Applicant Checklist

San Diego Integrated Regional Water Management
Implementation Grant Proposal- Round 2

Submitted by the San Diego County Water Authority

On behalf of the Regional Water Management Group and the Regional Advisory Committee

This *San Diego IRWM Implementation Grant Proposal – Round 2* is being submitted to the California Department of Water Resources (DWR) for consideration of implementation grant funding through the IRWM Grant Program. The following checklist presents the required elements of a grant application funded by the IRWM Grant Program. The checklist consists of four sections or "tabs" as outlined in the *IRWM Grant Program Guidelines*. The *San Diego IRWM Implementation Grant Proposal – Round 2* has been submitted electronically through the BMS and four hard copies have been delivered to DWR.

The *San Diego IRWM Implementation Grant Proposal – Round 2*, comprised of this checklist and 13 attachments, will verify individual project eligibility, completeness, and readiness-to-proceed to implementation. The projects selected for this proposal were screened through the region's adopted prioritization process and seven priority projects were identified. Implementation of these seven projects will contribute to the attainment of the regional goals and objectives established in the 2007 San Diego IRWM Plan and in the draft 2013 IRWM Plan Update.

Grant Application Checklist

APPLICANT INFORMATION TAB		
APPLICANT INFORMATION		
✓	Organization Name	San Diego County Water Authority
✓	Tax ID	95-600276
✓	Point of Contact	Mark Stadler
✓	Proposal Name	*San Diego IRWM Implementation Grant Proposal-Round 2*
✓	Proposal Objective	This *San Diego IRWM Implementation Grant Proposal – Round 2* is a compilation of projects that will diversify water supply, improve water quality, restore native habitat, and manage flood flows throughout the region. This proposal includes the suite of projects best suited to meeting the current and future challenges of the San Diego Region. Each of these projects further contains synergies and linkages with other projects included in this Proposal, resulting in a truly integrated suite of projects that, when implemented together, will assist the region in meeting its critical water management needs in a real and measurable fashion.
BUDGET		
✓	Other Contribution	$2,325,407
✓	Local Contribution	$17,500,018
✓	Federal Contribution	$1,550,271
✓	In-kind Contribution	$0
✓	Amount Requested	$10,511,225
✓	Total Proposal Cost	$31,886,921
GEOGRAPHIC INFORMATION		
✓	Latitude	DD 32 MM 59 SS 33
✓	Longitude	DD -116 MM 55 SS 39
✓	Longitude/Latitude Clarification	http://itouchmap.com/latlong.html

✓	Location	San Diego IRWM Region
✓	County	San Diego County
✓	Groundwater Basin	Batiquitos Lagoon Valley Campo Valley Cottonwood Valley El Cajon Valley Escondido Valley Mission Valley Otay Valleys Pamo Valley Potrero Valley Poway Valley Ranchita Town Area San Diego River Valley San Dieguito Creek San Elijo Valley San Luis Rey Valley San Marcos Area San Mateo Valley San Onofre Valley San Pasqual Valley Santa Margarita Valley Santa Maria Valley Sweetwater Valley Tijuana Warner Valley
✓	Hydrologic Region	South Coast
✓	Watershed	Carlsbad Otay River Pueblo Penasquitos San Diego River San Dieguito River San Juan San Luis Rey River Santa Margarita River Sweetwater River Tijuana River
LEGISLATIVE INFORMATION		
✓	State Assembly District	71, 75, 76, 77, 78, 79, 80
✓	State Senate District	36, 38, 39, 40
✓	U.S. Congressional District	42, 49, 50, 51, 52, 53
APPLICANT INFORMATION AND QUESTIONS TAB		
✓	Q1. Proposal Description	The San Diego IRWM Region is committed to implementing the regional goals and objectives established in the 2007 San Diego IRWM Plan, including (1) optimizing water supply reliability, (2) protecting and enhancing water quality, (3) providing stewardship of our natural resources, and (4) coordinating and integrating water resources management. This *San Diego IRWM Implementation Grant Proposal-Round 2* contains authorization documentation, proof of formal adoption, work plans, budgets, schedules, and other project details for each of the 7 projects proposed in this funding package. The list of projects and

		a brief description of each project are provided below. Please note that one project, the Rural DAC Partnership Program will directly address a critical water supply/water quality issue for DACs in the Region. 1. *North San Diego County Regional Recycled Water Project – Phase II:* This project is the second phase of a plan by North San Diego County water and wastewater agencies to regionalize recycled water systems that identifies new agency interconnections, seasonal storage opportunities and indirect potable water uses that will maximize supplies, reduce wastewater discharges to ocean, potentially reduce energy consumption due to diminished delivery of imported water, and allow recycled water to play an even more significant role in meeting future water needs. This phase of the project will construct many of the pipelines, storage tanks, pumps, and connections identified in Phase I. 2. *Turf Replacement and Agricultural Irrigation Efficiency Program:* This project will expand an outreach and rebate program targeted to urban and agricultural water users that will encourage customers to replace turf with more water efficient landscaping. It will also implement an education and rebate program to encourage increased irrigation efficiency and convert agriculture lands from potable to recycled water. 3. *Rural Disadvantaged Community (DAC) Partnership Program:* This project will provide funding to address inadequate water supply and water quality affecting rural DACs, including tribal communities. The project will reduce potential for high public health risks in water and/or wastewater systems. The project will promote environmental justice in rural communities by providing outreach to rural DACs for available infrastructure projects, while promoting IRWM goals. Rural Community Assistance Corporation (RCAC) will manage the Proposition 84 grant funds to facilitate implementation of infrastructure upgrades that protect rural DACs from public health hazards associated with aging or failing water facilities. 4. *Failsafe Potable Reuse at the Advanced Water Purification Facility:* This project will develop and test a failsafe treatment train for potable reuse without an environmental buffer. The data gathered through this process may be used by the California Department of Public Health (CDPH) in assessing the future potential of direct potable reuse facilities. 5. *Sustaining Healthy Tributaries to the Upper San Diego River:* This project will protect and restore a key segment of Boulder Creek upstream of the El Capitan Reservoir. It will protect and restore 3,000 feet of functioning riparian habitat and associated buffer habitat along Boulder Creek, and collect data to use as a baseline for other streams in the San Diego River watershed. This project will also conduct education and outreach to backcountry areas, including tribal communities, about invasive species and their impacts on watershed habitats. 6. *Chollas Creek Integration Project – Phase II:* This project will improve water quality and prevent flooding through (1) engineered modifications to the channel via installation of headwalls and drop structures that will modify creek flow and prevent erosion, (2) contaminate uptake and natural filtration through invasives removal and restoration with native species, and (3) engagement of community volunteers in water quality monitoring and hands-on watershed education. The project improves and maintains Chollas Creek as a natural urban drainage system that serves as a major conduit for stormwater runoff in the Encanto DAC. 7. *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II:* The project aims to establish nutrient water quality goals for the Santa Margarita River (SMR) Estuary (Phase I) and the SMR River (Phase II) that may lead to development of nutrient site-specific objectives by the San Diego Regional Water Quality Control Board (RWQCB) in the main stem of the river that are protective of beneficial uses. The project consists of three major activities: facilitate discussions among a SMR watershed stakeholder group to guide project activities, conduct monitoring and special studies, and develop nutrient water quality goals for the Lower SMR.

✓	Q2. Project Director	Mr. Mark Stadler Principal Water Resources Specialist Water Resources Department San Diego County Water Authority 4677 Overland Avenue San Diego CA 92123 (858) 522-6735 MStadler@sdcwa.org
✓	Q3. Project Management	Mr. Mark Stadler Principal Water Resources Specialist Water Resources Department San Diego County Water Authority 4677 Overland Avenue San Diego CA 92123 (858) 522-6735 MStadler@sdcwa.org
✓	Q4. Applicant Information	San Diego County Water Authority 4677 Overland Avenue San Diego CA 92123 (858) 522-6735
✓	Q5. Additional Information	The projects are located within the San Diego IRWM Region and the Upper Santa Margarita River Watershed IRWM Region, both of which are located within the San Diego Funding Area.
✓	Q6. DAC Waiver Cost Share Request	A DAC cost share waiver is not being requested for this proposal.
✓	Q7. Responsible Regional Water Quality Control Board(s):	The San Diego IRWM Region lies within the San Diego Regional Water Quality Control Board (Region 9).
✓	Q8. Eligibility	This proposal meets the requirements of Proposition 84 regarding a minimum funding match of 25%. The projects within this proposal have a cumulative funding match of 60% of total project costs.
✓	Q9. Eligibility	Yes, the application represents a single application from an IRWM Region approved in the RAP. The San Diego IRWM Region was approved in the 2009 RAP cycle.
✓	Q10. Eligibility	Yes, the San Diego County Water Authority (representing the RWMG in submitting this application) is a local public agency as defined in Appendix B of the Grant Guidelines.
✓	Q11. Eligibility	The urban water suppliers that will receive funding from the proposed grants include: San Diego County Water Authority and Olivenhain Municipal Water District . 1. Agency Name: San Diego County Water Authority (Water Authority) • Contact Name: Mark Stadler • Contact Phone Number: (858) 522-6735 • Contact Email Address: mstadler@sdcwa.org 2. Agency Name: Olivenhain Municipal Water District (OMWD) • Contact Name: Joey Randall • Contact Phone Number: (760) 753-6466 • Contact Email Address: jrandall@olivenhain.com Both the Water Authority and OMWD have received written confirmation from DWR that they are eligible to receive water management grant or loan funds due to compliance with AB 1420 requirements.
✓	Q12. Eligibility	Yes, the Water Authority and OMWD have both submitted complete 2010 UWMPs to DWR. Those plans have been verified by DWR, because they are included on DWR's website of compiled 2010 UWMPs: http://www.water.ca.gov/urbanwatermanagement/2010uwmps/

✓	Q13. Eligibility	Yes, the Water Authority and OMWD both submitted an AB1420 Self-Certification Statement - Table 1 & 2 to DWR with the Proposition 84-Round 1 Implementation Grant Proposal in 2011). Based on DWR's review, the Water Authority and OMWD are both currently implementing the BMPs consistent with AB 1420 and, therefore, are eligible to receive water management grant or loan funds.
✓	Q14. Eligibility	None of the projects in this proposal will directly affect groundwater levels or quality.
✓	Q15. Eligibility	N/A
✓	Q16. Eligibility	Yes, the San Diego IRWM Region receives imported water supplies through the State Water Project.
✓	Q17. Eligibility	Yes, the San Diego IRWM Plan reduces dependence on future additional imported water supplies through water conservation, source substitution, and recycling.
✓	Q18. Eligibility	Yes, the San Diego IRWM Plan Update (currently under development) will continue to reduce dependence on additional Delta water supplies.
✓	Q19. Eligibility	There are no agricultural water suppliers that will receive funding from the proposed grant.
✓	Q20. Eligibility	N/A
✓	Q21. Eligibility	There are no surface water diverters that will receive funding from the proposed grant.
✓	Q22. Eligibility	N/A
✓	Q23. Eligibility	There are no groundwater users that will receive funding from the proposed grant.
✓	Q24. Eligibility	N/A
PROJECTS TAB		
1. PROJECT INFORMATION		
✓	Project Name	***North San Diego County Regional Recycled Water Project – Phase II***
✓	Implementing Organization	Olivenhain Municipal Water District
✓	Secondary Implementing Organization	See below – there are 10 partner agencies involved in this project.
✓	Proposed Start Date	October 1, 2013
✓	Proposed End Date	August 31, 2017
✓	Scope of Work	Regional recycled water project that involves ten partnering agencies to maximize benefits and reduce costs.
✓	Project Description	*NSDCRRWP-Phase II* will increase the production and use of recycled water produced in the Region. By increasing the capacity and connectivity of the recycled water storage and distribution systems of the Project Partners, *NSDCRRWP-Phase II* encourages recycled water use, reduces costs, reduces imported water demand, and creates a more efficient system than could be completed the ten Project Partners on an individual basis. Included project components will replace potable water pipelines and irrigation systems with recycled water systems, convert numerous facilities to recycled water service, connect discrete recycled water systems to one another, increase recycled water storage capacity, and redistribute recycled water to more effectively meet demands. The proposed project includes 10 components designed to regionalize recycled water facilities so that agencies with the ability to generate recycled water in excess of local demand (i.e., within their service area) can provide recycled water to areas where additional supplies are needed. Together, the pipelines, pump stations, storage tanks, and interties constructed in this project will cumulatively produce an estimated 6,790 acre-feet per year (AFY) of recycled water and reduce the region's potable water demands. This will directly offset the use of potable supplies imported through the State Water Project (SWP) and the Colorado River Authority (CRA) via the San Diego County Water Authority and the

		Metropolitan Water District. The project partners include: 1. Leucadia Wastewater District (LWD) 2. Vallecitos Water District (VWD) 3. Vista Irrigation District (VID) 4. Rincon del Diablo Municipal Water District (RMWD) 5. Olivenhain Municipal Water District (OMWD) 6. Santa Fe Irrigation District (SFID) 7. Carlsbad Municipal Water District (Carlsbad MWD) 8. City of Escondido (Escondido) 9. City of Oceanside (Oceanside) 10. San Elijo Joint Powers Authority (SEJPA)
✓	Project Objective	The objectives of this project are to: • Increase the storage, production, and use of recycled water • Reduce dependence on imported water • Reduce the amount of wastewater sent to the ocean • Improve water supply reliability • Achieve better economy of scale/provide cost-effective recycled water supplies • Expand interagency cooperation • Improve the implementation process for recycled water systems • Assist agencies in meeting the State target of reducing potable water use by 20% by 2020
1. PROJECT BENEFITS INFORMATION		
The Proposal Solicitation Package (page 14) says please do not enter any information into BMS/GRanTS for the Project Benefits Questions.		
1. BUDGET		
✓	Other Contribution	$0
✓	Local Contribution	$15,594,668
✓	Federal Contribution	$0
✓	In kind Contribution	$0
✓	Amount Requested	$3,555,560
✓	Total Project Cost	$19,150,228
1. GEOGRAPHIC INFORMATION		
✓	Latitude	DD 33 MM 8 SS 40
✓	Longitude	DD -117 MM 12 SS 27
✓	Location	North County San Diego
✓	County	San Diego
✓	Groundwater Basin	Batiquitos Lagoon Valley, Escondido Valley, San Dieguito Creek, San Elijo Valley, San Luis Rey Valley, San Marcos Area
✓	Hydrologic Region	South Coast
✓	Watershed	San Luis Rey River, Carlsbad, San Dieguito River, Peñasquitos
1. LEGISLATIVE INFORMATION		
✓	State Assembly District	71, 75, 76
✓	State Senate District	36, 38, 39
✓	U.S. Congressional District	49, 50, 52

2. PROJECT INFORMATION		
✓	Project Name	***Turf Replacement and Agricultural Efficiency Program***
✓	Implementing Organization	San Diego County Water Authority
✓	Secondary Implementing Organization	City of San Diego
✓	Proposed Start Date	October 1, 2013
✓	Proposed End Date	December 31, 2015
✓	Scope of Work	Promote outdoor water use efficiency through financial incentives.
✓	Project Description	The *Turf Replacement and Agricultural Irrigation Efficiency Program* will provide financial incentives, technical assistance, on-site support and guidance, training, and resource lists to encourage and support projects that improve irrigation efficiency and reduce water use in urban landscapes and agricultural lands. There are two components of this program: 1. Turf Replacement Program: Turf replacement and irrigation upgrades will be incentivized through cash rebates once projects are completed according to program guidelines. The San Water Authority will manage the overall grant and administer the incentive program for customers participating throughout its service area, except for those customers located within the City of San Diego's (City's) service area. The City of San Diego Public Utilities Department (Water Conservation Program) will administer the incentive program for customers within its own service area and service areas for which it supplies wholesale water such as Coronado and Imperial Beach, and the City of San Diego Transportation & Storm Water Department (Think Blue/Storm Water Pollution Prevention Program) will provide education and outreach regarding the incentive program with an emphasis on dry weather runoff prevention and water quality protection that are achieved with improvements to irrigation efficiency within the City. This program component has been implemented by the Water Authority and the City for several years, and is ready for continued implementation. 2. Agricultural Irrigation Efficiency Program: The Water Authority will also administer a program component that provides incentives for agricultural customers to retrofit on-site potable irrigation systems to increase water use efficiency. This program will provide incentives to retrofit potable water irrigation systems to recycled water irrigation systems. This program component has been designed, and is ready for implementation.
✓	Project Objective	The project objectives are to: • Reduce urban outdoor water use. • Reduce agricultural water use. • Reduce stormwater runoff by reducing outdoor water use. • Reduce green waste production. • Increase the amount of potable water available to other users through implementation of water use efficiency measures and conversion to recycled water. • Increase environmental stewardship and awareness by implementing visible conservation programs that promote water-efficient landscaping.
2. PROJECT BENEFITS INFORMATION		
The Proposal Solicitation Package (page 14) says please do not enter any information into BMS/GRanTS for the Project Benefits Questions.		
2. PROJECT BUDGET		
✓	Other Contribution	$0
✓	Local Contribution	$191,831
✓	Federal Contribution	$0
✓	In kind Contribution	$0

✓	Amount Requested	$592,760
✓	Total Project Cost	$784,591
2. GEOGRAPHIC INFORMATION		
✓	Latitude	DD 32 MM 49 SS 47
✓	Longitude	DD -117 MM 7 SS 27
✓	Location	This regional project will be implemented throughout the San Diego IRWM region, including San Diego County Water Authority service area and the City of San Diego.
✓	County	San Diego County
✓	Groundwater Basin	Batiquitos Lagoon Valley Campo Valley Cottonwood Valley El Cajon Valley Escondido Valley Mission Valley Otay Valleys Pamo Valley Potrero Valley Poway Valley Ranchita Town Area San Diego River Valley San Dieguito Creek San Elijo Valley San Luis Rey Valley San Marcos Area San Mateo Valley San Onofre Valley San Pasqual Valley Santa Margarita Valley Santa Maria Valley Sweetwater Valley Tijuana Warner Valley
✓	Hydrologic Region	South Coast
✓	Watershed	Carlsbad Otay River Pueblo Penasquitos San Diego River San Dieguito River San Juan San Luis Rey River Santa Margarita River Sweetwater River Tijuana River
2. LEGISLATIVE INFORMATION		
✓	State Assembly District	71, 75, 76, 77, 78, 79, 80
✓	State Senate District	36, 38, 39, 40
✓	U.S. Congressional District	49, 50, 51, 52, 53

3. PROJECT INFORMATION		
✓	Project Name	***Rural DAC Partnership Program***
✓	Implementing Organization	Rural Community Assistance Corporation (RCAC)
✓	Secondary Implementing Organization	N/A
✓	Proposed Start Date	October 1, 2013
✓	Proposed End Date	January 1, 2018
✓	Scope of Work	Provide funding to address inadequate water supply and water quality affecting rural DACs, including tribal communities.
✓	Project Description	The *Rural DAC Partnership Program*, administered by RCAC, will fund critical water supply and water quality projects in rural DACs in San Diego County. Rural DACs lack the technical expertise and financial resources necessary to assemble the information needed to complete a complex grant application. Water supply infrastructure deficiencies will be identified and prioritized by the Rural DAC Stakeholder Committee and then funding will be provided via grant reimbursements to resolve those deficiencies. This program helps meet the critical DAC need for safe, healthy, potable, supplies of water that are adequate to meet basic household and fire protection demands, while at the same time recognizing and responding to DACs' needs for technical and managerial support to even request funding for these basic water needs. RCAC will manage the *Rural DAC Partnership Program* to address inadequate water supply and water quality in rural DACs, including tribal communities, with populations less than 10,000. DACs will be selected using 2010 Census data. Projects will be selected based on need and priorities established by the Rural DAC Stakeholder Committee with an emphasis on critical water supply and water quality issues. Opportunities to merge related projects will be evaluated. Projects will be selected from both tribal and non-tribal rural DACs. In every case, RCAC will look at other available funding resources to leverage Prop 84 grant dollars. All projects will address inadequate, unsafe, or unreliable water supply and water quality in rural DACs based on priorities already identified by the Rural DAC Stakeholder Committee.
✓	Project Objective	The project objectives are to: • Support rural DACs, including tribal communities, in implementing projects that will solve critical water or wastewater system issues. • Provide outreach and funding to DACs, including tribal communities, to achieve capacity development and sustainability. Support solutions that address public health risks. • Outreach to rural DACs, including tribal communities, to promote capacity development, sustainable infrastructure, and green operations.
3. PROJECT BENEFITS INFORMATION		
The Proposal Solicitation Package (page 14) says please do not enter any information into BMS/GRanTS for the Project Benefits Questions.		
3. PROJECT BUDGET		
✓	Other Contribution	$2,325,407
✓	Local Contribution	$0
✓	Federal Contribution	$1,550,271
✓	In kind Contribution	$0
✓	Amount Requested	$1,943,610

✓	Total Project Cost	$5,819,288
3. GEOGRAPHIC INFORMATION		
✓	Latitude	DD 32 MM 49 SS 47
✓	Longitude	DD -117 MM 7 SS 27
✓	Location	This regional project will be implemented throughout the San Diego IRWM region, but specifically within rural areas that do not lie within the service area of a municipal water agency.
✓	County	San Diego County
✓	Groundwater Basin	Campo Valley Cottonwood Valley El Cajon Valley Pamo Valley Potrero Valley San Diego River Valley San Luis Rey Valley San Pasqual Valley Santa Maria Valley Warner Valley
✓	Hydrologic Region	South Coast
✓	Watershed	Carlsbad Otay River Pueblo San Diego River San Dieguito River San Luis Rey River Santa Margarita River Tijuana River
3. LEGISLATIVE INFORMATION		
✓	State Assembly District	71, 75, 77
✓	State Senate District	38, 40
✓	U.S. Congressional District	50, 51, 52, 53
4. PROJECT INFORMATION		
✓	Project Name	***Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility***
✓	Implementing Organization	WateReuse Research Foundation (WRRF)
✓	Secondary Implementing Organization	City of San Diego
✓	Proposed Start Date	August 1, 2012
✓	Proposed End Date	September 30, 2015
✓	Scope of Work	Develop and test proper design and process engineering treatment trains for potable reuse without an environmental buffer (failsafe potable reuse).
✓	Project Description	The *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project will provide comprehensive testing, evaluation, and demonstration of sequential failsafe treatment steps (treatment trains) for potable reuse without an environmental buffer. To accomplish this, the project will draw upon active potable reuse research projects in the United States, Singapore, South Africa, and Australia in addition to worldwide potable reuse

		applications and practices used and researched in these same countries. Highlighted by a workshop on hazard analysis, critical control points, and redundancy requirements, this project will convene national and international health, treatment, and water quality experts to establish an appropriate framework for demonstration of failsafe potable reuse at the City of San Diego's existing advanced water purification demonstration facility (demonstration facility). This demonstration facility is designed as an educational facility as well, offering tours and education programs that allow the treatment process and the science behind it to be transparent. This project consists of four distinct phases: *Phase 1 – Develop expert panel guidelines on hazard analysis, redundancy, reliability and monitoring requirements for potable reuse without an environmental buffer*. *Phase 2 - Develop a comprehensive test plan for a failsafe potable reuse system that incorporates failsafe guidelines from previous WRRF studies*. *Phase 3 – Perform bench-scale, pilot-scale and demonstration-scale testing at the City of San Diego's water purification demonstration plant*. *Phase 4 – Prepare Final report on complete strategy for failsafe potable reuse*. WRRF is actively funding nearly $3 million in research to better develop potable reuse as a supplemental water supply. This project leverages the expertise from those investments and combines them to demonstrate failsafe potable reuse at the City of San Diego's demonstration facility.
✓	Project Objective	The project objectives are to: • Facilitate public education and awareness regarding potable reuse, and the San Diego Region's efforts to diversify local water supplies • Conduct research and testing of failsafe mechanisms for potable reuse to provide additional information about the viability and potential regulations that would be required to permit and implement potable reuse projects in California • Develop and implement guidelines for potable reuse through an expert panel
4. PROJECT BENEFITS INFORMATION		
The Proposal Solicitation Package (page 14) says please do not enter any information into BMS/GRanTS for the Project Benefits Questions.		
4. PROJECT BUDGET		
✓	Other Contribution	$0
✓	Local Contribution	$975,313
✓	Federal Contribution	$0
✓	In kind Contribution	$0
✓	Amount Requested	$2,176,390
✓	Total Project Cost	$3,151,703
4. GEOGRAPHIC INFORMATION		
✓	Latitude	DD 32 MM 52 SS 44
✓	Longitude	DD -117 MM 11 SS 55
✓	Location	Advanced Water Purification Facility, located at the North City Water Reclamation Plant in San Diego, CA
✓	County	San Diego County
✓	Groundwater Basin	N/A
✓	Hydrologic Region	South Coast

✓	Watershed	Carlsbad
4. LEGISLATIVE INFORMATION		
✓	State Assembly District	77
✓	State Senate District	39
✓	U.S. Congressional District	52
5. PROJECT INFORMATION		
✓	Project Name	***Sustaining Healthy Tributaries to the Upper San Diego River***
✓	Implementing Organization	San Diego River Park Foundation
✓	Secondary Implementing Organization	N/A
✓	Proposed Start Date	July 1, 2013
✓	Proposed End Date	January 31, 2017
✓	Scope of Work	Protect and restore Boulder Creek and collect data to establish a baseline for creek health in the San Diego River Watershed
✓	Project Description	This project will restore and maintain a portion of Boulder Creek, an important tributary to the El Capitan Reservoir in the San Diego River Watershed that captures rain, snow melt, and spring water and drains into El Capitan Reservoir. Boulder Creek is of unique significance because it is used to transfer water between Helix Water District's Lake Cuyamaca and the City of San Diego's El Capitan Reservoir where water is stored until treated for potable use. As part of this project, the community will be engaged in restoring approximately 4.4 acres of degraded riparian and associated buffer habitat on Boulder Creek. The project will also include monitoring of Boulder Creek and surrounding creeks to increase knowledge of the creeks and provide baseline information that will allow for early actions to be taken in the event that the creek begins to degrade. With a relatively small investment now, the creek and watershed can remain healthy, improving the health of the environmentand reducing potential water treatment costs. Boulder Creek is one of two known creeks in the San Diego River Watershed that supports wild rainbow trout. The presence of trout indicates a high quality stream with cold water. These unique conditions offer the potential to use Boulder Creek and nearby creeks as baselines for monitoring the overall health of the watershed. I This project includes field surveys of other creeks that drain into the El Capitan Reservoir. Monitoring will include real-time monitoring stations, biological assessments, and invasive animal and plant surveys. Education elements will provide information to private land owners in the area on how to reduce pollutant loading and activities that result in erosion and sedimentation, and will include outreach to three Native American Tribes in the area to provide training to empower their members to survey their tribal lands.
✓	Project Objective	Project objectives are: • To restore 4.4 acres of riparian habitat and associated buffer habitat along Boulder Creek • To develop and begin implementing an integrated and robust monitoring and assessment program for the Upper San Diego River Watershed • To engage the community in becoming stewards of the project area so that water quality within the natural streams and the downstream El Capitan Reservoir is better protected and to reduce the potential need for future improvements
5. PROJECT BENEFITS INFORMATION		
The Proposal Solicitation Package (page 14) says please do not enter any information into BMS/GRanTS for the Project Benefits Questions.		

5. PROJECT BUDGET		
✓	Other Contribution	$0
✓	Local Contribution	$175,225
✓	Federal Contribution	$0
✓	In kind Contribution	$0
✓	Amount Requested	$536,630
✓	Total Project Cost	$711,854
5. GEOGRAPHIC INFORMATION		
✓	Latitude	DD 32 MM 57 SS 50
✓	Longitude	DD -116 MM 41 SS 6
✓	Location	Boulder Creek, San Diego County, CA
✓	County	San Diego County
✓	Groundwater Basin	N/A
✓	Hydrologic Region	South Coast
✓	Watershed	San Diego River
5. LEGISLATIVE INFORMATION		
✓	State Assembly District	71
✓	State Senate District	38
✓	U.S. Congressional District	50
6. PROJECT INFORMATION		
✓	Project Name	***Chollas Creek Integration Project – Phase II***
✓	Implementing Organization	Jacobs Center for Neighborhood Innovation
✓	Secondary Implementing Organization	Groundwork San Diego-Chollas Creek
✓	Proposed Start Date	June 1, 2012
✓	Proposed End Date	June 1, 2016
✓	Scope of Work	Improve water quality and prevent flooding in Chollas Creek, and engage community members in hands-on water quality monitoring.
✓	Project Description	The *Chollas Creek Integration Project - Phase II* aims to improve water and habitat quality in a Chollas Creek segment at Northwest Village, and engage members of the surrounding DAC in water quality monitoring along Chollas Creek. **A. Creek Restoration**: Construction will accomplish flood damage reduction and water quality improvement through 1) creek re-alignment 2) inlet installation 3) drop structure installation 4) construction of inlets 5) non-native removal/restoration.. Specifically, two 3-foot drop structures (rip-rap) will be developed along the northwest and southwest segments of this creek section to slow the creek flow at these points. **B. Habitat Improvement**: Invasives removal and restoration will improve water quality through erosion control and pollution uptake, and will contribute to improved habitat values for wildlife. Recreational and public access benefits will also be achieved. This Phase II project will support a comprehensive invasives removal effort.

		C. Water Pollution Activities: Phase II will build upon *Chollas Creek Integration Project - Phase I*'s engagement of institutional stakeholders in the determination of water quality, natural resource, and environmental justice opportunities/constraints. Phase II will expand stakeholder outreach to include residents in water quality monitoring, and conduct targeted educational messaging. Thirty (30) area youth will be trained and employed as water quality monitors. Water quality monitoring will utilize existing City of San Diego stormwater data for pollution source tracking, and will expand upon the San Diego Coastkeeper's Citizen Science Monitoring and Pollution/Conservation Education programs. The project will also partner with Groundwork's Green Team Community Service Project for engagement of student volunteers, and a coalition of institutional stakeholders in the determination of water quality, natural resource, and environmental justice opportunities/constraints.
✓	Project Objective	Project objectives include: • Reduce the negative effects on waterways and watershed health caused by hydromodification and flooding. • Improve channel hydraulics to reduce the potential for flood damage • Effectively reduce sources of pollutants and environmental stressors. • Protect, restore and maintain habitat and open space.
6. PROJECT BENEFITS INFORMATION		
The Proposal Solicitation Package (page 14) says please do not enter any information into BMS/GRanTS for the Project Benefits Questions.		
6. PROJECT BUDGET		
✓	Other Contribution	$0
✓	Local Contribution	$163,723
✓	Federal Contribution	$0
✓	In kind Contribution	$0
✓	Amount Requested	$515,000
✓	Total Project Cost	$678,723
6. GEOGRAPHIC INFORMATION		
✓	Latitude	DD 32 MM 42 SS 33
✓	Longitude	DD -117 MM 5 SS 7
✓	Location	Chollas Creek, San Diego, CA
✓	County	San Diego County
✓	Groundwater Basin	Sweetwater Valley
✓	Hydrologic Region	South Coast
✓	Watershed	Pueblo
6. LEGISLATIVE INFORMATION		
✓	State Assembly District	80
✓	State Senate District	40
✓	U.S. Congressional District	51
7. PROJECT INFORMATION		
✓	Project Name	***Implementing Nutrient Management in the Santa Margarita River Watershed –Phase II***
✓	Implementing Organization	County of San Diego

✓	Secondary Implementing Organization	Rancho California Water District
✓	Proposed Start Date	June 1, 2010
✓	Proposed End Date	September 29, 2017
✓	Scope of Work	Work to establish nutrient water quality goals for the Santa Margarita River to ultimately develop nutrient site-specific objectives.
✓	Project Description	This project aims to establish the science and seek stakeholder consensus to develop nutrient water quality goals that are protective of beneficial uses and could be employed in the development of alternative nutrient water quality objectives (WQOs) for the SMR Watershed in response to the *Water Quality Control Plan for the San Diego Basin* (Basin Plan) Triennial Update. This is the second phase of work, which consists of continued stakeholder facilitation and continued monitoring, modeling, and data analyses to determine nutrient water quality goals. The project benefits the SMR watershed and the region by providing scientifically–based nutrient water quality goals that will ultimately conserve water and control eutrophication. Stakeholders believe that since the estuary through which the SMR flows is open to the ocean during the winter (the wet season), nutrients in the river only have a short residence time before they enter the ocean. This effort will counteract hydromodifications and lead to improved protection and restoration of habitat and open space, optimize water-based recreational opportunities, and enhance the maintenance of water resources. Within the region, the project will further the technical foundation of water management by demonstrating a science-based approach to establishing nutrient water quality goals that can be developed jointly with the regulatory agencies. If warranted by the results, the scientific studies will provide the underpinnings necessary to support Nutrient Site-Specific Objectives (SSOs) that require a Basin Plan amendment. This effort will serve as a template for similar efforts within the region.
✓	Project Objective	Objectives include: • Facilitate a watershed stakeholder group that will provide feedback and achieve consensus on the proposed nutrient water quality goals • Conduct monitoring and/or special studies to address gaps in data required to develop the nutrient water quality goals for the SMR River • Develop proposed nutrient water quality goals for the SMR River that are protective of beneficial uses • Encourage the implementation of BMPs to reduce nutrient runoff from wet and dry weather sources
7. PROJECT BENEFITS INFORMATION		
The Proposal Solicitation Package (page 14) says please do not enter any information into BMS/GRanTS for the Project Benefits Questions.		
7. PROJECT BUDGET		
✓	Other Contribution	$0
✓	Local Contribution	$399,259
✓	Federal Contribution	$0
✓	In kind Contribution	$0
✓	Amount Requested	$1,191,275
✓	Total Project Cost	$1,590,534
7. GEOGRAPHIC INFORMATION		
✓	Latitude	DD 33 MM 13 SS 53
✓	Longitude	DD -117 MM 24 SS 58

✓	Location	Santa Margarita River Watershed
✓	County	San Diego County and Riverside County
✓	Groundwater Basin	Temecula Valley, Santa Margarita Valley
✓	Hydrologic Region	South Coast
✓	Watershed	Santa Margarita River
7. LEGISLATIVE INFORMATION		
✓	State Assembly District	73, 75, 76
✓	State Senate District	28, 36
✓	U.S. Congressional District	42, 49, 50
APPLICATION ATTACHMENTS TAB		
✓	Attachment 1: Authorization and Eligibility Documentation	Att1_IG2 _Eligible_1of1.pdf
✓	Attachment 2: Adopted Plan and Proof of Formal Adoption	Att2_IG2 _Adopt_1of1.pdf
✓	Attachment 3: Work Plan	Att3_IG2_ WorkPlan_1of1.pdf
✓	Attachment 4: Budget	Att4_IG2_ Budget_1of1.pdf
✓	Attachment 5: Schedule	Att5_IG2 _Schedule_1of1.pdf
✓	Attachment 6: Monitoring, Assessment, and Performance Measures	Att6_IG2 _Measures_1of1.pdf
✓	Attachment 7: Technical Justification of Projects	Att7_IG2 _TechJust_1of1.pdf
✓	Attachment 8: Benefits and Cost Analysis	Att8_IG2 _BenCost_1of1.pdf
✓	Attachment 9: Program Preferences	Att9_IG2 _Preference_1of1.pdf
✓	Attachment 10: Disadvantaged Community Assistance	Att10_IG2 _DAC_1of1.pdf
✓	Attachment 11: AB 1420 and Water Meter Compliance Information	Att11_IG2 _SelfCert_1of1.pdf
✓	Attachment 12: Consent Form	Att12_IG2 _Consent_1of1.pdf
✓	Attachment 13: Delta Water	Att13_IG2 _Delta_1of1.pdf

Attachment 1

Authorization and Eligibility Requirements

Attachment 1 — San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2
Authorization and Eligibility Requirements

Attachment 1 consists of the following items:

- ✓ **Authorization and Eligibility Requirements.** This attachment consists of authorizing documentation, eligible applicant documentation, Groundwater Management Plan (GWMP) compliance, Urban Water Management Plan (UWMP) compliance, AB 1420 and California Water Code §525 compliance (water meter compliance), consent form for IRWM Plan Update, consistency with the adopted IRWM Plan, and progress on meeting the current *IRWM Grant Program Guidelines*.
- ✓ **Resolution.** Resolution 2013-03 authorizes the San Diego County Water Authority to submit this *San Diego IRWM Implementation Grant Proposal – Round 2* and execute an agreement with the State of California for implementation of seven priority water resources projects (see Appendix 1-1).
- ✓ **Memorandum of Understanding.** The adopted *Memorandum of Understanding for the Integrated Regional Water Management Program for Fiscal Years 2012-2016* gives the San Diego County Water Authority overall responsibility for managing the San Diego IRWM program and submitting all applications to the State on behalf of the parties (see Appendix 1-2).
- ✓ **Consistency with San Diego IRWM Plan.** To demonstrate consistency with the adopted 2007 San Diego IRWM Plan and the (incomplete) draft 2013 IRWM Plan Update, this proposal includes the Plan Amendment addressing the addition of new projects to the project list, the Proposition 84-Round 2 Project Selection Workgroup Suggested Criteria for Workgroup Consideration, and the package of projects that were recommended through the project selection process for this proposal. Further, applicable portions of the draft 2013 IRWM Plan Update (Vision, Mission, Goals, and Objectives) are included to demonstrate consistency between this Proposal and the Plan Update (see Appendix 1-3).

Authorizing Documentation

Resolution 2013-03 was adopted by the San Diego County Water Authority (Water Authority) Board of Directors on January 24, 2013 and authorizes the Water Authority to submit this *San Diego IRWM Implementation Grant Proposal – Round 2* and execute an agreement with the State of California for implementation of seven priority water resources projects (see Appendix 1-1).

Eligible Applicant Documentation

This *San Diego IRWM Implementation Grant Proposal – Round 2* is being submitted by the San Diego County Water Authority (Water Authority). Per the adopted *Memorandum of Understanding for the Integrated Regional Water Management Program for Fiscal Years 2012-2016*, the San Diego Regional Water Management Group (RWMG) – comprised of the City of San Diego, the County of San Diego, and the Water Authority – has determined that the Water Authority shall have overall responsibility for submitting all applications to the State on behalf of the parties (see Appendix 1-2). The Water Authority is also submitting this grant proposal on behalf of the following non-RWMG entities:

- Olivenhain Municipal Water District
- Rural Community Assistance Corporation (RCAC)
- WateReuse Research Foundation
- San Diego River Park Foundation
- Jacobs Center for Neighborhood Innovation

The Water Authority's qualifications as an eligible applicant in accordance with the *IRWM Grant Program Guidelines*[1] are as follows:

1. The Water Authority is a local agency as defined in Appendix B of the *IRWM Grant Program Guidelines*. The Water Authority is the regional water wholesale agency within San Diego County, whose mission is to provide a safe and reliable supply of water to its 24 member agencies.
2. The Water Authority is a county water district organized and existing under Division 12, commencing with §30000, of the California Water Code. The Water Authority was organized under the County Water Authority Act of 1943 to serve as the San Diego Region's water wholesaler.
3. The Water Authority has legal authority to enter into a grant agreement with the State of California. Per the adopted *Memorandum of Understanding for the Integrated Regional Water Management Program for Fiscal Years 2012-2016*, the San Diego RWMG has determined that the Water Authority shall have overall responsibility for submitting all applications to the State on behalf of the parties (see Appendix 1-2). Resolution 2013-03 authorizes the Water Authority to submit this *San Diego IRWM Implementation Grant Proposal – Round 2* and execute an agreement with the State of California for implementation of identified water resource projects (see Appendix 1-1).
4. The Water Authority, the City of San Diego, and the County of San Diego jointly developed and adopted a *Memorandum of Understanding for the Integrated Regional Water Management Program for Fiscal Years 2012-2016* (see Appendix 1-2). This MOU replaced the second MOU (dated March 10, 2009), as amended, between the Water Authority, the City, and the County for FYs 2009-2013 of the IRWM Grant Program. Section 1b of the MOU states that the "Water Authority shall submit the grant applications to the funding agency on behalf of the Parties." Additionally, section 3a of the MOU states that the "Water Authority shall administer and manage IRWM grant agreements, administer the local project sponsors' (LPS) contracts, develop and maintain a reporting and invoicing program, and communicate project and agreement progress to the RWMG, RAC [Regional Advisory Committee], and the funding agency."

GWMP Compliance

None of the seven projects included within this *San Diego IRWM Implementation Grant Proposal – Round 2* require compliance with or development of a Groundwater Management Plan (GWMP), because they would not involve groundwater management or recharge. These projects fall within the categories of natural resources and watersheds, water quality/stormwater, water supply, and recycled water. As such, these projects do not propose any direct action with regards to groundwater, and would not directly impact groundwater, either positively or negatively.

UWMP Compliance

There are two urban water suppliers included as project proponents within this *San Diego IRWM Implementation Grant Proposal – Round 2*: the Water Authority and Olivenhain Municipal Water District (OMWD). As required by the Urban Water Management Planning Act (CWC §10610 *et seq.*), each of these agencies submitted and received approval by the Department of Water Resources (DWR) of a complete 2010 Urban Water Management Plan (UWMP). Per these requirements, the two water suppliers listed above are currently eligible to receive grant funds. The UWMPs for these entities are available online at the following web addresses:

- San Diego County Water Authority: http://www.sdcwa.org/2010-urban-water-management-plan
- Olivenhain Municipal Water District: http://www.olivenhain.com/files/docs/projects/UWMP/2010%20OMWD%20UWMP.pdf

[1] Department of Water Resources (DWR). 2012. Integrated Regional Water Management Proposition 84 and 1E Guidelines. November.

AB 1420 Compliance

As defined in the *IRWM Grant Program Guidelines*, AB 1420 conditions the receipt of IRWM grant funds on implementation of demand management measures in compliance with CWC §10631. There are two urban water suppliers included in this grant proposal which must also comply with AB 1420 requirements: the Water Authority and OMWD. Both water suppliers have submitted AB 1420 compliance forms to DWR, as described in Attachment 11.

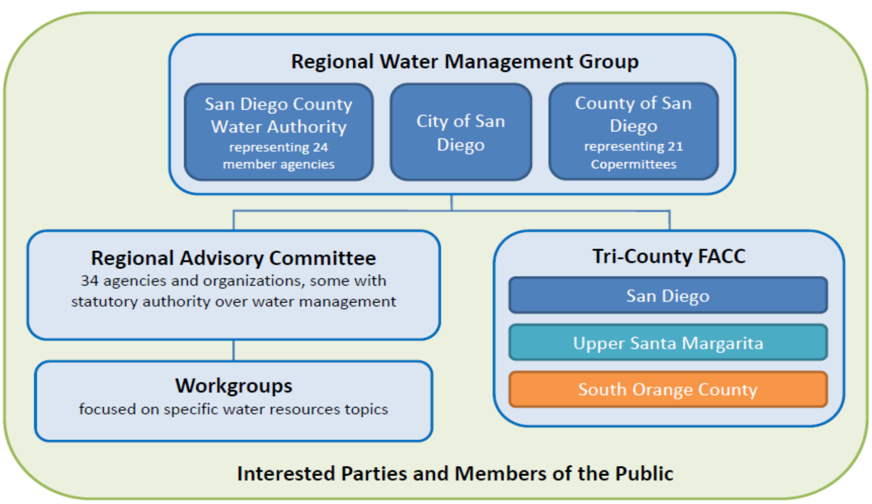
Water Meter Compliance

As defined in the *IRWM Grant Program Guidelines*, CWC §525 *et seq.* requires urban water suppliers applying for IRWM grant funds to demonstrate that they meet the State's water meter requirements. There are two urban water suppliers included in this grant proposal which must also comply with Water Meter requirements: The Water Authority and OMWD. Both water suppliers have submitted Water Meter compliance forms to DWR, as described in Attachment 11.

Progress on Meeting Current IRWM Plan Standards

Through stakeholder workshops and workgroup meetings, the San Diego IRWM Region is in the process of updating the 2007 IRWM Plan. Table 1-1 provides required information that demonstrates how the San Diego IRWM Region will adopt an IRWM Plan Update that meets the IRWM Plan Standards contained in Appendix C of the 2012 *IRWM Grant Program Guidelines*. As described in detail below, the projects contained within this grant proposal are consistent with both the adopted 2007 IRWM Plan and the draft 2013 IRWM Plan Update. Appendix 1-3 includes relevant draft excerpts of the 2013 IRWM Plan Update (Vision, Mission, Goals, and Objectives).

Table 1-1: Overview of Selected IRWM Plan Standards

<table>
<tr><th>Standard</th><th>Responses to Specific Standard Questions</th></tr>
<tr><td>Governance</td><td>The Governance and Financing Workgroup, a workgroup of the Regional Advisory Committee (RAC), was convened three times in 2012 to discuss future governance of the San Diego IRWM Program (Program).This workgroup analyzed the existing governance structure, potential future structural changes, and set forth a recommendation to the RAC regarding how the Program should be structured moving forward. The Governance and Financing Workgroup determined that, based on historical success of the Program, the existing governance structure be maintained. A graphical overview of that structure is provided below.


While the Governance and Financing Workgroup determined that the overall structure of the Program should remain the same, they suggested that the RAC be re-structured to allow for additional participation. The RAC, which was established in 2006, has essentially retained the same membership since that time. Since 2006 there have been several inquiries regarding the RAC and how new</td></tr>
</table>

Standard	Responses to Specific Standard Questions
	members can join this advisory body. In response to such inquiries, in December 2012 and early 2013 the Workgroup and RWMG established a process to re-formulate the RAC. This process, which was approved in full by the existing RAC, was successfully completed in January 2013, at which time 13 new members were elected to the RAC. This alteration of the IRWM governance structure will ensure that there continues to be balanced access and opportunity for participation in the IRWM effort. The Governance and Financing Workgroup did not propose changes to the structure of the RWMG or the Tri-County Funding Area Coordinating Committee (FACC). The structure of the RWMG has remained the same since the inception of the IRWM Program, and includes the San Diego County Water Authority, the City of San Diego, and the County of San Diego. The RWMG is organized via an MOU, and a copy of this agreement is included as Appendix 1-2. The Tri-County FACC is comprised of the three IRWM regions within the San Diego Funding Area, including the San Diego, Upper Santa Margarita, and South Orange County IRWM Regions. These regions work collaboratively, via MOU, to balance the necessary autonomy of each planning region to plan at the appropriate scale with the need to improve inter-regional cooperation and efficiency. The Tri-County FACC also ensures close coordination of the three planning regions to improve the quality and reliability of water throughout the span of all three IRWM Regions.
Region Description	Since development of the 2007 IRWM Plan, the region description has not changed significantly. The IRWM boundaries remain consistent with those established in the 2007 IRWM Plan, and are also consistent with those approved by DWR in the 2009 Region Acceptance Process. However, part of the focus of the IRWM Plan Update has been and continues to be participation from regional stakeholders in better articulating the region's water management issues. As such, throughout the fall of 2012, the RWMG held a series of focused Watershed Workshops throughout the Region to gain watershed-specific information to include in the Region Description. The Region consists of eleven parallel hydrologic units (watersheds), which in many cases have separate and unique features. Respecting this characteristic of the Region, the RWMG decided to hold Watershed Workshops to allow regional stakeholders to provide specific information regarding the key topics, water management issues, and planning priorities of each individual watershed. The information gathered during the Watershed Workshops is currently being compiled into an updated Region Description Chapter. This compiled information will not be significantly different from the information contained within the 2007 IRWM Plan. However, this information will help to define issues and characteristics of the Region at the watershed-scale, which will help to better-define issues and their potential solutions. This information will also help to ensure that issues and characteristics within the Region Description have been updated and refined in a manner such that each watershed is appropriately characterized and presented in the IRWM Plan Update as desired by stakeholders. The Tri-County FACC is also working together to develop common language to describe the two watersheds – Santa Margarita River and San Juan – that cross IRWM regional boundaries. By coordinating on the watershed descriptions, identification of issues and conflicts, and development of priority projects, the Tri-County FACC will ensure sustainable water resources planning within the Funding Area. Because man-made water infrastructure systems are the key water management units in the Funding Area, the planning regions reflect this reality and cross-boundary watershed issues are addressed via a collaborative subcommittee process.
Objectives	The Priorities and Metrics Workgroup (a workgroup of the RAC) was convened five times in 2012 to provide recommendations to the RAC on many aspects of the IRWM Plan Update, including the IRWM Plan objectives. The Priorities and Metrics Workgroup presented a set of recommended revised objectives to the RAC in December 2012, and the RAC made further edits to the objectives. As with the rest of the IRWM Plan Update, the objectives are currently in draft form and are subject to further

Standard	Responses to Specific Standard Questions
	stakeholder review once compiled into the complete public draft 2013 IRWM Plan in Spring 2013. The draft IRWM objectives are presented below with strikethrough editing that demonstrates the proposed changes that were made to the existing IRWM objectives. Two objectives (A and K) were added, and the language for Objectives B, E, G, and H was revised. All proposed changes to the objectives are presented below in red. **Objective A:** Encourage the development of integrated solutions to address water management issues and conflicts. **Objective B**: Maximize stakeholder/community involvement and stewardship of water resources, emphasizing education and outreach. **Objective C**: Effectively obtain, manage, and assess water resource data and information. **Objective D**: Further scientific and technical foundation of water management. **Objective E**: Develop and maintain a diverse mix of water resources, encouraging their efficient use and development of local water supplies. **Objective F**: Construct, operate, and maintain a reliable infrastructure system. **Objective G**: Enhance natural hydrologic processes to reduce the effects of hydromodification and encourage integrated flood management ~~Reduce the negative effects on waterways and watershed health caused by hydromodification and flooding~~. **Objective H**: Effectively reduce sources of pollutants and environmental stressors to protect and enhance human health, safety, and the environment. **Objective I**: Protect, restore, and maintain habitat and open space. **Objective J**: Optimize water-based recreational opportunities. **Objective K**: Effectively address climate change through adaptation or mitigation in water resource management.
Resource Management Strategies	As required by the Resource Management Strategies Standard in the 2012 *IRWM Grant Program Guidelines*, the IRWM Plan Update will consider the resource management strategies (RMS) from the *California Water Plan Update 2009*. In addition, the IRWM Plan Update will consider additional RMS identified in the 2007 IRWM Plan, and those identified by stakeholders during the IRWM Plan Update stakeholder outreach process. A joint RAC meeting and public workshop was held in August 2012, during which the San Diego IRWM stakeholders discussed all of the RMS included in the *California Water Plan Update 2009* as well as the additional RMS identified in the 2007 IRWM Plan. Further, the San Diego IRWM stakeholders discussed potential examples of projects through which the various RMS are currently being implemented in the Region. Through this process, stakeholders determined that the following RMS are appropriate for inclusion in the 2013 IRWM Plan Update. Indicates an RMS included in the *California Water Plan Update 2009*: • Indicates an RMS included in the 2007 IRWM Plan: «

Standard	Responses to Specific Standard Questions
	• Agricultural Water Use Efficiency • Urban Water Use Efficiency • Conveyance – Delta • Conveyance – Regional/Local • System Reoperation • Water Transfers • Conjunctive Management & Groundwater • Desalination • Precipitation Enhancement • Recycled Municipal Water • Surface Storage – CALFED • Surface Storage – Regional/Local • Drinking Water Treatment and Distribution • Groundwater and Aquifer Remediation • Matching Quality to Use • Pollution Prevention • Salt and Salinity Management • Urban Runoff Management • Agricultural Lands Stewardship • Economic Incentives (Loans, Grants, and Water Pricing) • Ecosystem Restoration • Land Use Planning and Management • Recharge Areas Protection • Water-dependent Recreation • Watershed Management • Flood Risk Management « Stakeholder/Community Involvement « Water Resources Data Collection, Management, and Assessment « Scientific and Technical Water Quality Management Knowledge Enhancement
Integration	The San Diego IRWM Program is committed to integration in both the planning process and in project formulation and implementation, and recognizes that integration is a fundamental component of IRWM planning. The IRWM Plan Update process has focused on allowing, encouraging, and actively pursuing integration both in the planning process and in the project development process. According to the 2012 *IRWM Grant Program Guidelines*, integration generally means combining separate pieces into an efficiently functioning unit. During the IRWM Plan Update process, the Priorities and Metrics Workgroup (refer to the Objectives section above) was asked to discuss integration and what this concept means to the San Diego IRWM Program (planning process). The Priorities and Metrics Workgroup determined that with respect to the IRWM Program, integration refers to the five following aspects: partnerships, resource management, beneficial uses, geography, and hydrology. These five integration concepts, which are defined below, will be integrated into the IRWM Plan Update such that they are encouraged and actively pursued in the San Diego IRWM planning process. • **Partnership Integration:** Establishing partnerships between different organizations can be cost effective by increasing data sharing, resources, and infrastructure. • **Resource Management Integration:** Employing multiple resource management strategies within a single project can effectively address a variety of issues. • **Beneficial Use Integration:** Project solutions can be implemented to support several different beneficial uses. • **Geographical Integration:** Implementing watershed-or regional-scale projects can benefit from economies of scale. • **Hydrological Integration:** Addressing different components of the hydrologic cycle. In the project formulation and implementation process, integration will be encouraged and actively pursued by multiple methods. As part of the Proposition 84-Round 2 Implementation Grant project selection process, the RWMG held a Strategic Integration Workshop in advance of the formal Call for Projects. During this process, IRWM stakeholders were asked to submit project concepts that could potentially be integrated with other project concepts to formulate more strategically integrated projects. At the Workshop, project proponents were given copies of all project concepts that were submitted and both large-group presentations and breakout groups were used to encourage discussion and collaboration among stakeholders. This process was considered highly effective, and resulted in integration of several project components in this funding application. The IRWM Plan Update will

Standard	Responses to Specific Standard Questions
	include a description of the Strategic Integration Workshop as a tool to continue employing during future rounds of IRWM grant funding.
Project Review Process	As with the rest of the IRWM Plan Update components, the project review process is currently under development by the Region's stakeholder workgroups. The Priorities and Metrics Workgroup (refer to the Objectives section above) met with the Proposition 84-Round 2 Project Selection Workgroup after the current project selection process was completed, in order to identify process strengths and proposed changes for future rounds of IRWM grant funding. The joint Workgroup meeting resulted in support for the current overall process, which includes the Strategic Integration Workshop (see Integration section above), Call for Projects through the online project database, convening of a Project Selection Workgroup, and RAC approval of the recommended project package. However, suggestions were made to improve the project database entries, allow for more stakeholder input in the scoring process, and allow the top scoring projects to be interviewed by the Workgroup. A Climate Change Workgroup was convened three times in 2012 to discuss and provide input on the *Climate Change Planning Study* that was conducted for the IRWM Plan Update. Through this process, San Diego IRWM stakeholders discussed how climate change vulnerabilities and greenhouse gas emissions could be considered in the project review process. The Climate Change Workgroup completed a robust climate change vulnerabilities analysis, within which they identified potential climate change vulnerabilities within the Region and ranked those vulnerabilities in terms of "high", "medium", and "low" applicability and importance to the Region. The Workgroup also evaluated the Resource Management Strategies (RMS) in the *California Water Plan Update 2009*, and created information regarding which RMS may help the Region adapt to potential climate change vulnerabilities. Although the project review process that will be included in the IRWM Plan Update has not been finalized, this process in its current form will consider climate change vulnerabilities and greenhouse gas emissions in the following ways: • **Objective K:** As discussed above in the Objectives section, the San Diego IRWM Region has tentatively chosen to add an objective regarding climate change. As with the other IRWM objectives, all projects evaluated as part of the project review process will be analyzed to determine if they will help the Region meet this objective. • **Resource Management Strategies:** The project selection process currently includes an analysis to determine if projects will help to implement the RMS included in the *California Water Plan Update 2009*. It is anticipated that the project review process will continue to include this analysis, and may also specifically consider those RMS that the Climate Change Workgroup has determined may help the Region adapt to climate change vulnerabilities. • **Greenhouse Gas Emissions:** Projects may be evaluated qualitatively during the project selection process for their relative greenhouse gas (GHG) emissions during construction and operation. Given the potential technical difficulty of implementing GHG emissions analysis for all projects, this process needs to be vetted and determined how to implement. In advance of each funding cycle, the Tri-County FACC works together to identify priority projects within the shared watersheds. While the IRWM Plan Update will acknowledge that each planning region has its own stakeholder-based project review and selection process, this coordination effort is intended to ensure that watershed-scale issues are identified and addressed.

Standard	Responses to Specific Standard Questions
Technical Analysis	During development of the 2007 IRWM Plan, San Diego IRWM stakeholders identified that establishing a regional, web-based data management system (Data Management System) was a short-term priority that was necessary to address immediate data needs and gaps of the Region. It was recognized that while there is a multitude of monitoring and sampling programs in place throughout the Region, the degree to which data generated by such efforts is shared varies. The result can be duplication of data collection efforts or the failure to identify and address significant gaps in data collection and analysis. The idea is that a web-based system will make data instantly available to interested stakeholders and will facilitate data sharing by transmitting data through user-friendly features. Rather than relying on agency-to-agency data transfers, the web-based system can act as a central clearinghouse for information. Work to begin the necessary regional Data Management System (DMS) is currently underway, and is being partially funded by DWR through a Proposition 84-Round 1 Implementation Grant. Considerable data and information have been, and are being, compiled for the IRWM Plan Update. Such data and information includes data compiled through the various planning studies, stakeholder outreach efforts (workshops, meetings, etc.), and data and information that was compiled to complete the Region Description section of the IRWM Plan Update. To the extent practical, this data and information will be incorporated into the DMS to help fill identified data gaps and increase information sharing within the Region. In the meantime, this information has been made available on the San Diego IRWM website: www.sdirwmp.org.
Relation to Local Water Use Planning	Coordination with local water use planning efforts is already considered extensive, as many components of the IRWM Plan are based upon the water demands, supplies, and other information included in the Region's Urban Water Management Plans (UWMPs – for water supply), Watershed Urban Runoff Management Plans (WURMPs – for water quality), and Watershed Management Plans (WMPs – for natural resources). The IRWM Plan Update effort has involved further coordination with the Region's water management agencies and specific departments within those agencies that prepare UWMPs, WURMPs, and WMPs to ensure that the IRWM Plan Update effort is coordinated and contains up-to-date information.

Relation to Local Land Use Planning	Two stakeholder workshops were convened in 2012 to support preparation of a *Land Use and Water Management Planning Study*, which was completed in March 2013. The results of this study will be incorporated into several sections of the IRWM Plan Update, but will be discussed in detail in the chapter regarding Regional Coordination. The existing IRWM Plan will be modified via the Update to incorporate recommendations from the *Land Use and Water Management Planning Study* that strive to improve coordination with local water use planning efforts. The IRWM Plan Update will be modified in the following ways in order to include actions that could improve coordination with local water use planning efforts.
	
	• **Regional Coordination:** Several sections of the Regional Coordination chapter may be modified to include information about how the Region could potentially improve coordination with local water use planning efforts. Such modifications will be included in the form of a summary of the *Land Use and Water Management Planning Study*.
	• **Project Selection Process:** The *Land Use and Water Management Planning Study* identified several ways in which the project selection process could be updated to improve coordination with local water use planning efforts, including:
	    o Prioritize projects that allow municipalities to fund updates to their general plans to incorporate water resource policies modeled in the Land Use and Water Management Planning Study or develop a water resources element.
	    o Prioritize projects that aim to create a GIS-based resource guide to all agencies, organizations, and stakeholders responsible for or involved in water management and

Standard	Responses to Specific Standard Questions
	land use planning for the Region. • **Framework for Implementation:** The implementation sections of the IRWM Plan may be modified to include updated short-term and long-term priorities. There are potential priorities associated with improving coordination with local water use planning efforts, including: o Building relationships with professional associations to share information through workshops, webinars, lunch sessions, etc. o Utilizing existing groups to disseminate key information and support an integrated approach to water resources management and land use decision-making processes. o Utilizing social media, pertinent websites, and other sources to share key information with land use officials, planners, and water resources managers.
Stakeholder Involvement	The RAC is the foundation of Stakeholder Involvement in the Region, and guides the San Diego IRWM Program through its input and involvement. The RAC is comprised of stakeholders representative of key groups or interests in the Region. The current stakeholder process is considered effective, and is based upon the *Stakeholder Outreach and Involvement Plan* originally established as part of the 2007 IRWM Plan. In 2012, the RWMG prepared an update to the *Stakeholder Outreach and Involvement Plan* to ensure that effective input was received throughout the Plan Update process. Since then, the Region has taken efforts to improve coordination with all stakeholders, but in particular with watershed-based groups, with disadvantaged communities (DACs), and with tribal communities as part of the IRWM Plan Update effort. Further outreach to the DACs is largely being completed through directed outreach meetings, which are held at strategic points throughout the IRWM Plan Update process. Further outreach to the tribal community has occurred through specific tribal meetings, which were conducted to address tribal concerns about involvement in the IRWM Planning process, and to receive specific input and information for the IRWM Plan Update. Lastly, the Region has undertaken an effort to reach out to the Region's watershed-based stakeholders through a series of focused Watershed Workshops that were held in the fall of 2012. More general stakeholder and public input has been garnered through a series of joint RAC meetings and public workshops throughout 2012 and 2013. Information received through the aforementioned stakeholder outreach efforts will be incorporated into the IRWM Plan Update. The Update will also include commitments to continue ensuring a robust stakeholder involvement process continues after the planning process is completed. The RWMG intends to maintain ongoing bi-monthly RAC meetings to facilitate information sharing across water management sectors in the Region.
Coordination	As part of the IRWM Plan Update process, the RWMG has made improvements to the regional coordination process. As documented through the Tri-County FACC, the coordination process within the Region and between neighboring IRWM regions is already considered robust. However, improvements to the coordination process will include broad-based stakeholder efforts such as the Watershed Workshops and the IRWM Summit, which were held to bring together regional and interregional stakeholders and gain input from these stakeholders in a collaborative manner. Further, the Region is continuing to hold regular meetings with the Tri-County FACC to coordinate with neighboring IRWM efforts and discuss any ongoing water management conflicts. Lastly, the Region is also coordinating with State agencies, and has, for example coordinated extensively with DWR on the *Flood Futures Report* to ensure that this process is coordinated with the Region's integrated flood management efforts.
Climate Change	The IRWM Plan Update will contain robust information regarding climate change (see discussion in Project Review Process section above). The IRWM Plan Update included a specific *Climate Change Planning Study* and stakeholder outreach effort, which involved holding three stakeholder meetings to develop information for the planning study. The Climate Change Workgroup completed a vulnerability assessment of the IRWM Region that was at least equivalent to the qualitative check list assessment in the *Climate Change Handbook for Regional Water Planning*. The Climate Change Workgroup also

Standard	Responses to Specific Standard Questions
	conducted a prioritization exercise to prioritize those climate change vulnerabilities that apply to the Region in terms of "high", "medium", and "low" priority. Further, the climate change planning study includes detailed information (a methodology) for further data gathering and analyzing of the prioritized climate change vulnerabilities.

IRWM Plan Compliance

Projects included within this grant proposal are part of the 2007 IRWM Plan and the draft 2013 IRWM Plan Update. As amended January 13, 2010, the 2007 IRWM Plan allows for periodic updates to the list of water management projects as new funding opportunities arise (see Appendix 1-3) or generally for inclusion in the plan. The San Diego IRWM project list is currently hosted online at: http://irwm.rmcwater.com/sd/login.php.

DWR stipulates that grants are only available for projects included in an IRWM Plan that meets a series of conditions. The following sections detail how the 2007 IRWM Plan and/or the draft 2013 IRWM Plan Update meet the necessary conditions set forth by DWR.

1. The 2013 IRWM Plan Update, although not currently completed, will comply with all provisions set forth in Part 2.2 of Division 6 of the CWC, commencing with §10530. Please note that the 2007 IRWM Plan is in compliance with the 2002 Integrated Regional Water Planning Act (previously CWC §10530), which was repealed and replaced in 2008.
2. The 2007 IRWM Plan meets the condition of being adopted before September 30, 2008. The RWMG has entered into a binding agreement with DWR to update the 2007 IRWM Plan by October 31, 2013 in accordance with a Proposition 84 Planning Grant contract that was executed with DWR on September 16, 2011. This update will be such that the IRWM Plan Update will meet the IRWM Plan standards contained in the 2012 *IRWM Grant Program Guidelines* and will take into account water-related needs of disadvantaged communities (DACs) within the Region. As such, the RWMG will update the 2007 IRWM Plan to adhere to the *IRWM Grant Program Guidelines* within two years of the execution date of the agreement (Proposition 84-Round 2 Implementation Grant Agreement), which is expected to occur on October 1, 2013. Please note that as the 2007 IRWM Plan was not adopted on or after September 30, 2008, the plan is not included within this proposal for review. The 2007 IRWM Plan can be downloaded from the program website at: http://sdirwmp.org/2007-irwm-plan.
3. The 2007 IRWM Plan and the draft 2013 IRWM Plan Update both contain programs and projects that will help to reduce dependence on imported water supplies, which are sourced in part from the Sacramento-San Joaquin Delta (Delta). The degree to which specific projects contained within this proposal will help to reduce dependence on the Delta is detailed in Attachment 13.
4. As indicated previously, the Region received a Proposition 84 Planning Grant that is assisting the Region in completing the 2013 IRWM Plan Update. The Planning Grant contract was executed between DWR and the Water Authority on September 16, 2011, and the Water Authority is currently in compliance with the Planning Grant Agreement. The Water Authority is submitting quarterly progress reports, is on schedule to complete the IRWM Plan Update, and work is being completed within the terms of the Planning Grant budget.

Consistency with Adopted IRWM Plan

Projects included within this grant proposal are part of the 2007 IRWM Plan and the draft 2013 IRWM Plan Update. As amended January 13, 2010, the 2007IRWM Plan allows for periodic updates to the list of water management projects as new funding opportunities arise (see Appendix 1-3). The draft 2013 IRWM Plan Update includes similar provisions such that the projects included in the San Diego IRWM project list are also considered part of the 2013 IRWM Plan Update. The San Diego IRWM project list is currently hosted online at: http://irwm.rmcwater.com/sd/login.php.

The IRWM project list is available 'live' on the online project database for project sponsors to review and update at any time. Any project sponsor may submit a project for inclusion in the Plan and/or an upcoming grant opportunity. This makes it easier for sponsors to add or revise projects, integrate their projects with others, or add additional features so the projects provide multiple benefits. As funding opportunities are pursued, the RWMG announces a new Call for Projects with a submittal deadline. A Project Selection Workgroup is then established by the RAC to review, score, and tier the submitted projects and recommend which ones to include within a specific grant application. All grant applications, including the proposed funding package, are submitted to the RAC for its consideration and recommendation. The ultimate approval of the application and funding package lies with the Water Authority's Board of Directors, the agency authorized to submit grant applications on behalf of the RWMG.

The Proposition 84-Round 2 Project Selection Workgroup selected by the RAC in 2012 extensively reviewed and ranked all projects submitted to the online project database by our October 19, 2012 deadline. Each project submitted by October 19, 2012 was ranked using the *Prop 84-Round 2 Project Selection Workgroup Suggested Criteria for Workgroup Consideration* (Appendix 1-3), which was developed and approved through an open and transparent process at a RAC meeting. Each project submitted within this grant proposal was prioritized and recommended by the Project Selection Workgroup, with the final recommendation regarding the funding package voted upon by the RAC on December 4, 2012. Appendix 1-3 also contains the recommended package of projects that was put together by the Project Selection Workgroup, and meeting notes from the RAC meeting where the funding package was voted upon.

Section F of the 2007 IRWM Plan and Chapter 7 of the draft 2013 IRWM Plan Update describes the prioritization process used to identify a top tier of priority projects. The projects included in this proposal were ranked using the adopted 2007 IRWM Plan criteria as discussed below. While this process ranked projects based on ability to address regional objectives and other criteria, the process does not identify specific groups of projects for which funding should be sought. The reason for this is twofold: 1) prioritizing projects for a specific funding application in the Plan would limit the versatility of the prioritization process for use in identifying projects for future funding opportunities and 2) as the IRWM Plan is intended to be a living document, the prioritization process should remain flexible, such that it may be adapted to changing regional needs.

A supplemental prioritization process is implemented to identify appropriate projects from the Tier 1 project list to be included in future funding applications as they arise. This process was used in the selection of projects for this *San Diego IRWM Implementation Grant Proposal – Round 2*. The details of this process are fluid, and should reflect the specific needs and requirements of the given funding opportunity. The following were updated by the RAC in September 2012 to help the Project Selection Workgroup to prioritize high priority projects for inclusion in this grant proposal.

- *IRWM Plan Objectives.* Select projects that contribute to the attainment of IRWM Plan objectives.
- *Legal, Scientific, and Technical Feasibility.* Select projects that are well supported from a technical standpoint based on supporting studies and data.
- *Budget.* Select projects that have well-developed budgets and exhibit reasonable costs.
- *Readiness to Proceed*. Select projects that will be ready to proceed by December 2014.
- *Contribution to Measurable Targets*. Select projects that contribute to IRWM Plan targets.
- *Cost-effectiveness*. Select projects that are cost-effective in both the short- and long-term, and provide quantifiable benefits to the Region.
- *Benefits DACs.* Select projects that address the critical water supply and water quality needs of Disadvantaged Communities (DACs).
- *Benefits Tribes.* Select projects that address the water resources needs of San Diego area tribes.
- *Integration.* Review integration potential using pre-defined types of integration – Partnerships, Management Strategies, Beneficial Uses, Geographic, and Hydrologic.

As appropriate, the Project Selection Workgroup incorporated these prioritization criteria to narrow the pool of high priority projects from the Plan-level prioritization and develop funding applications. These criteria may be applied in multiple ways. Some prioritization criteria are essential to a project's success in achieving the Region's objectives and/or being eligible for funding, and others are necessary to ensure that Regional projects also line up with the State's Program Preferences. The criteria used, and precise methods for applying the criteria, are determined by the Project Selection Workgroup designated by the RAC for each specific funding opportunity.

Proposed Funding Package

As described above, the Project Selection Workgroup used the 2007 IRWM Plan as its guidebook in evaluating and selecting projects for this *San Diego IRWM Implementation Grant Proposal – Round 2*. All projects proposed within this funding package are consistent with and help to implement both the goals and objectives in the 2007 IRWM Plan and the draft goals and objectives laid out in the draft 2013 IRWM Plan Update. Table 1-2 (below) provides an overview of the 2013 draft IRWM Plan Update goals and objectives and Table 1-3 (below) demonstrates that all of the projects included within this proposal would directly meet multiple objectives. The proposed funding package includes:

Project 1: North San Diego County Region Recycled Water Project (NSDCRRWP) – Phase II. This project is the second phase of a plan by North San Diego County water and wastewater agencies to regionalize recycled water systems that identifies new agency interconnections, seasonal storage opportunities and indirect potable water uses that will maximize supplies, reduce wastewater discharges to ocean, potentially reduce energy consumption due to diminished delivery of imported water, and allow recycled water to play an even more significant role in meeting future water needs. This phase of the project will construct many of the pipelines, storage tanks, pumps, and connections identified in Phase I.

Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program. This project will expand an outreach and rebate program targeted to urban and agricultural water users that will encourage customers to replace turf with more water efficient landscaping. It will also implement an education and rebate program to encourage increased irrigation efficiency and convert agriculture lands from potable to recycled water.

Project 3: Rural Disadvantaged Community (DAC) Partnership Program. This project will provide funding to address inadequate water supply and water quality affecting rural DACs, including tribal communities. The project will reduce potential for high public health risks in water and/or wastewater systems. The project will promote environmental justice in rural communities by providing outreach to rural DACs for available infrastructure projects, while promoting IRWM goals. RCAC will manage the Proposition 84 grant funds to facilitate implementation of infrastructure upgrades that protect rural DACs from public health hazards associated with aging or failing water facilities.

Project 4: Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility. This project will develop and test a failsafe treatment train for potable reuse without an environmental buffer. The data gathered through this process may be used by the California Department of Public Health (CDPH) in assessing the future potential of direct potable reuse facilities.

Project 5: Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies. This project will protect and restore a key segment of Boulder Creek upstream of the El Capitan Reservoir. It will protect and restore 3,000 feet of functioning riparian habitat and associated buffer habitat along Boulder Creek, and collect data to use as a baseline for other streams in the San Diego River watershed. This project will also conduct education and outreach to backcountry areas, including tribal communities, about invasive species and their impacts on watershed habitats.

Project 6: Chollas Creek Integration Project Phase II. This project will improve water quality and prevent flooding through (1) engineered modifications to the channel via installation of headwalls and drop structures that will modify creek flow and prevent erosion, (2) contaminate uptake and natural filtration through invasives removal and restoration with native species, and (3) engagement of community volunteers in water quality monitoring and hands-on watershed education. The project improves and maintains Chollas Creek as a natural urban drainage system that serves as a major conduit for stormwater runoff in the Encanto DAC.

Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II. The project aims to establish nutrient water quality goals for the Santa Margarita River (SMR) Estuary (Phase I) and the SMR River (Phase II) that may lead to development of nutrient site-specific objectives by the San Diego Regional Water Quality Control Board (RWQCB) in the main stem of the river that are protective of beneficial uses. The project consists of three major activities: facilitate discussions among a SMR watershed stakeholder group to guide project activities, conduct monitoring and special studies, and develop nutrient water quality goals for the Lower SMR.

Table 1-2: Draft 2013 San Diego IRWM Plan Update Goals and Objectives

IRWM Plan Objective		Primary IRWM Plan Goals Implemented by Objective			
		Goal 1: Improve the reliability and sustainability of regional water supplies	Goal 2: Protect and enhance water quality	Goal 3: Protect and enhance our watersheds and natural resources	Goal 4: Promote and support integrated water resource management
A	Encourage the development of integrated solutions to address water management issues and conflicts	○	○	○	●
B	Maximize stakeholder/community involvement and stewardship of water resources, emphasizing education and outreach	○	○	●	●
C	Effectively obtain, manage, and assess water resource data and information	○	○	○	●
D	Further the scientific and technical foundation of water quality management	○	○	●	●
E	Develop and maintain a diverse mix of water resources, encouraging their efficient use and development of local water supplies	●			○
F	Construct, operate, and maintain a reliable water infrastructure system	●			○
G	Enhance natural hydrologic processes to reduce the effects of hydromodification and encourage integrated flood management		●	○	○
H	Effectively reduce sources of pollutants and environmental stressors to protect and enhance human health and safety and the environment		●	○	○
I	Protect, restore and maintain habitat and open space	○	○	●	○
J	Optimize water-based recreational opportunities		○	○	●
K	Effectively address climate change through adaptation or mitigation in water resource management	●	●	●	○

● Primary IRWM Plan goal targeted by objective
○ Additional IRWM Plan goals targeted by objective

Table 1-3: Consistency of Proposed Projects with IRWM Plan Objectives

Proposal Projects		IRWM Plan Objectives Addressed										
		A	B	C	D	E	F	G	H	I	J	K
1	North San Diego County Regional Recycled Water Project (NSDCRRWP) – Phase II	●	○	●		●	●		●			○
2	Turf Replacement and Agricultural Irrigation Efficiency Program	●	●	●		●			●			○
3	Rural Disadvantaged Community (DAC) Partnership Program	●	●	○	●	●	●		○			●
4	Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility	●	○	●	●	○			○			○
5	Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies	●	●	●	●	○		●	●	●	○	
6	Chollas Creek Integration Project Phase II	●	●	●	○			●	●	●		
7	Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II	●	●	●	●							

● = directly related; ○ = indirectly related

Attachment 1

RESOLUTION No. _2013-_03

RESOLUTION OF THE BOARD OF DIRECTORS OF THE SAN DIEGO COUNTY WATER AUTHORITY AUTHORIZING THE GENERAL MANAGER TO SUBMIT A PROPOSITION 84, ROUND 2, IRWM IMPLEMENTATION GRANT APPLICATION

WHEREAS, Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Public Resources Code section 75001 *et seq.*), authorized the California Legislature to appropriate $1 billion to encourage integrated regional water management planning in California; and

WHEREAS, Section 83002(b)(3)(A)(i) of the California Water Code appropriated to the Department of Water Resources (DWR) funds for integrated regional water management (IRWM) planning grants and other purposes; and

WHEREAS, DWR has made these funds available through a grant program that allocates specific amounts of money to 11 funding areas located throughout California, including the San Diego Funding Area; and

WHEREAS, grant application procedures established by DWR require applicants to provide a copy of a resolution adopted by the applicant's governing body designating an authorized representative to file an application for an IRWM implementation grant; and

WHEREAS, achieving IRWM grant funding will help to achieve the regional water supply goals established in the Water Authority's 2010 Urban Water Management Plan; and

WHEREAS, the San Diego Regional Water Management Group (RWMG), in close cooperation with the Regional Advisory Committee (RAC), is preparing an application for a Proposition 84, Round 2, grant to further water supply reliability, water quality enhancement, natural resources stewardship, and water resource management in the region; and

WHEREAS, on December 5, 2012, the RAC recommended that the Water Authority Board authorize submittal of the San Diego Region's application for a Proposition 84, Round 2, implementation grant; and

WHEREAS, the memorandum of understanding that established the San Diego IRWM Program identifies the Water Authority as the program's authorized representative; and

WHEREAS, the Water Authority Board of Directors is the decision-making body for the Water Authority; and

WHEREAS, the Board of Directors has considered numerous reports submitted by Water Authority staff on IRWM planning.

NOW, THEREFORE, the Board of Directors of the San Diego County Water Authority resolves the following:

1. The foregoing facts are true and correct.

2. The General Manager is authorized to prepare the necessary data, conduct investigations, and submit a Proposition 84 implementation grant application.

3. The General Manager is authorized to enter into an agreement to receive a Proposition 84, Round 2, implementation grant from the California Department of Water Resources.

PASSED, APPROVED AND ADOPTED, this 24th day of January, 2013, by the following vote:

AYES: Unless noted below, all Directors present voted aye.

NOES: None

ABSTAIN: None

ABSENT: Arant, Boyle (p), Croucher (p), Lewinger, Morrison, Steiner, Tu, and Wight.

Thomas V. Wornham
Chair

ATTEST:

Michael T. Hogan
Secretary

I, Doria F. Lore, Clerk of the Board of the San Diego County Water Authority, certify that the vote shown above is correct and this Resolution No. 2013- 03 was duly adopted at the meeting of the Board of Directors on the date stated above.

Doria F. Lore
Clerk of the Board

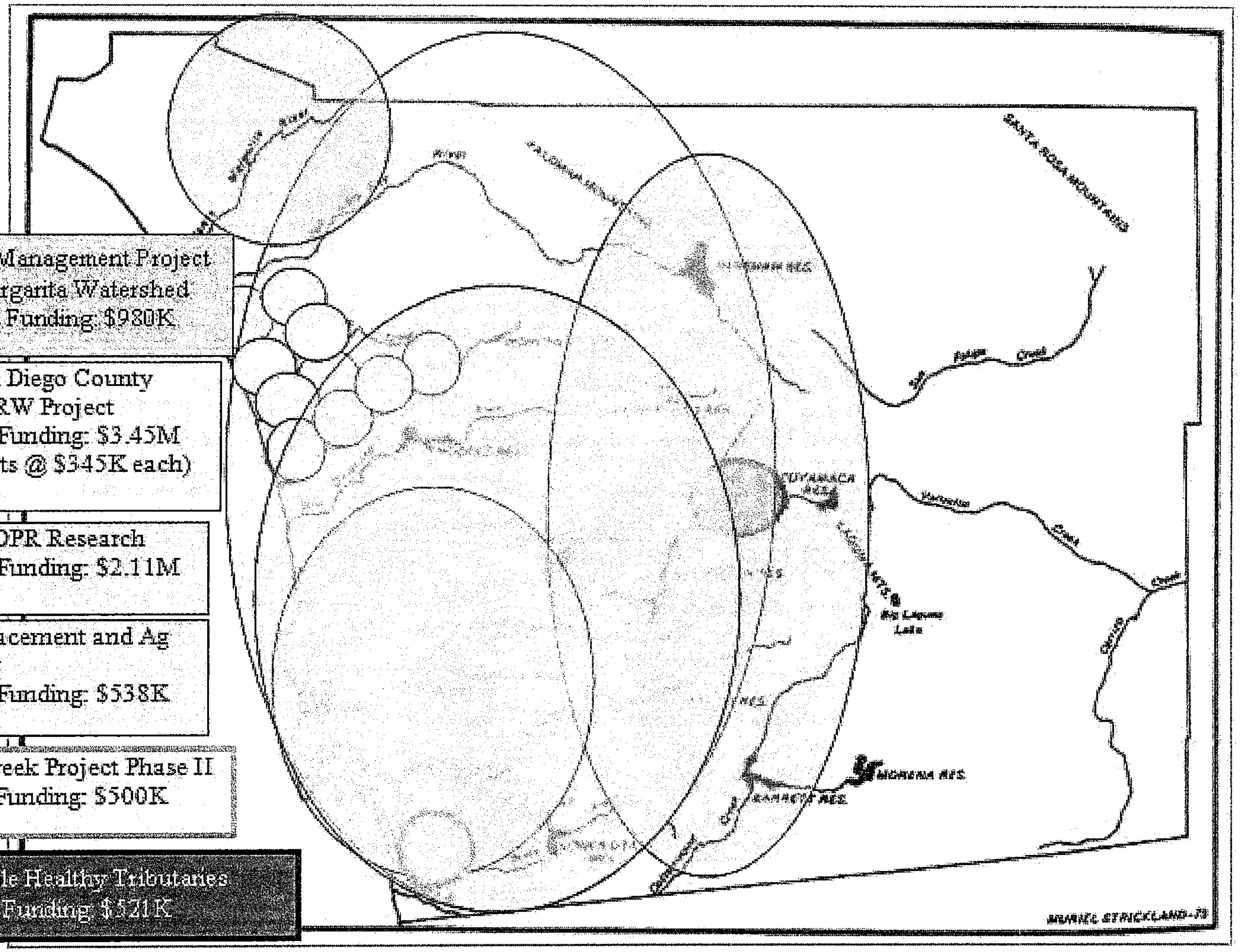
San Diego Integrated Regional Water Management Program
Recommended Prop 84-Round 2 Grant Project List

Project Title	Project Sponsor	Functional Area	Project Summary	Recommended Grant Amount
Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility	WateReuse Research Foundation	Water Supply	This project will provide comprehensive testing, evaluation and demonstration of failsafe treatment trains for potable reuse without environmental buffers. Highlighted by a workshop on hazard analysis, critical control points, and redundancy requirements, this project will convene national and international health, treatment and water quality experts to establish an appropriate framework for demonstration of failsafe potable reuse at the City of San Diego's demonstration facility. The WateReuse Research Foundation is actively funding nearly $3M in research to better develop potable reuse as a supplemental water supply. This project leverages the expertise from those investments and combines them to demonstrate a failsafe potable reuse train for acceptance by Department of Public Health under the SB 918 process.	**$2,113,000**
Rural Disadvantaged Community (DAC) Partnership Project – Phase II	Rural Community Assistance Corporation (RCAC)	Water Supply	RCAC will manage a fund that is to be disbursed to DACs for project development and construction. RCAC will assist rural DACs with project development, project oversight and access to resources, including financial resources. The DAC projects selected for Phase II funding will include both tribal and non-tribal projects such as Los Coyotes San Ysidro Water System water main replacement, La Jolla Eastern Water System water tank replacement, San Pasqual District B Water System water tank replacement) Rancho Estates MWC new well and finished water storage, Pauma Valley Water Co. new well and finished water storage, Phoenix House new well, and Descanso CWD pipeline replacement.	**$1,887,000**
North San Diego County Regional Recycled Water Project (NSDCRRWP) – Phase II	Olivenhain Municipal Water District	Water Supply – Recycled Water	NSDCRRWP Phase II builds on the successful partnerships established during the planning and design activities in NSDCRRWP Phase I by implementing multiple construction components of the regional recycled water supply and distribution system. Phase II includes construction of projects such as distribution pipelines, recycled water pump stations, interties between individual agency systems, and further exploration of linking the regional system. Phase II will cumulatively produce an estimated 6,805 AFY of recycled water. Phase II will involve multiple sub-projects associated with the partners included in this effort (Leucadia Wastewater District, Vallecitos Water District, Vista Irrigation District, Rincon del Diablo MWD, Olivenhain MWD, Santa Fe Irrigation District, Carlsbad MWD, City of Escondido, City of Oceanside, San Elijo JPA).	**$3,452,000**

Project Title	Project Sponsor	Functional Area	Project Summary	Recommended Grant Amount
Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies	San Diego River Park Foundation	Natural Resources and Watersheds	This project seeks to take an integrated approach to conserving healthy cold water streams through monitoring, field assessments, focused studies, on-the-ground restoration, data integration, and public education and involvement. El Capitan Reservoir is the largest local supply of water in the region. Since Boulder Creek drains into El Capitan Reservoir, any reduction of pollution reduces treatment costs. Any reduction of sedimentation reduces the resulting reduction in carrying capacity at the Reservoir. Through integration with partners and to bring a more holistic approach, the project has been expanded to include field surveys, monitoring, bio assessments, education, and stewardship components. Education elements include outreach to private land owners and 3 Indian Tribes in the area to reduce pollutant loading and better manage watershed lands.	**$521,000**
Turf Replacement and Agricultural Irrigation Efficiency Program	San Diego County Water Authority	Water Supply – Conservation	This regional program will promote outdoor water use efficiency in the residential and commercial sectors by providing financial incentives to replace turf grass with water-wise plant material and to upgrade overhead sprinkler irrigation systems to low-application rate/high-efficiency irrigation systems. The program will also offer incentives to agricultural customers to retrofit on-site potable irrigation systems as well as water use "audits" geared to give information and assistance to growers in their efforts to adopt techniques and methods that increase water use efficiency without jeopardizing crop productivity. All qualified retail water customers within the San Diego County Water Authority's service area, as well as the California American Water service area of Coronado and Imperial Beach, will be eligible to participate in the program. The Water Authority is partnering with the city of San Diego and Mission Resource Conservation District to implement this project.	**$538,000**
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II	County of San Diego	Water Quality/ Stormwater	This project is the continuation of the Implementing Nutrient Management in the Santa Margarita River Watershed - Phase I. The project aims to continue to facilitate the Stakeholder Advisory Group (begun during Phase I), continue the core monitoring and special studies to address data gaps identified by stakeholders to achieve project objectives, and to partner with the RWQCB staff in the development of nutrient WQOs for the Santa Margarita River and Estuary.	**$980,000**
Chollas Creek Integration Project – Phase II	Jacobs Center for Neighborhood Innovation	Water Quality/ Stormwater	The project improves water quality through: engineering modifications to slow creek flow and prevent erosion and flooding; contaminate uptake and natural filtration through restoration with native species of six acres; obtaining a streamlined process for CEQA and regional permitting that supports the on-going, long-term invasive removal and restoration; community engagement in social values research; and citizen science and water quality sampling. Phase II completes construction activities and habitat restoration delineated in Phase I at Northwest Village.	**$500,000**

Project Title	Project Sponsor	Functional Area	Project Summary	Recommended Grant Amount
Grant Administration	San Diego County Water Authority	--	The Water Authority will administer the grant through an agreement with DWR. The Water Authority also will enter into agreements with each project proponentto ensure compliance with State grant requirements. Water Authority staff will review and compile invoices and reports for the State and will receive funding from DWR and disburse it to project proponents	**$309,000**
Total				$10,300,000

San Diego IRWM Region and proposed Prop 84, Round 2, projects



Nutrient Management Project
Santa Margarita Watershed
Proposed Funding: $980K

North San Diego County
Regional RW Project
Proposed Funding: $3.45M
(10 projects @ $345K each)

Fail Safe DPR Research
Proposed Funding: $2.11M

Turf Replacement and Ag
Efficiency
Proposed Funding: $538K

Chollas Creek Project Phase II
Proposed Funding: $500K

Sustainable Healthy Tributaries
Proposed Funding: $521K

Rural Disadvantaged Community
(DAC) Partnership Project-Phase II
Proposed Funding: $1.88M

Appendix 1-2: RWMG MOU

MEMORANDUM OF UNDERSTANDING
BETWEEN CITY OF SAN DIEGO
COUNTY OF SAN DIEGO, and SAN DIEGO COUNTY WATER AUTHORITY
for the
INTEGRATED REGIONAL WATER MANAGEMENT PROGRAM
For Fiscal Years 2012-2016

This Memorandum of Understanding (MOU) between the San Diego County Water Authority (Water Authority); the City of San Diego, a municipal agency (City); and the County of San Diego, a political subdivision of the State of California (County), sets forth the respective roles of Water Authority, City and County in regard to the Integrated Regional Water Management (IRWM) Plan and Program. Water Authority, City and County are sometimes referred to in this MOU collectively as the "Parties" and individually as "Party."

This MOU replaces the Memorandum of Understanding (March 25, 2009), as amended, between City, County, and Water Authority for Fiscal Years 2009-2013 for the IRWM Grant Program.

RECITALS:

1. The California Legislature enacted SBX2 1 (Perata, Chapter 1 Statutes of 2008), the Integrated Regional Water Management Planning Act, which repealed and re-enacted Part 2.2 of Division 6 of the Water Code relating to integrated regional water management plans. SBX2 1 provides that a regional water management group may prepare and adopt an integrated regional water management (IRWM) plan.

2. In November 2002, Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act, authorized the Legislature to appropriate funding for competitive grants for IRWM projects.

3. In November 2006, Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Act, authorized the Legislature to appropriate funding for competitive grants for IRWM projects.

4. The intent of the IRWM Grant Program (Program) established in accordance with Proposition 50 and SBX2 1, is to encourage integrated regional strategies for management of water resources and to provide funding, through competitive grants, for projects that protect communities from drought, protect and improve water quality, promote environmental stewardship, and improve local water security by reducing dependence on imported water.

5. To qualify as a regional water management group (RWMG) and comply with the Program Guidelines (Guidelines) established under Proposition 50 and SBX2 1, at least three agencies must participate in the group; two of the agencies must have statutory authority over

water management that may include water supply, water quality, flood control, or stormwater management.

6. In 2005, the Parties established an RWMG that consists of Water Authority, which has statutory authority over water management; City, which has statutory authority over water management, water quality, wastewater, flood management and stormwater; and County, which has statutory authority over water quality, stormwater and flood control in the unincorporated area.

7. The Parties understand that only through a collaborative effort with the many stakeholders involved in water management planning can the IRWM Plan process be successful in the San Diego region.

8 As part of the public outreach and stakeholder involvement effort, the Parties established the Regional Advisory Committee (RAC), which comprises up to 32 representatives appointed by the Parties from the water management areas of water supply, water quality and natural resources/watersheds management; and representatives of businesses, academia and tribes, as well as other interested members of the public. The purpose of the RAC is to make recommendations to the Parties on key issues related to IRWM planning and grant applications.

9. The Parties, acting with positive recommendations from the RAC, completed the first San Diego IRWM Plan (Plan) in 2007. Subsequently, the Parties have received funding for planning and implementation of projects from the California Department of Water Resources (DWR). Additional funding is available to the San Diego IRWM Program from Proposition 84, approved by California voters in 2006.

10. To qualify for Proposition 84 IRWM funding, a planning region must have an IRWM Plan that complies with the requirements of California Water Code Section 83002(b)(3)(B), or must have committed to bringing its plan into compliance within two years of receiving such funding.

11. A Local Project Sponsor (LPS) is a proponent of an individual project that will be funded as part of an IRWM Program grant from the State or other future funding agencies. An LPS may be Water Authority, County, City, a Water Authority member agency, a municipality, a local agency or a non-profit organization.

12. This MOU consists of five major components: general grant obligations, San Diego IRWM Plan update, IRWM grant administration, the role of the RAC, and funding for IRWM Program management.

Now, therefore, in consideration of the above incorporated recitals and mutual obligations of the Parties herein expressed, the Parties agree as follows:

1. General Grant Obligations

a. The Parties are equal partners in the development and submission of IRWM grant applications. All Parties shall provide timely reviews and approvals before grant applications are submitted.

b. Water Authority shall submit the grant applications to the funding agency on behalf of the Parties.

c. To expedite the grant application process, Water Authority shall provide initial funding for a consultant to develop the applications. The total cost of the consultant and applications shall be shared by the parties consistent with Section 5 of this MOU.

d. The funding commitment by the Parties under Section 5 of this MOU assumes that the Parties will continue to pay or provide in-kind services as allowed for the entire cost of grant applications for the IRWM Program. As part of the IRWM Plan Update described in Section 2 of this MOU, the Parties agree to study the concept of obtaining funding from other sources to fully or partially defray the cost of grant applications.

e. Water Authority shall be responsible for administering funding for projects that are receiving IRWM Program grant funding with respect to submitting invoices and quarterly reports to the funding agency, distributing funding to LPS, and processing contract amendments as applicable.

f. The Parties shall share equally in any and all contractual liability, regardless of nature or type, which arises out of or results from a LPS's performance of services under its agreement with the Water Authority. The Parties shall share equally in any of the default provisions listed in the grant agreements received by the Parties. The Water Authority also agrees to pursue contractual remedies.

g. Each Party shall procure and maintain during the period of this MOU insurance from insurance companies admitted to do business in the State of California or shall self-insure to cover any contractual liability resulting from the conditions referenced in Section 1f.

2. San Diego IRWM Plan Update

a. The Parties are equal partners in the update of the Plan. Water Authority shall contract with a consultant to update the Plan in compliance with the Guidelines and schedule established by DWR, and submit the updated Plan to DWR.

b. The update of the Plan shall be contingent upon receipt of grant funding for this purpose.

3. IRWM Grant Contracts Administration

a. The Water Authority shall administer and manage IRWM grant agreements, administer the LPS contracts, develop and maintain a reporting and invoicing program, and communicate project and agreement progress to the RWMG, RAC, and the funding agency.

b. An LPS that has satisfied all invoicing requirements for a grant shall invoice the Water Authority, which shall in turn invoice the funding agency. The Water Authority shall, within 45 days of receipt of funds from the funding agency, disburse the funds to the LPS.

c. The Water Authority shall appropriate a percentage of the grant money allocated to each LPS project to fund administration of the IRWM grants. The Parties shall agree mutually to the percentage of the grant money that is to be appropriated for this purpose. To the extent that costs exceed the amount in this fund, and that the Parties mutually agree to the additional cost, the Parties shall equally share the additional costs in accordance with Section 5a.

d. Where a labor compliance requirement has been established by the granting agency, Authority shall report to the granting agency the compliance status of LPS, as reported by LPS, with applicable public works laws.

4. Role of Regional Advisory Committee (RAC)

The RAC shall be considered the project advisory committee. The Parties are committed to a cooperative relationship with the RAC and will incorporate the RAC's consensus recommendations in documents prepared for presentations to the Parties' governing bodies. The Parties' governing bodies will give primary consideration to the recommendations of the RAC as part of any decision related to the following:

a. Adoption of updates to the IRWM Plan for the San Diego Region.

b. Criteria for prioritizing projects to be submitted for IRWM grant programs.

c. Reevaluation of all projects submitted for grant funding if a funding agency funds the Program at a level lower than the requested grant amount and does not provide direction on which projects to fund. Parties shall fund the projects based on consultation with the RAC and the criteria for project prioritization (Section 4b).

d. Approval and submittal of grant applications.

e. Transition of responsibility for implementation of the IRWM Plan to a new institutional structure.

5. Funding

a. Funding for FY 2012-2016 shall not exceed $1,470,000. Each Party shall provide an equal share of this funding in an amount not to exceed $490,000. If a Party's contribution was not totally expended in the MOU (March 25, 2009), as amended, that Party shall be credited for the unexpended amount in this MOU.

b. In-kind services provided by the Parties shall be considered in excess of the above funding amounts and are not reimbursable. The Parties' staff shall separately document time spent on in-kind services for IRWM planning, administration and grant applications.

c. The funding commitment described in 5a shall not include expenditures to administer the IRWM Grant Program.

d. Water Authority shall invoice City and County on a quarterly basis along with supporting documentation of expenses. City and County shall remit payment within 60 days of receipt of invoice.

6. Assignment

Parties shall not assign or transfer this MOU or any rights under or interest in this MOU without written consent of all other Parties, which may be withheld for any reason.

7. Defense and Indemnity

Water Authority, City, and County each agree to mutually indemnify, defend at its own expense, including attorneys' fees, and hold each other harmless from and against all claims, costs, penalties, causes of action, demands, losses and liability of any nature whatsoever, including but not limited to liability for bodily injury, sickness, disease or death, property damage (including loss of use) or violation of law, caused by or arising out of or related to any negligent act, error or omission of that party, its officers or employees, or any other agent acting pursuant to its control and performing under this Agreement.

Nothing in the foregoing shall be construed to require any Party to indemnify another for any claim arising from the sole negligence or willful act of the Party to be indemnified.

8. Document Review

Water Authority, City and County each shall make available for inspection to the other Parties, upon reasonable advance notice, all records, books and other documents relating to the Plan and the Program, unless privileged.

9. Term

The term of this MOU shall begin on the date of execution by all Parties and expire on June 30, 2016 expressly contingent upon funding by Water Authority, City and County. The term may be extended by written agreement of all Parties. The Parties shall continue to participate in the planning, development and coordination of the Plan and Grants to the maximum extent possible. The Parties agree to notify one another in the event that their agency's future budget appropriations impact Program funding continuity. If appropriations are different than anticipated, the MOU and Program funding shall be adjusted based on actual funding.

10. Notice

Any notice, payment, credit or instrument required or permitted to be given hereunder will be deemed received upon personal delivery or 24 hours after deposit in any United States mail depository, first class postage prepaid, and addressed to the Party for whom intended as follows:

If to the Water Authority:	San Diego County Water Authority 4677 Overland Avenue San Diego, CA 92123 Attn: Mark Stadler
If to City:	City of San Diego Water Department 600 B Street, Suite 600 San Diego, CA 92101 Attn: Cathy Pieroni
If to County	County of San Diego 5201 Ruffin Road, Suite P San Diego, CA 92123 Attn: Sheri McPherson

Any Party may change such address or contact by notice given to the other Parties as provided herein.

11. Amendments

The MOU may be amended by written agreement of all Parties.

12. Severability

The partial invalidity of one or more parts of this MOU will not affect the intent or validity of this MOU.

13. Governing Law

This MOU shall be deemed a contract under the laws of the State of California and for all purposes shall be interpreted in accordance with such laws. Any action brought shall be in San Diego County, California.

14. Obligations

Nothing in this agreement shall create additional obligations with respect to the Plan or Program.

15. Termination of MOU

This MOU may be terminated by any Party with or without cause 30 days after notice in writing to the other Parties.

16. Signatures

The individuals executing this MOU represent and warrant that they have the legal capacity and authority to do so on behalf of their respective legal entities.

IN WITNESS WHEREOF, the Parties have executed this MOU as of the date below.

San Diego County
Water Authority

By: ______________________
Ken Weinberg
Director of Water Resources

City of San Diego

By: Hildred Pepper Jr.
Hildred Pepper Jr.
Purchasing & Contracting
Director

County of San Diego

By: Rill E. Cyt
Richard Crompton, Director
Department of Public Works

By: Bruce Retyn
Winston F. McColl, Director RISKY
Department of Purchasing and Contracting

APPROVED AS TO FORM:

San Diego County
Water Authority

By:
General Counsel
San Diego County Water Authority

City of San Diego

By:
Raymond C. Palmucci
Deputy City Attorney

County of San Diego

By:
James O'Day
County Counsel, Senior Deputy

Date: 9/21/11

RESOLUTION No. 10-002

RESOLUTION OF THE SAN DIEGO COUNTY BOARD OF SUPERVISORS AMENDING THE 2007 SAN DIEGO INTEGRATED REGIONAL WATER MANAGEMENT PLAN

WHEREAS, the San Diego Regional Water Management Group (RWMG), in close cooperation with the Regional Advisory Committee (RAC), drafted the first San Diego Integrated Regional Water Management (IRWM) Plan to optimize water supply reliability, protect and enhance of water quality, provide stewardship of natural resources and coordinate and integrate water resource management in the region; and

WHEREAS, the San Diego IRWM Plan is the foundation of long-term IRWM planning in the region, fostering coordination, collaboration, and communication among governmental and non-governmental water stakeholders; and

WHEREAS, carrying out the San Diego IRWM Plan and obtaining IRWM grant funding will help to achieve the County of San Diego Strategic Plan Environment Initiative; and

WHEREAS, the County of San Diego Board of Supervisors is the decision-making body for the County of San Diego; and

WHEREAS, on September 19, 2007, the RAC recommended that the RWMG governing bodies adopt the San Diego IRWM Plan; and

WHEREAS, the County of San Diego Board of Supervisor adopted the San Diego IRWM Plan at its November 7, 2007 meeting; and

WHEREAS, the RWMG would like to amend the San Diego IRWM Plan to facilitate the addition and revision of projects to the plan; and

WHEREAS, amendment of the San Diego IRWM Plan by the San Diego County Board of Supervisors will update the San Diego IRWM Plan in preparation for the San Diego Region's application for Proposition 84 and other potential funding; and

NOW, THEREFORE, LET IT BE RESOLVED that the County of San Diego Board of Supervisors resolves the following:

1. The 2007 San Diego Integrated Regional Water Management Plan is amended by the revision of the process for managing the IRWM project list as shown in Attachment 1.

2. Staff is directed to incorporate the amendment made by the resolution into the IRWM Plan.

APPROVED AS TO FORM AND LEGALITY
COUNTY COUNSEL

BY Tom Bosworth
SENIOR DEPUTY

ON MOTION of Supervisor Roberts, seconded by Supervisor Horn, the above Resolution was passed and adopted by the Board of Supervisors, County of San Diego, State of California, on this 13th day of January, 2010, by the following vote:

AYES: Cox, Jacob, Slater-Price, Roberts, Horn

\- - -

STATE OF CALIFORNIA)
County of San Diego) SS

I hereby certify that the foregoing is a full, true and correct copy of the Original Resolution entered in the Minutes of the Board of Supervisors.

THOMAS J. PASTUSZKA
Clerk of the Board of Supervisors

By: ______________________
Nancy Vizcarra, Deputy

No. 10-002

01/13/2010 (8)

2007 San Diego IRWM Plan
New text for Section G (Implementation):

G.5 Managing the IRWM Project List
Periodic updates to the list of water management projects must be made as new funding opportunities arise. Updating the project list will allow additional projects to be added, as project concepts are refined to address changing conditions and needs in the Region. This opportunity also will enable the project sponsors to revise their project submittals as necessary.

The San Diego IRWM project list is included in the Plan as Appendix 5. Any sponsor may submit a project for inclusion in the Plan. The Regional Water Management Group (RWMG) will decide whether to add a submitted project to Appendix 5 after reviewing it to ensure it is consistent with the Plan. The RWMG will notify the sponsor of its decision to accept or reject a project. This structure facilitates the addition of projects to the Plan. It also makes it easier for sponsors to add or revise projects, integrate their projects with others, or add additional features so the projects provide multiple benefits.

When the RWMG decides to submit an application for a grant or other funding opportunity, it will work with the Regional Advisory Committee (RAC) to form a technical workgroup that will review the projects in Appendix 5 and recommend which to submit for funding. All grant applications, including projects proposed for funding, will be submitted to the RAC for its consideration and recommendation. The ultimate approval of the application and projects submitted for funding lies with the Board of Directors of the San Diego County Water Authority, the agency authorized to submit grant applications on behalf of the RWMG.

SAN DIEGO
Integrated Regional
Water Management

Prop 84-Round 2 Project Selection Workgroup
Suggested Criteria for Workgroup Consideration

Revised September 2012

The following table presents suggested criteria to be considered by the Workgroup in developing the funding application package. Criteria have been categorized as project-level criteria or proposal-level criteria. Project-level criteria will be used to evaluate individual projects, while proposal-level criteria will be used to evaluate the proposal as a whole.

The ability of projects to address project-level criteria will be discussed during the first and second Workgroup meetings. The ability of the proposed funding application package to address the proposal-level criteria will be discussed during the third and fourth Workgroup meetings.

RMC will conduct technical review (truthing of database entries) and have numerical ranking complete prior to the first Workgroup meeting. RMC will ask questions of local project sponsors (LPS), as needed, and will inform LPS if any changes made to their database entries. LPS may contact Mark Stadler if they dispute the changes made.

Based on the numerical ranking, projects will be divided into Tier 1 (top 50th percentile) and Tier 2 (bottom 50th percentile). The Workgroup will evaluate the Tier 1 projects for potential inclusion within the grant application. However, once tiering is complete and the Workgroup has their Tier 1 project list, the numerical scores will be dropped and each project will be evaluated independently for its value and contribution to the region.

Interviews will be scheduled with LPS when the Workgroup has narrowed the list down to top 10-15 projects: 5 minute presentation with 10 minutes of Q&A. LPS will be directed as follows: "Keeping in mind the project-level criteria established for this grant cycle, please explain why this project should be funded."

The RAC will present appointments for the Project Selection Workgroup at their October 3rd RAC meeting. Workgroup appointments by caucus are due to Mark Stadler by October 19th. The Workgroup will recommend a suite of projects for the grant application at the December 5th RAC meeting.

Criteria	Suggested Workgroup Guidelines
PROJECT-LEVEL CRITERIA	
IRWM Plan Objectives	Select projects that contribute to the attainment of IRWM Plan objectives.
Legal, Scientific~~,~~ and Technical ~~Merit~~Feasibility	Select projects that are well supported from a technical standpoint based on supporting studies and data.
Budget	Select projects that have well-developed budgets and exhibit reasonable costs. Note that DAC projects are exempt from the 25% funding match requirement.
Readiness to Proceed	Select projects that will be ready to proceed by December ~~2011~~ 2014.

Criteria	Suggested Workgroup Guidelines
Contribution to Measurable Targets	Select projects that contribute to IRWM Plan targets.
Cost-Effectiveness – Water Supply, Water Quality, Flood Damage Reduction	Select projects that are cost-effective on both the short- and long-term, and provide quantifiable benefits to the region.
~~Program Preferences [a]~~	~~Select projects that implement Program Preferences and Statewide Priorities~~
Benefits DACs	Select projects that address the critical water supply and water quality needs of DACs.
Benefits Tribes	Select projects that address the water resources needs of San Diego area tribes.
Integration	Review integration potential using pre-defined types of integration – Partnerships, Management strategies, Beneficial uses, Geographic, Hydrologic
PROPOSAL-LEVEL CRITERIA	
IRWM Plan Objectives	Proposal to include a suite of projects that addresses all IRWM Plan objectives.
Linkages to Other Projects	Proposal to include projects with synergies and linkages among them.
Funding Match	Proposal to achieve an overall ~~25~~ 30% funding match.
Schedule	Proposal must include at least one project that will begin implementation by ~~December 2011~~ May 2014.
Economic Analysis – Water Supply, Water Quality and Other Expected Benefits, and Flood Damage Reduction	Proposal to include projects that realize quantifiable water supply benefits.
	Proposal to include projects that realize quantifiable water quality and other expected benefits.
	Proposal to include projects that realize quantifiable flood damage reduction benefits.
DWR Program Preferences	Proposal to include a suite of projects that implements a combination of Program Preferences with a high degree of certainty.
Geographic Parity	Proposal to include a suite of projects that will benefit hydrologic units across the Region.
Number of Projects	Proposal not to exceed 5-7 total projects.
~~Degree of Negative Impact~~	~~Proposal to include a suite of projects that have minimal secondary or cumulative negative impacts, including those that occur over a longer time or distance.~~
~~Amount Leveraged~~	~~Proposal to include a suite of projects that allow other projects to move forward.~~

San Diego Integrated Regional Water Management Program

Recommended Prop 84-Round 2 Grant Project List

Project Title	Project Sponsor	Functional Area	Project Summary	Recommended Grant Amount
Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility	WateReuse Research Foundation	Water Supply	This project will provide comprehensive testing, evaluation and demonstration of failsafe treatment trains for potable reuse without environmental buffers. Highlighted by a workshop on hazard analysis, critical control points, and redundancy requirements, this project will convene national and international health, treatment and water quality experts to establish an appropriate framework for demonstration of failsafe potable reuse at the City of San Diego's demonstration facility. The WateReuse Research Foundation is actively funding nearly $3M in research to better develop potable reuse as a supplemental water supply. This project leverages the expertise from those investments and combines them to demonstrate a failsafe potable reuse train.	**$2,113,000**
Rural Disadvantaged Community (DAC) Partnership Project – Phase II	Rural Community Assistance Corporation (RCAC)	Water Supply	RCAC will manage a fund that is to be disbursed to DACs for project development and construction. RCAC will assist rural DACs with project development, project oversight and access to resources, including financial resources. A total of 7 DAC projects were selected for Phase II funding. Those projects include 3 tribal projects (Los Coyotes San Ysidro Water System - water main replacement, La Jolla Eastern Water System - water tank replacement, San Pasqual District B Water System - water tank replacement) and 4 other DAC projects (Rancho Estates MWC - new well and finished water storage, Pauma Valley Water Co. - new well and finished water storage, Phoenix House - new well, and Descanso CWD - pipeline replacement).	**$1,887,000**
North San Diego County Regional Recycled Water Project (NSDCRRWP) – Phase II	Olivenhain Municipal Water District	Water Supply – Recycled Water	NSDCRRWP Phase II builds on the successful partnerships established during the planning and design activities in NSDCRRWP Phase I by implementing multiple construction components of the regional recycled water supply and distribution system. Phase II includes construction of distribution pipelines, recycled water pump stations, interties between individual agency systems, and further exploration of linking the regional system. Phase II will cumulatively produce an estimated 6,805 AFY of recycled water. Phase II will involve 10 sub-projects, one for each of the partners included in this effort (Leucadia Wastewater District, Vallecitos Water District, Vista Irrigation District, Rincon del Diablo MWD, Olivenhain MWD, Santa Fe Irrigation District, Carlsbad MWD, City of Escondido, City of Oceanside, San Elijo JPA).	**$3,452,000**
Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies	The San Diego River Park Foundation	Natural Resources and Watersheds	This project seeks to take an integrated approach to conserving healthy cold water streams through monitoring, field assessments, focused studies, on-the-ground restoration, data integration, and public education and involvement. El Capitan Reservoir is the largest local supply of water in the region. Since Boulder Creek drains into El Capitan Reservoir, any reduction of pollution reduces treatment costs. Any reduction of sedimentation reduces the	**$521,000**

Project Title	Project Sponsor	Functional Area	Project Summary	Recommended Grant Amount
			resulting reduction in carrying capacity at the Reservoir. Through integration with partners and to bring a more holistic approach, the project has been expanded to include field surveys, monitoring, bio assessments, education, and stewardship components. Education elements include outreach to private land owners and 3 Indian Tribes in the area to reduce pollutant loading and better manage watershed lands.	
Turf Replacement and Agricultural Irrigation Efficiency Program	San Diego County Water Authority	Water Supply – Conservation	This regional program will promote outdoor water use efficiency in the residential and commercial sectors by providing financial incentives to replace turf grass with water-wise plant material and to upgrade overhead sprinkler irrigation systems to low-application rate/high-efficiency irrigation systems. The program will also offer incentives to agricultural customers to retrofit on-site potable irrigation systems as well as water use “audits” geared to give information and assistance to growers in their efforts to adopt techniques and methods that increase water use efficiency without jeopardizing crop productivity. All qualified retail water customers within the San Diego County Water Authority’s service area, as well as the California American Water service area of Coronado and Imperial Beach, will be eligible to participate in the program.	**$538,000**
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II	County of San Diego	Water Quality/ Stormwater	This project is the continuation of the Implementing Nutrient Management in the Santa Margarita River Watershed - Phase I. The project aims to continue to facilitate the Stakeholder Advisory Group (begun during Phase I), continue the core monitoring and special studies to address data gaps identified by stakeholders to achieve project objectives, and to partner with the RWQCB staff in the development of nutrient WQOs for the Santa Margarita River and Estuary.	**$980,000**
Chollas Creek Integration Project – Phase II	Jacobs Center for Neighborhood Innovation	Water Quality/ Stormwater	The project improves water quality through: engineering modifications to slow creek flow and prevent erosion and flooding; contaminate uptake and natural filtration through restoration with native species of six acres; obtaining a streamlined process for CEQA and regional permitting that supports the on-going, long-term invasive removal and restoration; community engagement in social values research; and citizen science and water quality sampling. Phase II completes construction activities and habitat restoration delineated in Phase I at Northwest Village.	**$500,000**
Grant Administration	San Diego County Water Authority	--	--	**$309,000**
Total				**$10,300,000**

SAN DIEGO
Integrated Regional
Water Management

Joint Public Workshop & Regional Advisory Committee (RAC) Meeting #40

December 5, 2012
9:00 am – 12:00 pm
San Diego County Water Authority Board Room
4677 Overland Ave., San Diego CA 92123

DRAFT NOTES

Attendance

RAC Members
Kathleen Flannery, County of San Diego (Chair)
Arne Sandvik, Padre Dam Municipal Water District
Cathy Pieroni for Marsi Steirer, City of San Diego
Crystal Najera, City of Encinitas
Dennis Bowling, Floodplain Management Association
Jennifer Sabine, Sweetwater Authority
Katie Levy, San Diego Association of Governments
Linda Flournoy, Planning and Engineering for Sustainability
Mark Umphres, Helix Water District
Mike Thornton, San Elijo Joint Powers Authority
Mo Lahsaie, City of Oceanside
Rob Hutsel, San Diego River Park Foundation
Toby Roy for Ken Weinberg, San Diego County Water Authority
Travis Pritchard, San Diego CoastKeeper

RWMG Staff
Goldy Thach, City of San Diego
Loisa Burton, San Diego County Water Authority
Mark Stadler, San Diego County Water Authority
Sheri McPherson, County of San Diego

Interested Parties to the RAC
Andrea Demich, City of San Diego
Bill Pearce, City of San Diego
Bob Kennedy, Otay Water District/Metro JPA
Carmel Wong, City of San Diego
Crystal Mohr, RMC Water and Environment

Dave Ahles, City of Carlsbad
Deena Raver, County of San Diego
Eduardo Pech, California Department of Water Resources
Jeff Marchand, Fallbrook Public Utilities District
Jennifer Hazard, San Diego Regional Water Quality Control Board
Joey Randall, Olivenhain Municipal Water District
Julia Chunn-Heer, Surfrider
Kelly Craig, San Diego Zoological Society
Leigh Johnson, University of California Cooperative Extension
Michelle Lande, University of California Cooperative Extension
Joan Isaacson, Katz and Associates
Rosalyn Prickett, RMC Water and Environment

Welcome and Introductions

Ms. Kathleen Flannery (chair), County of San Diego, welcomed everyone to the meeting. Introductions were made around the room.

DWR Update

Eduardo Pech from the California Department of Water Resources (DWR) provided an update to the RAC. Mr. Pech noted that the final Proposal Solicitation Packages (PSPs) for Proposition 84 Implementation Grants and Proposition 1E Stormwater and Flood Grants have been released by DWR. Due to the later than anticipated release of the PSPs, the deadlines for each grant have been pushed back – the Proposition 84 Round 2 Grant Applications are now due March 29, 2013 and the Proposition 1E Grant Applications are now due February 1, 2013. DWR anticipates that funding awards for Proposition 84 will be released in October of 2013, and that funding awards for Proposition 1E will be released in August of 2013.

Grant Administration

Proposition 84 Planning Grant Status

Ms. Loisa Burton, San Diego County Water Authority (CWA), provided an update on the status of the Proposition 84 Planning Grant, noting that as of July 2012 approximately 20% of grant funding had been spent. Due to substantial work that has occurred since July, CWA anticipates that the next quarterly report and invoice to DWR will demonstrate that a significant amount of additional costs have been incurred.

Proposition 84 Implementation Grant Status

Ms. Burton noted that the Proposition 84-Round 1 grant agreement was signed by CWA's General Manager on December 3rd. The agreement will return to DWR for final signatures, and will likely be executed by mid-January 2013. CWA will provide draft agreements to the local project sponsors so that they can begin working internally on efforts to execute their individual grant contracts with CWA.

Proposition 50 Implementation Grant Status

Ms. Burton also provided an overview on the status of the Prop 50 Implementation Grant, noting that three major amendments are currently being processed. Once one of these pending amendments (Amendment No. 5) has been processed, CWA will be able to close out all completed projects. To date, four projects have been completed. In addition, the Zoological Society recently submitted the first post-performance report for the Biological Infiltration and Weltand Creation Program. These reports will be due to DWR every year for the next ten years.

Questions/Comments

- When CWA sends out the draft LPS agreements, will they be ready to sign? In other words, are the agreements ready to be executed?
    - *No. The LPS agreements will not be considered ready for execution until CWA has a fully executed contract with DWR. The draft LPS agreements are being sent so that all LPS organizations can begin discussing the agreements internally, and determining the next steps that they need to complete to finalize execution within their internal organizations.*

Project Completion Report: City of San Diego Infiltration Pit Phase 1 – Memorial Park Project

Andrea Demich from the City of San Diego's Transportation and Storm Water Department provided an overview of the Memorial Park Infiltration Pit Project, which was recently completed and received Proposition 50 Implementation Grant Funding through the San Diego IRWM Program. Ms. Demich noted that the project was the City's very first permanent BMP project, and therefore provided many lessons learned to the City. She noted that specifically, onsite monitoring was very valuable in that without monitoring, the City would not have been able to accurately assess project results.

Questions/Comments

- Did the City consider if compaction from heavy construction equipment was a potential cause of reduced infiltration seen in the Memorial Park Infiltration Pit Project?
    - *Yes, the City has considered this as a potential issue. In addition, the City believes that the soil monitoring that was done prior to project implementation was not adequate. This monitoring only took into consideration the top layers of soil where BMPs would be installed, and did not consider infiltration at lower depths.*

San Diego IRWM Plan Update

Sheri McPherson, San Diego County, provided an overview of the 2013 San Diego IRWM Plan Update. This joint meeting of the RAC and the Public will include a discussion of the IRWM Vision, Mission, Objectives, and Targets, which are being revised as part of the IRWM Plan Update. Ms. McPherson noted that a specific workgroup (the Priorities and Metrics Workgroup) was convened to evaluate these components of the IRWM Plan. Ms. McPherson provided an overview of the IRWM Vision, which was modified by the Priorities and Metrics Workgroup for grammatical purposes, but was not modified from a content point of view.

The updated Vision is as follows:

"An integrated, balanced, and consensus-based approach to ensuring the long-term sustainability of ~~San Diego's~~ the Region's water supply, water quality, and natural resources."

Questions/Comments

- Do we want the IRWM Vision to only focus on water? Suggest that the vision be expanded to consider other aspects of regional planning that are necessary to ensuring sustainability – this would include things like transportation and land use planning, etc.
  - *Those things are assumed to be included within the vision, to the extent that they impact water resources. The focus is water supply, water quality, and natural resources, but it is assumed that all factors that would impact these aspects of water management are also included in the vision.*

Ms. McPherson then provided an overview of the IRWM Mission, which was not modified by the Priorities and Metrics Workgroup. The IRWM Mission is as follows:

"To develop and implement an integrated strategy to guide the San Diego Region toward protecting, managing, and developing reliable and sustainable water resources. Through a stakeholder-driven and adaptive process, the Region can develop solutions to water-related issues and conflicts that are economically and environmentally preferable, and that provide equitable resource protection for the entire Region."

Questions/Comments

- Again, wouldn't it be better to expand the mission beyond specific water issues? We need to promote regional sustainability.

The RAC and members of the public discussed the following potential revisions to the IRWM Mission to take into account regional sustainability:

"To develop and implement an integrated strategy to guide the San Diego Region toward protecting, managing, and developing reliable and sustainable water resources. Through a stakeholder-driven and adaptive process, the Region can develop solutions to water-related issues and conflicts that are economically and environmentally preferable, and that provide equitable resource protection for the sustainability of the entire Region."

Ms. McPherson then provided an overview of the IRWM Goals. There were four goals in the original IRWM Plan, and the Priorities and Metrics Workgroup discussed revising three of the four goals. The revised IRWM Goals are as follows:

1. ~~Optimize water supply~~ Improve the reliability and sustainability of regional water supplies.
2. Protect and enhance water quality.
3. ~~Provide stewardship~~ Protect and enhance of our watersheds and natural resources.
4. ~~Coordinate and integrate~~ Promote and support integrated water resource management.

Next, Ms. McPherson provided an overview of the IRWM Objectives. The Priorities and Metrics Workgroup has suggested many revisions to the IRWM Objectives. Specifically, they suggested the addition of two new objectives (A and K), and revisions to four existing objectives (B, E, G, and H).

Further, the Priorities and Metrics Workgroup has suggested that a new pass/fail rule be implemented, which would require that to be included in the San Diego IRWM Plan, all implementation projects must contribute to the attainment of Objective A, Objective B, and at least one other objective. The revised IRWM Objectives are as follows:

A. Encourage the development of integrated solutions to address water management issues and conflicts.

B. Maximize stakeholder/community involvement and stewardship of water resources, emphasizing education and outreach.

C. Effectively obtain, manage, and assess water resource data and information.

D. Further scientific and technical foundation of water management.

E. Develop and maintain a diverse mix of water resources, encouraging their efficient use and development of local water supplies.

F. Construct, operate, and maintain a reliable infrastructure system.

G. Enhance natural hydrologic processes to reduce the effects of hydromodification and encourage integrated flood management. ~~Reduce the negative effects on waterways and watershed health caused by hydromodification and flooding.~~

H. Effectively reduce sources of pollutants and environmental stressors to protect and enhance human health and safety and the environment.

I. Protect, restore, and maintain habitat and open space.

J. Optimize water-based recreational opportunities.

K. Effectively address climate change through adaptation or mitigation in water resource management.

Rosalyn Prickett, RMC Water and Environment (RMC) explained that, in conjunction with the IRWM Objectives, there are a series of Targets and Metrics within the IRWM Plan that essentially are a way to measure the attainment of each objective. Targets are defined as measureable and tangible actions to achieve the objectives. Metrics are defined as measurements that can be used to evaluate the actions – they may be quantitative or qualitative. The IRWM Targets and Metrics were substantially revised by the Priorities and Metrics Workgroup, and were provided to the RAC and members of the public in a handout (refer to the San Diego IRWM website to obtain a copy of the handout: http://sdirwmp.org/regional-advisory-committee).

Questions/Comments

- General:
    - Need to better-define Objective A and Objective. What water management issues and conflicts are we referring to?
    - If Objective A and Objective B are mandatory, they need to be very clear. Better defined.
    - The mandatory requirement for Objective A and Objective B is concerning. It seems potentially limiting. On the other hand, if these are broad enough that all projects will meet them, then what is the point?
    - Are we including water conservation as a "water supply"? *Yes.*

  - Suggest looking beyond water management issues (Objective A, etc.) and expand to encompass broader sustainability.
- Regarding Objective E:
  - Does this objective only pertain to local water resources? If so, Target #3 pertaining to imported water does not make sense.
  - Need to include within the targets that our water supply (Colorado River) faces substantial potential threat due to Quagga mussels.
  - Target #4 and Target #5 look too similar. Also, one of these needs to clarify that groundwater issues have a lot to do with infiltration. Infiltration should be included in at least one of these targets.
  - Concerned with the wording of Target #5. We do not want to just sustain existing groundwater levels, because some groundwater basins are already overdrafted.
- Regarding Objective F:
  - Add something about soil humidity to Target #3.
  - I think that we should expand Target #2 to include stormwater capture, not just transport.
- Regarding Objective H:
  - The language regarding the public health component is confusing. This needs to be modified for clarity.
  - Target #3: we should consider more than the volume of fertilizer, we need to consider the type as well (organic vs. chemical).
  - Target #3: we should add solid waste – trash is just as much of a concern as pathogens, nutrients, and sediments.
  - Target #4: this target, regarding sanitary sewer overflows, seems beyond the purview of the San Diego IRWM Program.
  - Target #1: the metrics for this target should include trash prevention, not just removal.
  - Regarding the comment above – do not want to lose trash removal. This is very important. Should include both prevention and removal.
  - Target #5 regarding LID should be modified to reflect that we don't want to just implement LID, we want to be innovative and focus on new solutions. *This comment will be incorporated into Objective D.*
- Regarding Objective I:
  - Consider sediment and trash impacts. Add into Target #1: remove, reduce, and control sources of sediment and trash.

- Regarding Objective J:
    - Target #1: what is the difference between an underserved community and a disadvantaged community?
        - *An underserved community is one that does not receive services (in this case, water/wastewater services) a disadvantaged community is one that is economically disadvantaged.*
    - Target #2: need to include trees and urban forests as a metric.
    - Need to include interpretation/signage: not just about the quantity of recreation, but the quality.
    - Need to consider factoring ADA requirements into recreation – consider adding a metric for wheelchair-accessible trails, etc.
- Regarding Objective K:
    - Suggest modifying the objective to include greenhouse gas reduction, mitigation, and adaptation.
    - Target #3: Consider removing language about "neutralizing" GHG emissions, and instead focus on reducing GHG emissions and the embedded energy in water supplies.
    - Target #3: recommend deleting the parentheses.

Prop 84-Round 2 Implementation Grant Opportunity

Travis Pritchard, Chair of the Proposition 84-Round 2 Project Selection Workgroup, provided an overview of activities taken by the workgroup to reach consensus on a list of recommended projects for Prop 84-Round 2 Implementation Grant funding. Mr. Pritchard noted that 36 projects were submitted to the San Diego IRWM Project Database, for a total funding request of approximately $51 million. The workgroup had to come up with a package of projects that would sum to $9,991,000, leaving an additional $309,000 for grant administration (a total of $10,300,000 is available to the San Diego Region in this round of funding). Mr. Pritchard then explained the RAC members who comprised the Project Selection Workgroup. He also explained that the workgroup was organized into five "caucuses," including the Regional Water Management Group (RWMG), Water Retailers, Water Quality, Watershed/Natural Resources, and At-Large. The workgroup members contributed a substantial amount of time in November – five total meetings and 24 total hours – to arrive at consensus on the proposed package of projects.

Mr. Pritchard noted that the selection process included six major steps, as follows:

1. Consultant team applied RAC-approved project selection criteria to all projects. Projects were scored then grouped into "Tier 1" and "Tier 2" (top 50% and bottom 50%).
2. Workgroup evaluated Tier 1 and Tier 2 projects, and each workgroup member had the opportunity to nominate one Tier 2 project to Tier 1.
3. Workgroup evaluated Tier 1 projects, directing project-related questions to the consultant team.
4. Workgroup identified a short list of Tier 1 projects (12), which would go through interviews.
5. Workgroup conducted all-day interviews of all 12 short-listed projects.

6. Workgroup used information from the interviews, project database, and any clarifications provided by proponents to make their ultimate funding recommendation.

The workgroup did, ultimately arrive at consensus, recommending the following list of projects for Prop 84-Round 2 Implementation Grant Funding:

No.	Title	Proposed Funding Amount
496	Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility	$2,113,000
490	Rural Disadvantaged Community (DAC) Partnership Project- Phase II	$1,887,000
494	North San Diego County Regional Recycled Water Project (NSDCRRWP) - Phase II	$3,452,000
513	Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies	$521,000
497	Turf Replacement and Agricultural Irrigation Efficiency Program	$538,000
188	Implementing Nutrient Management in the Santa Margarita River Watershed - Phase II	$980,000
489	Chollas Creek Integration Project Phase II	$500,000
Total		**$9,991,000**

Rosalyn Prickett added that all projects were recommended for partial funding (i.e. a funding amount less than what was originally requested). The consultant team has checked with all project sponsors, and they will all be able to accept the awards and move forward with reduced funding awards.

Questions/Comments

- Thank you to all SDIRWM stakeholders for submitting projects – there were a lot of great projects!
- I notice that the projects seem light on the flood control aspects. Was this seen as an issue?
  - *The project selection workgroup felt that flood control projects would be better suited to Proposition 1E grants. Please note, however, that the Chollas Creek Integration Project Phase II will have flood control benefits.*
- Were any projects that initially fell into the Tier 2 project list ultimately funded?
  - *Yes. Project 496 and Project 188 were initially included in Tier 2.*

The RAC then voted on the funding package. Prior to the vote, Mark Stadler noted that due to the RAC transition, during which many existing RAC members have decided to no longer participate on the RAC, there was not a quorum. Further, Dennis Bowling abstained from voting due to his participation in the Chollas Creek Integration Project Phase II. The RAC unanimously voted to accept the Project Selection Workgroup's proposed grant package.

RAC Reorganization

Cathy Pieroni, City of San Diego, provided an overview of the next steps regarding reorganization of the RAC. Ms. Pieroni noted that today the RAC will be asked to vote on the approach, and, pending

RAC approval, will select members to continue on the reorganized RAC. The RAC unanimously approved the Selection Guidelines for RAC Members.

Rosalyn Prickett led the RAC Reorganization exercise, which included pulling names out of a hat at random. The following is a summary of the results of this exercise:

Continuing Members (2013-2014)

- Ken Weinberg (SDCWA)
- Marsi Steier (City of San Diego)
- Kathy Flannery (County of San Diego)
- Mark Umphres (Helix Water District)
- Cari Dale (City of Oceanside)
- Bill Hunter (Santa Fe Irrigation District)
- Anne Bamford (Industrial Environmental Association)
- Mike Thornton (San Elijo Joint Powers Authority)
- Kirk Ammerman (City of Chula Vista)
- Rob Hutsel (San Diego River Park Foundation)
- Lynne Baker (San Dieguito River Valley Conservancy)
- Linda Flournoy (Planning and Engineering for Sustainability)
- Dave Harvey (Rural Community Assistance Corporation)
- Travis Pritchard (San Diego CoastKeeper)
- Dennis Bowling (Floodplain Management Association)

Former RAC Members, Encouraged to Re-Apply!

- Jim Smyth (Sweetwater Authority)
- Albert Lau (Padre Dam Municipal Water District)
- Rob Roy (La Jolla Band of Luiseno Indians)
- Eric Larson (San Diego County Farm Bureau)
- Katie Levy (San Diego Association of Governments)

Toby Roy, San Diego County Water Authority, provided an overview of the RAC Conflict of Interest Policy. Ms. Roy noted that this policy follows the principles but not the legal implications associated with Fair Political Practices Commission requirements. The RAC members voted, and unanimously agreed to adopt the RAC Conflict of Interest Policy.

Questions/Comments

- Can you please send out the RAC application via email?
  - *Yes. The application will be sent out to all SDIRWM stakeholders.*

San Diego IRWM Workgroup Reports

Rosalyn Prickett provided an overview of the IRWM Plan Update Workgroups, noting that the Land Use Workgroup, Climate Change Workgroup, and Governance and Financing Workgroup are now complete. The Regulatory Workgroup recently held its final meeting, and the Priorities and Metrics Workgroup will hold its final meeting in December 2012. As such, workgroup reports will be held during the next RAC meeting, and will include information regarding the ultimate recommendations of each workgroup, as applicable.

Next Joint Public Workshop & RAC Meeting – February 6, 2013

The next joint public workshop and RAC meeting will be held on Wednesday February 6, 2013 from 9:00 a.m. to 12:00 p.m. at San Diego County Water Authority Board Room (4677 Overland Ave., San Diego, CA 92123).

RAC meetings to be held in 2013 are scheduled for the following dates:

- February 6
- April 3
- June 5
- August 7
- October 2
- December 4

Public Comments

Ms. Kathleen Flannery inquired if there were any public comments. No members of the public had comments.

SAN DIEGO Integrated Regional Water Management

Priorities & Metrics Workgroup and RAC-Vetted Proposed Vision, Mission, Goals, and Objectives

November 28, 2012

Vision:

An integrated, balanced, and consensus-based approach to ensuring the long-term sustainability of the Region's water supply, water quality, and natural resources.

Mission:

To develop and implement an integrated strategy to guide the Region toward protecting, managing, and developing reliable and sustainable water resources. Through a stakeholder-driven and adaptive process, the Region can develop solutions to water-related issues and conflicts that are economically and environmentally preferable, and that provide equitable resource protection for the entire Region.

Goals:

1. Improve the reliability and sustainability of regional water supplies.
2. Protect and enhance water quality.
3. Protect and enhance our watersheds and natural resources.
4. Promote and support integrated water resource management.

Objectives, Targets, and Metrics:

To be included in the San Diego IRWM Plan, all implementation projects must contribute to the attainment of Objective A, Objective B, and at least one other objective.

Objective A: Encourage the development of integrated solutions to address water management issues and conflicts.

Objective B: Maximize stakeholder/community involvement and stewardship of water resources, emphasizing education and outreach.

Objective C: Effectively obtain, manage, and assess water resource data and information.

Objective D: Further scientific and technical foundation of water management.

Objective E: Develop and maintain a diverse mix of water resources, encouraging their efficient use and development of local water supplies.

Objective F: Construct, operate, and maintain a reliable infrastructure system.

Objective G: Enhance natural hydrologic processes to reduce the effects of hydromodification and encourage integrated flood management.

Objective H: Effectively reduce sources of pollutants and environmental stressors to protect and enhance human health, safety, and the environment.

Objective I: Protect, restore, and maintain habitat and open space.

Objective J: Optimize water-based recreational opportunities.

Objective K: Effectively address climate change through adaptation or mitigation in water resource management.

Attachment 2

Adopted Plan and Proof of Formal Adoption

Attachment 2

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Adopted Plan and Proof of Formal Adoption

Attachment 2 consists of the following items:

✓ **Proof of Formal Adoption.** The 2007 San Diego IRWM Plan was adopted by all three Regional Water Management Group (RWMG) entities, as well as project proponents. Proof of formal adoption is included as Appendix 2-1.

✓ **Appendix 2-1.** This appendix contains formal resolutions for each of the RWMG entities and the project sponsors which indicate formal adoption of the IRWM Plan.

The RWMG agencies – San Diego County Water Authority, County of San Diego, and City of San Diego – formally adopted the 2007 San Diego IRWM Plan as follows:

- The San Diego County Water Authority Board of Directors adopted the Plan at a public meeting held on October 25, 2007, and amended on January 24, 2008 and January 13, 2010;
- The County of San Diego Board of Supervisors adopted the Plan at a public meeting held on November 7, 2007;
- The City Council for the City of San Diego adopted the Plan at a public meeting held on December 18, 2007.

The project sponsors that comprise this proposal also adopted the IRWM Plan as follows:

- The Board of Directors for the Rural Community Assistance Corporation adopted the Plan on October 28, 2010;
- The Olivenhain Municipal Water District Board of Directors adopted the Plan at a public meeting held on November 17, 2010;
- The Jacobs Center for Neighborhood Innovation adopted the Plan on December 17, 2010.
- The WateReuse Research Foundation adopted the Plan at a Board of Directors Meeting held on March 8, 2013.
- The San Diego River Park Foundation adopted the Plan at a Board of Directors Meeting held on March 14, 2013.

Appendix 2-1 contains formal resolutions for each of the RWMG entities and the project proponents, which indicate formal adoption of the IRWM Plan.

This attachment does not contain documentation that the San Diego IRWM Plan was adopted consistent with CWC §10543, because the San Diego Region is not establishing eligibility with an IRWM Plan meeting current 2012 *IRWM Grant Program Guidelines* provisions. Rather, as described in Attachment 1 and Attachment 12, the RWMG has entered into a binding agreement with DWR to amend the 2007 IRWM Plan according to the terms of the Proposition 84 Planning Grant contract that was executed with DWR on September 16, 2011 (Agreement No. 4600009346). In accordance with the terms of this agreement, the 2013 IRWM Plan Update will be completed by October 31, 2013.

Attachment 1

RESOLUTION No. _2007-_24

RESOLUTION OF THE BOARD OF DIRECTORS OF THE SAN DIEGO COUNTY WATER AUTHORITY ADOPTING THE 2007 SAN DIEGO INTEGRATED REGIONAL WATER MANAGEMENT PLAN

WHEREAS, the San Diego Regional Water Management Group (RWMG), in close cooperation with the Regional Advisory Committee (RAC), has drafted the first San Diego Integrated Regional Water Management (IRWM) Plan to optimize water supply reliability, protect and enhance of water quality, provide stewardship of natural resources and coordinate and integrate water resource management in the region; and

WHEREAS, the 2007 San Diego IRWM Plan defines the San Diego Region as the 11 parallel and similar hydrologic units with the county that discharge to coastal water; and

WHEREAS, the San Diego IRWM Plan establishes the plan's mission, vision, goals, objectives and regional priorities; and

WHEREAS, the San Diego IRWM Plan will form the foundation of long-term IRWM planning in the region, fostering coordination, collaboration and communication among governmental and non-governmental water stakeholders; and

WHEREAS, achieving IRWM grant funding will help to achieve the regional water supply goals established in the Water Authority's 2005 Urban Water Management Plan; and

WHEREAS, having an IRWM Plan in place will position the San Diego Region to compete for funding opportunities; and

WHEREAS, the Water Authority Board of Directors is the decision-making body for the Water Authority; and

WHEREAS, adoption of the San Diego IRWM Plan by the San Diego County Water Authority Board of Directors is a required element of the San Diego Region's application for Proposition 50, Chapter 8 funding; and

WHEREAS, the Water Authority Board of Directors accepted the public review draft IRWM Plan at its July 26, 2007 meeting; and

WHEREAS, on September 19, 2007, the RAC recommended that the Water Authority Board adopt the San Diego IRWM Plan; and

WHEREAS, the Board of Directors has considered the reports submitted by Water Authority staff on IRWM planning dated February 14, 2007; May 16, 2007; July 18, 2007; and September 19, 2007.

NOW, THEREFORE, the Board of Directors of the San Diego County Water Authority resolves the following:

1. The foregoing facts are true and correct.

2. The Board of Directors adopts the final draft of the 2007 San Diego Integrated Regional Water Management Plan.

PASSED, APPROVED AND ADOPTED, this 25th day of October, 2007, by the following vote:

AYES: Unless noted below all Directors voted aye.

NOES:

ABSTAIN: Barrett and Pocklington

ABSENT: Brammell, Craver, Croucher, Lewinger, Martin (p), Muir, Petty and Price

Fern M. Steiner
Chair

ATTEST:

Mark W. Watton
Secretary

I, Doria F. Lore, Clerk of the Board of the San Diego County Water Authority, certify that the vote shown above is correct and this Resolution No. 2007- 24 was duly adopted at the meeting of the Board of Directors on the date stated above.

Doria F. Lore
Clerk of the Board

RESOLUTION No. _2008-01

RESOLUTION OF THE BOARD OF DIRECTORS OF THE SAN DIEGO COUNTY WATER AUTHORITY ADOPTING THE AMENDED 2007 SAN DIEGO INTEGRATED REGIONAL WATER MANAGEMENT PLAN

WHEREAS, the San Diego Regional Water Management Group (RWMG), in close cooperation with the Regional Advisory Committee (RAC), has drafted the first San Diego Integrated Regional Water Management (IRWM) Plan to optimize water supply reliability, protect and enhance of water quality, provide stewardship of natural resources and coordinate and integrate water resource management in the region; and

WHEREAS, the 2007 San Diego IRWM Plan defines the San Diego Region as the 11 parallel and similar hydrologic units with the county that discharge to coastal water; and

WHEREAS, the San Diego IRWM Plan establishes the plan's mission, vision, goals, objectives and regional priorities; and

WHEREAS, the San Diego IRWM Plan will form the foundation of long-term IRWM planning in the region, fostering coordination, collaboration and communication among governmental and non-governmental water stakeholders; and

WHEREAS, achieving IRWM grant funding will help to achieve the regional water supply goals established in the Water Authority's 2005 Urban Water Management Plan; and

WHEREAS, having an IRWM Plan in place will position the San Diego Region to compete for funding opportunities; and

WHEREAS, the Water Authority Board of Directors is the decision-making body for the Water Authority; and

WHEREAS, adoption of the San Diego IRWM Plan by the San Diego County Water Authority Board of Directors is a required element of the San Diego Region's application for Proposition 50, Chapter 8 funding; and

WHEREAS, on September 19, 2007, the RAC recommended that the Water Authority Board adopt the San Diego IRWM Plan; and

WHEREAS, the Water Authority Board of Directors adopted the San Diego IRWM Plan at its October 25, 2007 meeting; and

WHEREAS, subsequent to October 25, 2007, the San Diego IRWM Plan has been amended; and

WHEREAS, the Board of Directors has considered the reports submitted by Water Authority staff on IRWM planning dated February 14, 2007; May 16, 2007; July 18, 2007; September 19, 2007; October 25, 2007; and January 24, 2008.

NOW, THEREFORE, the Board of Directors of the San Diego County Water Authority resolves the following:

1. The foregoing facts are true and correct.

2. The Board of Directors adopts the 2007 San Diego Integrated Regional Water Management Plan, as amended, dated January 24, 2008, and on file with the clerk of the board.

PASSED, APPROVED AND ADOPTED, this 24th day of January, 2008, by the following vote:

AYES: Unless otherwise noted, all Directors present voted aye.

NOES:

ABSTAIN:

ABSENT: Arant (p), Bowersox, Brammell, Craver, Ferguson, and Ken Williams

Fern M. Steiner
Chair

ATTEST:

Mark W. Watton
Secretary

I, Doria F. Lore, Clerk of the Board of the San Diego County Water Authority, certify that the vote shown above is correct and this Resolution No. 2008-01 was duly adopted at the meeting of the Board of Directors on the date stated above.

Doria F. Lore
Clerk of the Board

RESOLUTION No. 10-002

RESOLUTION OF THE SAN DIEGO COUNTY BOARD OF SUPERVISORS AMENDING THE 2007 SAN DIEGO INTEGRATED REGIONAL WATER MANAGEMENT PLAN

WHEREAS, the San Diego Regional Water Management Group (RWMG), in close cooperation with the Regional Advisory Committee (RAC), drafted the first San Diego Integrated Regional Water Management (IRWM) Plan to optimize water supply reliability, protect and enhance of water quality, provide stewardship of natural resources and coordinate and integrate water resource management in the region; and

WHEREAS, the San Diego IRWM Plan is the foundation of long-term IRWM planning in the region, fostering coordination, collaboration, and communication among governmental and non-governmental water stakeholders; and

WHEREAS, carrying out the San Diego IRWM Plan and obtaining IRWM grant funding will help to achieve the County of San Diego Strategic Plan Environment Initiative; and

WHEREAS, the County of San Diego Board of Supervisors is the decision-making body for the County of San Diego; and

WHEREAS, on September 19, 2007, the RAC recommended that the RWMG governing bodies adopt the San Diego IRWM Plan; and

WHEREAS, the County of San Diego Board of Supervisor adopted the San Diego IRWM Plan at its November 7, 2007 meeting; and

WHEREAS, the RWMG would like to amend the San Diego IRWM Plan to facilitate the addition and revision of projects to the plan; and

WHEREAS, amendment of the San Diego IRWM Plan by the San Diego County Board of Supervisors will update the San Diego IRWM Plan in preparation for the San Diego Region's application for Proposition 84 and other potential funding; and

NOW, THEREFORE, LET IT BE RESOLVED that the County of San Diego Board of Supervisors resolves the following:

1. The 2007 San Diego Integrated Regional Water Management Plan is amended by the revision of the process for managing the IRWM project list as shown in Attachment 1.
2. Staff is directed to incorporate the amendment made by the resolution into the IRWM Plan.

APPROVED AS TO FORM AND LEGALITY
COUNTY COUNSEL

BY Tom Bosworth
SENIOR DEPUTY

ON MOTION of Supervisor Roberts, seconded by Supervisor Horn, the above Resolution was passed and adopted by the Board of Supervisors, County of San Diego, State of California, on this 13th day of January, 2010, by the following vote:

AYES: Cox, Jacob, Slater-Price, Roberts, Horn

\- - -

STATE OF CALIFORNIA)
County of San Diego)SS

I hereby certify that the foregoing is a full, true and correct copy of the Original Resolution entered in the Minutes of the Board of Supervisors.

THOMAS J. PASTUSZKA
Clerk of the Board of Supervisors

By: Nancy Vizcarra
Nancy Vizcarra, Deputy

BOARD OF SUPERVISORS
COUNTY OF SAN DIEGO
SAN DIEGO COUNTY, CALIFORNIA

No. 10-002

01/13/2010 (8)

2007 San Diego IRWM Plan
New text for Section G (Implementation):

G.5 Managing the IRWM Project List
Periodic updates to the list of water management projects must be made as new funding opportunities arise. Updating the project list will allow additional projects to be added, as project concepts are refined to address changing conditions and needs in the Region. This opportunity also will enable the project sponsors to revise their project submittals as necessary.

The San Diego IRWM project list is included in the Plan as Appendix 5. Any sponsor may submit a project for inclusion in the Plan. The Regional Water Management Group (RWMG) will decide whether to add a submitted project to Appendix 5 after reviewing it to ensure it is consistent with the Plan. The RWMG will notify the sponsor of its decision to accept or reject a project. This structure facilitates the addition of projects to the Plan. It also makes it easier for sponsors to add or revise projects, integrate their projects with others, or add additional features so the projects provide multiple benefits.

When the RWMG decides to submit an application for a grant or other funding opportunity, it will work with the Regional Advisory Committee (RAC) to form a technical workgroup that will review the projects in Appendix 5 and recommend which to submit for funding. All grant applications, including projects proposed for funding, will be submitted to the RAC for its consideration and recommendation. The ultimate approval of the application and projects submitted for funding lies with the Board of Directors of the San Diego County Water Authority, the agency authorized to submit grant applications on behalf of the RWMG.

DUP.
(R-2008-369) 107
12/4

RESOLUTION NUMBER R- 303237

DATE OF FINAL PASSAGE DEC 18 2007

A RESOLUTION OF THE COUNCIL OF THE CITY OF SAN DIEGO REQUESTING THAT THE MAYOR ADOPT THE SAN DIEGO INTEGRATED REGIONAL WATER MANAGEMENT PLAN

WHEREAS, the San Diego Regional Water Management Group, consisting of the City of San Diego (City), the County of San Diego (County), and the San Diego County Water Authority (Water Authority) with the close cooperation of the Regional Advisory Committee, has drafted the first San Diego Integrated Regional Water Management (IRWM) Plan to optimize water supply reliability, protect and enhance water quality, provide stewardship of natural resources and coordination and integration of water resource management in the region; and

WHEREAS, California voters in 2002 passed Proposition 50 which authorizes the allocation of $500 million in state funds for local IRWM projects and Proposition 84 in 2006 which authorizes $1 billion in state funds for local IRWM projects with $91 million allocated to the San Diego region with the possibility of receiving $100 million in any unallocated funds; and

WHEREAS, California voters passed Proposition 1E in 2006, which provides $300 million statewide for flood management and storm water projects identified in an IRWM plan; and

WHEREAS, in 2005 the City, County and Water Authority formed, via a Memorandum of Understanding entered into by the City as authorized by the City Council in Resolution No. R-300517 on June 13, 2005, a Regional Water Management Group to create the IRWM plan and to pursue Propositions 50, 84 and 1E grant funding; and

WHEREAS, the San Diego Region has prepared a package of 21 IRWM projects for Proposition 50 Round 2 grant funding, with a total state funding request of $25 million, including 5 IRWM projects funded by the City which are eligible to receive $5.7 million in state funding; and

WHEREAS, the IRWM Plan has been approved by the Regional Advisory Committee and the public in a thirty-day public review; and

WHEREAS, IRWM Plan must be adopted by the City, County and Water Authority by January 1, 2008 to be eligible for Proposition 50 and Proposition 84 grant funding; NOW THEREFORE

BE IT RESOLVED, that the Mayor be authorized to adopt the IRWM plan on behalf of the City.

APPROVED: MICHAEL J. AGUIRRE, City Attorney

By Mark M. Mercer
MARK M. MERCER
Deputy City Attorney

MMM:sb
10/25/07
Or.Dept: Water
R-R-2008-369

R-303237

I hereby certify that the foregoing Resolution was passed by the Council of the City of San Diego, at this meeting of DEC 04 2007.

ELIZABETH S. MALAND
City Clerk

By Mary Zumaya
Deputy City Clerk

Approved: 12.18.07
(date)

JSL
JERRY SANDERS, Mayor

Vetoed: ______________
(date)

____
JERRY SANDERS, Mayor

R- 303237

Appendix 2-1: Proof of Formal Adoption

Passed by the Council of The City of San Diego on DEC 04 2007, by the following vote:

Council Members	Yeas	Nays	Not Present	Ineligible
Scott Peters	☑	☐	☐	☐
Kevin Faulconer	☑	☐	☐	☐
Toni Atkins	☑	☐	☐	☐
Anthony Young	☑	☐	☐	☐
Brian Maienschein	☑	☐	☐	☐
Donna Frye	☑	☐	☐	☐
Jim Madaffer	☑	☐	☐	☐
Ben Hueso	☑	☐	☐	☐

Date of final passage DEC 18 2007.

* Motion to amend Proposition 50 Projects- 13678-yea; 245-nay.

AUTHENTICATED BY:

JERRY SANDERS
Mayor of The City of San Diego, California.

(Seal)

ELIZABETH S. MALAND
City Clerk of The City of San Diego, California.

By Mary Zumaya, Deputy

Office of the City Clerk, San Diego, California

Resolution Number R-303237

7

RESOLUTION OF THE SAN DIEGO COUNTY BOARD OF SUPERVISORS ADOPTING THE 2007 SAN DIEGO INTEGRATED REGIONAL WATER MANAGEMENT (IRWM) PLAN

WHEREAS, the County of San Diego (County), in cooperation with the San Diego County Water Authority (Water Authority) and the City of San Diego (City) has formed a San Diego Regional Water Management Group (RWMG); and

WHEREAS, on December 3, 2003, the Board of Supervisors authorized County staff to apply for and accept grant funds pursuant to Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002; and

WHEREAS, on May 11, 2005, the Board of Supervisors authorized County staff to enter into a Memorandum of Understanding (MOU) with the Water Authority and City to develop a Proposition 50 Integrated Regional Water Management Grant Application; and

WHEREAS, on July 25, 2007, the Board of Supervisors authorized the first amendment to the MOU with the Water Authority and the City; and

WHEREAS, the RWMG, in close cooperation with a Regional Advisory Committee, has drafted the 2007 San Diego Integrated Regional Water Management (IRWM) Plan to optimize water supply reliability, protect and enhance water quality, provide stewardship of natural resources, and coordinate and integrate water resource management in the region; and

WHEREAS, the San Diego IRWM Plan will form the foundation of long-term IRWM planning in the region, fostering coordination, collaboration, and communication among governmental and non-governmental water stakeholders; and

WHEREAS, having an IRWM Plan will position the San Diego Region to compete for funding opportunities presently available under Proposition 50, Proposition 84 (the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006), and Proposition 1E (Disaster Preparedness and Flood Prevention Bond Act of 2006); and

WHEREAS, the County of San Diego Board of Supervisors is the decision-making body for the County of San Diego; and

WHEREAS, adoption of the San Diego IRWM Plan by the San Diego County Board of Supervisors is a requirement of the San Diego Region's application for Proposition 50 and Proposition 84funding and may become a requirement for funding under Proposition 1E and other State propositions, legislation or appropriations; and

WHEREAS, on September 19, 2007, the Regional Advisory Committee recommended that the County of San Diego Board of Supervisors accept the San Diego IRWM Plan.

NOW, THEREFORE, BE IT RESOLVED that the County of San Diego Board of Supervisors resolves the following:

1) The foregoing facts are true and correct.

2) The Board of Supervisors adopts the 2007 San Diego Integrated Regional Water Management Plan.

APPROVED AS TO FORM AND LEGALITY
COUNTY COUNSEL

BY: ____________
SENIOR DEPUTY

Rural Community Assistance Corporation (RCAC)
BOARD RESOLUTION

LET IT RESOLVED, that RCAC's, Board of Directors duly accepts and endorses the 2007 San Diego Regional Integrate Regional Water Management Plan part of the 2006 Proposition 84.

BE IT ALSO RESOLVED, that the RCAC will meet the conditions prescribed by the grant award from the *Integrated Regional Water Management Plan* (*IRWMP*) in the amount of $500,000

.

BE IT ALSO RESOLVED, that the Board of Directors of RCAC authorizes its officers to execute and attest all necessary papers, documents, and applications related to the foregoing.

BE IT FURTHER RESOLVED, that Stanley Keasling, RCAC chief executive officer, is authorized on behalf of the RCAC Board of Directors to execute all ascpects of this grant request.

I, Robert Rendon, Secretary of the RCAC Board of Directors, do hereby certify that the above is a true and correct copy of a resolution adopted at the meeting of the Board of Directors of RCAC on October 28, 2010, at which a quorum was present and voted.

____

Robert Rendon, Secretary

RESOLUTION NO. 2010-35

RESOLUTION OF THE OLIVENHAIN MUNICIPAL WATER DISTRICT BOARD OF DIRECTORS ADOPTING THE SAN DIEGO INTEGRATED REGIONAL WATER MANAGEMENT PLAN

WHEREAS, the San Diego Regional Water Management Group (RWMG), comprised of the San Diego County Water Authority, City of San Diego, and County of San Diego, has collaborated with the Regional Advisory Committee (RAC), comprised of water management stakeholders from throughout the San Diego region, to draft the 2007 San Diego Integrated Regional Water Management (IRWM) Plan; and

WHEREAS, the 2007 San Diego IRWM Plan seeks to optimize water supply reliability, protect and enhance water quality, provide stewardship of natural resources, and coordinate and integrate water resource management within the region; and

WHEREAS, the San Diego IRWM Plan forms the foundation of long-term IRWM planning in the region, fostering coordination, collaboration, and communication among governmental and non-governmental water management stakeholders; and

WHEREAS, the State of California encourages integrated water resource planning on a regional basis through IRWM Plans and by conditioning certain existing and possibly future grant funding programs – including Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Public Resources Code section 75001 et seq.) – to activities contained in IRWM Plans;

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of Olivenhain Municipal Water District hereby adopts the 2007 San Diego Integrated Regional Water Management Plan and is committed to continued development and implementation of the Plan to support water resources management in the San Diego region, and

BE IT FURTHER RESOLVED that we encourage the California Department of Water Resources to fully fund the grant applications that are prepared as a result of this Plan.

PASSED, ADOPTED AND APPROVED at a regular meeting of the Board of Directors of Olivenhain Municipal Water District held on Wednesday, November 17, 2010.

Edmund K. Sprague, President
Board of Directors
Olivenhain Municipal Water District

RESOLUTION NO. 2010-35 *continued*

ATTEST:

Jacob J. Krauss, Secretary
Board of Directors
Olivenhain Municipal Water District

BOARD OF DIRECTORS OF JACOBS CENTER FOR NEIGHBORHOOD INNOVATION

A RESOLUTION OF ADOPTION FOR THE SAN DIEGO INTEGRATED REGIONAL WATER MANAGEMENT PLAN

WHEREAS the San Diego Regional Water Management Group (RWMG), comprised of the San Diego Water Authority, City of San Diego, and County of San Diego, has collaborated with the Regional Advisory Committee (RAC), comprised of water management stakeholders from throughout the San Diego region, to draft the 2007 San Diego Integrated Regional Water Management (IRWM) Plan; and

WHEREAS the 2007 San Diego IRWM Plan seeks to optimize water supply reliability, protect and enhance water quality, provide stewardship of natural resources, and coordinate and integrate water resource management within the region; and

WHEREAS the San Diego IRWM Plan forms the foundation of long-term IRWM planning in the region, fostering coordination, collaboration, and communication among governmental and non-governmental water management stakeholders; and

WHEREAS the State of California encourages integrated water resource planning on a regional basis through IRWM Plans and by conditioning certain existing and possibly future grant funding programs – including Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Public Resources Code section 75001 *et seq.*) – to activities contained in IRWM Plans;

NOW THEREFORE BE IT RESOLVED that the Jacobs Center for Neighborhood Innovation adopts the 2007 San Diego Integrated Regional Water Management Plan and is committed to continued development and implementation of the Plan to support water resources management in the San Diego region, and

BE IT FURTHER RESOLVED that we encourage the California Department of Water Resources to fully fund the grant applications that are prepared as a result of this Plan.

ADOPTED this 16th day of December 2010. I, the undersigned, hereby certify that the foregoing resolution was adopted by the Board of Directors.

JACOBS CENTER FOR NEIGHBORHOOD INNOVATION

Valerie Jacobs

Chair of the Board of Directors

Attest:

Secretary

Resolution of the Board of the WateReuse Research Foundation Adopting 2007 San Diego Integrated Regional Water Management Plan

WHEREAS, the mission of the WateReuse Research Foundation (WRRF) is to conduct and promote applied research on the reclamation, recycling, reuse, and desalination of water; and

WHEREAS, the vision of WRRF is to be the respected voice for research on water reuse and desalination; and

WHEREAS, the County of San Diego, in cooperation with the San Diego County Water Authority, and the City of San Diego formed a San Diego Regional Water Management Group (RWMG) to establish and manage integrated planning in the region; and

WHEREAS, the RWMG, in cooperation with the Regional Advisory Committee (RAC), drafted the 2007 San Diego Integrated Regional Water Management (IRWM) Plan; and

WHEREAS, the IRWM Plan establishes the Plan's mission, vision, goals and objectives; and

WHEREAS, the RWMG has identified the research project entitled *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* (Project) and submitted by WRRF as a funding priority; and

WHEREAS, WRRF is highly qualified to conduct the Project research and serve as the Project sponsor; and

WHEREAS, WRRF's vision and mission are consistent with those in the IRWM Plan.

NOW, THEREFORE, the WRRF Board of Directors resolves the following:

1. The foregoing facts are true and correct.
2. The Board of Directors adopts the 2007 San Diego IRWM Plan for purposes of conducting the Project and future collaboration between RWMG and WRRF.

ADOPTED on this 8th day of March, 2013

Attest

Chair, Board of Directors

Thomas A. Minwegen

Secretary, Board of Directors

Resolution 2013-04

Supporting the 2007 San Diego Integrated Regional Water Management Plan

WHEREAS, the County of San Diego, in cooperation with the San Diego County Water Authority, and the City of San Diego has formed a San Diego Regional Water Management Group (RWMG); and

WHEREAS, the RWMG, in cooperation with the Regional Advisory Committee (RAC), drafted the San Diego Integrated Regional Water Management (IRWM) Plan; and

WHEREAS, the IRWM Plan establishes the plan's mission, vision, goals and objectives; and

WHEREAS, the San Diego River Park Foundation is an active member of the IRWM RAC to provide input on non-profit natural resource priorities for the San Diego region; and

WHEREAS, NOW, THEREFORE, BE IT RESOLVED that the Board of Directors hereby agrees with and supports the IRWM Plan, dated October 2007.

I, the undersigned, hereby certify that the foregoing Resolution Number 2013-04 was duly adopted by the Board of Directors following a roll call.

Ayes Beck, Berwanger, Dahnke, DeCelles, Duran, Grant Lowe, Palan, Rudee, Ryan, Sudberry, Wagner

Nos: ____

Not Present: Anderson, Embery, Peugh, Pryde

By: Jamie DeCelles Date: 3/14/2013

Secretary, Board of Directors

Attachment 3

Work Plan

Attachment 3

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Work Plan

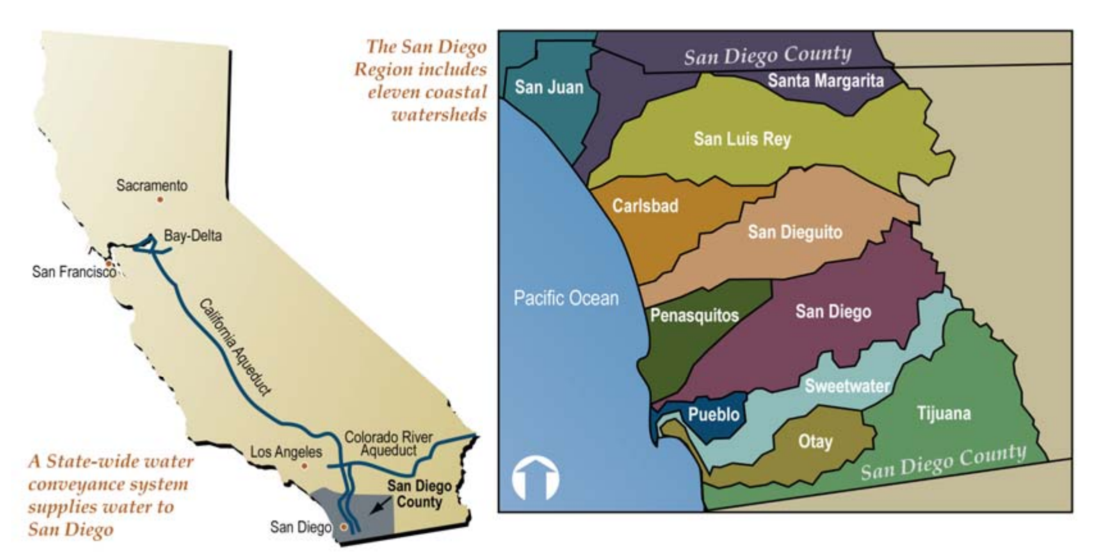
Attachment 3 consists of the following items:

- ✓ **Work Plan(s).** Attachment 3 contains detailed information regarding the tasks that were and will be performed for each project constituting the proposal, as well as supporting documents such as regional and project maps, and existing data and studies.

This Work Plan contains summary descriptions of all the projects constituting the *San Diego IRWM Implementation Grant Proposal – Round 2* and tasks necessary to complete each project in the proposal. The Work Plan demonstrates that the proposal is ready for implementation, and includes a brief discussion of the supporting studies, data, resources, and deliverables for each project, to ensure implementation of the proposal is based on sound scientific and technical principles. The Work Plan tasks are also consistent with the major tasks and sub-tasks identified in the Budget (Attachment 4) and Schedule (Attachment 5) of this proposal.

Introduction

The Regional Water Management Group (RWMG) is comprised of the San Diego County Water Authority (Water Authority), City of San Diego (City), and County of San Diego (County). The combined jurisdiction of the three agencies comprises the entire San Diego IRWM region, and their combined responsibilities address all facets of water management. The San Diego IRWM program also includes numerous water management stakeholders who support IRWM planning and implementation through participation in committees, workshops, and projects. The Regional Advisory Committee (RAC) and ad-hoc Workgroups provide essential review, guidance, and recommendations to the RWMG on all IRWM planning topics. The Tri-County Funding Area Coordinating Committee (Tri-County FACC) is a collaborative effort among the three neighboring IRWM regions in the San Diego Funding Area to discuss planning and projects of mutual interest. Both of these groups play an important role in providing guidance for the IRWM program.



San Diego IRWM Region

In the 2007 San Diego IRWM Plan, the RWMG and RAC identified four goals and nine objectives that were established to guide water resource management in the region. In 2012, the RWMG, RAC, and a workgroup convened for the 2013 IRWM Plan Update (the Priorities and Metrics Workgroup) revised the existing goals and objectives to reflect changed conditions and priorities since the 2007 IRWM Plan was adopted. Each of the draft updated IRWM Plan goals and their corresponding objectives are listed in Table 3-1.

Table 3-1: Draft 2013 San Diego IRWM Plan Update Goals and Objectives

IRWM Plan Objective		Primary IRWM Plan Goals Implemented by Objective			
		Goal 1: Improve the reliability and sustainability of regional water supplies	Goal 2: Protect and enhance water quality	Goal 3: Protect and enhance our watersheds and natural resources	Goal 4: Promote and support integrated water resource management
A	Encourage the development of integrated solutions to address water management issues and conflicts	○	○	○	●
B	Maximize stakeholder/community involvement and stewardship of water resources, emphasizing education and outreach	○	○	●	●
C	Effectively obtain, manage, and assess water resource data and information	○	○	○	●
D	Further the scientific and technical foundation of water quality management	○	○	●	●
E	Develop and maintain a diverse mix of water resources, encouraging their efficient use and development of local water supplies	●			○
F	Construct, operate, and maintain a reliable water infrastructure system	●			○
G	Enhance natural hydrologic processes to reduce the effects of hydromodification and encourage integrated flood management		●	○	○
H	Effectively reduce sources of pollutants and environmental stressors to protect and enhance human health and safety and the environment		●	○	○
I	Protect, restore and maintain habitat and open space	○	○	●	○
J	Optimize water-based recreational opportunities		○	○	●
K	Effectively address climate change through adaptation or mitigation in water resource management	●	●	●	○

● Primary IRWM Plan goal targeted by Plan objective
○ Additional IRWM Plan goals targeted by objective

Through development and adoption of the 2007 IRWM Plan and ongoing planning activities, regional stakeholders identified a suite of water management projects and programs that together improve water supply reliability and water quality for the region, reduce dependence on imported water, eliminate or reduce pollution, and protect or restore in sensitive habitat areas. Those projects and programs were used to identify projects submitted and awarded funding as part of the *Proposition 50 Implementation Grant and Proposition 84-Round 1 Implementation Grant*.

As part of the ongoing IRWM program, regional stakeholders continue to periodically revise existing projects and/or submit new projects that further progress toward meeting the regional goals and objectives. The RWMG, RAC, and a Project Selection Workgroup then review the submitted projects and identify a new suite of projects for submittal in each funding cycle. In 2012, this process was employed (see also description in Attachment 1) to develop the proposed funding package in this *San Diego IRWM Implementation Grant Proposal – Round 2*.

The projects included within this Proposal are consistent with the draft 2013 IRWM Plan Update, which includes the 2007 IRWM Plan goals and objectives. Each project included was identified as a Tier 1 high priority project by regional stakeholders (see also description in Attachment 1). As shown in Table 3-2, each of the projects included within this proposal meets one or more of the water management objectives established for the region.

Table 3-2: Consistency of Proposed Projects with Draft 2013 IRWM Plan Objectives

Proposal Projects	IRWM Plan Objectives Addressed										
	A	B	C	D	E	F	G	H	I	J	K
North San Diego County Regional Reuse Water Project (NSDCRRWP) – Phase II	●	○	●		●	●		●			○
Turf Replacement and Agricultural Irrigation Efficiency Program	●	●	●		●			●			○
Rural Disadvantaged Community (DAC) Partnership Program	●	●	○	●	●	●		○			●
Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility	●	○	●	●	○			○			○
Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies	●	●	●	●	○		●	●	●	○	
Chollas Creek Integration Project Phase II	●	●	●				●	●	●		
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II	●	●	●	●							

● = directly related; ○ = indirectly related

Integration Activities

Integration is considered a fundamental component of the San Diego IRWM planning effort, as integration is the "I" in IRWM planning. As such, the IRWM Plan Update process, which is currently underway, has included specific efforts to encourage and increase integration within the Region. One specific component of these integration efforts included a Strategic Integration Workshop that was held to encourage the submittal of integrated projects for consideration in this *San Diego IRWM Implementation Grant Proposal – Round 2.* Prior to the Strategic Integration Workshop, stakeholders were asked to submit project concepts describing preliminary project ideas, and project partner forms that described potential services that could be provided to support projects. These project concept and project partner forms were evaluated and discussed by a group of San Diego IRWM stakeholders to determine potential integration opportunities and partnering opportunities. After stakeholders reviewed the project concept and project partner forms, the Strategic Integration Workshop was held on September 12, 2012, during which time local project sponsors and potential project partners were gathered to discuss the preliminary project concepts. The purpose of this workshop was to bring stakeholders together to provide information to stakeholders about projects that were being considered within the Region, and to encourage project sponsors and project partners to get together and discuss ways in which their project concepts could be elaborated upon or potentially combined to increase integration. Prior to the Strategic Integration Workshop, the Priorities and Metrics Workgroup, comprised of a group of San Diego IRWM Stakeholders, determined that integration can take many forms, and for purposes of the IRWM Program has five specific definitions:

- *Partnership Integration:* Establishing partnerships between different organizations can be cost effective by increasing data sharing, resources, and infrastructure.
- *Resource Management Integration:* Employing multiple resource management strategies within a single project can effectively address a variety of issues.

- *Beneficial Use Integration:* Project solutions can be implemented to support several different beneficial uses.
- *Geographical Integration:* Implementing watershed-or regional-scale projects can benefit from economies of scale.
- *Hydrological Integration:* Addressing different components of the hydrologic cycle.

Proposal Goals and Objectives

The overall objective of this *San Diego IRWM Implementation Grant Proposal – Round 2* is to present a suite of projects and programs that:

1. Further the mission, vision, goals, and objectives established in the San Diego IRWM Plan;
2. Provide multiple benefits through integration of water management strategies;
3. Implement high priority projects and programs as identified by the RAC; and
4. Assist in meeting the region's critical water supply, water quality, and natural resources needs.

Purpose and Need

One of the most significant issues for the San Diego IRWM Region is the availability and reliability of its water supplies, which currently consist primarily of imported water. The region receives imported water from the State Water Project (SWP) and the Colorado River, via the Metropolitan Water District of Southern California (MWD). It also receives Colorado River water that results from the Water Authority's transfer agreement with the Imperial Irrigation District (IID) and its canal-lining projects in the Imperial and Coachella Valleys. Recent legal and regulatory decisions regarding water management in the Sacramento-San Joaquin River Delta may reduce the amount of water delivered by the SWP. This situation, coupled with the recent droughts affecting both the SWP and the Colorado River, serves as a reminder that the region's water supply is vulnerable to events outside the region. The region's water purveyors are working to improve the quantity and reliability of local supplies, primarily through expansion of water conservation and recycling programs.

Another significant issue for the San Diego region is the quality of surface water supplies. The San Diego region contains a number of water bodies on the Clean Water Act Section 303(d) list. Total Maximum Daily Loads (TMDLs) have been established for the higher priority impairments in beaches, creeks, lagoons, and San Diego Bay. The impact to water quality posed by increasing urban runoff from development is a significant concern. The region is also blessed with many natural resources, including a wealth of critical riparian and aquatic habitat that is home to a number of endangered species. An important aspect of IRWM planning is to develop projects that can address the critical water supply and water quality issues, while also achieving goals of habitat preservation and expanded recreational opportunities.

As a result, water supply diversification and water quality improvement have been identified as the cornerstones of the region's IRWM program. As described in Attachment 1, the RWMG and RAC underwent a detailed project prioritization process to consider the water resources projects to be carried forward for consideration in this proposal. This top tier of projects was reviewed for eligibility for funding through the Proposition 84-Round 2 program and a recommended funding package was considered and approved by the RAC and then the Water Authority Board of Directors.

The San Diego IRWM Region is also lacking in scientific data related to these issues – water supply diversification and water quality. Specifically, the Region's stakeholders identified a need to invest in data collection and analysis related to basin-appropriate water quality objectives and safety of potable reuse without an environmental buffer. Each of these data gaps, if filled, could provide greater opportunities for effective water resources management in the Region. As noted above, the Region is highly dependent on imported water, and opportunities for supplementing local water supplies are limited, given physical restrictions of local aquifers, climate, and infrastructure. Data relating to basin-specific water quality objectives is also in demand because many of the Region's water bodies are on the 303(d) list for impairment, but can often sustain or increase their designated beneficial uses if seasonal conditions are considered during regulatory permitting. Scientific data are needed support changes in regulatory policy by the San Diego Regional Water Quality Control Board (RWQCB) and/or California Department of Public Health (CDPH) who are responsible for implementing surface and drinking water regulations.

Through this process, seven projects and programs were developed to best address the needs of the San Diego region, consistent with the goals and objectives of the 2007 IRWM Plan and the draft 2013 IRWM Plan Update. Each program is comprised of a set of projects aimed at generating geographic balance and a wide array of benefits throughout the region.

For a full explanation of the purpose and need of each project, and how the purpose and need address the San Diego IRWM Plan's goals and objectives, please refer to individual project work plans included in this attachment.

Project List

This *San Diego IRWM Implementation Grant Proposal – Round 2* is a compilation of projects that will diversify water supply, improve water quality, restore native habitat, and manage flood flows throughout the region. This proposal includes the suite of projects best suited to meeting the current and future challenges of the San Diego region. Each of these projects further contains synergies and linkages with other projects included in this Proposal, resulting in a truly integrated suite of projects that, when implemented together, will assist the region in meeting its critical water management needs in a real and measurable fashion.

Table 3-3 presents the specific projects included as part of the proposal, organized by program. An abstract, current project status, priority of the project, and implementing agency (sponsor) is provided for each project.

Table 3-3: Projects Included in the San Diego IRWM Implementation Grant Proposal

Project	Description	
1: North San Diego County Regional Recycled Water Project – Phase II	*Abstract:*	This project is the second phase of a plan by North San Diego County water and wastewater agencies to regionalize recycled water systems that identifies new agency interconnections, seasonal storage opportunities and indirect potable water uses that will maximize supplies, reduce wastewater discharges to ocean, potentially reduce energy consumption due to diminished delivery of imported water, and allow recycled water to play an even more significant role in meeting future water needs. This phase of the project will construct many of the pipelines, storage tanks, pumps, and connections identified in Phase I.
	Status:	Phase I *NSDCRRWP Facilities Plan* is complete; Phase II construction components implement the priority interconnections identified in the Facilities Plan.
	Priority	High. This project was ranked Tier 1 in the prioritization process and was subsequently selected by the Project Workgroup as a project that should be implemented without delay.
	Sponsor:	Olivenhain Municipal Water District
2: Turf Replacement and Agricultural Irrigation Efficiency Program	*Abstract:*	This project will expand an outreach and rebate program targeted to urban and agricultural water users that will encourage customers to replace turf with more water efficient landscaping. It will also implement an education and rebate program to encourage increased irrigation efficiency and convert agriculture lands from potable to recycled water.
	Status:	Turf Replacement Program component has been launched and is functioning; this grant funding will provide incentives for continued implementation of the Turf Replacement component and new Agricultural Irrigation component.
	Priority	High. This project was ranked Tier 1 in the prioritization process and was subsequently selected by the Project Workgroup as a project that should be implemented without delay.
	Sponsor:	San Diego County Water Authority
3: Rural Disadvantaged Community (DAC) Partnership Program	*Abstract:*	This project will provide funding to address inadequate water supply and water quality affecting rural DACs, including tribal communities. The project will reduce potential for high public health risks in water and/or wastewater systems. The project will promote environmental justice in rural communities by providing outreach to rural DACs for available infrastructure projects, while promoting IRWM goals. Rural Community Assistance Corporation (RCAC) will manage the Proposition 84 grant funds to facilitate implementation of infrastructure upgrades that protect rural DACs from public health hazards associated with aging or failing water facilities.
	Status:	Phase I projects have been selected and are underway; Phase II will allow 4-5 additional rural DAC infrastructure upgrades to be completed.
	Priority	High. This project was ranked Tier 1 in the prioritization process and was subsequently selected by the Project Workgroup as a project that should be implemented without delay.
	Sponsor:	Rural Community Assistance Corporation
4: Failsafe Potable Reuse at the Advanced Water Purification Facility	*Abstract:*	This project will develop and test a failsafe treatment train for potable reuse without an environmental buffer. The data gathered through this process may be used by the California Department of Public Health (CDPH) in assessing the future potential of direct potable reuse facilities.
	Status:	The City of San Diego's Water Purification Demonstration Plant is currently operational; this project will implement testing of a new failsafe treatment train to test future failsafe potable reuse.
	Priority:	High. This project was ranked Tier 1 in the prioritization process and was subsequently selected by the Project Workgroup as a project that should be implemented without delay.
	Sponsor:	WateReuse Research Foundation

Project	Description	
5: Sustaining Healthy Tributaries to the Upper San Diego River	*Abstract:*	This project will protect and restore a key segment of Boulder Creek upstream of the El Capitan Reservoir. It will protect and restore 3,000 feet of functioning riparian habitat and associated buffer habitat along Boulder Creek, and collect data to use as a baseline for other streams in the San Diego River watershed. This project will also conduct education and outreach to backcountry areas, including tribal communities, about invasive species and their impacts on watershed habitats.
	Status:	The San Diego River Park Foundation (SDRPF) restoration site has been acquired; restoration and monitoring activities have not yet begun.
	Priority:	High. This project was ranked Tier 1 in the prioritization process and was subsequently selected by the Project Workgroup as a project that should be implemented without delay.
	Sponsor:	San Diego River Park Foundation
6: Chollas Creek Integration Project – Phase II	*Abstract:*	This project will improve water quality and prevent flooding through (1) engineered modifications to the channel via installation of headwalls and drop structures that will modify creek flow and prevent erosion, (2) contaminate uptake and natural filtration through invasives removal and restoration with native species, and (3) engagement of community volunteers in water quality monitoring and hands-on watershed education. The project improves and maintains Chollas Creek as a natural urban drainage system that serves as a major conduit for stormwater runoff in the Encanto DAC.
	Status:	Phase provided for restoration of an adjacent segment of Chollas Creek and implementation of an Opportunities Assessment for invasives control; Phase II will complete a second segment of restoration and implement invasives removal and water quality monitoring by local DAC students.
	Priority:	High. This project was ranked Tier 1 in the prioritization process and was subsequently selected by the Project Workgroup as a project that should be implemented without delay.
	Sponsor:	Jacobs Center for Neighborhood Innovation
7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II	*Abstract:*	The project aims to establish nutrient water quality goals for the Santa Margarita River (SMR) Estuary (Phase I) and the SMR River (Phase II) that may lead to development of nutrient site-specific objectives by the San Diego Regional Water Quality Control Board (RWQCB) in the main stem of the river that are protective of beneficial uses. The project consists of three major activities: facilitate discussions among a SMR watershed stakeholder group to guide project activities, conduct monitoring and special studies, and develop nutrient water quality goals for the Lower SMR.
	Status:	Phase I established a SMR stakeholder group and began data collection and analysis for establishing water quality objectives for SMR Estuary; Phase II will build on existing efforts by continuing stakeholder-driven expanding data collection and analysis to establish goals for the Lower SMR.
	Priority:	High. This project was ranked Tier 1 in the prioritization process and was subsequently selected by the Project Workgroup as a project that should be implemented without delay.
	Sponsor:	County of San Diego

Integrated Elements of Projects

Several of the projects included in this proposal are linked, and the coordinated implementation of each project is critical to the success of the proposal as a whole. The proposal has been crafted to maximize the linkages and integration between the projects within the proposal, and projects included in the proposal have been selected based on their ability to generate multiple benefits.

The *NSDCRRWP – Phase II* integrates infrastructure between its ten North County project partners and may supply agricultural participants in the *Turf Replacement and Agricultural Irrigation Efficiency Program* with recycled water. It also complements efforts from all the projects in this proposal to protect and improve the Region's water resources. Along with the *Failsafe Potable Reuse at the Advanced Water Treatment Facility*, these three projects work to address the water supply diversification priority of the San Diego IRWM region. The *Rural DACs Partnership Program* further addresses water supply needs, by addressing rural backcountry systems which are largely dependent on small groundwater basins.

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II, *Failsafe Potable Reuse at the Advanced Water Treatment Facility,* and *Sustaining Healthy Tributaries to the Upper San Diego River* will all collect and analyze data for use in water resource management. They will all contribute to the IRWM concept of integrated management, utilizing a collaborative, stakeholder-driven process to address water concerns across a multi-jurisdictional area. These projects will provide the scientific basis needed by the Region's stakeholder to influence regulatory policy that enables both protection and maximization of beneficial uses.

Sustaining Healthy Tributaries to the Upper San Diego River and *Chollas Creek Integration Project – Phase II* both seek to protect and restore riparian habitats within the Region. The Watershed Workshops held in 2012 identified the protection of natural resources as an important priority for the Region.

NSDCRRWP – Phase II, Turf Replacement and Agricultural Irrigation Efficiency Program, Rural DACs Partnership Program, Chollas Creek Integration Project – Phase II, and *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* are all continuation of priority projects that were funded through the San Diego IRWM Region's *Proposition 50 Implementation Grant* or *Proposition 84-Round 1 Implementation Grant*. This builds upon work that is already being implemented as part of the San Diego IRWM Program and contributes to attainment of the Region's IRWM Plan Objectives.

For a full explanation of the linkages and synergies between projects, please refer to individual project work plans and Attachment 7.

Regional Map

Figure 3-1 provides a regional overview of the seven proposed projects in this *San Diego IRWM Implementation Grant Proposal – Round 2*, and Figure 3-2 provides a regional overview of the seven projects in relation to disadvantaged communities (DACs).

Completed Work

Significant work is expected to be completed prior to the grant award date (October 1, 2013) on projects included in this proposal. Please note that the individual work plans below contain information for each work plan task, demonstrating the work that will be completed before the grant funding is secured. Additionally, work that supports the projects and has been completed is described in the individual project work plans below.

Existing Data and Studies

Available data and studies have been collected and reviewed to support the feasibility and technical methods of the projects included within this proposal. For a list of the existing data and studies for each project, please refer to individual project work plans included in this attachment. The existing data and studies included for each individual project have been submitted on a separate CD as part of this *San Diego IRWM Implementation Grant Proposal – Round 2*.

Project Maps

Site maps showing each project's geographical location and the surrounding work boundary are included in individual project work plans provided below. Please refer to those individual project maps.

Project Timing and Phasing

Some projects included in this proposal are multi-phases projects and can operate on a standalone basis whiles others are not. For project timing and phasing for each project please refer to individual project work plans included in this attachment.

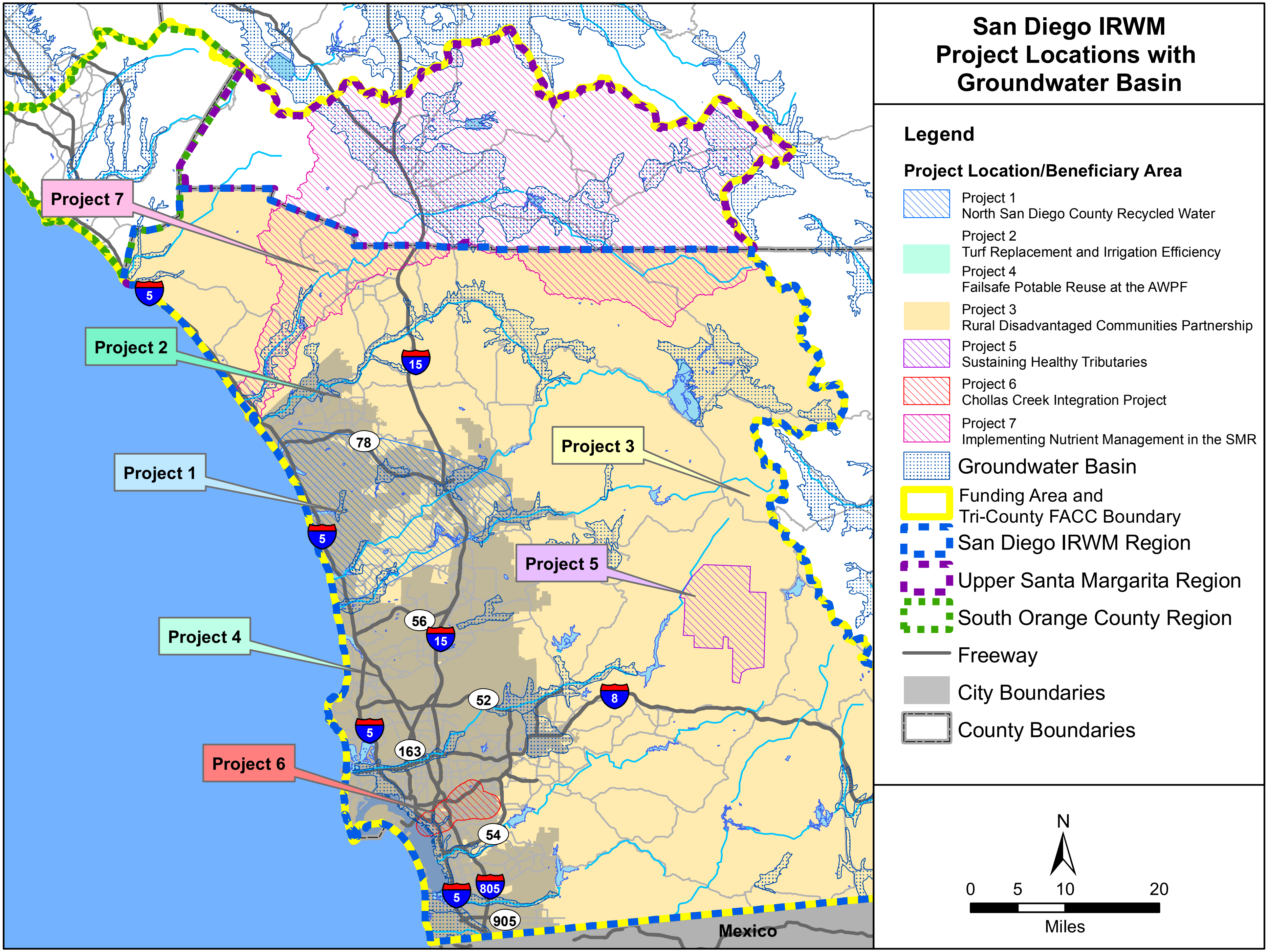
Interregional Project

The *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* project included in this funding application is an interregional project being implemented jointly by the San Diego IRWM and Upper Santa Margarita IRWM regions. Although the Upper Santa Margarita IRWM region is a full partner and benefits will accrue across watershed boundaries to both regions, the entire project work plan, budget, and benefits for the project have been included in this funding application in order to simplify project administration and contracting.

The San Diego Funding Area maintains the Tri-County FACC agreement among the three Regional Water Management Groups (RWMGs) to equitably allocate the Funding Area's Proposition 84 funds. Consequently, the Upper Santa Margarita RWMG has committed both grant funds (per the aforementioned agreement) and matching funds to support this interregional project. Please refer to Appendix 3-1 in Attachment 3 for a letter of support for the interregional project from our San Diego IRWM Program Manager.

Work Plan Tasks

The specific activities that will be performed to implement each project in the *San Diego IRWM Implementation Grant Proposal – Round 2* are described in detail in the individual project work plans, provided below. In addition, the following sections describe the specifics of each project with respect to project sponsors, project need, project purpose, project objectives, project partners, project abstract, linkages and synergies between projects, existing data and studies, project timing and phasing, and project mapping.


San Diego IRWM
Project Locations with
Groundwater Basin
Legend
Project Location/Beneficiary Area
Project 1
North San Diego County Recycled Water
Project 2
Turf Replacement and Irrigation Efficiency
Project 4
Failsafe Potable Reuse at the AWPF
Project 3
Rural Disadvantaged Communities Partnership
Project 5
Sustaining Healthy Tributaries
Project 6
Chollas Creek Integration Project
Project 7
Implementing Nutrient Management in the SMR
Groundwater Basin
Funding Area and
Tri-County FACC Boundary
San Diego IRWM Region
Upper Santa Margarita Region
South Orange County Region
Freeway
City Boundaries
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Project 7
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Project 4
Project 6
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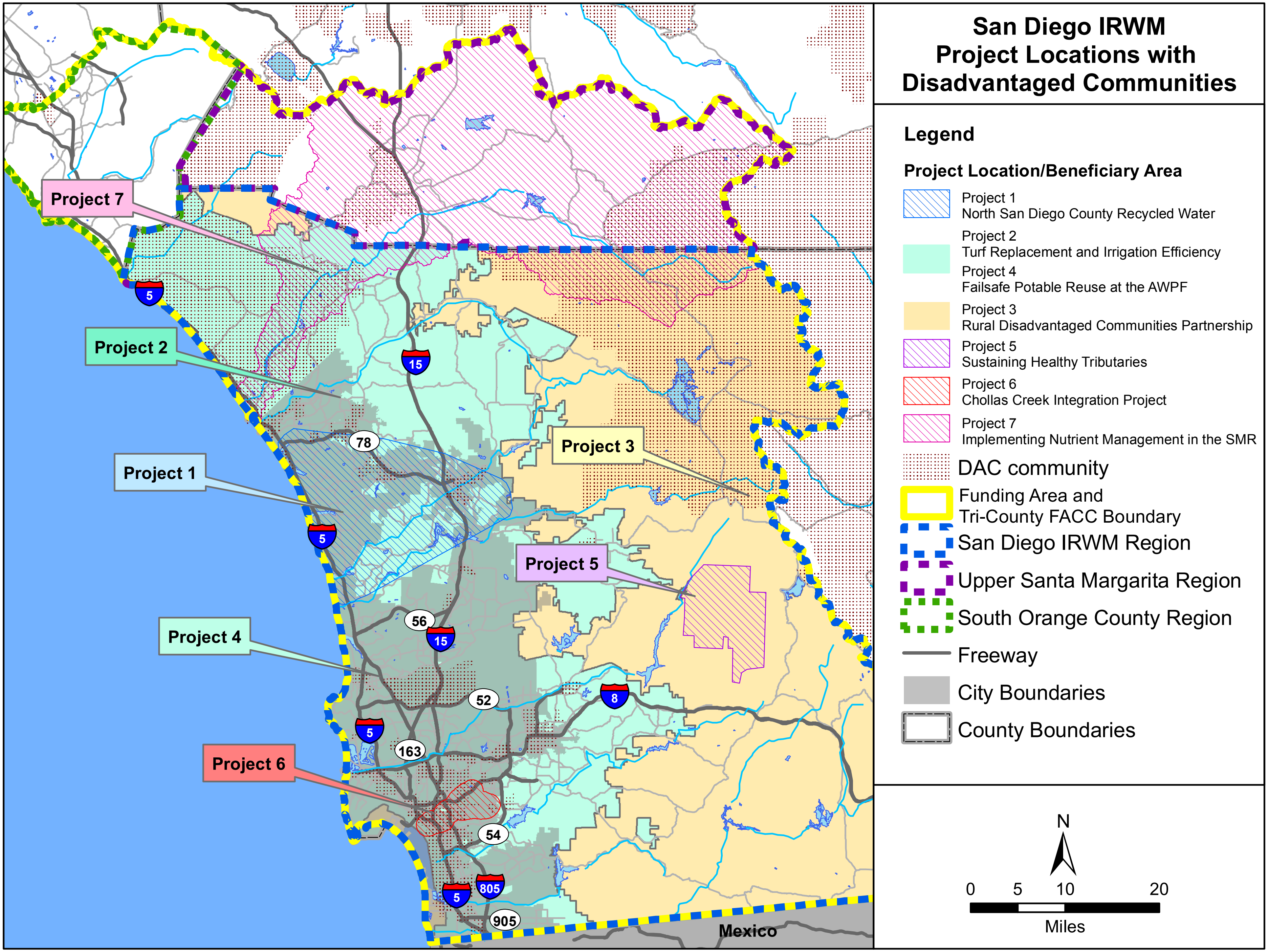

San Diego IRWM
Project Locations with
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Project Location/Beneficiary Area
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Project 6
Chollas Creek Integration Project
Project 7
Implementing Nutrient Management in the SMR
DAC community
Funding Area and
Tri-County FACC Boundary
San Diego IRWM Region
Upper Santa Margarita Region
South Orange County Region
Freeway
City Boundaries
County Boundaries
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Project 7
Project 2
Project 1
Project 3
Project 5
Project 4
Project 6
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Project 1: North San Diego County Regional Recycled Water Project – Phase II

I. Introduction

Project Sponsor

Olivenhain Municipal Water District (OMWD) is the project sponsor for *North San Diego County Regional Recycled Water Project (NSDCRRWP) – Phase II*.

Project Need

Southern California faces many water supply challenges exacerbated by unreliable local water supplies. This has led to a heavy reliance on imported water, particularly in the San Diego IRWM Region, which receives approximately 80% of its water supply from imported sources. Droughts, climate change, population growth, legal, and environmental constraints combine to reduce or strain imported water supply reliability. Recycled water offers a reliable, drought-proof option for augmenting water supplies. *NSDCRRWP-Phase II* will ensure a more reliable water supply for the Region by implementing activities to produce and distribute recycled water to customers for non-potable uses. *NSDCRRWP-Phase II* will also reduce dependence on increasingly expensive imported water, saving money and helping to meet State preferences and priorities.

Over time, the ten partner agencies involved in this project have developed separate and very limited integrated recycled water systems throughout the same general area in northern San Diego County. This project provides an integrated solution to addressing water supply challenges by coordinating development of comprehensive recycled water infrastructure to distribute additional recycled water supplies through integrated systems. Integration of facilities will allow recycled water to play an even more substantial role in meeting future water needs. *NSDCRRWP-Phase II* project will build on elements of an existing project (*NSDCRRWP-Phase I*) to implement multiple construction components of the regional recycled water supply and distribution system.

Project Purpose

NSDCRRWP-Phase II will increase the production and use of recycled water produced in the Region. By increasing the capacity and connectivity of the recycled water storage and distribution systems of the Project Partners, *NSDCRRWP-Phase II* encourages recycled water use, reduces costs, reduces imported water demand, and creates a more efficient system than could be completed the ten Project Partners on an individual basis. Included project components will replace potable water pipelines and irrigation systems with recycled water systems, convert numerous facilities to recycled water service, connect discrete recycled water systems to one another, increase recycled water storage capacity, and redistribute recycled water to more effectively meet demands.

Project Abstract

NSDCRRWP-Phase II represents a coordinated effort between several North San Diego County water and wastewater agencies to maximize recycled water use within the North San Diego County region. The proposed project includes 10 components designed to regionalize recycled water facilities so that agencies with the ability to generate recycled water in excess of local demand (i.e., within their service area) can provide recycled water to areas where additional supplies are needed. Together, the pipelines, pump stations, storage tanks, and interties constructed in this project will cumulatively produce an estimated 6,790 acre-feet per year (AFY) of recycled water and reduce the region's potable water demands. This will directly offset the use of potable supplies imported through the State Water Project (SWP) and the Colorado River Authority (CRA) via the San Diego County Water Authority (Water Authority) and the Metropolitan Water District (MWD).

The following sections describe each of the ten construction components, which will be implemented by the following municipalities:

1. Leucadia Wastewater District (LWD)
2. Vallecitos Water District (VWD)
3. Vista Irrigation District (VID)

4. Rincon del Diablo Municipal Water District (RMWD)
5. Olivenhain Municipal Water District (OMWD)
6. Santa Fe Irrigation District (SFID)
7. Carlsbad Municipal Water District (Carlsbad MWD)
8. City of Escondido (Escondido)
9. City of Oceanside (Oceanside)
10. San Elijo Joint Powers Authority (SEJPA)

Table 3-4 provides an overview of the ten project components and the volume of recycled water produced and distributed by each component.

Table 3-4: Recycled Water Distributed Via NSDCRRWP-Phase II Components

NSDCRRWP-Phase II Component	Recycled Water (AFY)
Component 1-1: LWD Regional System Connection	250
Component 1-2: VWD Pump Improvements	300
Component 1-3: VID Golf Course Recycled Water	200
Component 1-4: RMWD Northwest Recycled Water Expansion	16
Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water	350
Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements	50
Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion	454
Component 1-8: Escondido Recycled Water Easterly Main Extension	4,570
Component 1-9: Oceanside Reclaimed Water Main Extension	600
Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage	*
Total	**6,790**
* Provides 350 AFY storage for Component 1-5	

Component 1-1: LWD Regional System Connection

LWD owns the Gafner Water Recycling Plant (Gafner WRP), in Carlsbad, CA, which has a peak production capacity of 1 million gallons per day (MGD). Approximately one-half of the Gafner WRP's seasonal demand-dependent production is delivered to the La Costa Resort & Spa's golf course water feature (275 AFY). The LWD Regional System Connection Project would construct a high pressure pump station and 1,200 feet of transmission pipeline to connect to an existing OMWD transmission pipeline. This would allow up to a half of the Gafner WRP's capacity (currently unused) to be used by OMWD, stored in the to-be-converted Wanket Tank (see Project 1-10 below), or fed into Carlsbad MWD's recycled water distribution system, which is being connected to OMWD via a separate future project.

Component 1-2: VWD Pump Improvements

VWD currently treats an average of 3.85 MGD of wastewater to tertiary (recycled water) standards at its Meadowlark Water Reclamation Facility (WRF). VWD has an agreement with the Carlsbad MWD to supply up to 3.0 MGD of recycled water from the Meadowlark WRF. VWD has a similar agreement with OMWD to supply up to 1.5 MGD of recycled water from the Meadowlark WRF. By expanding the production capacity at the Meadowlark WRF, VWD will be able to deliver additional recycled water to these two agencies and assist in their individual goals and the regional goal to expand recycled water use. This project component would replace a constant speed motor driven pump with a new higher-capacity variable frequency drive at VWD's Lift Station Number 1. This would increase the station's capacity to 3,100 gallons per minute and result in an increase in the wastewater flow to Meadowlark from 4.15 MGD to 4.75 MGD. These additional flows will increase the recycled water production at Meadowlark WRF to an average of 4.4 MGD. This project component will also overhaul the discharge pipeline arrangement and the lift station's electrical package to accommodate the increased flow. Ultimately, this project component will increase the recycled water capacity of the VWD and the region as a whole.

Component 1-3: VID Golf Course Recycled Water

The VID component would provide recycled water to the Shadowridge Golf Course. The golf course had previously used recycled water from the Shadowridge WRF. However, that treatment plant was shut down several years ago. This project component will supply recycled water to the golf course by connecting to and using water from Carlsbad MWD's recycled water system. This project component will include construction of a metered connection from Carlsbad MWD's 12-inch recycled water main at the intersection of Melrose Dr. and Faraday Ave. to the Shadowridge WRF's 14-inch failsafe pipeline. A major piece of this project component would utilize a portion of the Shadowridge WRF's failsafe pipeline, which has been idled since the plant was shutdown. Joints in the section of the failsafe pipeline downstream of the Shadowridge WRF to the connection with Carlsbad MWD's system would be inspected and restrained, to ensure pipeline integrity. The project component would also require Installation of approximately 400 feet of 8-inch pipeline from the terminus of failsafe pipe at the Shadowridge WRF to VID's existing 16-inch pipeline north of the Shadowridge WRF. Lastly, a 4-inch potable water meter would also be installed at golf course's irrigation pond for supplemental water supply and blending.

Component 1-4: RMWD Northwest Recycled Water Expansion

RMWD's Northwest Recycled Water Expansion Project aims to provide recycled water for irrigation in open areas near the Escondido Country Club that are currently irrigated with potable water. It will also serve potential customers in the northern portion of the RMWD's service area, and extend recycled water piping to serve a future filling station near the Rockhoff Pump Station for construction water use. It is estimated that potable water demand will be offset by 16 AFY once this project has been completed.

Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water

This project will construct new and convert existing potable facilities in OMWD's Northwest Quadrant service area to expand OMWD's recycled water system. Facilities will be constructed in the Village Park community of Encinitas to convert common areas of homeowner associations and schools from potable to recycled water. This project is estimated to offset 350 AFY of current potable water use with recycled water, and improve access to recycled water supplies in the area.

Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements

SFID purchases wholesale recycled water from SEJPA for use by multiple customers within its western service area. Additional customers have been identified who could be converted from potable water to recycled water use if appropriate on-site retrofit improvements were made. This project would construct the required on-site recycled water irrigation improvements for a mixture of schools, commercial properties, homeowners associations, and estate residences. It is estimated that approximately 50 AFY of potable water use would be offset by recycled water when this project is completed. Additionally, the proposed residential estate customer would serve as a template for connecting other large estates to recycled water systems in the region.

Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion

The Carlsbad MWD and the City of Oceanside will partner on this project to extend the North El Camino Real Recycled Water Pipeline, with Carlsbad MWD taking the lead. This expansion would install 14,000 feet of pipeline within El Camino Real and Vista Way, enabling Carlsbad MWD and the City of Oceanside to meet existing irrigation demands with recycled water. Customers converting from potable water use to recycled water use include schools, parks, homeowner associations, a mall, golf course driving range, median landscaping, and the El Camino County Club. This project component will allow an estimated 454 AFY of potable water demand to be offset with recycled water, including 180 AFY of demand at the County Club, which is located in the City of Oceanside.

Component 1-8: Escondido Recycled Water Easterly Main Extension

The Escondido Recycled Water Easterly Main Extension Project will reduce the amount of treated wastewater being sent to the ocean via a near-capacity outfall. This project component involves the construction of 5.1 miles of a 24-inch recycled water main, which will allow Escondido to reduce the amount of potable water that is currently being used for agricultural, golf course, park, and other irrigation purposes. As with several of the other project components, increasing recycled water use will also help prevent the need for a new ocean outfall, reduce dependence on imported water, and reduce costs.

Component 1-9: Oceanside Reclaimed Water Main Extension

The City of Oceanside's project component would consist of a pipeline extension from Faraday Ave. (in Carlsbad MWD service area) to Melrose Dr. (in VID's service area) to serve the Shadowridge Golf Course (see Component 1-3) and an extension to the west (in Oceanside's service area) to serve the Ocean Hills golf course and greenbelt areas. The project may involve purchase of an abandoned failsafe outfall pipeline in Melrose Dr., currently owned by the City of Vista and converting the pipeline to recycled water use. The remainder of the project consists of the installation of pipeline along Melrose from the Shadowridge Golf Course north to Cannon Rd. and west to Lake Blvd., servicing both a middle school and an elementary school. The total project consists of approximately 8,140 feet of 12-inch pipeline and 6,300 feet of 8-inch pipeline.

Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage

SEJPA seeks to increase its recycled water capacity by converting existing potable water tanks to recycled water storage. Currently, SEJPA is considering two tanks for conversion: (1) a 3-million-gallon steel water tank jointly owned by OMWD and the San Dieguito Water District and (2) an earthen-basin wastewater equalization tank at the San Elijo Water Reclamation Facility. An evaluation of the tanks for conversion to recycled water storage will determine which of the two will be more economical to convert, which will allow for conversion of one of the tanks to move forward. The steel tank would allow recycled water use to be expanded in the City of Encinitas, providing an estimated 350 AFY of recycled water. The earthen basin tank would allow onsite storage of approximately one million gallons of finished-product recycled water, and is estimated to also provide approximately 350 AFY of additional capacity to the four water purveyors that the SEJPA currently serves. As such, the addition of recycled water storage through conversion of either tank will allow SEJPA to serve at least 350 AFY of new system demand.

Project Objectives

Though each component included within this project may have its own specific objectives, the cumulative objectives of the overall NSDCRRWP-Phase II are presented below. These objectives encompass all of the individual objectives of each individual component.

- Increase the storage, production, and use of recycled water
- Reduce the Region's dependence on imported water
- Reduce the amount of wastewater sent to the ocean
- Improve water supply reliability
- Achieve better economy of scale and provide cost-effective recycled water supplies
- Expand interagency cooperation
- Improve the implementation process for recycled water systems
- Assist agencies in meeting the target of reducing potable water use by 20% by 2020 as set forth in the Water Conservation Act of 2009 (Senate Bill X7-7)

Table 3-5 provides an overview of the draft 2013 IRWM Plan Update Objectives that are expected to be achieved through implementation of the *North San Diego County Regional Recycled Water Project – Phase II*.

Table 3-5: Contribution to Draft 2013 IRWM Plan Update Objectives

Proposal Projects	Contribution to IRWM Plan Objectives										
	A	B	C	D	E	F	G	H	I	J	K
North San Diego County Regional Recycled Water Project	●	○	●		●	●		●			○

○ = indirectly related
● = directly related

The *North San Diego County Regional Recycled Water Project – Phase II* will contribute to the following draft IRWM Plan Update Objectives:

Objective A – Integrated solutions to water management issues and conflicts: This project developed in part through the Strategic Integration Workshop, as described above. This project is also achieves the Integrated Solutions objective by meeting the Partnership, Beneficial Uses, and Geography definitions of integration, as described above.

Objective B – Maximize stakeholder involvement and stewardship: This project will involve community outreach and education components about the benefits of using recycled water for non-potable uses. All 10 partners in this process will conduct specific outreach to potential recycled water users.

Objective C – Effectively obtain, manage, and assess water resources data: This project will collect and assess data related to the recycled water systems within the project partners' combined service areas. As a result, the 10 partners will have access to a consolidated dataset that identifies existing and planned recycled water facilities throughout the region.

Objective E – Develop and maintain a diverse mix of water resources: The project will include construction of facilities to provide approximately 6,790 additional AFY of recycled water to users throughout northern San Diego County. This will help to diversify water resources within the project area.

Objective F – Construct, operate, and maintain a reliable infrastructure: This project will implement project components that interconnect and maximize the use of recycled water within the project partners' combined service area. Coordination of 10 recycled water systems will maximize the use of current and planned treatment plants and conveyance facilities.

Objective H – Effectively reduce sources of pollutants and environmental stressors: This project will maximize use of recycled water, which will reduce wastewater discharges to ocean outfalls.

Objective K – Effectively address climate change through adaptation or mitigation in water resource management: Expanded recycled water use would reduce greenhouse gas (GHG) emissions associated with the conveyance and treatment of imported water. Diversifying local water supplies is an important climate change adaptation measure for the San Diego Region.

Project Partners

All project partners are part of the North San Diego County Regional Recycled Water Group, which is implementing many of the projects identified in the NSDCRRWP. Partners specific to each component of the *NSDCRRWP – Phase II* are listed in Table 3.6 below.

Table 3-6: Project Partners for NSDCRRWP-Phase II Components

Project Component	Lead Agency	Partners
Component 1-1: LWD Regional System Connection	Leucadia Wastewater District	Olivenhain Municipal Water District, City of Carlsbad
Component 1-2: VWD Pump Improvements	Vallecitos Water District	
Component 1-3: VID Golf Course Recycled Water	Vista Irrigation District	City of Carlsbad, City of Oceanside
Component 1-4: RMWD Northwest Recycled Water Expansion	Rincon del Diablo Municipal Water District	City of Escondido
Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water	Olivenhain Municipal Water District	San Elijo Joint Powers Authority, Carlsbad Municipal Water District, and Leucadia Wastewater District
Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements	Santa Fe Irrigation District	San Elijo Joint Powers Authority, City of Solana Beach, and County of San Diego
Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion	Carlsbad Municipal Water District	City of Oceanside
Component 1-8: Escondido Recycled Water Easterly Main Extension	City of Escondido	
Component 1-9: Oceanside Reclaimed Water Main Extension	City of Oceanside	Vista Irrigation District, Carlsbad Municipal Water District
Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage	San Elijo Joint Powers Authority	Olivenhain Municipal Water District, San Dieguito Water District, and Encinitas Ranch Golf Authority

Project Integration

The NSDCRRWP-Phase II components are intended to provide a comprehensive approach to further development and expansion of recycled water systems in the north San Diego County area. All projects will help to improve water supply reliability by providing recycled water to users in place of potable water supplies. Specific integration of the components and the larger recycled water systems within the North County are discussed below:

Component 1-1: LWD Regional System Connection

The LWD Regional System Connection has a linkage with the OMWD Conversion of Distribution Facilities to Recycled Water (Component 1-5), which includes conversion of the 3-million gallon Wanket Tank from potable to recycled water service. The LWD project will provide flexibility to OMWD in procuring recycled water from several neighboring agencies of which LWD is one.

Component 1-2: VWD Pump Improvements

VWD has an agreement with the Carlsbad MWD to supply up to 3.0 MGD of recycled water from the Meadowlark WRF. VWD has a similar agreement with the OMWD to supply up to 1.5 MGD of recycled water from the Meadowlark WRF. By expanding the production capacity at the Meadowlark WRF, VWD is able to deliver additional recycled water to these two agencies and assist in their individual goals and the regional goal to expand recycled water use.

Component 1-3: VID Golf Course Recycled Water

The NSDCRRWP identified supplying recycled water to the Shadowridge Golf Course and other recycled water markets in the vicinity as a potential project that would require integration of several agencies projects and systems. The Oceanside Melrose Drive Reclaimed Water Main Extension (Component 1-9) would extend the VID project to markets within the City of Oceanside as well as other VID markets along the pipeline route. Recycled water from the City of Carlsbad's existing system will provide the supply to both the VID Course Recycled Water component and to Component 1-9.

Component 1-4: RMWD Northwest Recycled Water Expansion

This project would utilize recycled water from the City of Escondido's Hale Avenue Resource Recovery Facility (HARRF), as would the Escondido Recycled Water Easterly Main Extension (Component 1-8). As such, it will help with the City's goal to help prevent the need for a new ocean outfall.

Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water

OMWD's conversion project will generate the demand to accommodate the additional supply that will be created by SEJPA Conversion of Existing Tanks to Recycled Water Storage (Component 1-10). A recycled water purchase agreement was signed in 2012, and a small interconnection between the two agencies' facilities was constructed in early 2013 near the Wanket Reservoir site. LWD Regional System Connection (Component 1-1) will connect LWD to OMWD recycled water system, offering an additional source of recycled water supply to OMWD. Improved supply and storage reliability in OMWD's system will also help Carlsbad MWD's recycled water system as the two systems are linked via the LWD system, and additional linkages have been identified as part of the North San Diego County Regional Recycled Water Project (NSDCRRWP) – Phase I study.

Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements

SFID's project would utilize recycled water produced by SEJPA Conversion of Existing Tanks to Recycled Water Storage (Component 1-10), which has a goal of trying to maximize recycled water use to reduce ocean discharges.

Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion

Carlsbad MWD's project will provide recycled water to the City of Oceanside, which will allow both agencies to increase recycled water use and reduce discharges of wastewater to the ocean.

Component 1-8: Escondido Recycled Water Easterly Main Extension

This project will provide recycled water to the local agricultural community, thereby improving their water supply reliability. Along with RMWD Northwest Recycled Water Expansion (Component 1-4), the project would distribute recycled water from the HARRF to new customers in the City's eastern service area.

Component 1-9: Oceanside Melrose Drive Reclaimed Water Main Extension

This project is in cooperation with the VID Golf Course Recycled Water (Component 1-3), which would allow for additional recycled water to be served to City of Oceanside users via the proposed connection with the Carlsbad MWD's existing recycled water system.

Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage

This conversion project will provide necessary recycled water storage to (1) serve new OMWD distribution system and planned customers, (2) serve new San Dieguito Water District customers planned for connection in 2013, (3) serve new SFID customers planned for connection in 2014, and (4) receive recycled water produced from the newly constructed Advanced Water Treatment Facility owned by the SEJPA. In addition, in 2012, the SEJPA and OMWD entered into a 20-year recycled water purchase agreement. Furthermore, LWD Regional System Connection (Component 1-1) will connect LWD to OMWD's recycled water system, potentially offering an alternative source of recycled water supply into the converted 3-million gallon steel reservoir tank. The viability of each of these agencies as a recycled water source for OMWD was established in the Study of Recycled Water Supply Options for the Northwest Quadrant conducted for OMWD by DLM Engineering in May 2012.

Completed Work

The following sections document completed work for NSDCRRWP-Phase II and each project component. Please note that in accordance with guidance from DWR found on Page 11 of the Proposal Solicitation Package, the documents referenced in this section have been provided in an electronic format only (on the supporting CD), and are not included within the printed hard copies that have been mailed to DWR.

North San Diego County Regional Recycled Water Project

- North San Diego County Regional Recycled Water Project Report, Prepared by RMC, April, 2012

Component 1-1: LWD Regional System Connection

- Leucadia County Water District (now LWD), La Costa Albertson's No. 6720, Carlsbad, CA, Plans for the Construction of Storm Drain, and Reclaimed Water Pipelines (900 feet of 16" DIP), Sheet 4 of 8, O'Day Consultants, As-Built Drawings July 19, 2002.
- Technical Memorandum for LWD, by Dudek, October 27, 2010, Recycled Water demand and cost per AF for existing and through Phase 5.
- North San Diego County Regional Recycled Water Project Report, Prepared by RMC, April, 2012: 1) Page 3-2 Table 3-1, Existing and Future Recycled Water Supplies, Gafner WRP; 2) Page 3-6, Gafner WRP description; Page 5-6. Table 5-4, Short Term Project – Additional Recycled Water Demand by Plant (200 AFY to OMWD and 200 AFY to Carlsbad).

Component 1-2: VWD Pump Improvements

- Vallecitos Water District, Lift Station No. 1 Upgrades Alternatives Analysis. This analysis estimates the amount of wastewater flow that can be delivered to the Meadowlark WRF under several infrastructure improvement alternatives. Under Alternative 4, which is the selected project alternative, the estimated flow rate of wastewater that can be delivered to the Meadowlark WRF is 4.78 after upgrading the pumps to 3,100 gallon-per-minute capacity.
- Design and construction specifications are projected to be completed in April 2013

Component 1-3: VID MWD Golf Course Recycled Water

- Shadowridge Golf Course Recycled Water Supply Analysis, dated October 9, 2012 – Water use for the Golf Course in 2010 and 2011 averaged approximately 200 acre-feet per year (page 2).
- City of Carlsbad adopted a Mitigated Negative Declaration that includes the project.
- A study is underway to evaluate the partnership opportunities with the City of Oceanside and potential customers along the proposed pipeline corridor to the City of Oceanside.

Component 1-4: RMWD Northwest Recycled Water Expansion

- Preliminary Design Report – alignment evaluation, conceptual filling station siting, existing demand review and pipe sizing, utility coordination, survey, easement review. Average annual recycled water demand for users was based on one-half the maximum monthly demand for each user and total 16 AFY for the project. See page 5 in the attached PDR for a review of existing meter records.
- 50% design and construction specifications
- 90% design and construction specifications
- 100% design and construction specifications
- CEQA Notice of Exemption (NOE)

Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water

- Update of Potable and Recycled Water Master Plan Capital Improvement Program, completed by AECOM for OMWD, March 2011. Refer to pages 6-1 through 6-3.
- Northwest Quadrant/Village Park Recycled Water Study, completed by AECOM for OMWD, April 2011. Refer to page 6 for recycled water demands, and to pages 15-16 for cost estimates.
- Study of Recycled Water Supply Options for the Northwest Quadrant conducted by DLM Engineering for OMWD, May 2012.

- Preliminary Design Report for Northwest Quadrant Recycled Water Project Phase II: Wanket Reservoir Improvements, Technical Memorandum 2, prepared by Trussell Technologies, Inc for OMWD, November 2012.
- Preliminary Design Report for Northwest Quadrant Recycled Water Project Phase II: Technical Memorandum 3. This document shows 350 AFY of demand in Village Park based on a hydraulic analysis of irrigation demands in the study area.

Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements

- 2009 Asset Management Master Plan- confirmation of users and usage, Section 9, pages 9-1 to 9-20.

Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion

- CMWD has completed a feasibility study for its Phase III Recycled Water Project, dated June 2012 showing the existing irrigation customer site locations, summarized their annual and peak irrigation demands, and developed the facilities required to supply the recycled water to the sites and associated project cost estimate. Pipeline Expansion Segment 5 projects a recycled water demand of 454 AFY including 180 AFY within the City of Oceanside. A detail description of the Expansion Segment 5 and customer list are shown on pages 52, 61, and 62 of this report.
- In November 2012, the CMWD Board approved the mitigated negative declaration for the Phase III Recycled Water Project, which include the North El Camino Real Recycled Water Pipeline, referred to as Expansion Segment 5, and appropriated funding to initiate final design.
- Final design of the pipeline is scheduled to be completed prior to the grant award date.

Component 1-8: Escondido Recycled Water Easterly Main Extension

- Preliminary Design Report, prepared by RMC Water and Environment, August 2012.
- Final design was began in September 2012 is expected to be completed in June 2013.
- Two construction bid packages are expected to be released in July or August 2013.
- An environmental MND is being prepared and is expected to be completed in June 2013.

Component 1-9: Oceanside Melrose Drive Reclaimed Water Main Extension

- North San Diego County Regional Recycled Water Project completed the Regional Recycled Water Facilities Plan that identified the potential recycled water demands which is located on page 4-11 of that report.
- Currently working on the Preliminary Design Report that will detail the pipeline alignment.
- A CEQA Mitigated Negative Declaration will be prepared in the Fall of 2013.

Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage

- San Elijo Water Reclamation Facility Master Plan, prepared by Carollo Engineers, December 2007. Refer to pages 28 through 35.
- Conceptual Design Report for: Flow Equalization/Recycled Water Storage Facility, prepared by Infrastructure Engineering Corporation, March 2009
- Update of Potable and Recycled Water Master Plan Capital Improvement Program, completed by AECOM for OMWD, March 2011. Refer to pages 6-1 through 6-3 for a project summary, and to page A-1 for cost estimates. Northwest Quadrant/Village Park Recycled Water Study, completed by AECOM for OMWD, April 2011. Refer to page 6 for recycled water demands, and to pages 12-16 for cost estimates.
- Study of Recycled Water Supply Options for the Northwest Quadrant conducted for OMWD by DLM Engineering in May 2012.

- Preliminary design of Village Park Recycled Water Distribution Facilities currently underway as of January 2013; final design expected prior to September 2013.
- Recycled Water Master Permit Amendment
- Construction of the Advanced Water Treatment Facility at the San Elijo Water Reclamation Facility, March 2013.

Project Timing and Phasing

In the 1980s and 1990s, several water and wastewater agencies located in the northern portion of the Region partnered together to receive Federal funding (Title XVI recycled water grant funding) to expand their recycled water systems. As a result of this success, additional agencies joined together to conduct further investigations on expanding the use of recycled water within the northern portion of the Region. These additional efforts have resulted in the NSDCRRWP, which will allow the project partners to implement additional expansion and, in some cases, linkages of their recycled water systems to allow for further increases in recycled water use. *NSDCRRWP-Phase I* consisted of a study assessing the potential for further expansion of recycled water in the region, including an assessment of further inter-agency cooperative projects. Recycled water opportunities identified in the first phase were based on previous and ongoing agency planning efforts as well as an assessment of new opportunities.

With the completion of the regional study, agencies have identified an initial set of construction components as *NSDCRRWP-Phase II*. The design, permitting, and environmental documentation for these Phase II projects have been completed or are in progress to be completed such that Phase II will focus on construction and other implementation activities.

Project Map

The following section contains several maps that demonstrate the geographical location and surrounding work boundaries of each of the ten project components included in the *NSDCRRWP-Phase II*, as well as a general overview map that shows the entire area covered by the project. Note that component maps provided by project partners and were sourced from supporting documents included as Completed Works above.

Figure 3-3 is an overview map that shows the entire NSDCRRWP study area, which is generally bound by the Pacific Ocean to the west, the City of Escondido's service area to the east, the border of the City of Carlsbad's service area and the City of Oceanside's service area to the north, and SFID's service area to the south.

Component 1-1 Map: Figure 3-3-1 depicts the LWD Regional System Connection Project components and locations. Please note that the blue "P" on the map indicates the location of the high pressure pump station, the blue and red pipelines are existing LWD pipelines, and the orange pipeline is the 1,200 feet of transmission pipeline included in the project that would connect to an existing OMWD pipeline (in purple).

Component 1-2 Map: Figure 3-3-2 depicts the VWD Pump Improvements components and locations. As described above, improvements would be made to the existing Lift Station Number 1, located along San Marcos Boulevard in San Marcos, CA.

Component 1-3 Map: Figure 3-3-3 depicts the VID Golf Course Recycled Water Project components and locations. As described above, improvements would be made to the existing 14-inch failsafe pipeline, and would include construction of 400 feet of 8-inch pipeline to connect to an existing VID pipeline to ultimately connect to the Shadowridge Golf Course.

Component 1-4 Map: Figure 3-3-4 depicts the RMWD Northwest Recycled Water Expansion Project components and locations. Existing recycled water infrastructure is indicated in purple, and additional pipelines are indicated in red. In addition, piping would be placed to serve a future filling station near the Rockhoff Pump Station (construction water filling station).

Component 1-5 Map: Figure 3-3-5 depicts the OMWD Conversion of Distribution Facilities to Recycled Water components and locations. New pipelines to serve the Village Park community are indicated in red and yellow.

Component 1-6 Map: Figure 3-3-6 depicts the SFID Onsite Recycled Water Irrigation System Improvements Project components and locations. This project component would serve identified recycled water users within the western area of SFID's service area, which are indicated in blue on the graphic. The pink lines indicate existing recycled water pipelines, while the blue hashed line indicates proposed recycled water pipelines.

Component 1-7 Map: Figure 3-3-7 depicts the Carlsbad MWD Recycled Water Pipeline Expansion Project components and locations. The proposed recycled water pipeline alignment is indicated in green, while existing water pipelines are indicated in purple.

Component 1-8 Map: Figure 3-3-8 depicts the Escondido Recycled Water Easterly Main Extension Project components and locations. The figure shows the proposed and existing recycled water pipelines, as well as the recycled water customers that would be served by the project (eastern agriculture, Oak Hill Memorial Park, Eagle Crest Golf Course, and San Diego Safari Park).

Component 1-9 Map: Figure 3-3-9 depicts the Oceanside Reclaimed Water Main Extension Project components and locations. The figure shows the project area outlined in yellow, which includes the pipeline extension from Faraday Avenue to Melrose Drive to serve the Shadowridge Golf Course, Ocean Hills Golf Course, and greenbelt areas.

Component 1-10 Map: Figure 10 depicts the SEJPA Conversion of Existing Tanks to Recycled Water Storage components and locations. The first graphic shows the location of the existing steel water tank (Wanket Reservoir) in Encinitas, CA. The second graphic shows the San Elijo Water Reclamation Facility where the earthen-basin tank is located. One of these facilities will be converted to recycled water use as part of this project component.

Figure 3-3: North San Diego County Regional Recycled Water Project Map

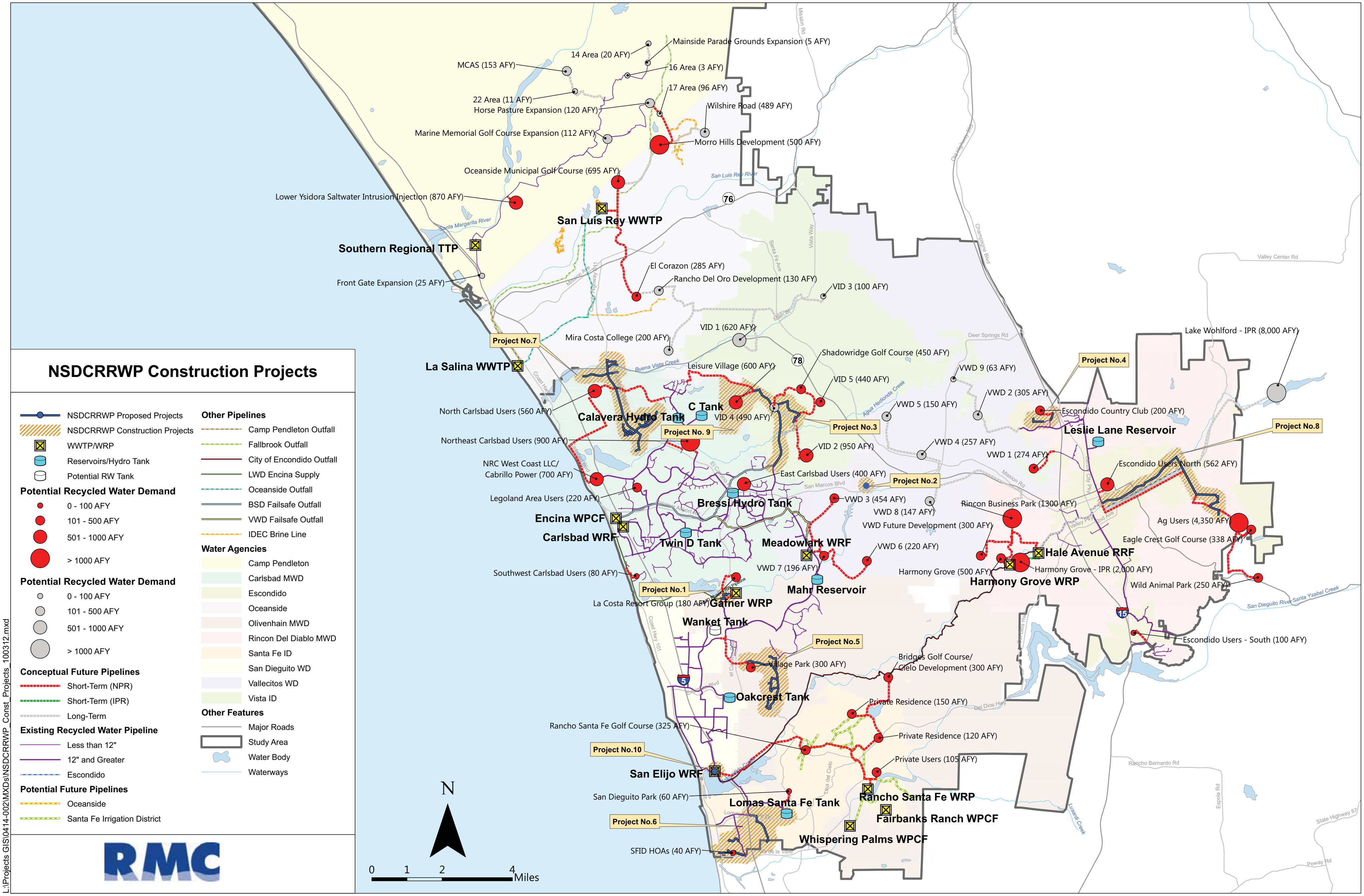

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Figure 3-3-1: Map of Component 1-1: LWD Regional System Connection

Figure 3-3-2: Map of Component 1-2: VWD Pump Improvements

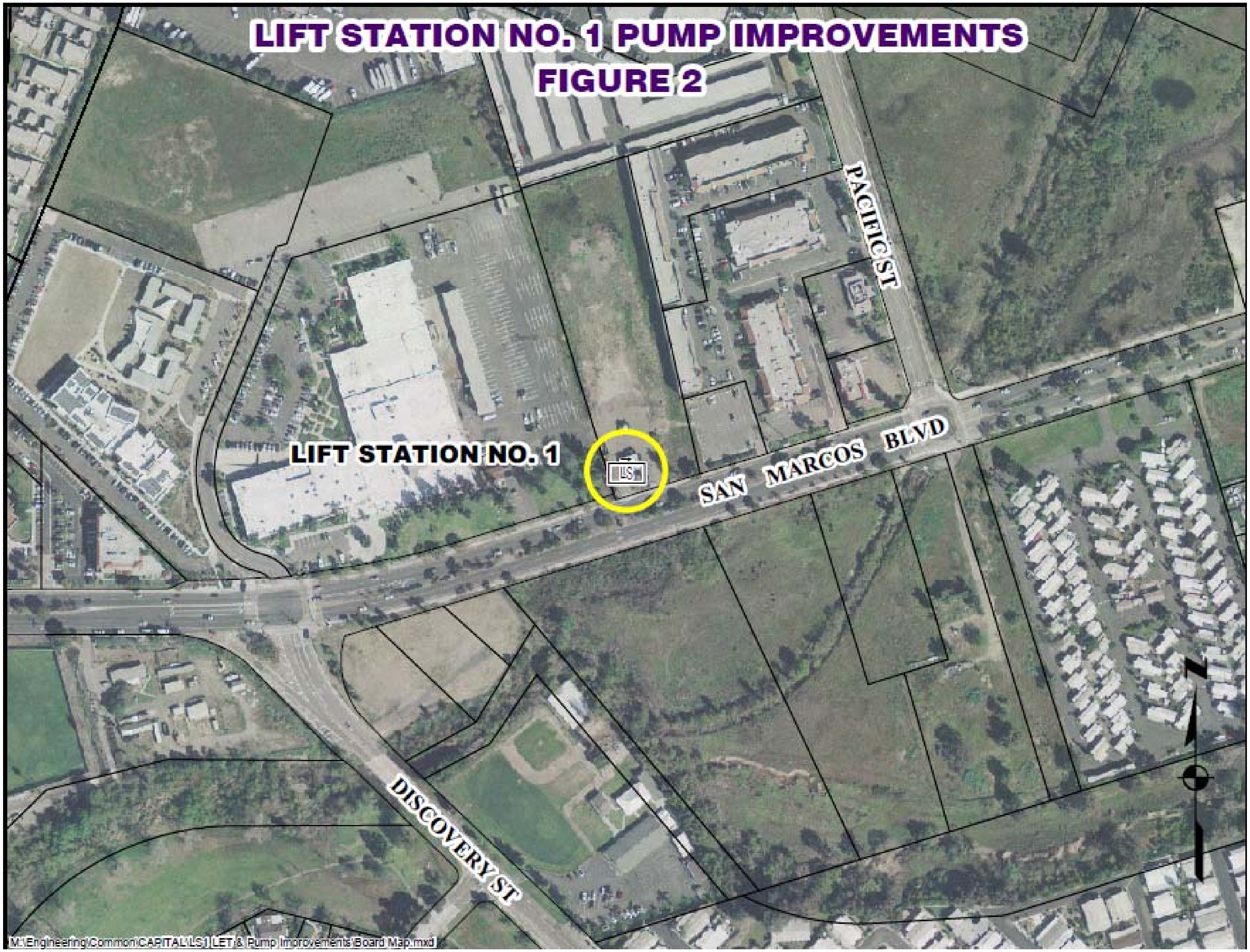


Figure 3-3-3: Map of Component 1-3: VID Golf Course Recycled Water

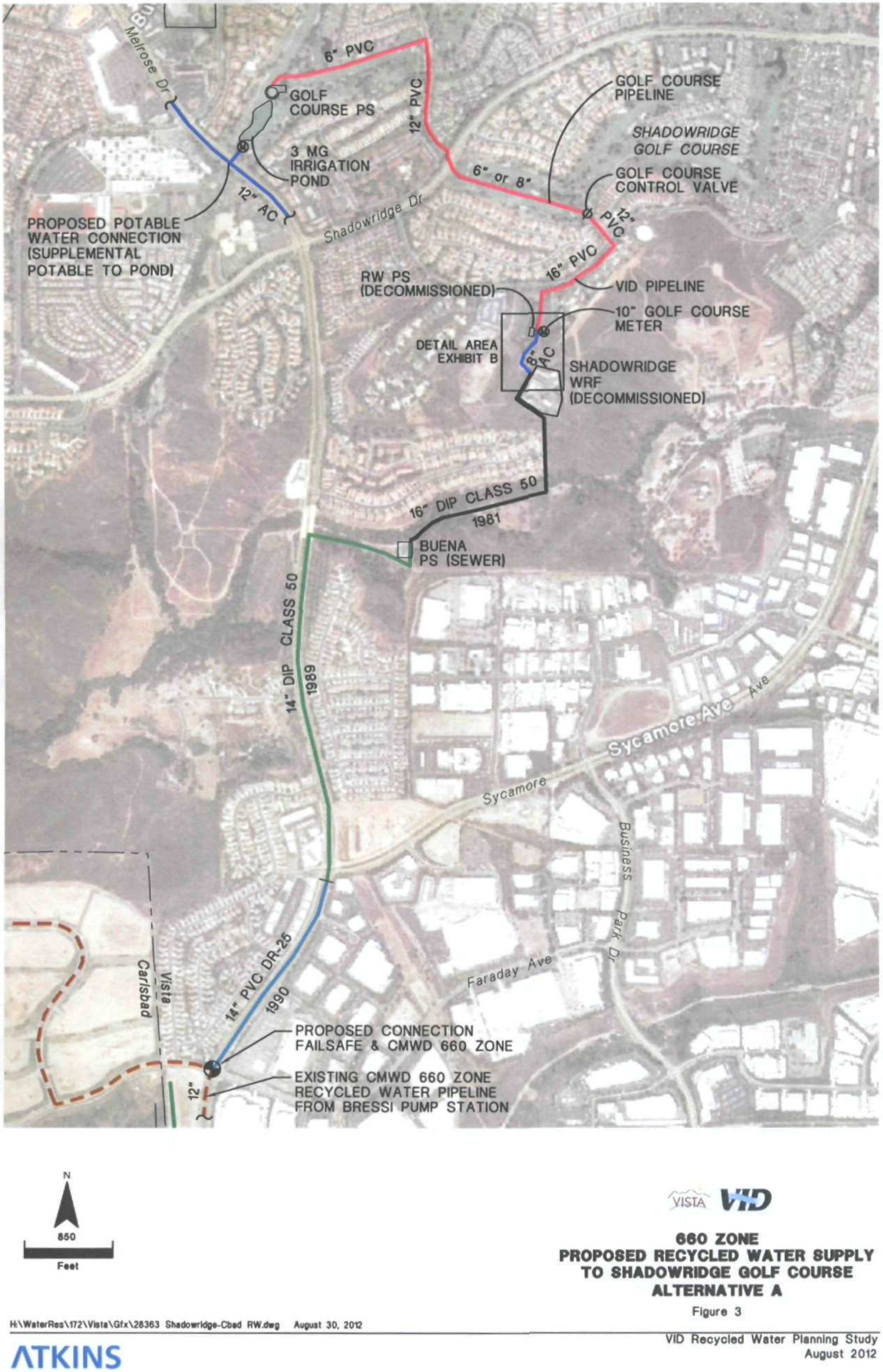


Figure 3-3-4: Map of RMWD Northwest Recycled Water Expansion

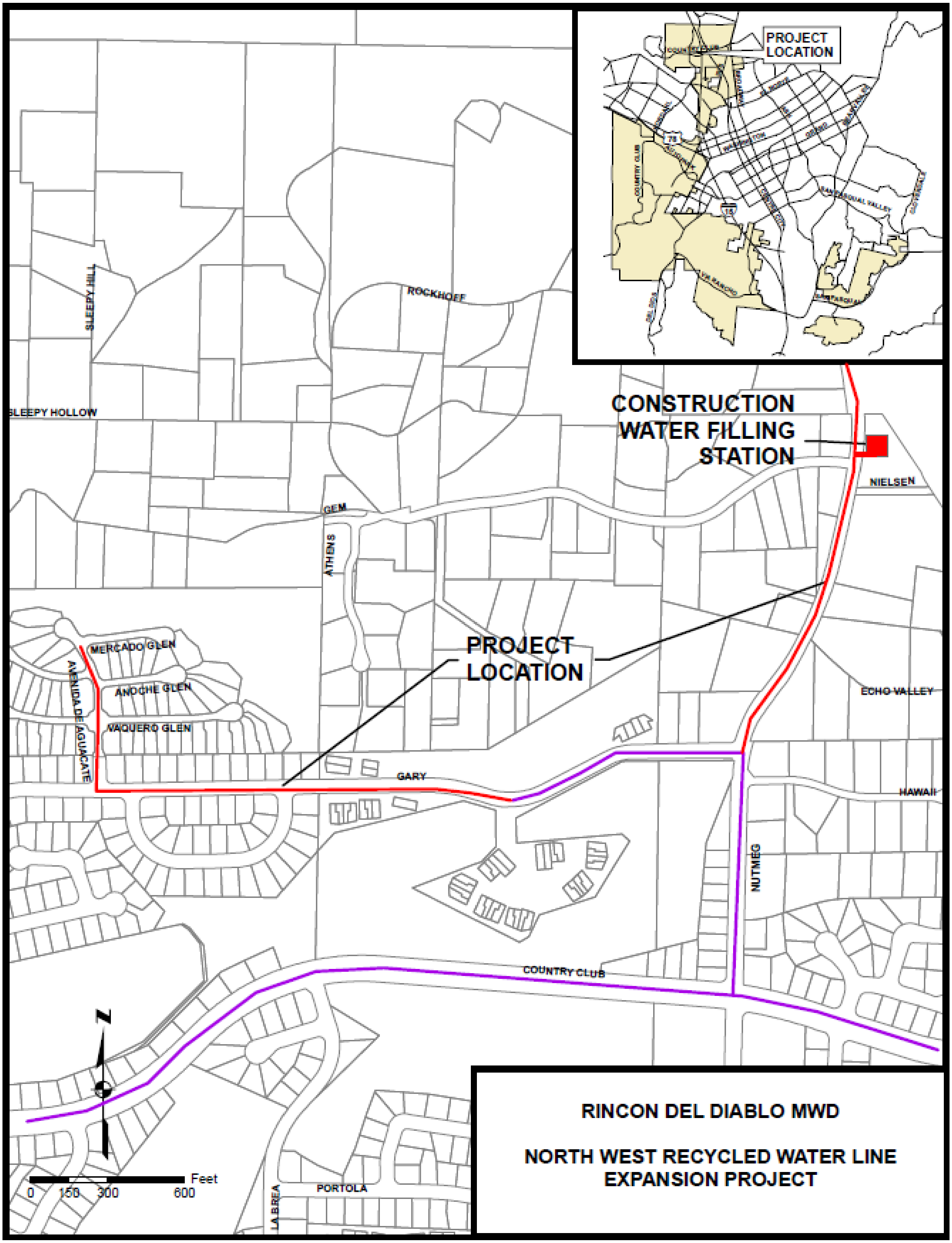
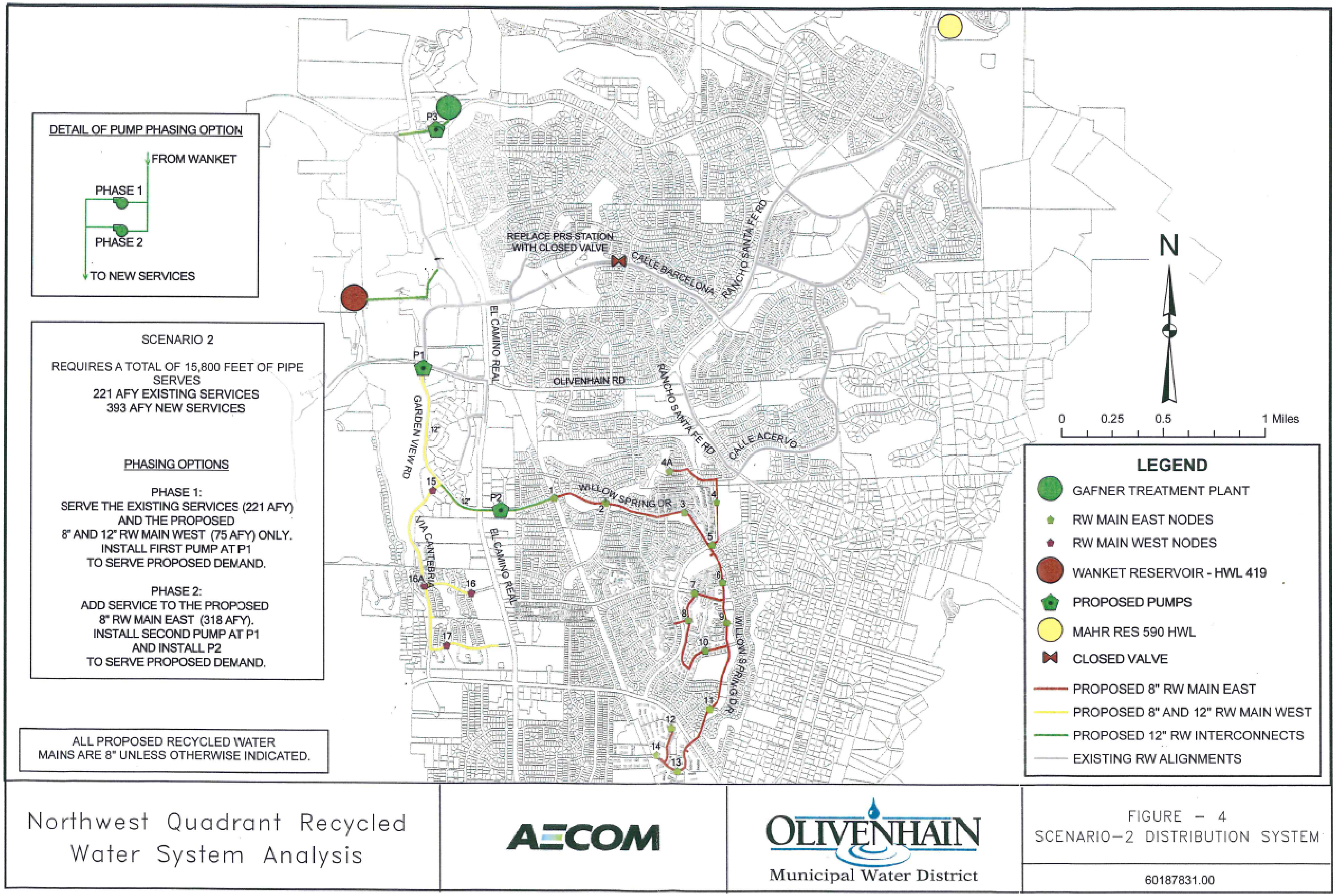
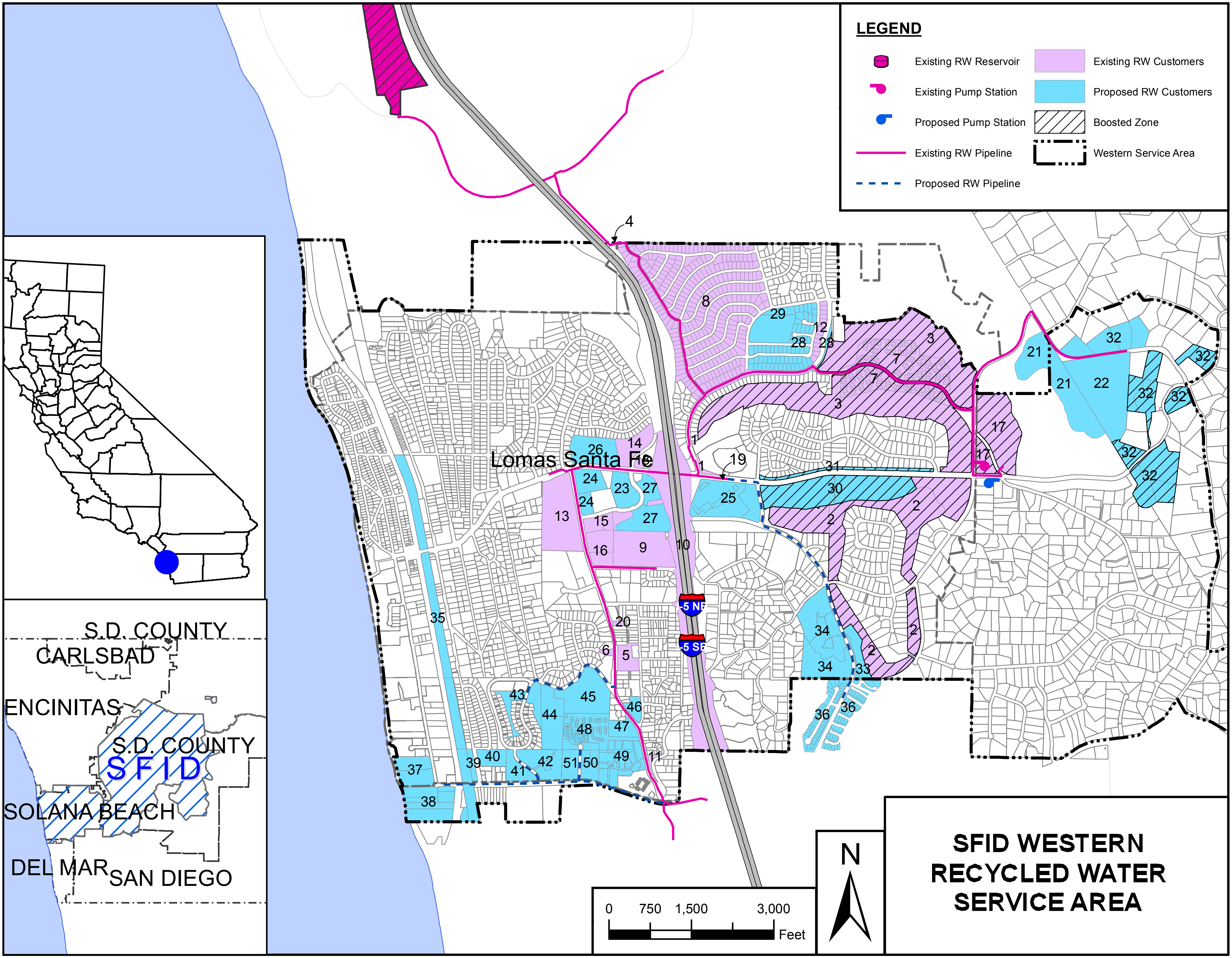


Figure 3-3-5: Map of OMWD Conversion of Distribution Facilities to Recycled Water





LEGEND
Existing RW Reservoir
Existing Pump Station
Proposed Pump Station
Existing RW Pipeline
Proposed RW Pipeline
Existing RW Customers
Proposed RW Customers
Boosted Zone
Western Service Area
Lomas Santa Fe
5 NB
5 SB
S.D. COUNTY
CARLSBAD
ENCINITAS
S.D. COUNTY
SFID
SOLANA BEACH
DEL MAR
SAN DIEGO
0
750
1,500
3,000
Feet
N
SFID WESTERN RECYCLED WATER SERVICE AREA

Figure 3-3-7: Map of Component 1-7 Carlsbad MWD Recycled Water Pipeline Extension

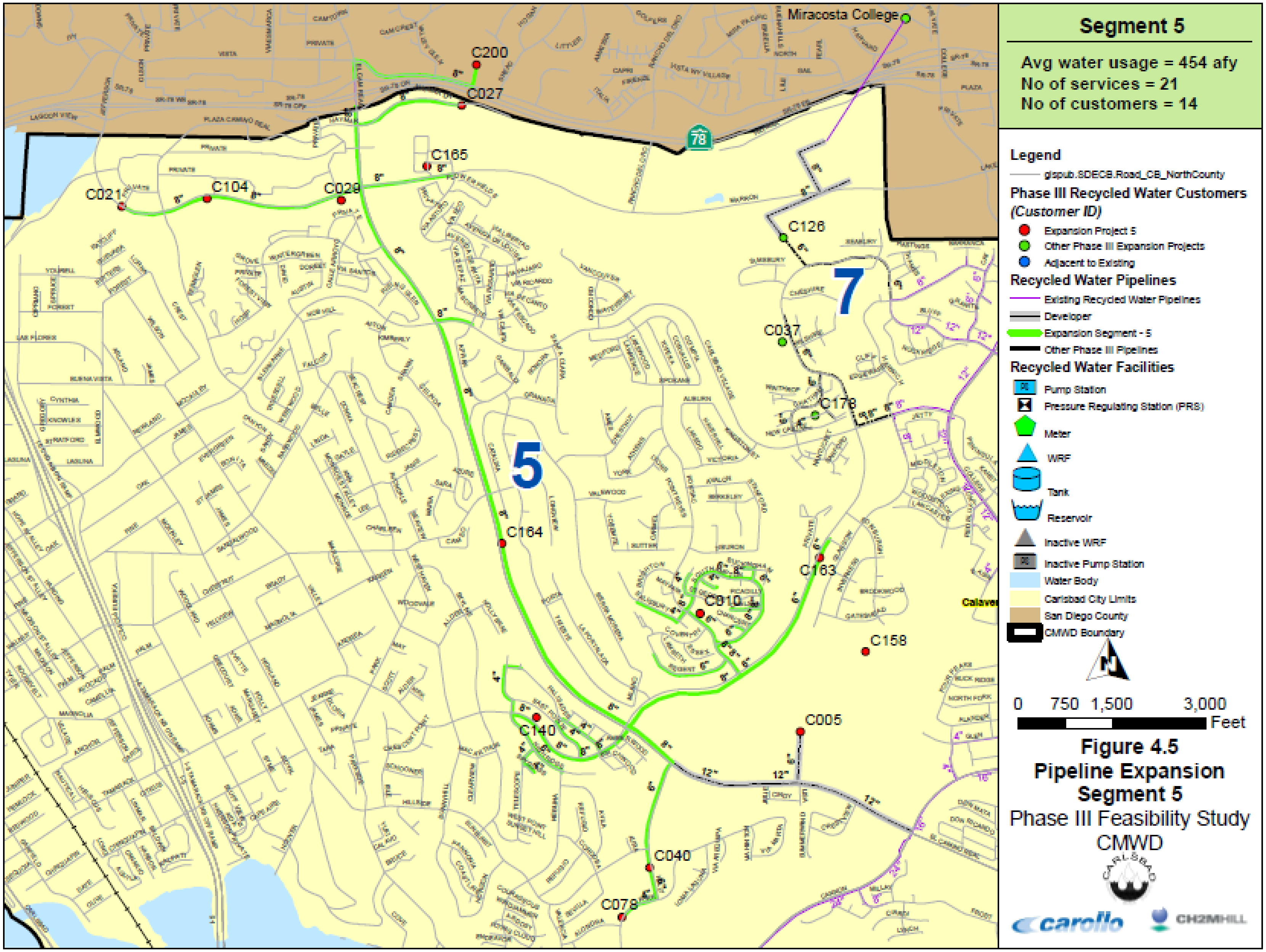


Figure 3-3-8: Map of Component 1-8 Escondido Recycled Water Easterly Main Extension

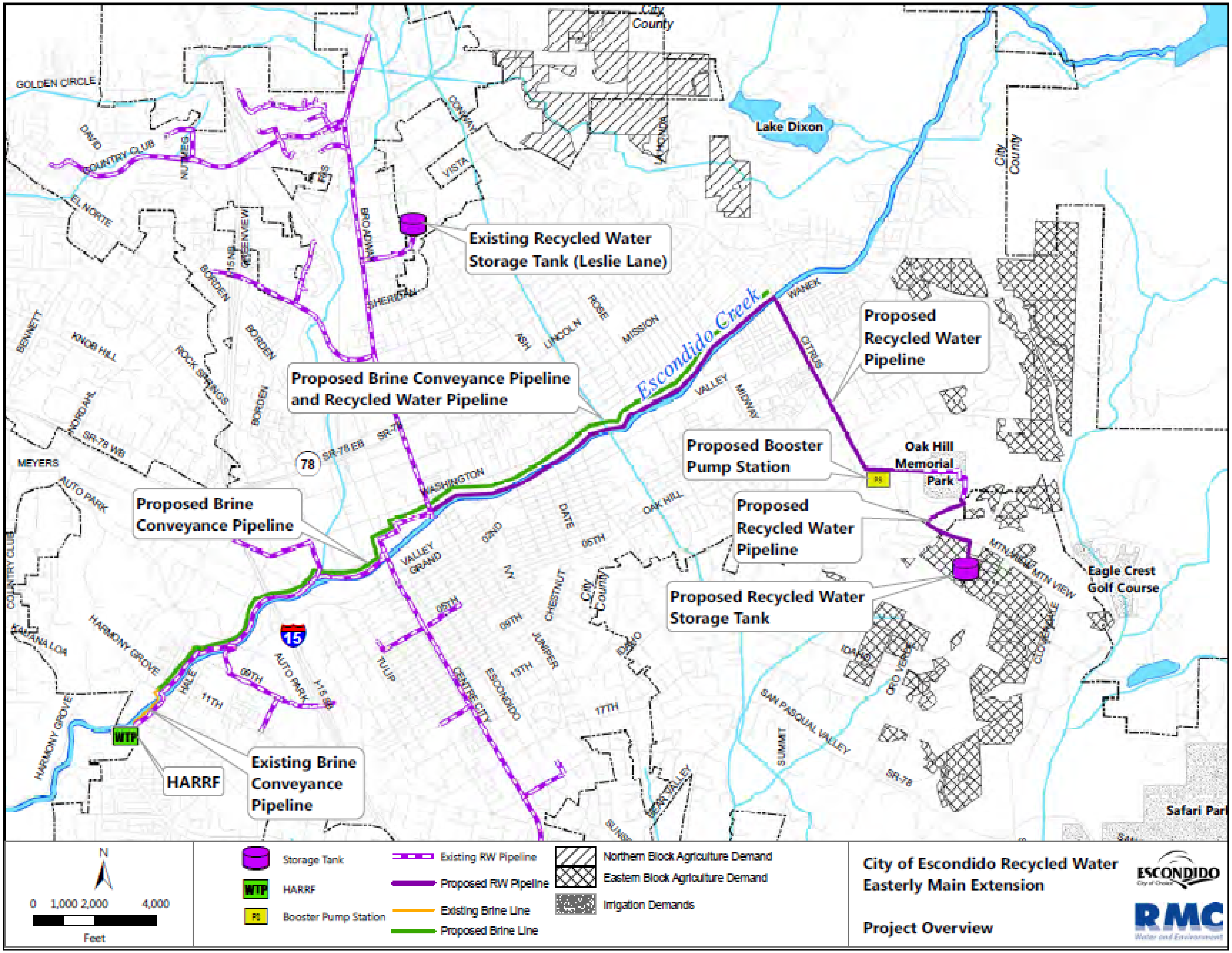


Figure 3-3-9: Map of Component 1-9 Oceanside Reclaimed Water Main Extension

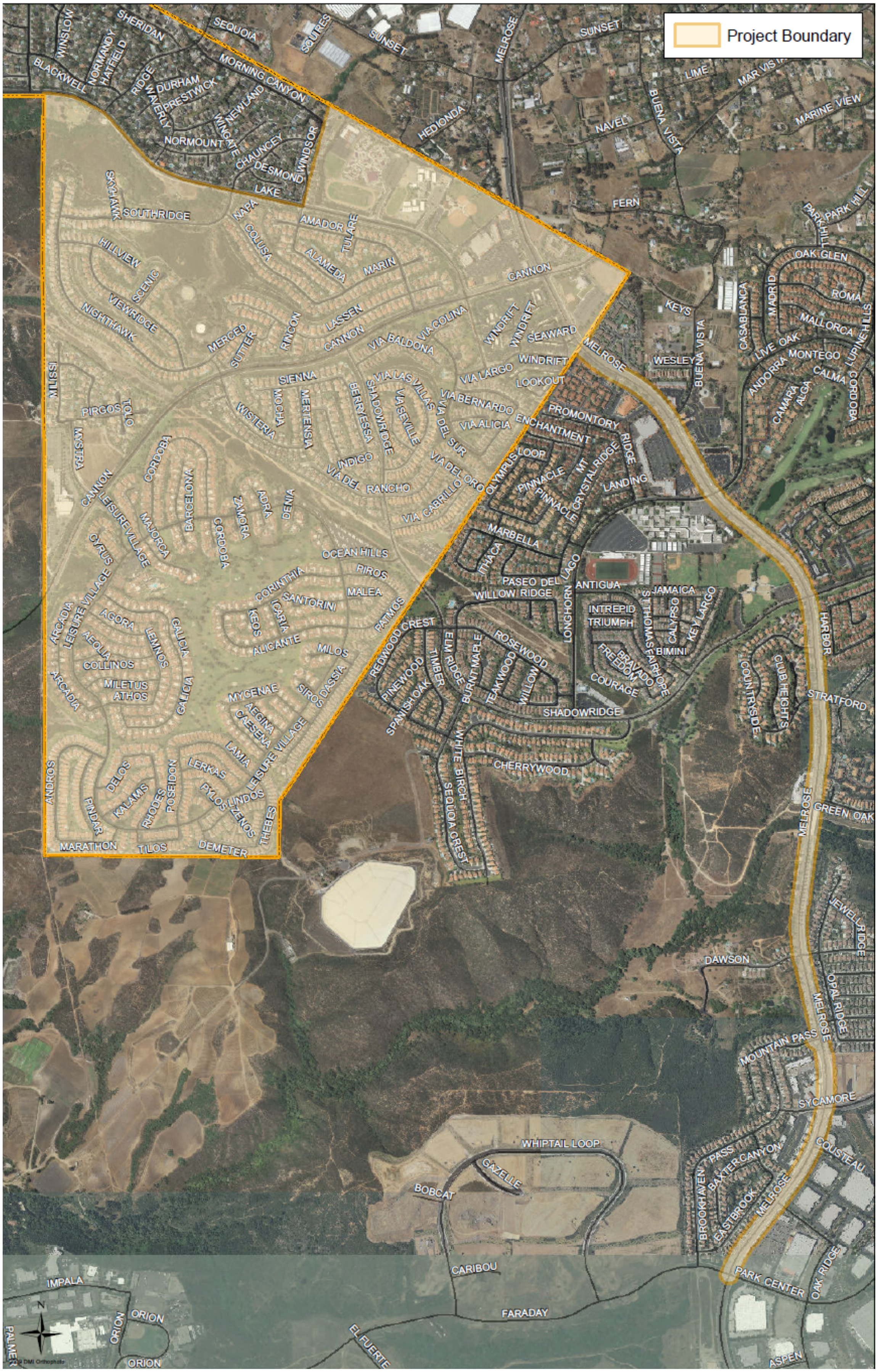
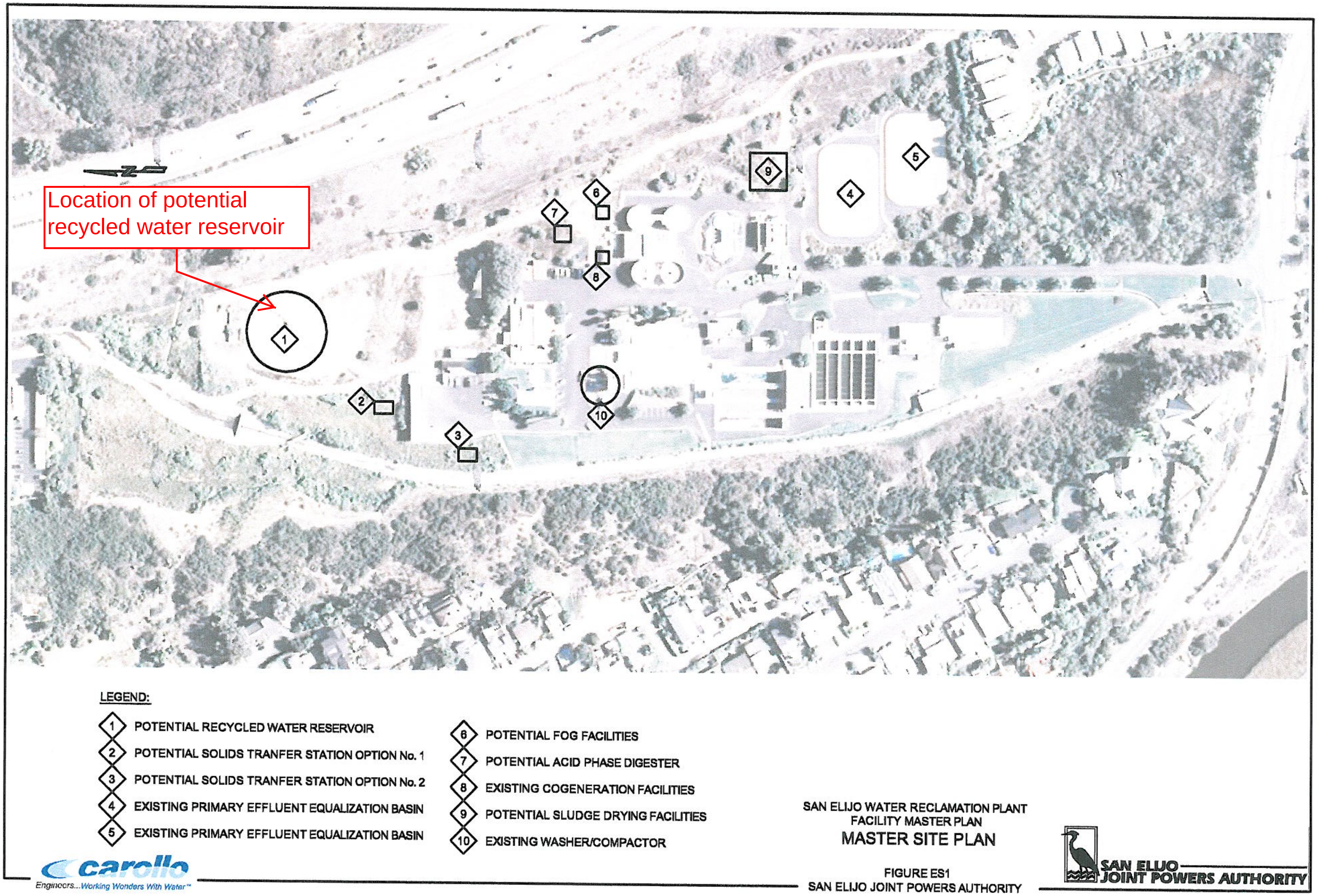


Figure 3-3-10: Map of Component 1-10 SEJPA Conversion of Existing Tanks to Recycled Water Storage



II. Project Work

(GA) Grant Administration

The San Diego County Water Authority will be responsible for administration and processing of the Implementation Grant contract, including tasks associated with compiling and submitting project invoices, quarterly reports, and completion reports for DWR. *NSDCRRWP- Phase II* will contribute $103,560 to this administrative effort. All data submitted by project partners as described in Attachment 6 will be compiled by the grant administrator for the San Diego IRWM data management system to be made publicly available.

Row (a) Direct Project Administration

Task 1: Project Administration

OMWD will be responsible for administration of the grant contract. The ten partner agencies that participate in the NSDCRRWP operate under cooperative cost sharing agreements. These agreements are entered into with the consent of each of the partnering agencies Board of Directors and approval takes place in open session public meetings. The agreements outline agency responsibilities and cost-sharing commitments. All contract management activities associated with quarterly reporting are included under Task 3; this work plan does not show budget under Task 1.

Task 2: Labor Compliance Program

All ten components of the *NSDCRRWP-Phase II* are “public works projects” and will require implementation of a Labor Compliance Program (LCP). Each of the individual partners will assure that an LCP, compliant with Department of Industrial Relations standards, is in place prior to any construction activities covered under this grant program. In order to simplify budgeting for this grant application, agency staff costs associated with establishing and implementing the LCPs were not included in this work plan.

Task 3: Reporting

In order to assess progress and accomplishments of the project, OMWD will prepare quarterly reports and invoices for the project. OMWD will also prepare a project completion report to document to DWR completion of the project and attainment of project goals and objectives. In addition, all of the data to be collected as described in Attachment 6 will be submitted to the Water Authority’s grant administrator to be submitted to DWR, compiled in the San Diego IRWM Program’s Data Management System, and made publicly available.

Table 3-7: Row (a) Direct Project Administration
North San Diego County Regional Recycled Water Project – Phase II

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 3: Reporting				
Quarterly Reports and Invoices	Quarterly	Not started		X
Project Completion Report	8/31/2017	Not started		X

Row (b) Land Purchase/ Easement

No easement acquisitions and/or right-of-ways will be required for project. All construction activities associated with the NSDCRRWP-Phase II components will be completed within roadway rights-of-way or on lands owned by the partner agencies.

Row (c) Planning / Design / Engineering / Environmental Documentation

Task 4: Assessment and Evaluation

No planning, conceptual, or technical studies are included in this work plan. Completed planning studies for the NSDCRRWP-Phase II components are included in the list of "Completed Work" above.

Task 5: Final Design

A majority of the project design work associated with the ten project components have been completed or are underway and have been funded through other means. Completed design reports for the NSDCRRWP-Phase II components are included in the list of "Completed Works" above.

One of the project components requires project design, as described below:

Project 1-6: Onsite Recycled Water Irrigation System Improvements Project

Project design deliverables include the following:

1. Preliminary on-site recycled water system improvement concept drawings and specifications - 30% Design (for submittal to DEH for consideration/comment).
2. Draft Final on-site recycled water system improvement drawings and specifications - 90% Design (incorporating DEH comments and submitted to DEH for final comments)
3. Final on-site recycled water system improvement drawings and specifications (incorporating DEH comments and with DEH and other required agency signatures).

Note that there will be approximately five separate sites for which design documents will be prepared. In general, they will be prepared simultaneously.

Task 6: Environmental Documentation

Each of the partner agencies will be responsible for complying with the necessary environmental regulations for their project component; no CEQA, NEPA, and other environmental compliance are included in this work plan. Completed environmental documentation for the NSDCRRWP-Phase II components are included in the list of "Completed Work" above.

Task 7: Permitting

Each of the partner agencies will be responsible for obtaining the necessary permits for their project component; no permits are included in this work plan.

Table 3-8: Row (c) Planning/Design/Engineering/Environmental Documentation
North San Diego County Regional Recycled Water Project – Phase II
Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements Project

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 5: Project Design				
Preliminary Concept Drawings and Specifications (30%)	January – June 2014	To be completed		X
Draft Final Drawings and Specifications (90%)	July – October 2014	To be completed		X
Final Drawing and Specifications for DEH (and other) signatures (100%)	November – December 2014	To be completed		X

Row (d) Construction/ Implementation

Task 8: Construction Contracting

Each of the partner agencies will be responsible for obtaining contractors and awarding construction contracts; no contracting is included in this work plan.

Task 9: Construction

The following sections describe the construction activities associated with each of the project components for *NSDCRRWP-Phase II*. A majority of the construction activities for this project will occur after contract execution.

Building Materials and/or Construction Standards

Projects will be constructed in accordance with all current applicable laws, standards and regulations, including the American Water Works Association standards for materials, construction and testing of pipe, storage tanks, pumps, and valves; NSF approval for materials that come in direct contact with drinking water; California Department of Transportation Standard Specifications for materials, construction and testing; International or California Building Code, California or National Plumbing Code, California Electrical Code, Standard Methods for laboratory testing, California or federal OSHA standards for safety equipment and design requirements.

Table 3-9: Row (d) Construction/ Implementation Summary
North San Diego County Regional Recycled Water Project – Phase II

Project Component	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Component 1-1: LWD Regional System Connection	November 2015-March 2017	Not yet begun		X
Component 1-2: VWD Pump Improvements	October 2013-August 2014	Not yet begun		X
Component 1-3: VID Golf Course Recycled Water	July 2014 – May 2015	Not yet begun		X
Component 1-4: RMWD Northwest Recycled Water Expansion	May 2014 – April 2015	Not yet begun		X
Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water	October 2013 – August 2015	Not yet begun		X
Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements	April 2015 – February 2016	Not yet begun		X
Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion	September 2014 – July 2015	Not yet begun		X
Component 1-8: Escondido Recycled Water Easterly Main Extension	July 2014 – September 2015	Not yet begun		X
Component 1-9: Oceanside Reclaimed Water Main Extension	July 2015- November 2016	Not yet begun		X
Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage	November 2014 – March 2016	Not yet begun		X

Component 1-1: LWD Regional System Connection Project

This project includes the construction of a new 700 gallons per minute (gpm), 1.0 million gallons per day (mgd) pump station needed to boost the recycled water transmission service pressure to 200 pounds per square inch (psi). The High Pressure Pump Station will be constructed on the site of the existing LWD Gafner WRP. The new pumps will discharge to several hundred feet of existing 16-inch pipeline to El Camino Real. This pipeline will be extended with a 12-inch transmission main for approximately 1,200 feet to a connection with the existing OMWD transmission and distribution system. This zone of the OMWD recycled water system will have storage provided by the existing Wanket Tank that will be converted by OMWD from potable to recycled water service.

Subtask 9.1.1 Mobilization and Site Preparation:

Mobilization and site preparation for this project will include the establishment of the construction area within the LWD Gafner WRP site. Mobilization will include installation of a construction office trailer, as well as project management planning and submittals - including a detailed time schedule and schedule of charges - for use in progress assessment.

Subtask 9.1.2 Project Construction:

The project construction will include site work, excavation, construction of new concrete wet well structures, installation of new 100-horsepower high pressure pumps and all appurtenant piping, as well as electrical and instrumentation work.

Subtask 9.1.3 Performance Testing and Demobilization:

Soils compaction, concrete strength, reinforcing steel, etc. will be tested during construction. Testing will include factory and field performance testing of the new pumps and transmission piping.

Table 3-10: Row (d) Construction/ Implementation – Details for 1-1
North San Diego County Regional Recycled Water Project – Phase II
Component 1-1: LWD Regional System Connection Project

Task 9-1: Construction for *LWD Regional System Connection Project*				
Activity or Deliverable	**Schedule**	**Status**	**Completion of Task**	
			Before Sept 2013	**After Sept 2013**
Subtask 9.1.1 Mobilization and Site Preparation				
Construction permits and management	November - December 2015	Not yet begun		X
Clearing and grading	November - December 2015	Not yet begun		X
Subtask 9.1.2 Project Construction				
Construct on-site pump station and off-site transmission piping	January – December 2016	Not yet begun		X
Subtask 9.1.3 Performance Testing and Demobilization				
Final startup, testing, and operational training	January – March 2017	Not yet begun		X

Component 1-2: VWD Pump Improvements

This project's construction involves the replacement of an existing constant speed motor driven pump with a new, higher-capacity pump with variable frequency drive. The existing 10-inch discharge pipeline will be replaced with a larger size pipeline to reduce head loss. To increase meter accuracy, the existing flow meter will be relocated outside of the lift station to a location where a straight run of pipe exists. A new electrical service switchboard will be installed in a new electric meter room on the exterior of the existing building, and a new motor control center with automatic transfer switch will replace the existing indoor switchboard. The existing 1-ton capacity pump crane will be upsized to a lifting capacity of approximately 2 tons.

Subtask 9.2.1 Mobilization and Site Preparation:

This task involves costs associated with mobilizing the construction crews and equipment to the work site. It will also involve obtaining the required agency permitting to perform the work and bonding requirements with VWD.

Subtask 9.2.2 Project Construction:

This task involves replacing the existing constant speed motor driven pump with a higher-capacity pump with variable frequency drive, relocating the existing flow meter, installing the new electrical package, and upsizing the capacity of the existing 1-ton crane to a 2-ton lifting capacity.

Subtask 9.2.3 Performance Testing and Demobilization:

This task involves any and all required materials testing, including soil content and compaction, concrete strength, pump motor horsepower, pump flow, and pipeline pressure testing. It also includes the production and submission of proper operating manuals for the equipment installed as well as demobilizing the construction crew and equipment from the work site.

Table 3-11: Row (d) Construction/ Implementation – Details for 1-2
North San Diego County Regional Recycled Water Project – Phase II: Component 1-2: VWD Pump Improvements

Task 9-2: Construction for *VWD Pump Improvements*				
Activity or Deliverable	**Schedule**	**Status**	**Completion of Task**	
			Before Sept 2013	**After Sept 2013**
Subtask 9.2.1 Mobilization and Site Preparation				
Mobilize equipment & crews	October - November 2013	Not yet begun		X
Insurance and bonds	October - November 2013	Not yet begun		X
Permits and safety plan	October - November 2013	Not yet begun		X
Subtask 9.2.2 Project Construction				
Replacing existing pump with variable frequency drive	December 2013 – May 2014	Not yet begun		X
Relocating existing flow meter	December 2013 – May 2014	Not yet begun		X
Installing new electrical package	December 2013 – May 2014	Not yet begun		X
Upsizing capacity of existing crane	December 2013 – May 2014	Not yet begun		X
Subtask 9.2.3 Performance Testing and Demobilization				
Soil and concrete testing	June – August 2014	Not yet begun		X
Horsepower, flow, & pressure testing	June – August 2014	Not yet begun		X
Operating manuals	June – August 2014	Not yet begun		X
Demobilize equipment and crews	June – August 2014	Not yet begun		X

Component 1-3: VID Golf Course Recycled Water

This project will involve the installation of a metered connection from the Carlsbad Municipal Water District's 12-inch recycled water main at the intersection of Melrose Dr. and Faraday Ave. to Shadowridge WRF's 14-inch failsafe pipeline. It will also involve the installation of approximately 400 feet of 8-inch pipeline from the terminus of the failsafe pipe at the Shadowridge WRF to the existing Vista Irrigation

District (VID) 16-inch pipeline north of the SWRF. It will investigate and restrain joints on the section of the failsafe directly downstream of the SWRF, and install a 4-inch potable water meter at a golf course irrigation pond for supplemental water and blending. Arrangements for use or acquisition of the approximately 2 miles of existing 14- and 16-inch failsafe pipeline from the City of Vista will also be part of the project.

Subtask 9.3.1 Mobilization and Site Preparation:

This task will involve the location and preparation of staging site(s), construction staking, potholing, and other general activities associate with mobilization and site preparation. It will also include acquisition of the failsafe pipeline from the City of Vista.

Subtask 9.3.2 Project Construction:

This task will involve (1) the installation of a metered connection from the CMWD 12-inch" recycled water main at the intersection of Melrose Dr. and Faraday Ave. to the Shadowridge WRF's 14-inch failsafe pipeline, (2) installation of approximately 400 feet of 8-inch pipeline from the terminus of the failsafe pipe at the SWRF to the existing VID 16-inch recycled water pipeline north of the SWRF, (3) the restraining of joints on the section of the failsafe directly downstream of the SWRF, and (4) installation of a 4-inch potable water meter at a golf course irrigation pond.

Subtask 9.3.3 Performance Testing and Demobilization:

This task will involve flushing and pressure testing pipelines.

Table 3-12: Row (d) Construction/ Implementation – Details for 1-3
North San Diego County Regional Recycled Water Project – Phase II: Component 1-3: VID Golf Course Recycled Water

Task 9-3: Construction for *VID Golf Course Recycled Water*				
Activity or Deliverable	**Schedule**	**Status**	**Completion of Task**	
			Before Sept 2013	**After Sept 2013**
Subtask 9.3.1 Mobilization and Site Preparation				
Staging site, staking, potholing, saw cutting, etc	July – August 2014	Not yet begun		X
Acquisition of failsafe pipeline from City of Vista	July – August 2014			
Subtask 9.3.2 Project Construction				
Metered connection to CMWD	September 2014 – February 2015	Not yet begun		X
400 feet of 8-inch pipeline	September 2014 – February 2015	Not yet begun		X
Restrain joints in existing failsafe pipeline	September 2014 – February 2015	Not yet begun		X
Install 4" potable water meter	September 2014 – February 2015	Not yet begun		X
Subtask 9.3.3 Performance Testing and Demobilization				
Flush and pressure test pipelines	March – May 2015	Not yet begun		X

Component 1-4: RMWD Northwest Recycled Water Expansion

This project will include the construction of approximately 3,500 feet of 4- and 6-inch pipeline within the existing right-of-way, make site improvements for a future recycled water filling station for construction water use, and install four 2-inch irrigation meters.

Subtask 9.4.1 Mobilization and Site Preparation:

This task will include obtaining permits, site staging, implementing stormwater BMPs, labor and equipment mobilization, potholing, shop drawing reviews, traffic control, and other activities associate with site preparation and mobilization.

Subtask 9.4.2 Project Construction:

This task will involve installation of pipeline and appurtenances, as well as filling station site work. Filling station site work will include extending 1,400 feet of 6-inch recycled water pipeline to connect to the future location of a new filling station site.

Subtask 9.4.3 Performance Testing and Demobilization:

This task includes pressure testing the piping, final inspection of work, site cleanup, and demobilization.

Table 3-13: Row (d) Construction/ Implementation – Details for 1-4
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-4: RMWD Northwest Recycled Water Extension

Task 9-4: Construction for *RMWD Northwest Recycled Water Expansion*				
Activity or Deliverable	**Schedule**	**Status**	**Completion of Task**	
			Before Sept 2013	**After Sept 2013**
Subtask 9.4.1 Mobilization and Site Preparation				
Mobilization	May – June 2014	Not yet begun		X
Surveying	May – June 2014	Not yet begun		X
Traffic control	May – June 2014	Not yet begun		X
Subtask 9.4.2 Project Construction				
Installation of pipeline and appurtenances	July 2014 – January 2015	Not yet begun		X
Filling station site work	July 2014 – January 2015	Not yet begun		X
Subtask 9.4.3 Performance Testing and Demobilization				
Pressure testing	February – April 2015	Not yet begun		X
Demobilization	February – April 2015	Not yet begun		X

Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water

This project will involve the conversion of eligible customers in the Village Park and El Camino Real corridor areas of Encinitas to recycled water. Specifically, OMWD plans to install two pump stations, 6,500 feet of 12-inch PVC pipeline, five 12-inch gate valves, 20,000 feet of 8-inch PVC pipeline, and ten 8-inch gate valves.

Subtask 9.5.1 Mobilization and Site Preparation:

This subtask will involve site staging, staking, potholing, saw cutting, and other tasks associated with site preparation and resource mobilization, at both the Village Park location and the location of the pump stations.

Subtask 9.5.2 Project Construction:

This subtask will involve the installation of two pump stations, 6,500 feet of 12-inch PVC pipeline, five 12-inch gate valves, 20,000 feet of 8-inch PVC pipeline, and ten 8-inch gate valves. Project construction will also require repaving 26,500 feet of a 4-foot-wide trench.

Subtask 9.5.3 Performance Testing and Demobilization:

This subtask will involve flushing and pressure testing pipelines, as well as general demobilization activities at the pump stations and Village Park.

Table 3-14: Row (d) Construction/ Implementation – Details for 1-5
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water

Task 9-5: Construction for *OMWD Conversion of Distribution Facilities to Recycled Water*				
Activity or Deliverable	**Schedule**	**Status**	**Completion of Task**	
			Before Sept 2013	**After Sept 2013**
Subtask 9.5.1 Mobilization and Site Preparation				
Site staging, staking, potholing, saw cutting, and associated tasks	October 2013 - February 2014	Not yet begun		X
Subtask 9.5.2 Project Construction				
Installation of two pump stations	March 2014 - February 2015	Not yet begun		X
Installation of 12- and 8-inch PVC pipeline and gate valves	March 2014 - February 2015	Not yet begun		X
Subtask 9.5.3 Performance Testing and Demobilization				
Flush and pressure test pipelines, general demobilization	March – August 2015	Not yet begun		X

Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements

This project will install small diameter (1-inch to 2-inch) PVC irrigation pipelines, valves, sprinkler heads, irrigation controllers, and other associated irrigation appurtenances. Construction will also include the installation of small diameter (1-inch to 2-inch) copper services connecting the on-site system to the existing recycled water distribution system, and the installation of a new recycled water meter and meter box.

Subtask 9.6.1 Mobilization and Site Preparation:

This task will include disconnecting the irrigation system from the existing potable system and providing temporary irrigation piping systems.

Subtask 9.6.2 Project Construction:

Project construction involves a series of tasks, which will include:

- Installing proper recycled water identification devices for existing irrigation components
- Replacing sprinkler heads and other potable facilities with those approved for recycled water use
- Installing new small diameter (1-inch to 2-inch) recycled water irrigation pipelines, valves, and other buried components
- Installing backflow devices to protect the potable water system
- Installing small, skid-mounted, on-site booster pumps
- Installing recycled water service and meter

Subtask 9.6.3 Performance Testing and Demobilization:

This task will include site and resource demobilization, as well as final start-up testing and approvals.

Table 3-15: Row (d) Construction/ Implementation – Details for 1-6
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements

Task 9-6: Construction for *SFID Onsite Recycled Water Irrigation System Improvements*				
Activity or Deliverable	**Schedule**	**Status**	**Completion of Task**	
			Before Sept 2013	**After Sept 2013**
Subtask 9.6.1 Mobilization and Site Preparation				
Mobilization including disconnecting irrigation system to be modified from existing potable system	April – May 2015	Not yet begun		X
Subtask 9.6.2 Project Construction				
Install proper recycled water identification devices for existing irrigation components	June – November 2015	Not yet begun		X
Replace sprinkler, replace existing potable water valves, relocate fountains, benches, and other typical facilities	June – November 2015	Not yet begun		X
Install new recycled water irrigation pipelines, valves, and other buried components	June – November 2015	Not yet begun		X
Install backflow devices to protect potable water system and connection of new recycled water system components	June – November 2015	Not yet begun		X
Install small skid mounted on-site booster pumps	June – November 2015	Not yet begun		X
Installation of recycled water service and meter	June – November 2015	Not yet begun		X
Subtask 9.6.3 Performance Testing and Demobilization				
Demobilization, final start-up testing/approvals	December 2015 – February 2016	Not yet begun		X

Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion

This project includes review and approval of shop drawings, truck and material haul routes, the installation of pipelines with street restoration improvements that meet City of Carlsbad and City of Oceanside standards, pressure testing of the pipelines to CMWD standards, and the completion of all punch list items.

Subtask 9.7.1 Mobilization and Site Preparation:

This task will involve setting up the contractor's staging area.

Subtask 9.7.2 Project Construction:

This task includes delivery of the pipe material, excavation of pipeline trenches in public streets, installation of pipelines, re-compaction of earth in the pipeline trench, and restoration of surface improvements.

Subtask 9.7.3 Performance Testing and Demobilization:

This task involves pressure testing the installed pipelines as well as removing equipment and material from staging areas.

Table 3-16: Row (d) Construction/ Implementation – Details for 1-7
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion

Task 9-7: Construction for *Carlsbad MWD Recycled Water Pipeline Expansion*				
Activity or Deliverable	**Schedule**	**Status**	**Completion of Task**	
			Before Sept 2013	**After Sept 2013**
Subtask 9.7.1 Mobilization and Site Preparation				
Establish staging area	September – October 2014	Not yet begun		X
Subtask 9.7.2 Project Construction				
Installation of recycled water pipeline	November 2014 – April 2015	Not yet begun		X
Subtask 9.7.3 Performance Testing and Demobilization				
Pressure testing and staging area restoration	May – July 2015	Not yet begun		X

Component 1-8: Escondido Recycled Water Easterly Mains Extension

This project includes the installation of an approximately 5.1 mile long extension of a 24-inch recycled water transmission main in the City of Escondido.

Subtask 9.8.1 Mobilization and Site Preparation:

This task involves obtaining all permits, insurance, and bonds; mobilizing labor force, equipment and construction facilities onto the site; providing necessary storage, parking, and staging areas; providing construction water supply; providing on-site sanitary facilities; performing all training; and performing project site cleanup.

Subtask 9.8.2 Project Construction:

Construction will involve installing 5.1 miles of 24-inch recycled water transmission main.

Subtask 9.8.3 Performance Testing and Demobilization:

This task will include pipeline testing, including flow and pressure testing, as well as site demobilization and the demobilization of equipment and crews.

Table 3-17: Row (d) Construction/ Implementation – Details for 1-8
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-8: Escondido Recycled Water Easterly Main Extension

Task 9-8: Construction *Escondido Recycled Water Easterly Mains Extension*				
Activity or Deliverable	**Schedule**	**Status**	**Completion of Task**	
			Before Sept 2013	**After Sept 2013**
Subtask 9.8.1 Mobilization and Site Preparation				
Mobilization, clean-up	July – August 2014	Not yet begun		X
Subtask 9.8.2 Project Construction				
Installation of 24-inch recycled water main	September 2014 – June 2015	Not yet begun		X
Installation of isolation valves, air valves, and blowoff/drain	September 2014 – June 2015	Not yet begun		X
Subtask 9.8.3 Performance Testing and Demobilization				
Pressure testing	July - September 2015	Not yet begun		X
Demobilize equipment and crews	July - September 2015	Not yet begun		X

Component 1-9: Oceanside Melrose Drive Reclaimed Water Main Extension

This project will include the installation of approximately 8,140 of 12-inch recycled pipeline and 6,300 of 8-inch recycled pipeline.

Subtask 9.9.1 Mobilization and Site Preparation:

This task will involve contractor mobilization to the project site and set up of the contractor's construction yard and temporary office facilities. It will also involve pipeline survey and layout, as well as preconstruction videos.

Subtask 9.9.2 Project Construction:

This task will include traffic control setup, saw cutting the street, trench excavation, trucking materials, pipe installation, pipe bedding and backfill, repaving the street, street striping, and clean up.

Subtask 9.9.3 Performance Testing and Demobilization:

This project will conduct compaction testing of the trench backfill and asphalt, as well as pressure testing of pipeline. It will also include the removal of the contractor's temporary construction yard and office trailers.

Table 3-18: Row (d) Construction/ Implementation – Details for 1-9
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-9: Oceanside Reclaimed Water Main Extension

Task 9-9: Construction for *Oceanside Melrose Drive Reclaimed Water Main Extension*				
Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Subtask 9.9.1 Mobilization and Site Preparation				
Set up of construction yard and temporary facilities	July – August 2015	Not yet begun		*X*
Subtask 9.9.2 Project Construction				
Installation of recycled water pipeline	September 2015 – August 2016	Not yet begun		*X*
Subtask 9.9.3 Performance Testing and Demobilization				
Testing during construction and removal of temporary facilities	September – November 2016	Not yet begun		*X*

Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage

This project will involve the conversion from potable to recycled water of either the existing 3 million gallon steel tank in Encinitas or the 1 million gallon earthen basin wastewater tank. The first task will be to evaluate the two tanks to determine the best candidate. Either tank will require inlet/outlet valves and piping, minor repairs to, and cleaning of, floor, roof and walls, tank painting, and 12-inch to 16-inch connecting pipeline (approximately 200 feet). Additionally, if the steel tank is selected, it will require corrosion system improvements, while the earthen basin would require the replacement of its polyethylene cover if selected.

Subtask 9.10.1 Mobilization and Site Preparation:

This task will involve site staging, a utility survey, staking, potholing, saw cutting, and other associated tasks.

Subtask 9.10.2 Project Construction:

This task will involve the installation of a new 12-inch meter and recycled water connection, completion of conversion of the tank, installation of a new inlet connection, and conversion of an existing 16-inch pipeline and pressure reducing station to recycled water. It will also involve conducting minor repairs and cleaning to the floor, roof and walls of the tank, and, if the steel tank is selected, tank painting and cathodic protection system improvements or polyethylene cover replacement if the earthen basin is selected. Additionally, this task will involved the installation of approximately 200 feet of 12-inch to 16-inch connecting pipeline.

Subtask 9.10.3 Performance Testing and Demobilization:

This task will involve flushing and pressure testing the pipelines, conducting soil and concrete testing, and general demobilization activities.

Table 3-19: Row (d) Construction/ Implementation– Details for 1-10
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage

Task 9-10: Construction for *SEJPA Conversion of Existing Tanks to Recycled Water Storage*				
Activity or Deliverable	**Schedule**	**Status**	**Completion of Task**	
			Before Sept 2013	**After Sept 2013**
Subtask 9.10.1 Mobilization and Site Preparation				
Site staging, staking, potholing, saw cutting, and associated tasks	November - December 2014	Not yet begun		X
Subtask 9.10.2 Project Construction				
Installation of a new 12-inch meter and recycled water connection	January -December 2015	Not yet begun		X
Conversion at the tank	January -December 2015	Not yet begun		X
Installation of a new inlet connection	January -December 2015	Not yet begun		X
Conversion of existing 16-inch pipeline and pressure reducing station to recycled water	January -December 2015	Not yet begun		X
Subtask 9.10.3 Performance Testing and Demobilization				
Flushing and pressure testing pipelines, soil and concrete testing, and general demobilization	January - March 2016	Not yet begun		X

Row (e) Environmental Compliance/ Mitigation/ Enhancement

Task 10: Environmental Compliance / Mitigation / Enhancement

Each of the partner agencies will be responsible for complying with the necessary environmental mitigation or enhancement requirements for their project component; no environmental mitigation is included in this work plan.

Row (f) Construction Administration

Task 11: Construction Administration

Each of the partner agencies will be responsible for managing the construction contractor for their project component; no construction administration is included in this work plan.

Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program

I. Introduction

Project Sponsor

The San Diego County Water Authority (Water Authority) is the project sponsor for the *Turf Replacement and Agricultural Efficiency Program*.

Project Need

The Water Authority, a wholesale water agency, imports approximately 80% of its water supplies from the State Water Project (SWP) and the Colorado River.[1] SWP supplies from the Bay-Delta have been restricted since 2006, due to drought and regulatory restrictions, and additional restrictions on Colorado River water limits its use for additional supplemental supply. In 2009, Senate Bill X7-7 was passed, which mandates a 20% reduction in urban water use by 2020.[2] The intent of the *Turf Replacement and Agricultural Irrigation Efficiency Program* is to encourage changes in the way potable water is used in an outdoor setting. The outdoor emphasis of this program is particularly important considering that approximately 60% of total residential water demand in the Region is attributed to outdoor water use, and approximately 9% of the Region's total water use is attributed to agricultural sources.[3]

Water use efficiency/water conservation is one of the most cost-effective and environmentally- friendly ways to reduce regional water demands. Due to outdoor water demands in the Region, there are large opportunities to improve outdoor water use efficiency in the Region, and this program will help to fulfill those opportunities. This program can also promote awareness towards the value of environmental stewardship by demonstrating that changes made at the individual level have a substantial positive impact to the Region.

Project Purpose

This regional program will promote outdoor water use efficiency in the residential and commercial sectors by providing financial incentives to replace turf grass with water-wise plant material and to upgrade overhead sprinkler irrigation systems to high-efficiency irrigation systems. The program will also offer incentives to agricultural customers to convert potable water irrigation systems to recycled water systems.

Project Abstract

The *Turf Replacement and Agricultural Irrigation Efficiency Program* will provide financial incentives, technical assistance, on-site support and guidance, training, and resource lists to encourage and support projects that improve irrigation efficiency and reduce water use in urban landscapes and agricultural lands. There are two components of this program:

1. Turf Replacement Program: Turf replacement and irrigation upgrades will be incentivized through cash rebates once projects are completed according to program guidelines. The Water Authority will manage the overall grant and administer the incentive program for customers participating throughout its service area, except for those customers located within the City of San Diego's (City's) service area. The City of San Diego Public Utilities Department - Water Conservation Program will administer the incentive program for customers within its own service area and service areas for which it supplies wholesale water such as Coronado and Imperial Beach, and the City of San Diego Transportation & Storm Water Department - Think Blue/Storm Water Pollution Prevention Program, will provide education and outreach regarding the incentive program with an emphasis on dry weather runoff prevention and water quality protection that are achieved with improvements to irrigation efficiency within the City. This program component has been implemented by the Water Authority and the City for several years, and is ready for continued implementation.

[1] San Diego County Water Authority. 2011. *2010 Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.
[2] San Diego County Water Authority. 2011. *2010 Urban Water Management Plan*. Page 1-4, Section 1.2.
[3] San Diego County Water Authority. 2011. *2010 Urban Water Management Plan*. Page 2-1, Section 2.1.1 and Page 2-4, Figure 2-1.

2. Agricultural Irrigation Efficiency Program: The Water Authority will also administer a program component that will provide incentives to retrofit potable water irrigation systems to recycled water irrigation systems. This program component has been designed, and is ready for implementation.

The financial incentives, training, and education that are the main components of this program will encourage customers to replace turf grass and upgrade irrigation systems in urban landscapes and increase water use efficiency in the agricultural sector. This program is designed to reduce regional water demands, reduce energy consumption via reduced water demands (considering the energy required for water use), reduce green waste production, and improve surface water quality. Reducing outdoor water use and increasing irrigation efficiency in both agricultural and urban sectors also helps to minimize dry weather runoff that flows into storm drains and receiving waters, and reduces pollutants that contribute to the impairment of watersheds.

Project Objectives

The *Turf Replacement and Agricultural Irrigation Efficiency Program* seeks to accomplish the following objectives:

- Reduce urban outdoor water use through the provision of financial incentives to upgrade on-site irrigation systems and replace turf with water-wise plant material.
- Reduce agricultural water use through the provision of financial incentives to convert potable irrigation systems to non-potable systems.
- Reduce stormwater runoff by reducing outdoor water use in both the urban and rural portions of the Region.
- Reduce green waste production by providing incentives to replace turf grass with water wise plant material.
- Increase the amount of potable water (water supply) available to other users through implementation of water use efficiency measures and conversion to recycled water.
- Increase environmental stewardship and awareness by implementing visible conservation programs that promote water-efficient landscaping.

This program contributes to the draft IRWM Plan Update objectives in the following ways:

Table 3-20: Contribution to DRAFT IRWM Plan Update Objectives

Proposal Projects	Contribution to DRAFT IRWM Plan Update Objectives										
	A	B	C	D	E	F	G	H	I	J	K
Turf Replacement and Agricultural Irrigation Efficiency Program	●	●	●		●			●			○

○ = indirectly related
● = directly related

Objective A: Integrated solutions to address water management issues and conflicts: This program was developed through the Strategic Integration Workshop, and meets the San Diego IRWM Program's Partnerships and Resource Management definitions of integration, as described above.

Objective B: Maximize stakeholder and community involvement and stewardship: As part of the Turf Replacement Program, the City of San Diego Public Utilities Water Conservation Program and the City of San Diego Transportation & Storm Water Pollution Prevention and Think Blue Programs will promote an education and outreach campaign for its service area on water efficiency and storm water-friendly landscaping that will promote changes in norms and behaviors toward the use of water and support responsible stewardship of limited water resources while reducing the impact of dry weather flows caused by irrigation.

Objective C: Effectively obtain, manage, and assess water resource data and information: The San Water Authority and the City of San Diego will evaluate a sampling of pre- and post-conversion water use data from their Turf Replacement Rebate programs to determine if estimated water savings were achieved. The partners will provide an analysis of sample sites that evaluate before and after water consumption as well as apply assumed water savings per square foot of turf replaced. For the Water Authority's Agricultural Irrigation Efficiency program, the Water Authority will record pre- and post-conversion water savings using potable water billing records and provide a list of customers and associated acreage that is converted from potable to recycled water.

Objective E: Develop and maintain a diverse mix of water: The program is intended to improve water supply reliability and reduce dependence on imported water in urban landscapes and agriculture over the long-term, resulting in increased water use efficiency, and increased use of recycled water. For the Water Authority's Agricultural Irrigation Efficiency program, the Water Authority will provide water billing data to document that source substitution has occurred by participating customers and, if available, will provide records for converting agricultural sites using potable water irrigation systems to recycled water systems. Alternatives to imported water help diversify Water Authority's water portfolio, as does reducing dependence on imported water. Further, increasing recycled water demand (while reducing imported water demand) helps to create and sustain a market for recycled water, which in turn provides opportunities for expansion of recycled water systems.

Objective H: Effectively reduce sources of pollutants and environmental stressors: This program will educate residential, commercial, and agricultural sector customers about limiting runoff from their properties as they go through the process of making water-efficient enhancements. The program will also highlight the importance of reducing runoff into the municipal storm drain system and other waterways, as well as educate users about the pollution commonly found in runoff. Enhancement activities will reduce sediment and a nutrient flows to stormwater drains reducing pollutant loads.

Objective K: Effectively address climate change through adaptation or mitigation in water resource management: This program will reduce the use of imported and highly treated potable water which is currently delivered to both residential and agricultural users for irrigation. Reducing water use and converting to recycled water reduces the energy needed to supply water, and therefore, reduces greenhouse gas emissions. This will help indirectly address climate change concerns.

Project Partners

The Water Authority is the program lead and will administer the Turf Replacement Program for member agencies (not including the City of San Diego), as well as administer the Agricultural Irrigation Efficiency Program within its service area. The City of San Diego is the primary partner for this integrated program and will implement Turf Replacement Program for City customers (City of San Diego Public Utilities Department -Water Conservation Program) and provide public outreach support for the rebate program with emphasis on opportunities for dry weather runoff reduction and water quality protection achieved through irrigation efficiencies (City of San Diego Transportation & Storm Water Department). The Water Authority's other 23 member agencies, whose customers will be eligible participants in the Turf Replacement Program, will assist with program implementation within individual member agency service areas.

Project Integration

The Water Authority, City of San Diego Public Utilities Department, and City of San Diego Transportation & Storm Water Department all submitted Project Concepts for consideration at the IRWM Strategic Integration Workshop (see Integration Activities on page 3-3 for details). Subsequent to the workshop, the three entities merged concepts into a cumulative program, which is the *Turf Replacement and Agricultural Irrigation Efficiency Program* included in this proposal. In addition, the project partners have previously integrated conservation and turf replacement efforts: The Water Authority and the City's existing Turf Replacement Programs are jointly funded by a grant awarded by DWR through Proposition 50.

Completed Work

The Water Authority developed a microsite (a small website) for its existing Turf Replacement Program to provide program information and resources to the public. The microsite launched in December 2012, and includes dedicated web pages that were specifically developed to provide information to members of the public who are implementing turf replacement retrofits, or are considering applying for City or Water Authority rebates for such activities. Web pages on the microsite include: program criteria, terms and conditions, rebate application forms, design ideas, resources, “How-To’s”, and FAQs. The link to the microsite is: http://turfreplacement.watersmartsd.org/.

Further, materials have been developed to support the Water Authority’s and City’s existing Turf Replacement Programs. As described previously, the City and the Water Authority have already implemented outdoor water use efficiency rebate programs, which are partially funded by DWR and the San Diego IRWM Program through Proposition 50. The following includes a list of resources that have been developed through Proposition 50 funding and are relevant to the *Turf Replacement and Agricultural Irrigation Upgrade Program.* Please note that in accordance with guidance from DWR found on Page 11 of the Proposal Solicitation Package, the documents referenced in this section have been provided in an electronic format (on the supporting CD), but can also be found in Appendix 3-2:

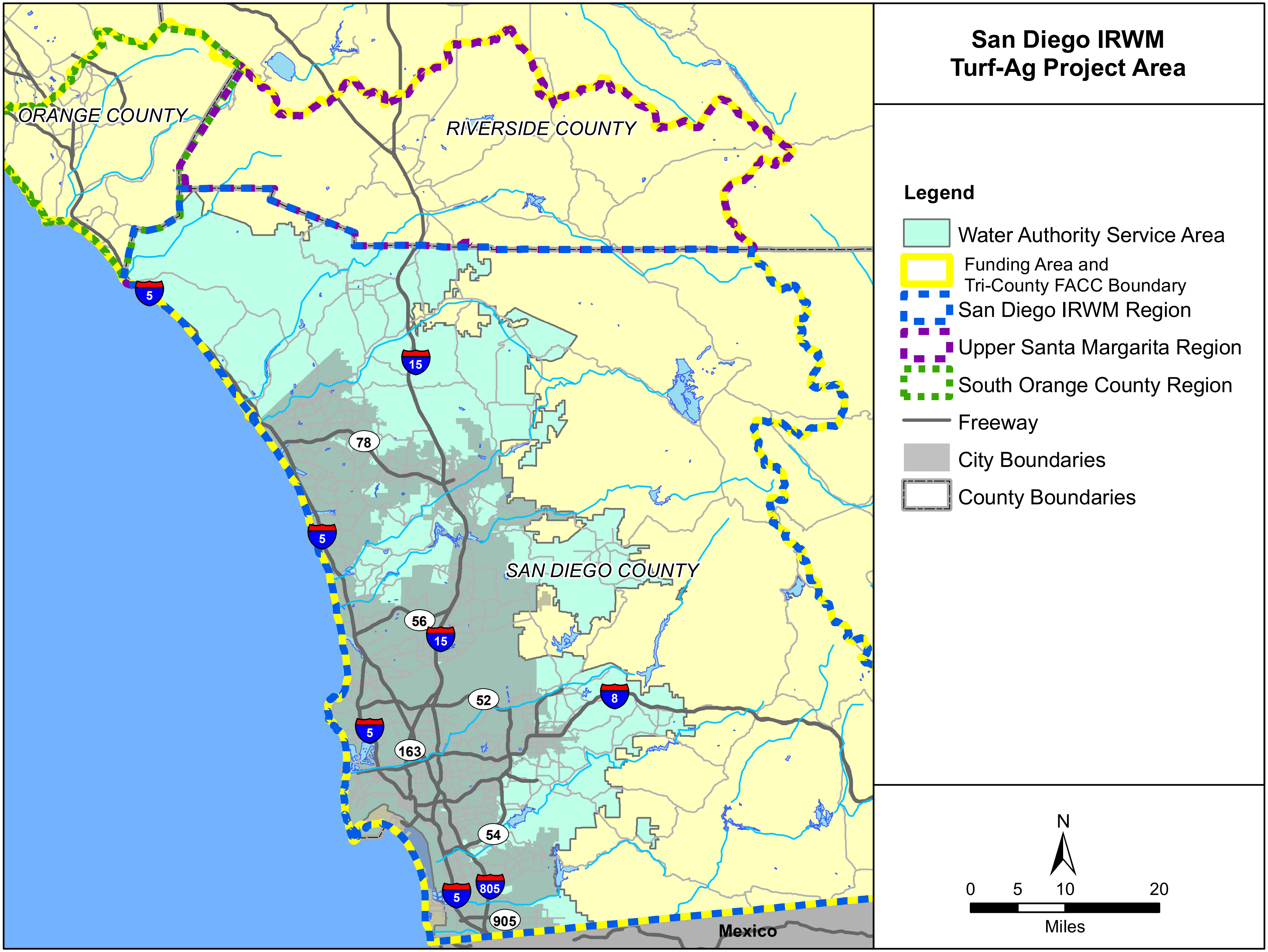
- *Customer guidelines and requirements for participation*. Please also refer to the Water Authority’s microsite, http://turfreplacement.watersmartsd.org/, and to the City’s program website, http://www.sandiego.gov/water/conservation/residentialoutdoor/index.shtml
- *Internal protocols for administering the programs*
- *Customer on-line training program and customer resource lists*. Please also refer to the Water Authority’s website, which provides an on-line tutorial that provides project-related information to customers. Customer resource lists for the Water Authority’s program can be found on the website: http://turfreplacement.watersmartsd.org/. Appendix 3-2 includes a copy of the City’s resources list.
- *Marketing material and related collateral*.
- *Application forms*.

Project Timing and Phasing

The Water Authority’s and City of San Diego’s existing Turf Replacement Programs are being funded by a Proposition 50 grant awarded from DWR's IRWM Program authorized under the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50). As such, the Turf Replacement Program components of this program can be considered a continuation of an existing program. However, this is not a large, multi-phased project as the work being completed under the aforementioned Proposition 50 grant award is independent of the work items included in this grant proposal. The Agricultural Irrigation Efficiency Program component of the program has been designed, but is not currently being implemented, and is not a portion of a larger multi-phased project.

Project Map

Figure 3-4 is a site map showing the project’s geographical location and surrounding work boundaries.


San Diego IRWM
Turf-Ag Project Area
ORANGE COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
Mexico
5
15
78
56
52
8
163
54
805
905
Legend
Water Authority Service Area
Funding Area and
Tri-County FACC Boundary
San Diego IRWM Region
Upper Santa Margarita Region
South Orange County Region
Freeway
City Boundaries
County Boundaries
N
0
5
10
20
Miles

II. Project Work

(GA) Grant Administration

The San Diego County Water Authority will be responsible for administration and processing of the Implementation Grant contract, including tasks associated with compiling and submitting project invoices, quarterly reports, and completion reports for DWR. The *Turf Replacement and Agricultural Irrigation Efficiency Program* will contribute $17,265 to this administrative effort. All data submitted by project partners as described in Attachment 6 will be compiled by the grant administrator for the San Diego IRWM data management system to be made publicly available.

Row (a) Direct Project Administration

Task 1: Project Administration

This task will involve administering the grant contract, tracking budgets, developing and administering the Memorandum of Understanding between the Water Authority and the City, and establishing and administering vendor contracts for both the Water Authority's Turf Replacement Program and the Agricultural Irrigation Efficiency Program. This task will also include efforts necessary to prepare invoices, quarterly reports, project assessment and evaluation plans (PAEPs), and final reports as required by DWR for IRWM contracting purposes. It is assumed that this work will be completed in-house by a Water Resources Specialist at the Water Authority. In addition, all of the data to be collected as described in Attachment 6 will be submitted to the Water Authority's grant administrator to be submitted to DWR, compiled in the San Diego IRWM Program's Data Management System, and made publicly available.

Task 2: Labor Compliance Program

It is not anticipated that a labor compliance program will be required for the Turf Replacement and Agricultural Irrigation Efficiency Program as construction projects are not a part of the scope and this program has been designed in a manner that is not expected to require labor compliance.

Task 3: Reporting

Reporting for the Turf Replacement and Agricultural Irrigation Efficiency Program will be included in Task 1: Project Administration.

Table 3-21: Row (a) Direct Project Administration Budget
Turf Replacement and Agricultural Irrigation Efficiency Project

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 1: Project Administration				
Track budgets, prepare invoices, compile backup documentation, and prepare quarterly reports and PAEPs for DWR	Quarterly after contract execution	Not yet begun		X
Prepare and administer vendor contracts	After contract execution	Not yet begun		X
Prepare and administer MOU with City of San Diego and the Water Authority	After contract execution	Not yet begun		X
Prepare final report	At conclusion of project	Not yet begun		X

Row (b) Land Purchase/ Easement

No easement acquisitions and/or right-of-ways will be required for this program.

Row (c) Planning/Design/Engineering/Environmental Documentation

Task 4: Assessment and Evaluation

No environmental documentation is required to implement the Turf Replacement and Agricultural Irrigation Efficiency Program.

Task 5: Project Design

As indicated previously, both the Turf Replacement and the Agricultural Irrigation Efficiency components of this overall program are already implemented or have been designed, and are therefore ready for implementation. No design work is required.

Task 6: Environmental Documentation

There are no CEQA, NEPA, or other environmental compliance requirements for this program.

Task 7: Permitting

No permits are required to implement this program.

Row (d) Construction/ Implementation

Task 8: Construction Contracting

Implementation of the *Turf Replacement and Agricultural Irrigation Efficiency Program* does not require construction contracting. This program provides financial incentives to customers and users for project implementation, and does not involve any construction on the behalf of the Water Authority or the City. As such, construction contracting is not included in this work plan.

Task 9: Construction/ Implementation

This task includes all elements required to implement the *Turf Replacement and Agricultural Irrigation Efficiency Program*. As such, this task includes the budget for the City's in-house administration of the Turf Replacement Program, the in-house administration of the Water Authority's Turf Replacement Program and vendor contract, and the in-house administration of the Water Authority's Agricultural Irrigation Efficiency Program, which includes management of the vendor that will process pass-through incentives. This task also includes the budget for all rebates and incentives that will be provided to customers who complete replacement or retrofit activities in compliance with the conditions of the program.

Subtask 9.1 Water Authority Turf Replacement – In house: This subtask includes work to administer the Water Authority's Turf Replacement Program, including management of the vendor that will operate the program. This task also includes budgeted funds for the Water Authority's Turf Replacement Program rebates. With regards to labor, it is assumed that two Water Authority staff members will be required to implement the Turf Replacement Program. These staff hours include time to administer the program, process invoices from vendors and from customers implementing the program, and maintain the website. Time and effort included within this subtask are based upon previous experience with a similar program funded through Proposition 50 from DWR.

The Water Authority anticipates that this program will fund replacement of a minimum of 81,800 square feet of turf within the Water Authority's service area, including areas that serve DACs.

Subtask 9.2 Water Authority Turf Replacement - Vendor: This subtask includes work to operate the Water Authority's Turf Replacement Program throughout the Water Authority's service area (excluding the City of San Diego) by the vendor selected and contracted with by the Water Authority. Work that will be completed by the vendor under this subtask includes: reviewing and processing rebate applications and required submittals, tracking and reporting on the progress of the rebate program, disbursing rebates to customers, conducting onsite inspections, providing customer service, and providing marketing and outreach. The work included in this scope pertains to the time it would take a Program Manager and an Inspector (both vendors) to complete the work items discussed above. Time and effort included within this subtask are based upon previous experience with a similar program funded through Proposition 50 from DWR.

Subtask 9.3 City of San Diego Turf Replacement - In house: This subtask includes work to administer and implement the City of San Diego's Turf Replacement Program. Activities include application review and approval, pre- and post-site visits to commercial and residential customer sites, verification of successful project completion, customer support, rebate check processing, and program website maintenance. This task also includes budgeted funds for the City's Turf Replacement rebates. With regards to labor, it is assumed a minimum of three City staff members will be required to implement the Turf Replacement Program. These staff hours include time to complete activities discussed in the preceding paragraph. Time and effort included within this subtask are based upon previous experience with a similar program funded through Proposition 50 from DWR.

The City of San Diego anticipates that this program will fund replacement of a minimum of 237,870 square feet of turf within the City of San Diego, including areas that serve DACs.

Subtask 9.4 Water Authority Agricultural Irrigation Efficiency Program – In house: This subtask includes work to administer the Agricultural Irrigation Efficiency Program, including management of the vendor that will process the economic incentives for customers (rebates). This subtask also includes budgeted funds for materials and equipment necessary to implement the agricultural efficiency upgrades. Eligible costs include, but are not limited to: various hardware (recycled water pipelines, weather-based irrigation controllers (WBICs), space tubing, mesh baskets, meters, various valves, etc.).

The Water Authority anticipates converting 50 acres of agricultural land on a minimum of two sites to recycled water irrigation.

Subtask 9.5 Water Authority Agricultural Irrigation Efficiency Program – Vendor: This subtask includes operation of the Agricultural Irrigation Efficiency Program by the vendor selected and contracted with by the Water Authority.

Table 3-22: Row (d) Construction/ Implementation
Turf Replacement and Agricultural Irrigation Efficiency Program

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 9: Construction / Implementation				
Subtask 9.1 Water Authority Turf Replacement – In house				
Administration of Turf Replacement Program, including management of vendor.	After contract execution	Not yet begun		X
Development of program microsite.	Prior to contract execution	Completed	X	
Subtask 9.2 Water Authority – Vendor				
Operation of the Turf Replacement Program throughout the Water Authority's service area (excluding the City's service area).	After contract execution	Not yet begun		X
Subtask 9.3 City of San Diego Turf Replacement - In house				
Administration and implementation of City's Turf Replacement Rebate Program.	After contract execution	Not yet begun		X
Subtask 9.4 Water Authority Agricultural Irrigation Efficiency Program – In house				
Administration of the Agricultural Irrigation Efficiency Program, including management of the vendor that will operate the incentive program.	After contract execution	Not yet begun		X
Subtask 9.5 Water Authority Agricultural Irrigation Efficiency Program – Vendor				
Operation of the Agricultural Irrigation Efficiency Program	After contract execution	Not yet begun		X

Row (e) Environmental Compliance/ Mitigation/ Enhancement

Task 10: Environmental Compliance/ Mitigation/ Enhancement

Although the *Turf Replacement and Agricultural Irrigation Efficiency Program* provides incentives and rebates, the administering agencies are not responsible for individual/onsite environmental compliance/mitigation/enhancement. Responsibility for any such requirements lies with the site owner or representative.

Row (f) Construction Administration

Task 11: Construction Administration

The *Turf Replacement and Agricultural Irrigation Efficiency Program* does not require any direct construction, and therefore will not involve construction management or administrative duties.

Project 3: Rural Disadvantaged Community (DAC) Partnership Program

I. Introduction

Project Sponsor

The Rural Community Assistance Corporation (RCAC) is the project sponsor for the *Rural DAC Partnership Program*.

Project Need

Drinking water systems that serve disadvantaged communities (DACs) often lack both access to much needed infrastructure financing and the resources to adequately maintain existing system facilities. As a result, these systems face significant challenges in complying with long standing and new drinking water rules.

Three major problems that impede the sustainability of a small community water system include:

- Contamination of drinking water source water from wastewater intrusion, agricultural influences, and/or contaminant spills from industrial activities;
- Seasonal weather changes resulting in floods or droughts require design options to bypass treatment during rain and storm events and identification of alternative water supplies (including water reuse sources) to increase capacity during droughts; and
- Deteriorating collection and distribution systems compromise source water quality and increase the cost of water treatment.

Rural communities within the San Diego IRWM Region unincorporated areas – which are not served by the Water Authority's member agencies – have water supply and quality issues exacerbated by climate change, poor economies, and lack of community expertise. Inadequate water supply to support existing communities is a public health risk. The majority of drinking water maximum containment level (MCL) violations occur with small public water systems. Further, inadequate wastewater treatment results in unplanned discharge events.

Groundwater shortages and energy consumption are also critical concerns in the San Diego IRWM Region's rural areas. This program will decrease water supply losses and therefore, decrease energy usage by reducing groundwater pumping and eliminating leaking tanks. Fire protection is a major issue for tribes and surrounding communities, and increased water storage improves water supplies for firefighting and other emergency conditions.

There is not enough available funding to meet the needs of rural DACs. The California Department of Public Health (CDPH) has 41 small (less than 10,000 population) systems located in San Diego County on its 2013 State Revolving Fund (SRF) Priority Project Funding list. The State Water Resources Control Board (SWRCB) has a similar lengthy list of communities requesting funding from the Clean Water SRF for wastewater improvements.

Rural DACs in the San Diego IRWM Region have water supplies that are inadequate to support existing connections. It is costly to provide supplemental treatment processes to improve the water quality of contaminated drinking water source waters. It is difficult for small DAC drinking water and wastewater systems to afford improvements because they have fewer ratepayers to share the costs. Further, rural DACs lack the technical expertise and financial stability necessary to assemble the information needed for a complex grant program, much less the resources to complete the grant application itself.

Project Purpose

The goal of the *Rural DAC Partnership Program* is to provide funding to address inadequate water supply and water quality affecting rural DACs, including tribal communities. The program is necessary because DAC system operators generally lack the financial and technical resources to apply on their own. The program will help rural water systems to provide a safe water quality source that is not contaminated with nitrates, bacteria, or other contaminants. The program reduces potential for high public health risks in water and/or wastewater systems through infrastructure improvements and helps small water systems to provide sufficient quantities of safe drinking water to the residents served by their systems. Public safety will be improved by providing adequate storage necessary for fire-fighting and emergency conditions.

The *Rural DAC Partnership Program* will rely on the Rural DAC Stakeholder Committee – made up of RCAC, CDPH, County Department of Environmental Health (DEH), Indian Health Services (IHS), and RWMG representatives – to identify and select a minimum of four rural DAC projects that address critical water quality or quantity infrastructure improvements. Emphasis will be given to projects ready to be constructed.

The program will assist rural DACs, including tribal communities, with project coordination and oversight. RCAC will utilize other funding programs to provide capacity and technical development support to promote sustainability. Green technologies will be encouraged.

Project Abstract

The *Rural DAC Partnership Program*, administered by RCAC, will fund critical water supply and water quality projects in rural DACs in San Diego County. Rural DACs lack the technical expertise and financial resources necessary to assemble the information needed to complete a complex grant application. Water supply infrastructure deficiencies will be identified and prioritized by the Rural DAC Stakeholder Committee and then funding will be provided via grant reimbursements to resolve those deficiencies. This program helps meet the critical DAC need for safe, healthy, potable, supplies of water that are adequate to meet basic household and fire protection demands, while at the same time recognizing and responding to DACs' needs for technical and managerial support to even request funding for these basic water needs.

RCAC will manage the *Rural DAC Partnership Program* to address inadequate water supply and water quality in rural DACs, including tribal communities, with populations less than 10,000. DACs will be selected based on 2010 Census data as shown in Figure 3-2.

RCAC will continue to use the Rural DAC Stakeholder Committee – made up of RCAC, CDPH, County DEH, IHS, and RWMG representatives – to solicit and select rural DACs for funding of critical infrastructure improvement projects. RCAC will assist rural DACs with outreach, program information, determining project scope/readiness, and preparation of project documentation for funding. RCAC will also provide specialized Technical, Managerial, and Financial (TMF) assessments to DACs and training to support project sustainability assist with project oversight and manage disbursement of payments for completed work. As appropriate, RCAC will provide additional resources including supplementary technical assistance funding through existing RCAC programs and assist in accessing additional financial sources.

Projects will be selected based on need and priorities established by the Rural DAC Stakeholder Committee with an emphasis on critical water supply and water quality issues. The Rural DAC Stakeholder Committee designated the following criteria for DAC selection:

Primary Criteria

- Disadvantaged community per 2010 Census data
- Construction project
- Addresses public health issue
- Critical water projects (quantity/quality/reliability)
- Adequate TMF capacity (likely to be successful)
- Shovel ready or ability to complete within project time frame

Secondary Criteria

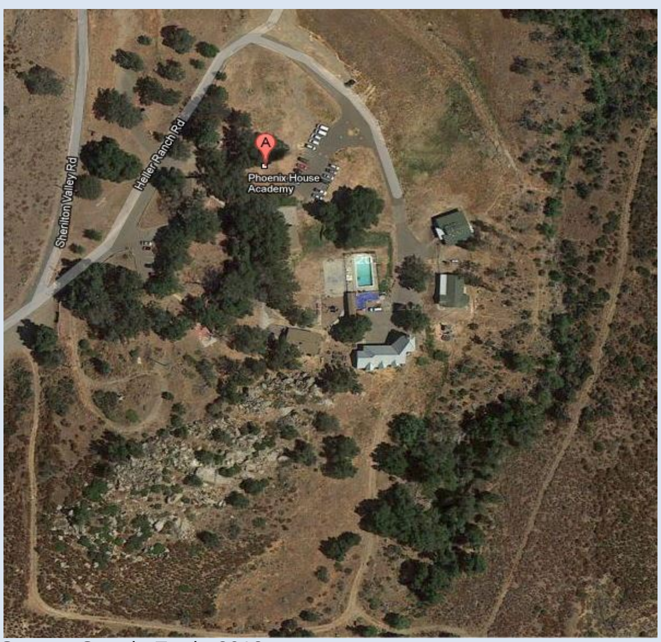
- Project ability to leverage other funding,
- Capital cost per connection,
- Multiple benefits,
- Green technology, and
- Environmental justice concerns.

Opportunities to merge related projects will be evaluated. Projects will be selected from both tribal and non-tribal rural DACs. In every case, RCAC will look at other available funding resources to leverage Prop 84 grant dollars.

RCAC is a certified Community Development Financial Institution (CDFI) and will be responsible for disbursements for selected rural DAC projects. Reporting processes for the DAC projects will, at a minimum, include required reporting to receive Prop 84 grant funds. Work will be verified by RCAC before invoices are submitted and payments are made. RCAC will provide written quarterly reports to the San Diego IRWM program and will be available to report directly to the RAC if requested.

All projects will address inadequate, unsafe, or unreliable water supply and water quality in rural DACs based on priorities already identified by the Rural DAC Stakeholder Committee. The proposed *Rural DAC Partnership Program* will select and implement four or more projects similar to the example projects described below. Three example projects described below have been identified as likely to be, or similar to projects likely to be selected, for inclusion in this program by the Rural DAC Stakeholder Committee.

Example 3-1: Phoenix House School – The Phoenix House Foundation owns and operates a small Potable Water System (PWS) serving 75 students and staff in Descanso, CA. The only well that serves this system is located adjacent to a creek, approximately 25 feet from a sewer line that crosses the creek and about 100 feet down gradient from the septic leach field. Due to the location of this well, it is susceptible to exposure from fecal coliform, and has a history of bacteriological failures at the wellhead.[4] The proposed project is construction of a replacement well and two new 10,000 gallon storage tanks. The project will protect the drinking water source from bacteriological contamination and provide sufficient storage to provide the community with water in the event of power outages or routine maintenance procedures on the well pump and motor.[5]



Source: Google Earth, 2013

Photograph 3-1: Arial view of Phoenix House School. Note proximity of creek, marked by the line of trees and vegetation in the right of the photo.

[4] Phoenix House Foundation. 2006. *Preliminary Engineering Report* (System #3701478). Page 1.
[5] Phoenix House Foundation. 2006. *Preliminary Engineering Report* (System #3701478). Page 2.

Example 3-2: Rancho Estates MWC – The Rancho Estates Mutual Water Company (MWC) serves an agricultural community of approximately 180 residents in Pauma Valley, CA. The water system is served by 7 active wells and two shallow open cut reservoirs that are approximately 3 million gallons and 1.5 million gallons. Since the community is agricultural, the bulk of the water demands (average of 680 gpm) are used for irrigation of crops. Because the reservoirs are subject to contamination, the County of San Diego has issued Compliance Orders to cover and/or replace them.[6] The water system is also plagued with nitrate and bacterial problems which are violations of the Title 22 California Code of Regulations for drinking water.[7] The water system currently blends water from Yuima Municipal Water District (YMWD) through the distribution system as a control measure for nitrates which has kept them under the nitrate MCL.[8] The proposed project would consolidate the Rancho Estates MWC with the Yuima Municipal Water District. Infrastructure improvements include 16,500 linear feet of distribution pipeline and a new 50,000 gallon water storage tank. The agricultural operations of the Rancho Estates MWC will continue, but Rancho Estates MWC will cease providing potable water. This would protect public health by eliminating potential contamination due to the environmental exposure and address leakage issues.

Example 3-3: San Pasqual District B Water System – San Pasqual District B (Western) is a community PWS located near Valley Center, CA, on the San Pasqual Reservation. The water system has 90 residential connections and 12 transient connections. The PWS consists of a consecutive connection to Valley Center Municipal Water District (VCMWD), a booster pump station, a storage tank, and a distribution system.[9] The primary existing tank was constructed in 1992 and has a storage capacity of 100,000 gallons. A small 38,000 gallon corrugated steel tank also exists at the same site. Both USEPA[10] and IHS[11] have concluded that the tank exterior is showing oxidation and significant corrosion, as well as leaking in the base and joints. In addition, the system does not have an adequate amount of storage capacity to meet the County regulation requiring 2 days of storage for fire protection.[12] Due to the age and leaking of the tank and the need for additional storage, replacement of the tank was deemed the most reasonable option for addressing these issues. The proposed project will abandon the aging and leaking 100,000 gallon tank in place, and replace an adjacent 38,000 gallon tank with a new 250,000 gallon welded steel tank to provide greater water storage to the entire distribution system.[13] This would protect public health by eliminating potential contamination due to the leakage, eliminate wasted water supplies, and provide the District B community with adequate storage capacity.

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[6] County of San Diego. 2010. *Compliance Order, Rancho Estates Mutual Water Company*.
County of San Diego. 2007. *Compliance Order, Rancho Estates Mutual Water Company*.
[7] Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 1-6.
[8] Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 2-6.
[9] USEPA. 2012. Sanitary Survey of San Pasqual District B (Western) (PWSID #0605080). Prepared by Sleeping Giants Environmental Consultants, LLC. Page 1.
[10] USEPA. 2012. Sanitary Survey of San Pasqual District B (Western) (PWSID #0605080). Prepared by Sleeping Giants Environmental Consultants, LLC. Page 5.
[11] IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 2.
[12] IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 2.
[13] IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 1.

Source: Google Earth, 2013.

Photograph 3-2: Ariel view of District B's 100,000 gallon tank and abandoned 38,000 gallon tank

Project Partners

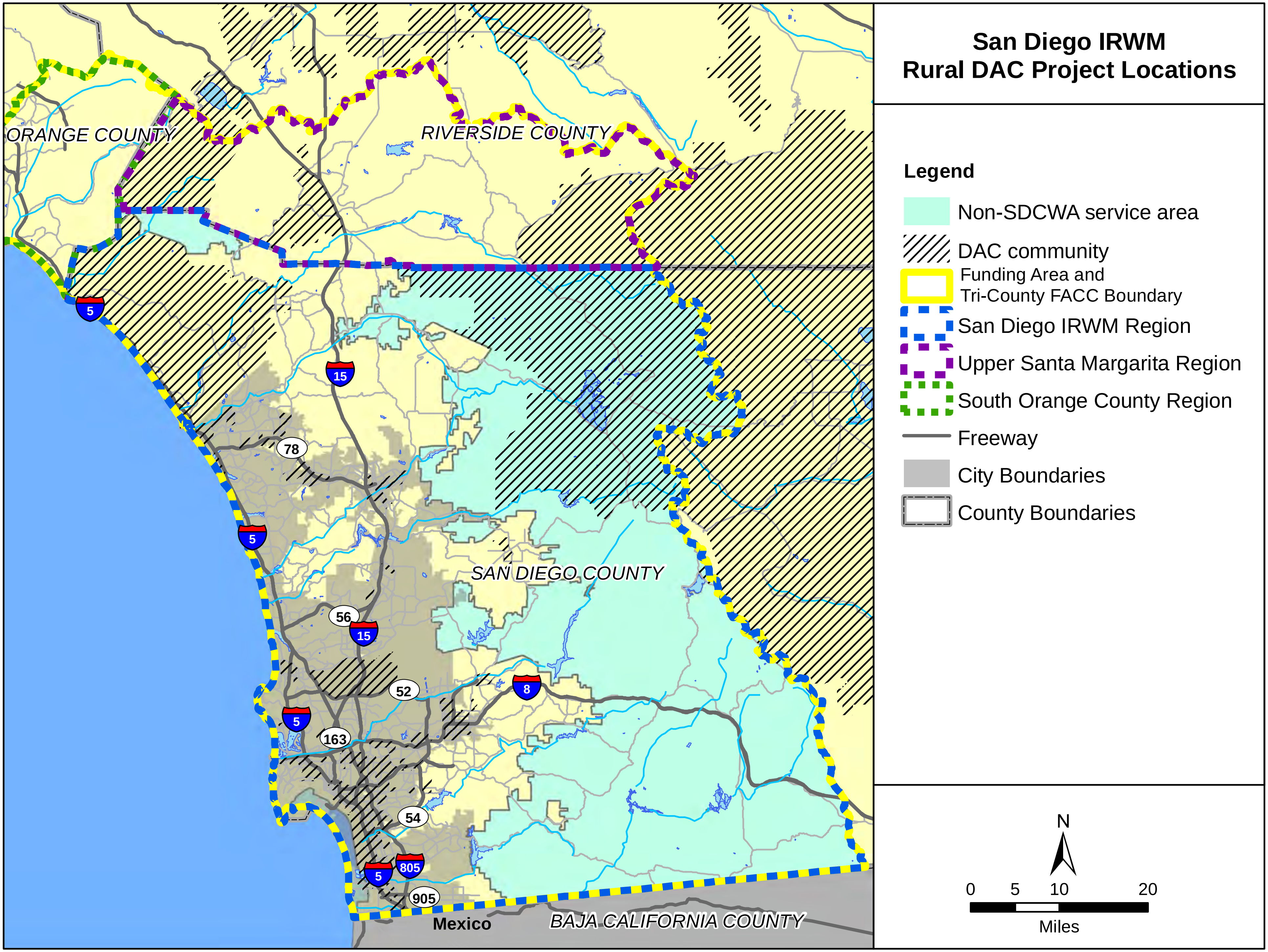
Rural Communities Assistance Corporation (RCAC) is the project lead and will be providing funding oversight for the *Rural DACs Partnership Program*. Following selection of the priority projects, RCAC will work with small PWS operators, as well as other funding agencies (including USEPA, IHS, CDPH, U.S. Department of Agriculture) to implement water system improvements in the rural DAC systems. In Example Project 3-3, which addresses system deficiencies on tribal lands, IHS is a partner providing design, construction management services, and construction costs for a total of 50% funding. In Example Projects 3-1 and 3-2 that address other small water systems in the backcountry, the State Water Resources Control Board (SWRCB) is a partner providing 80% funding match through the CA Safe Drinking Water State Revolving Fund.

Project Timing and Phasing

The *Rural DACs Partnership Program* was initiated in Prop 84-Round 1 and designed to address the critical water supply and water quality needs of DACs in rural east county areas. However, the proposed projects in this application can proceed with implementation, independent of any other projects included in the Round 1 package.

Project Map

Figure 3-5 is a site map showing the project's geographical location in relation to DACs in the San Diego County backcountry, as mapped by the 2010 U.S. Census. However, as discussed in Attachment 10, RCAC will provide additional income and demographic data as necessary to justify small pockets of DACs within the larger Census tracts, if those PWS's are shown to be in critical need of infrastructure upgrades.


San Diego IRWM
Rural DAC Project Locations
Legend
Non-SDCWA service area
DAC community
Funding Area and
Tri-County FACC Boundary
San Diego IRWM Region
Upper Santa Margarita Region
South Orange County Region
Freeway
City Boundaries
County Boundaries
ORANGE COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
BAJA CALIFORNIA COUNTY
Mexico
5
15
78
56
52
8
163
54
805
905
N
0
5
10
20
Miles

Project Objectives

The *Rural DAC Partnership Program* seeks to accomplish the following objectives:

- Recognize and support rural DACs, including tribal communities, in implementing projects that will solve critical water or wastewater system issues. Emphasis will be given to systems lacking safe and reliable delivery of drinking water or deficient wastewater collection and treatment.
- Provide outreach and Prop 84 funding to DACs, including tribal communities, to achieve capacity development and sustainability. Support solutions that address public health risks found in small DACs providing water and/or wastewater services.
- Outreach to rural DACs, including tribal communities, to promote capacity development, sustainable infrastructure, and green operations. To support environmental justice, provide outreach to rural DACs which are not able to access available resources that are available to them.

Efficient use of finite water supplies and energy resources will be incorporated into DAC projects when appropriate and affordable.

Sustainability will be a priority in the development of DAC funded projects. RCAC will leverage sustainability with other state, federal and local programs to provide water board and manager training, operator training, and assist when needed with tasks like selecting the right engineer for infrastructure improvements.

The *Rural DACs Partnership Program* will contribute to the draft San Diego IRWM Plan Update objectives, as summarized in Table 3-23 and described below.

Table 3-23: Contribution to DRAFT IRWM Plan Update Objectives

Proposal Projects	Contribution to IRWM Plan Objectives										
	A	B	C	D	E	F	G	H	I	J	K
Rural DAC Partnership Program	●	●	○	●	●	●		○			●

○ = indirectly related
● = directly related

A: Integrated solutions to address water management issues and conflicts. The *Rural DACs Partnership Program* was developed in part by bringing together disparate projects through the Strategic Integration Workshop described above. This project also meets the Partnerships and Resource Management criteria for integration, as defined above.

B: Maximize stakeholder/community involvement and stewardship of water resources, emphasizing education and outreach. Selection of DAC projects for funding will be decided by a Rural DAC Stakeholder Committee with representatives from RCAC, CDPH, County DEH, IHS, and RWMG. Additionally, project solicitation outreach meetings will be conducted to inform citizens of the importance of environmental stewardship emphasizing conservation, regulatory (drinking water quality) compliance, and utility efficiency.

C: Effectively obtain, manage, and assess water resource data and information. All pertinent water resource data will be obtained and provided to the IRWM DMS. However, there may be an exception for some information obtained from Indian tribes that have restrictions on data distribution and use.

D: Further scientific and technical foundation of water management. RCAC works closely with CDPH (small Public Water Systems (PWS)) and USEPA's Region 9 (tribal PWS) drinking water divisions addressing compliance issues and data collection, water quality data, and technical information. Data produced from these activities for the DAC communities will be provided to the IRWM DMS.

E: Develop and maintain a diverse mix of water resources, encouraging their efficient use and development of local water supplies. Projects are intended to improve water supplies and water quality for rural DAC communities. They will reduce water loss due to leakage, improve water supply reliability for rural DACs, improve potable water storage, and/or improve drinking water quality.

F: Construct, operate, and maintain a reliable infrastructure system. Sustainability will be a priority in the development of DAC funded projects. RCAC will provide water board and manager training, operator training and assist when needed with tasks like selecting the right engineer for infrastructure improvements.

H: Effectively reduce sources of pollutants and environmental stressors to protect and enhance human health, safety, and the environment. By improving water supply infrastructure, the program will reduce potential contaminants in water supplies, protect finished water supplies by providing covered storage, and prevent potential contamination from leaks.

K: Effectively address climate change through adaptation or mitigation in water resource management: This program will enable small water systems in the Region's backcountry to adapt to climate change vulnerabilities associated with the increased potential for wildfires by increasing storage for emergency response.

Project Integration

This project is the second phase of RCAC's *Rural DAC Partnership Program*. The projects selected for inclusion in this round will be selected by the Rural DAC Stakeholder Committee. Phase II will continue partnerships established in the Phase I portion of this project (funded in Proposition 84-Round 1), and create linkages and continued support with previous IRWM DAC projects. The *Rural DAC Partnership Program* also supports:

- USEPA Region 9 primary regulatory responsibilities for Indian Tribes.
- CDPH State Revolving Fund Priority Project List and primary regulatory responsibilities.
- SWRCB's Small Community Wastewater Strategy which promotes strategies to assist small and/or disadvantaged communities with wastewater needs.
- USDA Rural Development and Health and Human Services' targeted low income projects.
- IHS support for Indian Tribes and public health goals.
- County DEH list of Community Water Systems' compliance orders

RCAC partners with agencies to achieve their goals of assisting rural DACs with infrastructure improvements and protection on public health.

Completed Work

The project selection process for the *Rural DAC Partnership Program* will utilize the following plans and studies. Please note that in accordance with guidance from DWR found on Page 11 of the Proposal Solicitation Package, the documents referenced in this section have been provided in an electronic format only (on the supporting CD), and are not included within the printed hard copies that have been mailed to DWR:

- Rural Community Assistance Corporation. November 2010. RCAC's Rural Review.
- State Water Resources Control Board. September 2007. 2007 Statewide Competitive Project List: Small Community Wastewater Grant Program.
- Trageser, Claire. January 2010. No Solutions for Rural Water Pollution Problem. Voice of San Diego: January 14, 2010.
- US EPA. September 2002. The Clean Water and Drinking Water Infrastructure Gap Analysis.
- US EPA. March 2008. Investing in a Sustainable Future: Drinking Water State Revolving Fund 2007 Annual Report.
- US EPA. September 2007. Small Drinking Water Systems: State of the Industry and Treatment Technologies to Meet the Safe Drinking Water Act Requirements.
- White, Christine. State of California Revolving Fund CWSRF Program: State Fiscal Year 2010/2011 Project Priority List.

For the three priority projects that have been identified as example projects, the following completed work has been included with this grant application:

- ***Example 3-1: Phoenix House School -***
  - Phoenix House Foundation. 2006. *Preliminary Engineering Report*.

  - Phoenix House Foundation. 2006. *Department of Health Services, Safe Drinking Water State Revolving Fund, Application for Construction Funds 2006/2007*.
- ***Example 3-2: Rancho Estates MWC -***
  - County of San Diego Department of Environmental Health. 2007. *Domestic Water Supply Permit, Rancho Estates Mutual Water Company*.
  - Rancho Estates Mutual Water Company. 2008. *Engineering Report Executive Summary*.
  - County of San Diego Department of Environmental Health. 2010. *Compliance Order, Community Water System, Bacteriological Procedure Failure – System No. 3700936*.
  - Rancho Estates Mutual Water Company. 2010. *Safe Drinking Water State Revolving Fund, Applicant Planning Project Technical Report*.
- ***Example 3-3: San Pasqual District B Water System -***
  - Indian Health Service. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement, San Pasqual Band of Mission Indians, San Diego County, California*.
  - USEPA, Region 9. 2012. *Sanitary Survey Report, San Pasqual District B (Western), PWSID No. 0605080*. Prepared by Sleeping Giant Environmental Consultants, LLP.

II. Project Work

(GA) Grant Administration

The San Diego County Water Authority will be responsible for administration and processing of the Implementation Grant contract, including tasks associated with compiling and submitting project invoices, quarterly reports, and completion reports for DWR. The *Rural DAC Partnership Program* will contribute $56,610 to this effort. All data submitted by project partners as described in Attachment 6 will be compiled by the grant administrator for the San Diego IRWM data management system to be made publicly available.

Row (a) Direct Project Administration

Task 1: Project Administration

This task will involve administering the grant contract, tracking budgets, and providing funding oversight for the selected small and tribal water systems. This task will also include efforts necessary to prepare invoices, quarterly reports, project assessment and evaluation plans (PAEPs), and final reports as required by DWR for IRWM contracting purposes. It is assumed that this work will be completed in-house by a Project Manager and Support Staff from RCAC. In addition, all of the data to be collected as described in Attachment 6 will be submitted to the Water Authority's grant administrator to be submitted to DWR, compiled in the San Diego IRWM Program's Data Management System, and made publicly available.

RCAC will also coordinate the funding match for priority projects with IHS, SWRCB, and other federal funding agencies. This task does not include RCAC technical assistance, which is factored into individual tasks elsewhere in the work plan.

Task 2: Labor Compliance Program

Labor Compliance Programs (LCP) for the priority projects will be completed in accordance with CCR §16421-16439 and will be submitted to the California Department of Industrial Relations for review and approval prior to commencement of any activities that would require an LCP.

Task 3: Reporting

Reporting for the *Rural RAC Partnership Program* is included above in Task 1: Project Administration.

Table 3-24: Row (a) Direct Project Administration
Rural DAC Partnership Program

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 1: Project Administration				
Track budgets, prepare invoices, compile backup documentation, and prepare quarterly reports	Quarterly after contract execution	Not yet begun		X
Prepare and administer PAEP	After contract execution	Not yet begun		X
Prepare project completion report	At conclusion of project	Not yet begun		X
Coordination with federal funding agencies	As needed	Ongoing	X	X
Task 2: Labor Compliance Program				
Preparation, submittal, and implementation of Labor Compliance Program	Prior to construction	Not yet begun		X

Row (b) Land Purchase/ Easement

At this point, it is assumed that no easement acquisitions and/or right-of-ways will be required for any of the projects.

C. Planning/Design/Engineering/Environmental Documentation

Task 4: Assessment and Evaluation

The following provides a list of necessary studies that will be completed in order to assess and evaluate the project. Deliverables that will be a result of this task include: a technical memorandum on selection process and outcomes, and program guidelines.

Subtask 4.1: Facilitation of Rural DAC Stakeholder Committee

Subtask 4.1 will involve convening the stakeholder group in order to review the priority list of projects to ensure readiness to proceed and commitment of funding match and, if necessary, reviewing and selecting additional projects for funding. The Stakeholder Committee will meet on an as-needed basis following contract execution with the goal of selecting four or more priority projects for funding. RCAC will convene and facilitate the meetings, develop meeting agenda and notes, and provide all necessary supporting documentation for projects to enable project selection.

Subtask 4.2: Rural DACs Project Assessment and Selection Study

The *Rural DACs Project Assessment and Selection Study* will be performed upon contract execution. This study will involve soliciting for additional critical water quantity and/or quality projects from rural DACs (if necessary), finalizing project selection criteria, evaluating other available funding resources to leverage Proposition 84 dollars, providing outreach and program information, and assisting with project scope, readiness, and project documentation for funding. The recommended list of priority projects developed by the Stakeholder Committee will be included, along with documentation of how the project selection criteria were applied and any other rationale for selection.

Subtask 4.3: Rural DACs Partnership Program Guidelines

The *Rural DACs Partnership Program Guidelines* will be prepared to provide small and tribal water system operators with the information needed to contract with RCAC under this program. The guidelines will include information about project eligibility, project selection criteria, contracting and reporting requirements, reimbursable activities, roles and responsibilities, and other program requirements.

Although not included directly in this work plan, ***Rural DAC Project Planning*** (as necessary) shall be completed before contract execution. For any priority project being considered for funding through the *Rural DACs Partnership Program*, project planning should be complete and available to the Stakeholder Committee prior to its meeting. This assessment/evaluation may consist of feasibility studies and/or preliminary engineering studies as needed to evaluate options and provide recommendations and cost estimates (see "Completed Work" above for a list of project planning for the four identified priority projects). RCAC will provide capacity development, training, and technical assistance to support project sustainability utilizing existing RCAC programs.

Task 5: Final Design

Completion of the final project design will be determined based on DAC project selection (Task 4). Funding for project design may be provided to small or tribal water systems via the *Rural DACs Partnership Program* implementation in Task 9.

Task 6: Environmental Documentation

CEQA, NEPA, and other required environmental documentation will be identified during DAC project selection (Task 4). Funding for environmental compliance may be provided to small or tribal water systems via the *Rural DACs Partnership Program* implementation in Task 9.

Task 7: Permitting

All required permitting will be addressed during DAC project selection (Task 4). Although none are anticipated, funding for permitting may be provided to small or tribal water systems via the *Rural DACs Partnership Program* implementation in Task 9.

Table 3-25: Row (c) Planning/Design/Engineering/Environmental Documentation
Rural DAC Partnership Program

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 4: Assessment and Evaluation				
Subtask 4.1: Facilitation of Rural DACs Stakeholder Committee	September 2014 – February 2015	Not yet begun		X
Subtask 4.2: Preparation of Rural DACs Project Assessment and Selection Study	March – May 2015	Not yet begun		X
Subtask 4.3: Rural DACs Partnership Program Guidelines	March – May 2015	Not yet begun		X

Row (d) Construction/ Implementation

Task 8: Construction Contracting

All construction contracting for the priority projects will occur after contract execution. Construction contracting will include solicitation of bids and award of contract by the RCAC Project Manager. Funding for construction contracting may be provided to small or tribal water systems via the *Rural DACs Partnership Program* implementation in Task 9.

Task 9: Construction/Implementation

This task includes all elements required to implement the *Rural DACs Partnership Program*. As such, this task includes the budget for RCAC's Project Manager and Support Staff to administer the program, as well as budget to be spent on implementation of infrastructure upgrades in the Region's disadvantaged backcountry. This task includes the budget for design, environmental, and construction activities that will be provided to small and tribal water systems to construct infrastructure upgrades in compliance with the conditions of the program.

All construction activities for this program will occur after contract execution.

Building Materials and/or Construction Standards

The building materials and computational methods for construction will be determined based on DAC project selection (Task 4). Projects will be constructed in accordance with all current applicable laws, standards and regulations, including the American Water Works Association standards for materials, construction and testing of pipe, storage tanks, pumps, and valves; NSF approval for materials that come in direct contact with drinking water; California Department of Transportation Standard Specifications for materials, construction and testing; International or California Building Code, California or National Plumbing Code, California Electrical Code, Standard Methods for laboratory testing, California or federal OSHA standards for safety equipment and design requirements.

Subtask 9.1: Rural DACs Partnership Program Implementation

As described above, this task includes work to administer RCAC's *Rural DACs Partnership Program*, including management of the small and tribal water systems that will be selected for funding. This task will also include coordination with the federal funding agencies (e.g., IHS, SWRCB, USEPA) that will provide funding match for the priority projects. RCAC will collect appropriate documentation of this funding match and submit it to DWR with the quarterly reporting (Task 1). It is assumed that two RCAC staff members will oversee administration of the program. Note that the time and effort included within this subtask are based upon previous experience with a similar program funded through Proposition 84-Round 1.

Subtask 9.2: Rural DACs Infrastructure Reimbursements

This task includes the grant funding that will be made available to small and tribal operators to improve and upgrade their water supply infrastructure in compliance with the program guidelines (see Task 4). It is assumed that this program will fund infrastructure upgrades within four or more rural DACs in the Region. Based on the priority projects identified to date by the Stakeholder Committee (see below), this work plan assumes that reimbursements will include, but are not limited to, the following activities:

- Construction of new storage tanks and foundations,
- Connection of the new storage tanks to existing water mains,
- Demolition or abandonment in place of storage tanks,
- Abandonment in place of altitude valves,
- Installation of a pressure reducing valve stations,
- Construction of new sections of water main,
- Installation of an air relief valves,
- Installation of gate valves,
- Construction of new groundwater wells, and
- Construction of piping to connect new wells to existing distribution system.

Table 3-26: Row (d) Construction/ Implementation
Rural DAC Partnership Program

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 9: Construction				
Subtask 9.1: Rural DACs Partnership Program Implementation	July 2015 – November 2017	Not yet begun		X
Subtask 9.2: Rural DACs Infrastructure Reimbursements	July 2015 – November 2017	Not yet begun		X

The budget for infrastructure reimbursements will be dependent on DAC project selection (Task 4). The following text box describes implementation tasks associated with the four example projects identified by the Rural DAC Stakeholder Committee to date.

Example Project Implementation

Project implementation tasks are described in detail below for the three priority example projects identified to date. Note that this list of priority projects will be revisited upon contract execution to ensure that funded DAC projects are ready to proceed, have committed funding match, and have the technical capacity to manage the new facilities.

Example 3-1: Phoenix House School

Design – An updated *Preliminary Engineering Report* will be prepared and will include project planning, existing facilities review, assessment of need for the project, alternatives considered and analyzed, selection of an alternative, and proposed project. Final design and construction specification contract documents will also be needed.

Environmental – Specific environmental compliance requirements are to be determined as part of the project. Due to the limited scope and footprint of the project, a Negative Declaration in compliance with CEQA is anticipated.

Construction – Construction tasks will include construction of a new well and piping to connect to the existing distribution system.

Subtask 9.1 Mobilization and Site Preparation:

Site preparation will be needed for the new well site and tank site. Mobilization will include moving equipment and materials to the site.

Subtask 9.2 Project Construction:

Project construction includes well drilling and development, disinfection system, treated water storage, and connection to the existing distribution system.

Subtask 9.3 Performance Testing and Demobilization:

Well production, water quality, and pressure testing.

Example 3-2: Rancho Estates MWC

Design – An updated *Preliminary Engineering Report* will be prepared and will include project planning, existing facilities review, assessment of need for the project, alternatives considered and analyzed, selection of an alternative, and proposed project. Final design and construction specification contract documents will also be needed.

Environmental – N/A

Construction – Construction tasks will include installation of new piping, new storage tank, hydrants, and household connections and meters.

Subtask 9.1 Mobilization and Site Preparation:

Site preparation will be needed for the piping and tank sites. Mobilization will include moving equipment and materials to the site.

Subtask 9.2 Project Construction:

Project construction includes an improved connection to the Yuima Municipal Water District. Infrastructure improvements include 3,000 feet of 4” pipe and 13,500 feet of 6” pipe, a new 50,000 gallon water storage tank, 41 new hydrants, and 60 household connections and meters.

Subtask 9.3 Performance Testing and Demobilization:

All new construction will be pressure tested.

Example 3-3: San Pasqual District B Water System

Design – Final engineering design will be needed to complete the project. Community involvement in the project will be facilitated by RCAC.

Environmental – Due to the limited scope and footprint of the project, a Finding of No Significant Impact (FONSI) determination for NEPA and a Negative Declaration determination for CEQA are anticipated.

Construction – Construction tasks will include construction of a new tank and foundation, connection of the tank to the existing water main, demolition of one tank and abandonment in place of another, construction of a new section of water main, and installation of gate valves.

Subtask 9.1 Mobilization and Site Preparation:

The new tank will be installed near an existing tank, so minimal site preparation will be needed. Mobilization will include moving equipment and materials to the site.

Subtask 9.2 Project Construction:

A new 250,000 gal water storage tank and foundation will be constructed and connected to an existing water main. Two existing tanks will be removed from service. One will be demolished and the other will be abandoned in place. The construction process will require three water main connections and 400 feet of 8-inch water main. Four 8-inch gate valves will also be installed.

Subtask 9.3 Performance Testing and Demobilization:

All new construction will be pressure tested.

Row (e) Environmental Compliance/Mitigation/Enhancement

Task 10: Environmental Compliance / Mitigation / Enhancement

All tasks carried out for this project will be conducted in a manner that ensures environmental compliance with CEQA, NEPA, and all other relevant environmental statutes. No environmental mitigation is anticipated for the priority projects; therefore, these activities are not included in the Work Plan or Budget.

Row (f) Construction Administration

Task 11: Construction Administration

This task involves administration, coordination, and review of the construction contract and all other related construction tasks. RCAC will review construction progress and approve progress payments based on physical inspection of the project and consultation with the construction manager. Funding for construction contracting may be provided to small or tribal water systems via the *Rural DACs Partnership Program* implementation in Task 9.

Project 4: Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility

I. Introduction

Project Sponsor

The WateReuse Research Foundation (WRRF) is the project sponsor for *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility*.

Project Need

Environmental buffers (i.e., intermediate water storage structures such as reservoirs or aquifers that allow treated reuse water to blend with water from other sources) have been important features of potable water reuse projects constructed in the United States for the last five decades. Over this period, treatment technologies have improved significantly and their costs have decreased. As utilities have become more confident in their ability to meet potable water standards and guidelines, potable reuse projects have been proposed, designed, and in some cases built in the United States without environmental buffers.[14] The increasing interest of utilities in operating potable reuse projects without environmental buffers (i.e., failsafe potable reuse) is driven by a number of factors, including water rights, lack of usable buffers near the locations where reclaimed water is produced, potential for contamination of the reclaimed water when it is released into the environmental buffer, and costs associated with maintenance, operation, and monitoring of environmental buffers.[15] In California, potable reuse without environmental buffers is not yet allowed by state regulatory agencies.

Senate Bill 918 (SB 918) requires the California Department of Public Health (CDPH) to finalize regulations for indirect potable reuse through groundwater recharge and reservoir augmentation by the end of 2013 and 2016, respectively. CDPH must also report on the feasibility of potable reuse without an environmental buffer, wherein purified water is delivered to the raw water conveyance system or the influent channel of a drinking water treatment plant (failsafe potable reuse) and could potentially increase the viability of potable reuse for water agencies throughout the State. One challenge in establishing regulations for all types of potable reuse projects is a lack of industry knowledge regarding specific treatment objectives required to protect public health, the myriad of alternative treatment processes available to enhance water quality, redundancy requirements for the sequential treatment system (treatment train), treatment system reliability requirements, and real-time water quality monitoring techniques.

The United States science and engineering community has struggled with this lack of industry knowledge for some time, dating back to a workshop held in Boulder, Colorado in 1975 by the United States Environmental Protection Agency, the American Water Works Association, the Water Pollution Control Federation, and the University of Colorado. Industry knowledge continues to be an issue, as the scientific community continued to discuss the potential for failsafe potable reuse at the WateReuse Foundation California Conference held in 2012 in Sacramento, California. Similarly, the National Research Council (NRC) wrestled with the issue in its 1982 Report, *Quality Criteria for Water Reuse*, in its 1984 review of the Potomac Estuary Experimental Water Treatment Plant, and in its 1998 report, *Issues in Potable Reuse*. The NRC targeted this issue once again in its new 2011 report, *Water Reuse: Potential for Expanding the Nation's Water Supply Through Reuse of Municipal Wastewater*. Internationally, Australia recently issued a set of guidelines for potable reuse. All these existing guidelines must be assimilated and supplemented with project-specific criteria for local applicability in California.

This project seeks to fill known knowledge and data gaps and ultimately support wider implementation of potable reuse by increasing industry understanding and easing the burden on regulatory agencies to address the complex issues associated with the variations of possible potable reuse scenarios. The City

[14] National Research Council. 2012. *Water Reuse: Potential for Expanding the Nation's Water Supply through Reuse of Municipal Water*.
[15] National Research Council. 2012. *Water Reuse: Potential for Expanding the Nation's Water Supply through Reuse of Municipal Water*.

of San Diego's (City) Recycled Water Study (completed in 2012) estimated that augmenting reservoir supplies with advanced-treated purified water (indirect potable reuse via reservoir augmentation) could create 98,560 AFY of new local water supply for southern San Diego County by 2035. In addition, potable reuse projects allow agencies to further the reuse of water, which reduces the volume of water ultimately wasted by discharging to the ocean. Application of the lessons learned from this WRRF study could substantially increase potable reuse throughout the State and nation.

Project Purpose

The purpose of this project is to develop and demonstrate proper design and process engineering for failsafe potable reuse treatment trains. The project consists of four distinct activities as described below:

1. Develop expert panel guidelines on hazard analysis, redundancy, reliability, and monitoring requirements for potable reuse without an environmental buffer
2. Develop a comprehensive test plan for a failsafe potable reuse system that incorporates failsafe guidelines from previous studies completed by WRRF
3. Perform bench-scale, pilot-scale and demonstration-scale testing at the City of San Diego's existing water purification demonstration facility (demonstration facility)
4. Prepare a final report on a complete strategy for failsafe potable reuse

Project Abstract

The *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project will provide comprehensive testing, evaluation, and demonstration of sequential failsafe treatment steps (treatment trains) for potable reuse without an environmental buffer. To accomplish this, the project will draw upon active potable reuse research projects in the United States, Singapore, South Africa, and Australia in addition to worldwide potable reuse applications and practices used and researched in these same countries. Highlighted by a workshop on hazard analysis, critical control points, and redundancy requirements, this project will convene national and international health, treatment, and water quality experts to establish an appropriate framework for demonstration of failsafe potable reuse at the City of San Diego's existing advanced water purification demonstration facility (demonstration facility). This demonstration facility is designed as an educational facility as well, offering tours and education programs that allow the treatment process and the science behind it to be transparent.

This project consists of four distinct phases activities as described below:

Phase 1 – Develop expert panel guidelines on hazard analysis, redundancy, reliability and monitoring requirements for potable reuse without an environmental buffer: This task will identify an expert panel to participate in an international workshop that will develop the necessary guidelines to address hazard analysis, redundancy requirements, and appropriate water quality monitoring techniques for implementing potable reuse without an environmental buffer. A two-day workshop will be held in San Diego with the California Department of Public Health (CDPH) and municipalities pursuing potable reuse invited to attend. The expert panel will produce failsafe guidelines that will provide needed guidance for the potable reuse demonstration testing that will be performed as a part of this project.

Phase 2 - Develop a comprehensive test plan for a failsafe potable reuse system that incorporates failsafe guidelines from previous WRRF studies: This task will devise a test plan that incorporates the failsafe guidelines developed by the expert panel in this project along with the potable reuse treatment guidelines (developed in WRRF 11-02) and any other salient guidance from on-line monitoring (WRRF 11-01) and/or engineered storage buffer (WRRF 12-06). The test plan will be comprehensive and will include bench-scale work to better develop surrogate and indicator concepts, pilot-scale testing to demonstrate alternative disinfection and oxidation technology performance, as well as demonstration-scale testing to provide proof of failsafe system concept.

Phase 3 – Perform bench-scale, pilot-scale and demonstration-scale testing at the City of San Diego's water purification demonstration plant: This task will operate the City's demonstration facility for 52 weeks to develop long-term information that will evaluate the failsafe concepts developed in the test plan. The demonstration testing will involve microbial challenges, evaluations of intentional system failures, demonstration of on-line monitoring equipment's response, and redundancy treatment response. In addition to the demonstration testing, pilot-scale testing of alternative disinfection and oxidation processes will also be routinely operated and challenge tested. The combination of demonstration and pilot-scale testing will cover a wide range of treatment alternatives, monitoring, system response, and system reliability concepts.

Phase 4 – Prepare Final report on complete strategy for failsafe potable reuse: A final report will be compiled to provide a comprehensive pathway to failsafe potable reuse. The report will summarize expert panel guidelines and all the data gathered for on-line monitoring applications, redundancy and reliability performance, and relevant surrogate and indicators for various treatment processes. The report will be provided along with a workshop to develop a common understanding of project outcomes prior to finalizing the report with any specific comments.

The WateReuse Research Foundation is actively funding nearly $3 million in research to better develop potable reuse as a supplemental water supply. This project leverages the expertise from those investments and combines them to demonstrate failsafe potable reuse at the City of San Diego's demonstration facility.

Project Objectives

The Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility Project seeks to accomplish the following objectives:

- Facilitate public education and awareness regarding potable reuse, and the San Diego Region's efforts to diversify local water supplies
- Conduct research and testing of failsafe mechanisms for potable reuse to provide additional information about the viability and potential regulations that would be required to permit and implement potable reuse projects in California
- Develop and implement guidelines for potable reuse through an expert panel

This project will contribute to the updated SDIRWM Plan Objectives, as summarized in Table 3-27 and detailed below.

Table 3-27: Contribution to DRAFT IRWM Plan Update Objectives

Proposal Projects	Contribution to IRWM Plan Objectives										
	A	B	C	D	E	F	G	H	I	J	K
Failsafe Potable Reuse at the Advanced Water Purification Facility	●	○	●	●	○			○			○

○ = indirectly related
● = directly related

Objective A: Integrated solutions to address water management issues and conflicts: This project seeks to provide an integrated solution to address water management issues by meeting the San Diego IRWM Program's Partnerships and the Geography definitions of integration, as described above.

Objective B: Maximize stakeholder/community involvement and stewardship of water resources, emphasizing education and outreach. As the project will involve testing at the City's existing demonstration facility, this facility will continue to be open to the public for tours during the operation of the project to educate the community about San Diego's water supply challenges and the role that full advanced water treatment technology and potable reuse can have in addressing those challenges.

Objective C: Effectively obtain, manage, and assess water resource data and information. Potable reuse creates a valuable and sustainable water resource, and the water quality and treatment performance data developed through this project will increase industry and regulatory knowledge of how to regulate and implement potable reuse. Developing better information will help promote potable reuse, which will help provide many benefits to the San Diego Region and to the State of California.

Objective D: Further scientific and technical foundation of water management. This project develops and implements guidelines to demonstrate a failsafe potable reuse concept that builds upon the millions in funds that WRRF has invested to research this topic. Without this project, CDPH will face a daunting challenge in assessing the viability of potable reuse without an environmental buffer. The significant benefit of this project is that it will present thorough guidelines and a detailed scientific assessment that will assist CDPH when developing regulations for potable reuse in accordance with SB 918.

Objective E: Develop and maintain a diverse mix of water resources, encouraging their efficient use and development of local water supplies. This project would facilitate development of a major new water source under local control, thus diversifying and expanding the Region and State's water supplies. Findings and concepts developed through this project will potentially expand the number of potable reuse endeavors throughout the San Diego Region and the State.

Objective H: Effectively reduce sources of pollutants and environmental stressors to protect and enhance human health, safety, and the environment. This project would facilitate increased recycling through potable reuse, which would in turn reduce wastewater discharges to the ocean and the marine environment. The treatment process for producing water for reuse would also destroy chemical and microbial pollutants, producing water that is extremely pure with salinity levels of 50 milligrams per liter (mg/L) or less, whereas imported water salinity levels are typically on the order of 500 mg/L. This advanced treatment will have a tremendous benefit to lowering the salinity in the region's water supply and the total annual amount of salt imported to the San Diego Region.

Objective K: Effectively address climate change through adaptation or mitigation in water resource management. This project will contribute to the development of a significant local water source. This will reduce the need for imported water, reducing the greenhouse gases associated with importing water to the Region. By developing guidelines for potable reuse without an environmental buffer, this project could avoid adverse impacts to climate change associated with the construction of additional water conveyance infrastructure and the energy required to transport water through the new conveyance infrastructure. Further, if this project contributes to approval of failsafe potable reuse, it will provide a drought-resistant source of potable water that is independent of imported water, whose use may be subject to additional restraints under the influence of climate change.

Project Partners

Project partners in the *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project include the WateReuse Research Foundation (Lead Project Sponsor), City of San Diego (owner and operator of the demonstration facility), Padre Dam Municipal Water District (participating water agency), and the Helix Water District (participating water agency). Further, the expert panel that will be convened for the project will involve individuals from a multitude of agencies and organizations. Those experts will participate on an individual basis; as such, the organizations which they represent are not considered formal partners for this project.

Project Integration

This project is integrated with many efforts associated with potable reuse, as it builds upon all relevant research and literature conducted to date with respect to this topic. However, this project is also directly linked to two specific potable reuse efforts. Those efforts are described below.

- WateReuse Research Foundation Potable Reuse Development Program: Four WRRF research projects with a total budget of more than $2.98 million (WRRF projects 11-01, 11-02, and 11-10 and 12-06) provide a foundation on which this project will build. This project presents an opportunity to demonstrate the treatment and monitoring methods developed in existing WRRF projects, which is necessary for regulatory approval of the potable reuse project being contemplated in San Diego (see information provided below).
- City of San Diego Water Purification Demonstration Project: The City constructed the demonstration facility to evaluate processes necessary to produce advanced-treated purified water, which would be the water used in a full-scale potable reuse application. The demonstration facility is an ideal facility to demonstrate the advanced treatment and monitoring methods

developed in the WRRF research projects and provide a foundation for regulatory approval of a potential full-scale potable reuse project in San Diego.

Completed Work

The work included in this project (see below for more information) is contingent upon two completed work items. Those items are described in further detail below. Please note that in accordance with guidance from DWR found on Page 11 of the Proposal Solicitation Package, the documents referenced in this section have been provided in an electronic format only (on the supporting CD), and are not included within the printed hard copies that have been mailed to DWR.

- WRRF Research Project 11-01: Currently in progress.
  This research project will identify, evaluate, test, and validate potential treatment systems that could be used to assure the public safety of potable reuse. This project specifically focuses on investigating potential online monitoring technologies that could be implemented to remove regulated and unregulated contaminants that would potentially be regulated in failsafe potable reuse applications.
- City of San Diego Water Purification Demonstration Project: Currently in progress.
  The City of San Diego is currently implementing a project that is examining the use of advanced water purification technology to provide safe and reliable water to San Diego. This project includes a public outreach component, a regulatory component, construction and testing at a demonstration-scale facility, and will result in a final report that is due for completion mid-2013. This project is being partially funded through a *Propositions 50 Implementation Grant*.

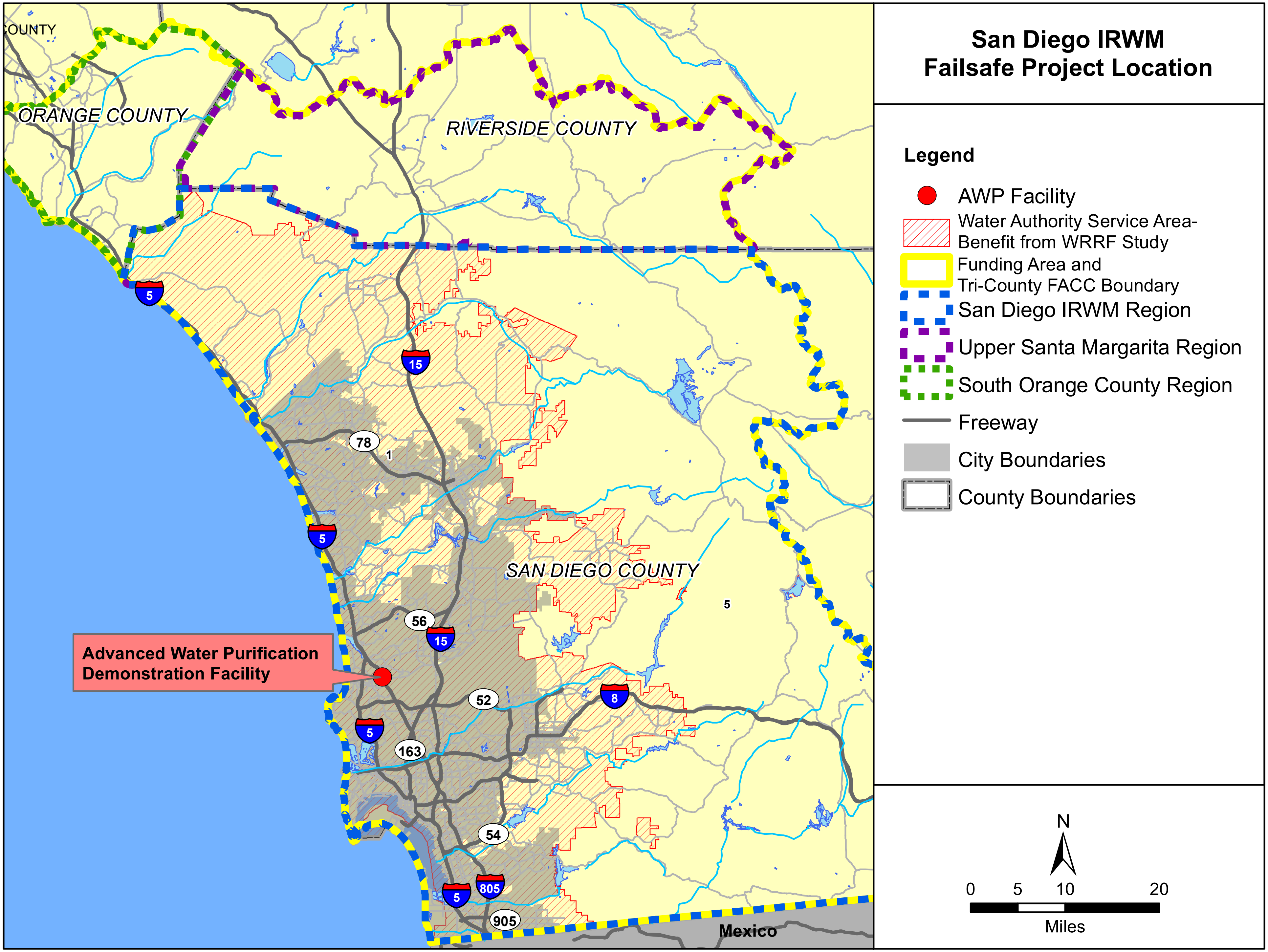
Project Timing and Phasing

The Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility Project is part of a multi-phased project, as it is part of WRRF's Potable Reuse Development Program. The Potable Reuse Development Program is a potable reuse funding initiative that has on-going research projects to investigate on-line monitoring technologies (WRRF 11-01) for evaluating system performance as well as alternative potable reuse treatment trains and public health criteria for failsafe potable reuse. The Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility Project will operate a demonstration-scale potable reuse treatment train that will demonstrate the concepts developed in WRRF 11-01. The operation of this project will occur at the demonstration facility, which was constructed and is currently being operated by the City of San Diego for the Water Purification Demonstration Project.

The other phases (WRRF 11-01 and the Water Purification Demonstration Project) described above have already reached critical milestones and salient information from those efforts is available. As such, the Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility Project can be fully implemented at this time.

Project Map

Figure 3-6 is a site map showing the project's geographical location and surrounding work boundaries.



San Diego IRWM
Failsafe Project Location
Legend
AWP Facility
Water Authority Service Area-
Benefit from WRRF Study
Funding Area and
Tri-County FACC Boundary
San Diego IRWM Region
Upper Santa Margarita Region
South Orange County Region
Freeway
City Boundaries
County Boundaries
N
0
5
10
20
Miles
COUNTY
ORANGE COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
Mexico
Advanced Water Purification
Demonstration Facility
5
15
78
56
52
163
8
54
805
905

II. Project Work

(GA) Grant Administration

The San Diego County Water Authority will be responsible for administration and processing of the Implementation Grant contract, including tasks associated with compiling and submitting project invoices, quarterly reports, and completion reports for DWR. The *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project will contribute $63,390 to this effort. All data submitted by project partners as described in Attachment 6 will be compiled by the grant administrator for the San Diego IRWM data management system to be made publicly available.

Row (a) Direct Project Administration

Task 1: Project Administration

This task involves project administration, coordination, and review of all following project tasks. Funds to support this task will come from the WRRF's administrative budget and are not included in this work plan.

Task 2: Labor Compliance Program

Labor compliance will not be required for this project as it is not a construction project. However, the City of San Diego has an approved Labor Compliance Program, which is already implemented and applied as necessary to applicable facilities.

Task 3: Reporting

Reporting for the *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project will be completed by WRRF. All of the data to be collected as described in Attachment 6 will be submitted to the Water Authority's grant administrator to be submitted to DWR, compiled in the San Diego IRWM Program's Data Management System, and made publicly available. To simplify billing for this project, quarterly progress reports and invoicing will be completed as part of the overall project management effort in Task 5.1 below.

Row (b) Land Purchase/ Easement

No easement acquisitions and/or right-of-ways will be required to implement this project.

Row (c) Planning/Design/Engineering/Environmental Documentation

Table 3-28, below, provides a summary table of the planning/design/engineering/environmental documentation subtasks for the *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project.

Task 4: Assessment and Evaluation

This task describes the scope of work for WateReuse Research Foundation 11-02 project, "Equivalency of Alternative Treatment Trains for Potable Reuse" (WRRF 11-02) that provides the foundation for the demonstration of failsafe potable reuse in this project. This task gathers public health experts to determine proper treatment requirements for potable reuse, conducts a two-day workshop, and produces an expert panel report on treatment requirements for potable reuse. This task also develops a "state of the science" report to summarize all that is known and practiced in potable reuse world-wide. The project also develops a toolbox of unit process models that can be combined to simulate integrated treatment trains. Finally, an alternative treatment train is developed with the help of the toolbox and will be validated at pilot-, near-full-scale, or full-scale levels.

The following sections describe the technical approach for the proposed project, specifically related to three major components: (1) a collaborative workshop with public health experts, several leading reuse agencies, and leading researchers that culminates in a final set of public health criteria; (2) a comprehensive toolbox that allows users to assemble unit processes into reuse treatment trains and evaluate the quality of the final effluent; and (3) a combination of pilot-, near-full-scale, and full-scale validations of potable reuse treatment trains. For failsafe potable reuse, it will be particularly important to address how well the proposed treatment trains account for the benefits provided by environmental buffers that are currently integrated into the Potable Reuse paradigm, namely:

1. Loss of wastewater identity
2. Time for natural decomposition of residual chemical contaminants
3. Time to react to a constituent of concern that is detected in the advanced-treated purified water

Subtask 4.1: Background Research and Criteria Development

Subtask 4.1A: Literature Review on Potable Reuse

There is a substantial amount of literature related to the occurrence and treatment of pathogens and trace organic compounds (TOrCs) in wastewater and potable reuse supplies. Two recently completed WRRF projects provide comprehensive summaries of this information and should be the starting point for the literature review. WRF-02-009 (Study of Innovative Treatments of Reclaimed Water), which is now in press, includes detailed evaluations of technologies and their ability to remove both pathogens and TOrCs. The intent of that work was to find the optimal and lowest cost alternative to reverse osmosis (RO). The second project is WRF-06-019 (Monitoring for Microconstituents in an Advanced Wastewater Treatment Facility), which focuses on ultrafiltration (UF) and RO for TOrC rejection. These projects provide an immense database of literature from which public health and engineering design criteria can be developed. Furthermore, the project will involve compiling currently available process evaluation parameters, process models, and treatment train models. Several Co-Principal Investigators (PIs) are currently finalizing a Water Environment Research Foundation (WERF) report (WERF-CEC4R08, Trace Organic Compound Indicator Removal during Conventional Wastewater Treatment), which is directly applicable to this project. The immediate value of this WERF project is the detailed secondary process models that have been developed. Similar to process models for nitrogen reduction, the WERF project allows for various secondary processes to be modeled for TOrC reduction. The WERF project includes a detailed comparison of cost and performance of tertiary treatment compared to the cost and performance of secondary process modifications. The PI for WERF-CEC4R08 is also the lead for Task 4.2 in this project. Therefore, the models from the WERF project can be easily integrated into the toolbox to provide a starting point for advanced treatment.

The projects mentioned above will be supplemented with individual experience, publications by the PIs, and other recent publications by potable reuse experts. The project team also has an extensive collection of draft and final regulations, guidelines, and criteria for many U.S. states as well as other countries. In addition, each of the PIs maintains an extensive network of professional relationships throughout the U.S. and abroad that can be used to obtain project-specific information. These efforts and resources will be led by recognized experts in the respective field and organized as follows:

- Topic 1 – Health Criteria and Regulations
- Topic 2 – Process models, process evaluation criteria, and treatment train models
- Topic 3 – Alternative treatment trains

Subtask 4.1B: Review of Available Public Health Criteria

The review of available public health criteria will build on the effort in Topic 1 in Task 4.1A. The review will include a review of the following sources: 1) state and local drinking water standards; 2) unregulated compounds; 3) Safe Drinking Water Act (SDWA) Regulations; 4) Contaminant Candidate List 3 (CCL3); 5) World Health Organization (WHO) and European Union (EU) standards; 6) draft and approved versions of California's recycling criteria (Title 22, Division 4, Chapter 3, California Code of Regulations); 7) California Indirect Potable Reuse CEC Monitoring requirements; 8) California Department of Public Health (CDPH) Draft Groundwater Recharge Reuse Regulations; 9) California reuse regulations currently under development; 10) Australian Guidelines for Water Recycling; and 11) Monitoring Strategies for Chemicals of Emerging Concern in Recycled Water (Recommendations from a Science Advisory Panel, Final Report to the California State Water Resources Control Board, June 2010).

Subtask 4.1C: Develop Criteria that are Protective of Public Health to Evaluate Treatment Technologies for Failsafe Potable Reuse

Developing public health criteria for potable reuse is a challenging task due to the tremendous uncertainty involved. For this project, public health criteria will be developed by a highly qualified, independent panel of experts during a two-day workshop.

The two-day workshop will be held in Southern California at the headquarters of the Los Angeles Department of Water and Power. Before the workshop, the panel will review potable reuse fact sheets and summaries based on information gathered by the project team during previous tasks. On the first day of the workshop, the panel will hear selected presentations from experts in the field of potable reuse, including representatives from reuse agencies, regulatory agencies, and other prominent reuse experts. On the second day of the workshop, the panel will deliberate and hold a short public meeting to share its preliminary thoughts. If desired by the WateReuse Research Foundation and the Project Advisory Committee (PAC), the public meeting could be webcast for Foundation subscribers. At the conclusion of the workshop, the panel will prepare a report with proposed public health criteria for potable reuse.

Subtask 4.1D: Develop a List of Additional Criteria to Evaluate and Compare Unit Processes and Treatment Trains

In this task, additional criteria will be assimilated to evaluate the overall sustainability of the unit processes and treatment train alternatives. The toolbox model to be developed in Task 4.2 will be based on IT3, an existing model that has been developed and is being made available to the project. In its present form, IT3 includes decision trees and decision-making tools that give consideration to environmental factors (including greenhouse gas emissions), social factors, energy consumption, and chemical usage. Task 4.1D will be utilized to identify additional criteria to be included in the model to enable effective evaluation and comparison of alternative processes and treatment trains.

Criteria to be considered for Task 4.1D include the following: 1) effluent quality; 2) energy consumption; 3) chemical consumption and handling requirements; 4) production, handling, and disposal of residuals; 5) treatment consistency and reliability; 6) monitoring requirements; 7) compatibility with real-time monitoring technology; 8) maintenance requirements, operator staffing requirements, and training requirements; 9) physical space and footprint requirements; 10) characteristics that could replace the role of the environmental buffer, such as constituent removal, time to react to plant upsets, blending with other waters, elimination of wastewater identity, etc.; 11) TOrC reduction (removal + oxidation); 12) nutrient removal; 13) Title 22 requirements (or their equivalent); 14) bulk organic transformation; 15) DBP formation; 16) pathogen reduction (removal + inactivation); 17) energy footprint; 18) generation of greenhouse gas emissions; 19) capital, O&M, and life cycle costs; 20) and the impact on public perception.

Subtask 4.1E: State of the Science and Criteria Report

The project team will develop a report summarizing the state of the science and will be based on the following project components:

- Task 4.1A – Literature review
- Task 4.1B – Review of available public health criteria
- Task 4.1C – Public health criteria developed by expert panel during project workshop
- Task 4.1D – Review of additional design and sustainability criteria

The final report and the individual components will be developed in consideration of their applicability to various regulatory agencies, including but not limited to:

- The California Department of Public Health
- The California State Water Resources Control Board
- Other California agencies
- Agencies from other states, particularly Arizona, Florida, and Texas
- International agencies

Subtask 4.2: Toolbox for Integrated Treatment Trains

The toolbox developed during the project will be a computer model that delivers information on integrated water reuse treatment trains for potable reuse. The ideal "toolbox" must be meet several key criteria:

1) It must include accurate and defensible information;
2) It must be extremely user friendly, easy to learn, and easy to use; and
3) It must be readily modified and updated.

The project team will develop a Microsoft Excel-based tool with click and drag icons representing unit processes that can be modified with reasonably limited, albeit sufficient, site-specific input criteria. An existing toolbox (IT3) that was developed will be modified to incorporate the public health and additional design criteria developed during Task 4.1.

Subtask 4.2A: Develop a List of Unit Processes and Associated Variables

The final version of the toolbox will include common technologies for advanced treatment in the form of a list of unit processes and variables associated with each process. The technical information on these technologies will be based on the experience of the project team members and supplemented with information gathered during the Task 4.1 literature review. The existing toolbox already includes the following information for common technologies: planning level cost estimates, energy and chemical use, and carbon/greenhouse gas emissions.

Subtask 4.2B: Identify Existing Models

Secondary treatment processes play a key role in the reduction of biological oxygen demand (BOD), nutrients, total organic carbon (TOC), TOrCs, and other constituents, which may have direct impacts on advanced treatment processes that are "downstream" (follow) the secondary process. While the incorporation of secondary process models into the larger potable reuse toolbox is ideal, it requires substantial complexity. Existing models will be used to create input information related to general water quality and TOrCs. These data will be supplemented with other conventional design criteria, such as flow and treatment goals, and will be fed directly into the potable reuse toolbox. For tertiary processes, the project will utilize the detailed literature (see Task 4.1) to develop a treatment performance sensitivity analysis that considers secondary effluent water quality (pH, alkalinity, BOD, TSS, turbidity, etc.). One important value to this approach is that this sensitivity analysis can be updated as new technologies enter the marketplace. Regarding sharing of proprietary information or intellectual property, the project proposes the use of commercially available models for the secondary processes and will provide full access to the Excel-based model (IT3) for tertiary and advanced potable reuse treatment processes.

Subtask 4.2C: Develop and Refine Description of Individual Unit Process Models

This effort will be focused on the generation of tertiary treatment performance, cost, and emissions analyses. These analyses will be embedded within IT3 and can be accessed and modified.

Subtask 4.2D: Integrate Unit Process Models into a Unified Toolbox

The proposed model is based upon a treatment technology toolbox that was previously developed (IT3). Within the budget allocated for this task, the project team will develop 8 to 12 different treatment trains for use within the model. These treatment trains will be proposed by the project team and revised based upon input from WRRF and the PAC. The model will be programmed to monitor treatment train effluent quality and other objectives and to alert the model user when objectives are not met by any of the treatment trains. Alerts will be based upon cost exceedances, water quality violations, public health concerns, carbon emissions, etc. Some additional criteria will be added as a result of Task 4.1D. The toolbox output will list technology-specific concerns regarding reliability, track record, and regulatory acceptance.

Subtask 4.2E: Validate Toolbox Using Data from Existing Systems Practicing Indirect Potable Reuse

The project team has gathered support from utility partners employing a wide range of unit processes and treatment trains. Periodic sampling and historical water quality data from these facilities will be used to validate the treatment performance model with actual data.

Subtask 4.2F: Toolbox Report

The toolbox report will be a user's manual that defines the input values, step-by-step screenshots to demonstration operation, and real life examples based upon the testing conducted as part of this project.

Subtask 4.3: Treatment Train Development and Validation

The objectives of Task 4.3 are to identify and validate the most promising treatment train alternative(s) for potable reuse based on the information and data compiled during the preceding tasks. The project team proposes to validate the relevant treatment trains with a combination of pilot-, near-full-scale, and full-scale testing. The technical approach for Task 4.3 is provided below.

Subtask 4.3A: Develop Treatment Train

After assimilating the model and full-scale potable reuse data, the project team will assemble one alternative (baseline) potable reuse treatment train for further testing. Current potable reuse treatment trains will serve as the foundation of this alternative. The project team will then supplement the baseline treatment train with unit processes that address the aforementioned deficiencies.

Subtask 4.3B: Validate the Treatment Train

The sampling plan for the Task 4.3B validation testing, including analyses and frequency, will be finalized once the public health and additional design criteria are developed in Task 4.1. The sampling frequency will range from daily to monthly depending on the analyte of interest, but the frequencies will be sufficient to fully characterize the efficacy of the treatment train. Testing will be performed for 12 months at the demonstration facility (see Task 9.3) to determine the treatment efficacy of these alternative treatment trains to achieve the potable reuse health requirements established in Task 4.1.

Subtask 4.3C: Treatment Train Report

This task will prepare a report summarizing the results from the validation of the potable reuse treatment trains. In this report, the project team will make final determinations related to the equivalency of current potable reuse treatment trains and the suitability of the proposed potable reuse treatment train(s) relative to the Task 4.1 criteria. This report will also identify critical issues requiring further attention, if any, prior to full-scale implementation of potable reuse.

Subtask 4.4: In-Kind Equipment and Water Quality Tests

These tasks describe the water quality testing that will be performed and also the in-kind pilot equipment that will be provided.

Subtask 4.4A: Lab Analysis for Water Quality Testing

An outside (third-party) water quality laboratory will be used to quantify many constituents of emerging concern. A commercial laboratory will analyze NDMA, general mineral analyses and other contaminants.

Subtask 4.4B: In-Kind Pilot Equipment

Pilot equipment is typically leased for a fee and startup/installation fees are also incurred. This project received 6-months of a GE Water UF pilot, 12 months of ITT Water and Technology Ozone/AOP pilot and BAC pilot units, and 12 months of APT Water's pilot equipment all at no cost. These donated unit processes are a significant contribution to this project and will allow for the completion of Task 4.3.

Task 5: Final Design

This project is developing information for proper design and operational concepts for failsafe potable reuse treatment trains. A failsafe potable reuse train will provide a robust process train that will enable potable reuse projects to eliminate the need for an environmental buffer with proper monitoring and operations. The project will be highlighted by an expert panel workshop that will develop specific guidelines to better define a failsafe potable reuse system. The project design and development consists of four core tasks, as described below:

Subtask 5.1: Project Management and Coordination with Participating Agencies

This task provides time for weekly progress meetings, bi-monthly meetings with the project partners (City of San Diego, Helix Municipal Water District and Padre Dam Municipal Water District) and WRRF as well as quarterly updates with CDPH. Meeting agendas will be prepared and meeting minutes provided to summarize discussion topics, key conclusions and action items. Coordination with outside agencies that are performing similar potable reuse research will also be performed in this task. Additionally, quarterly progress reports and invoicing will be completed as part of this overall project management task.

Subtask 5.2: Expert Panel Workshop to Develop Guidelines for Failsafe Potable Reuse

This task will identify an expert panel to participate in an international workshop that will develop the necessary guidelines to address hazard analysis, critical control points, redundancy requirements, and appropriate water quality monitoring techniques for implementing potable reuse without an environmental buffer. It is envisioned that the expert panel workshop will be held in San Diego County to better facilitate CDPH technical staff's attendance. The expert panel will be developed by generating a list of leading experts in the subjects of hazard analysis, on-line monitoring technologies, public health, critical control point assessments, membrane processes, adsorption, oxidation and disinfection processes. An agenda will be created in coordination with the panel chair to provide relevant presentation topics for consideration in developing guidelines for failsafe potable reuse. As an example, presentations are likely to include summaries of the expert panel report on overall treatment objectives from Task 4 (see above for further details) and the most promising on-line monitoring techniques along with their most appropriate applications and limitations. A literature review that summarizes relevant information will be provided to the panel prior to the workshop for their review. A two-day workshop will be held, and municipalities pursuing potable reuse will be invited to attend. The first day of the workshop will consist of presentations aimed at providing relevant information to the panelists as well as a potential straw-man for developing these new failsafe guidelines. The second day of the workshop will be dedicated to deliberations and discussions amongst the panel members. The expert panel will produce failsafe guidelines that will provide needed guidance for the demonstration testing that will be performed in this project.

Subtask 5.3: Develop Comprehensive Test Plan for Potable Reuse

This task will incorporate the failsafe guidelines in this project, the potable reuse guidelines (developed in Task 4), and any salient information or guidance for on-line monitoring technologies to determine the necessary testing to provide scientific answers to address the most pertinent questions. To ensure proper focus, an initial deliverable will be drafted that will summarize the test objectives to narrow the focus for the proposed test plan. The test objectives will be distributed for review and comment to the project partners, CDPH, and WRRF. After receiving comments, the test objectives will be finalized and included as an upfront summary to the comprehensive test plan. The test plan will include bench-scale work to better develop surrogate and indicator concepts, demonstration-scale testing to provide proof of concept information, and possibly some pilot-scale testing to demonstrate alternative disinfection and oxidation technology performance. The test plan will also be distributed for review and comment to the project partners, CDPH, and WRRF. Once comments are received and discussed amongst the project team, a final test plan will be distributed.

Subtask 5.4: Final Report on Complete Strategy for Failsafe Potable Reuse

Following the implementation of Task 5.3, a draft final report will be compiled to provide the complete picture for failsafe potable reuse. The report will summarize relevant guideline documents, provide insight on the most promising on-line monitoring techniques, provide design guidance for redundancy and reliability, and present a suitable surrogate and indicator framework for various treatment processes. The document will also include the literature review provided to the expert panel on hazard analysis and critical control points. A full analysis of the data generated will be presented along with system response strategies to various failure scenarios. The draft report will be provided to the project partners, CDPH, and WRRF for comment. A workshop will be held to facilitate the review process and develop a common understanding prior to receiving any detailed comments. Following the workshop, any comments provided by the project partners, CDPH, and WRRF will be discussed and a final report will be produced that incorporates the most constructive and salient comments received.

Table 3-28 Row (c) Planning/Design/Engineering/Environmental Documentation
Failsafe Potable Reuse at the Advanced Water Treatment Facility

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 4: Assessment and Evaluation				
Subtask 4.1 Background Research and Criteria Development	August 2012 to January 2013	Completed	X	
Subtask 4.2 Toolbox for Integrated Treatment Trains	September 2012 to January 2014	90% Complete	X	
Subtask 4.3 Treatment Train Development and Validation	March 2013 to June 2014	In Process		X
Subtask 4.4 In-kind Equipment and Water Quality Tests	March 2013 to June 2014	In Process		X
Task 5: Project Design				
Subtask 5.1 Project Management and Coordination with Participating Agencies	September 2013 – September 2015	Not yet begun		*X*
Subtask 5.2 Expert Panel Workshop to Develop Guidelines for Failsafe Potable Reuse	September 2013 – January 2014	Not yet begun		*X*
Subtask 5.3 Develop Comprehensive Test Plan for Potable Reuse	January – March 2014	Not yet begun		*X*
Subtask 5.4 Final Report on Complete Strategy for Failsafe Potable Reuse	March – September 2015	Not yet begun		*X*

Task 6: Environmental Documentation

There are no CEQA, NEPA, or other environmental compliance requirements for this project.

Task 7: Permitting

No permits are required to implement this project. All testing will occur at the City of San Diego's Advanced Water Treatment Facility, which already has any necessary permits.

Row (d) Construction/ Implementation

Task 8: Construction Contracting

Implementation of *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* does not require construction contracting. This project includes outreach and testing at an existing pilot-scale demonstration facility, and does not involve any direct construction. As such, construction contracting is not included in this work plan.

Task 9: Construction/ Implementation

The implementation of the test plan designed in Task 5 will take place at the City of San Diego's existing Advanced Water Treatment Facility. The total testing time is slated for 52-weeks of implementation to develop the necessary information for evaluating failsafe potable reuse.

Subtask 9.1: Perform Demonstration-Scale Testing

This task will operate the City of San Diego's advanced water purification demonstration facility for 52 weeks to develop long-term data to evaluate the failsafe concepts developed from the workshop that were incorporated into the test plan developed in Task 5.3. The demonstration facility testing will generate water quality data, on-line monitoring information, microbial removal data, process performance results, and a better understanding of the demonstration facility's ability to respond to a challenging water quality or process failure event. The demonstration testing may also include pilot-scale testing for some alternative disinfection technologies that cannot be tested at the demonstration scale due to on-site limitations such as water and power availability. Chemicals anticipated to be used for demonstration-scale testing include: ammonia hydroxide, sodium hypochlorite, citric acid, sodium hydroxide, antiscalant/CIP chemicals, and hydrogen peroxide. The water quality parameters that will be tested include, but are not limited to: constituents of emerging concern (CECs), nitrosodimethylamine (NDMA), total organic carbon (TOC), trihalomethane (THM), coliphage, coliform, and protozoa.

The demonstration testing will cover a wide range of treatment alternatives, monitoring techniques, system response, and system reliability concepts that fit within the failsafe and potable reuse treatment guidelines. The demonstration testing will focus on reliable, robust, and resilient organics oxidation and removal processes, pathogen inactivation and removal processes, and nutrient removal processes. Surrogate monitoring will be used to evaluate process performance in real time.

Subtask 9.2: Bench-scale Experiments on Indicators and Surrogates

Bench-scale testing will be performed to better define a surrogate and indicator framework for advanced-treated purified water. It is envisioned that the bench-scale testing will be performed on tertiary-treated recycled water and on the reverse osmosis permeate. The bench-scale testing will look at various disinfection and oxidation processes as well as membrane filtration and organics removal processes (i.e. adsorption, reverse osmosis). The goal is to develop correlations for easily monitored surrogates (such as UV absorbance, turbidity, and chlorine residual) for critical indicators (such as pathogens and endocrine disrupting compounds). Surrogates that serve as potential viable performance monitoring approaches at the bench-scale will then be used to monitor at the demonstration scale along with the relevant indicators.

Subtask 9.3: Develop Meaningful Calibrations for Emerging Technologies

The project team will work with manufacturers of real-time water quality monitoring equipment to develop proper calibrations and reliable information from the most promising technologies.

Subtask 9.4: Challenge Testing for Indicators with Surrogate Monitoring

The demonstration facility testing will involve microbial challenges, evaluations of intentional system failures, demonstration of on-line monitoring equipment's response, and redundancy treatment response.

Table 3-29: Row (d) Construction/ Implementation
Failsafe Potable Reuse at the Advanced Water Purification Facility

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 9: Construction				
Subtask 9.1: Perform Demonstration-Scale Testing	March 2014 – March 2015	Not yet begun		X
Subtask 9.2: Bench-scale Experiments on Indicators and Surrogates	March 2014 – September 2014	Not yet begun		X
Subtask 9.3: Develop Meaningful Correlations Calibrations for Emerging Technologies	March 2014 – March 2015	Not yet begun		X
Subtask 9.4: Challenge Testing for Indicators with Surrogate Monitoring	September 2014 – March 2015	Not yet begun		X

Row (e) Environmental Compliance/ Mitigation/ Enhancement

Task 10: Environmental Compliance/ Mitigation/ Enhancement

The project would not require any environmental compliance, mitigation, or enhancement.

Row (f) Construction Administration

Task 11: Construction Administration

This project does not require any direct construction administration.

Project 5: Sustaining Healthy Tributaries to the Upper San Diego River

I. Introduction

Project Sponsor

The San Diego River Park Foundation (SDCRPF) is the project sponsor for *Sustaining Healthy Tributaries to the Upper San Diego River*.

Project Need

Tributaries of the Upper San Diego River are generally in good health; however, disturbance (fire) and activities on privately owned lands are a potential threat to this condition. Boulder Creek is used as a natural conveyance of water from Lake Cuyamaca to El Capitan Reservoir, the region's largest local water supply reservoir. By protecting Boulder Creek and other tributaries of the San Diego River that drain into El Capitan Reservoir, potential future costs to restore or repair the watershed will be reduced or made unnecessary. As the El Capitan Reservoir is listed an impaired (303d-listed) water body, activities that can be taken to improve the water quality of this water reservoir could potentially avoid the need for water treatment.

Boulder Creek has many important natural features and supports several beneficial uses. Specifically, Boulder Creek supports wild Rainbow Trout, is an important tributary to the El Capitan Reservoir, and conveys water from Lake Cuyamaca to the reservoir to help maintain reservoir levels. Despite these important features of Boulder Creek, there is a lack of data regarding this water body. Specifically, there is no baseline against which to evaluate stream health to ensure that the beneficial uses are protected and maintained in the future, nor is there baseline data regarding Boulder Creek that can be applied to other water bodies to assess their health and ability to potentially support beneficial uses.

Project Purpose

The purpose of this project is to protect and restore Boulder Creek, collect data from Boulder Creek to establish an appropriate baseline for creek health in the watershed, establish a community-supported monitoring program for the watershed, and educate land owners on maintaining or improving stream health in order to protect stream habitat as well as the El Capitan Reservoir.

Project Abstract

The Upper San Diego River Watershed contains water bodies that provide source water for the City of San Diego's El Capitan Reservoir, the largest local water supply source in San Diego County, which is impaired by water quality concerns and is on the 303(d) list of impaired water bodies. The streams and creeks that drain into El Capitan Reservoir are relatively healthy, but are under continued threat of degradation from both natural and man-made sources. This project seeks to develop a means of engaging local community members in assessing and monitoring the health of this important watershed and using the information collected to identify emerging threats and changing conditions.

This project will restore and maintain a portion of Boulder Creek, an important tributary to the El Capitan Reservoir in the San Diego River Watershed that captures rain, snow melt, and spring water and drains into El Capitan Reservoir. Areas of the Boulder Creek catchment, including Cuyamaca Peak, average more than 40 inches of rain a year. Boulder Creek is of unique significance because it is used to transfer water between Helix Water District's Lake Cuyamaca and the City of San Diego's El Capitan Reservoir where water is stored until treated for potable use. As part of this project, the community will be engaged in restoring approximately 4.4 acres of degraded riparian and associated buffer habitat on Boulder Creek. The project will also include monitoring of Boulder Creek and surrounding creeks to increase knowledge of the creeks and provide baseline information that will allow for early actions to be taken in the event that the creek begins to degrade. With a relatively small investment now, the creek and watershed can remain healthy, improving the health of the environment, maintaining carrying capacity in the reservoir, and reducing potential water treatment costs.

Boulder Creek is one of two known creeks in the San Diego River Watershed that supports wild rainbow trout. The presence of trout indicates a high quality stream with cold water. These unique conditions offer

an exciting potential to use Boulder Creek and nearby creeks as baselines for monitoring the overall health of the 440 square mile San Diego River Watershed. Identifying a suitable creek to use as a baseline for "healthy" conditions and creating a robust monitoring program is a primary goal of the overall watershed water quality monitoring program for the San Diego River Watershed.

Preliminary studies have shown that Boulder Creek is threatened by rural development, legacy mines, erosion and sedimentation from wildfires, and invasive plants and animals. Some hydromodifications have occurred on Boulder Creek, most of which is in public ownership. Recently, the San Diego River Park Foundation purchased a privately owned 3,000-foot section of the Creek. This project will also include work to restore this section, which has been damaged by private development and wildfire.

Through integration with partners and to bring a more holistic approach to assessing baseline conditions for Boulder Creek, this project includes field surveys of other creeks that drain into the El Capitan Reservoir. Monitoring will include real-time monitoring stations, biological assessments, and invasive animal and plant surveys. Education elements will provide information to private land owners in the area on how to reduce pollutant loading and activities that result in erosion and sedimentation. Another important component is outreach to three Native American Tribes in the area to provide training to empower their members to survey their tribal lands.

Project Objectives

The *Sustaining Healthy Tributaries to the Upper San Diego River* project seeks to accomplish the following objectives:

- To restore 4.4 acres of riparian habitat and associated buffer habitat along Boulder Creek
- To develop and begin implementing an integrated and robust monitoring and assessment program for the Upper San Diego River Watershed
- To engage the community in becoming stewards of the project area so that water quality within the natural streams and the downstream El Capitan Reservoir is better protected and to reduce the potential need for future improvements or corrective actions

This project will contribute to the updated SDIRWM Plan Objectives, as summarized in Table 3-30 and detailed below.

Table 3-30: Contribution to DRAFT IRWM Plan Update Objectives

Proposal Projects	Contribution to IRWM Plan Objectives										
	A	B	C	D	E	F	G	H	I	J	K
Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies Project	●	●	●	●	○		●	●	●	○	

- ○ = indirectly related
- ● = directly related

Objective A: Encourage the development of integrated solutions to address water management issues and conflicts. This project is an integrated effort among several partners to implement a project that provides maximum benefits for habitat, protects source water for an important local water supply source, improves water quality, and involves stakeholder outreach and data collection and management.

Objective B: Maximize stakeholder/community involvement and stewardship of water resources, emphasizing education and outreach. This project will engage volunteers in stewardship activities, and will also include extensive water management outreach to area residents, including three tribal nations.

Objective C: Effectively obtain, manage, and assess water resource data and information. This project will include collection of real-time water quality data, which will be integrated into an existing public website that has been developed to provide public access to water resources data.

Objective D: Further scientific and technical foundation of water management. This project will include the development of water quality assessments to determine beneficial use and other data applicable to a baseline creek (Boulder Creek). This data can be used to further the scientific and technical understanding of baseline creek data for the San Diego River Watershed and the Region.

Objective E: Develop and maintain a diverse mix of water resources. This project will help to maintain local water supplies by implementing source water protection guidelines for El Capitan Reservoir, which is an important part of the Region's water supply infrastructure and is currently impaired by water quality concerns.

Objective G. Enhance natural hydrologic processes and encourage integrated flood management. This project will help to maintain and restore burned areas of Boulder Creek, which is an important natural water conveyance system for water transfers between Lake Cuyamaca and El Capitan Reservoir.

Objective H: Effectively reduce sources of pollutants and environmental stressors to protect and enhance human health, safety, and the environment. This project will monitor water quality impacts in the source waters for El Capitan Reservoir and actively help to manage those source waters to improve watershed health, actively address environmental stressors such as sedimentation, and protect the water quality of El Capitan Reservoir, which is an important part of the Region's water supply.

Objective I: Protect, restore, and maintain habitat and open space. This project will include efforts to actively restore functioning riparian habitat and associated buffer habitat, and monitor for quagga mussels and other nuisance species, including feral pigs.

Objective J: Optimize water-based recreational opportunities. This project will include public education about fishing and other water-based recreation opportunities in the project area. In addition, the project will help to restore Boulder Creek, which is known to provide habitat for local fish such as trout.

Project Partners

Project partners in *Sustaining Healthy Tributaries to the Upper San Diego River* include:

- San Diego River Park Foundation (SDRPF) - project lead and primary project sponsor
- San Diego Fly Fishers – Project partner that will assist with developing assessment and monitoring program
- San Diego State University (SDSU) – Project partner that will develop and install real-time monitoring equipment
- Kumeyaay Digueno Land Conservancy (consisting of 9 member tribes) – Project partner that will assist with Native American outreach and training and assist with cultural monitoring activities
- Helix Water District – Project partner that will participate in Working Group on hydromodifications

Project Integration

The project partners submitted individual Project Concepts for the Strategic Integration Workshop conducted by the IRWM Program. Following the Strategic Integration Workshop, the project partners worked to bring together different project elements including SDSU's San Diego River Watershed real-time monitoring efforts and the Kumeyaay Diegueno Land Conservancy's interest in training Native Americans to assess and monitor the health of waterways within their tribal lands. Other project partners were contacted to discuss their interest in developing a more comprehensive approach to caring for a generally healthy upper watershed and developing knowledge which could be transferred to other areas in the Region. Further, a previous IRWM-funded project (the *El Capitan Reservoir Watershed Acquisition and Restoration Project* funded through Proposition 50) also helped to acquire open space areas within the Upper San Diego River Watershed to protect local water supplies and the receiving body of El Capitan Reservoir.

Completed Work

This project (see below for more information) builds upon several completed work items. Those work items are described below. Please note that in accordance with guidance from DWR found on Page 11 of the Proposal Solicitation Package, the documents referenced in this section have been provided in an electronic format only (on the supporting CD), and are not included within the printed hard copies that have been mailed to DWR.

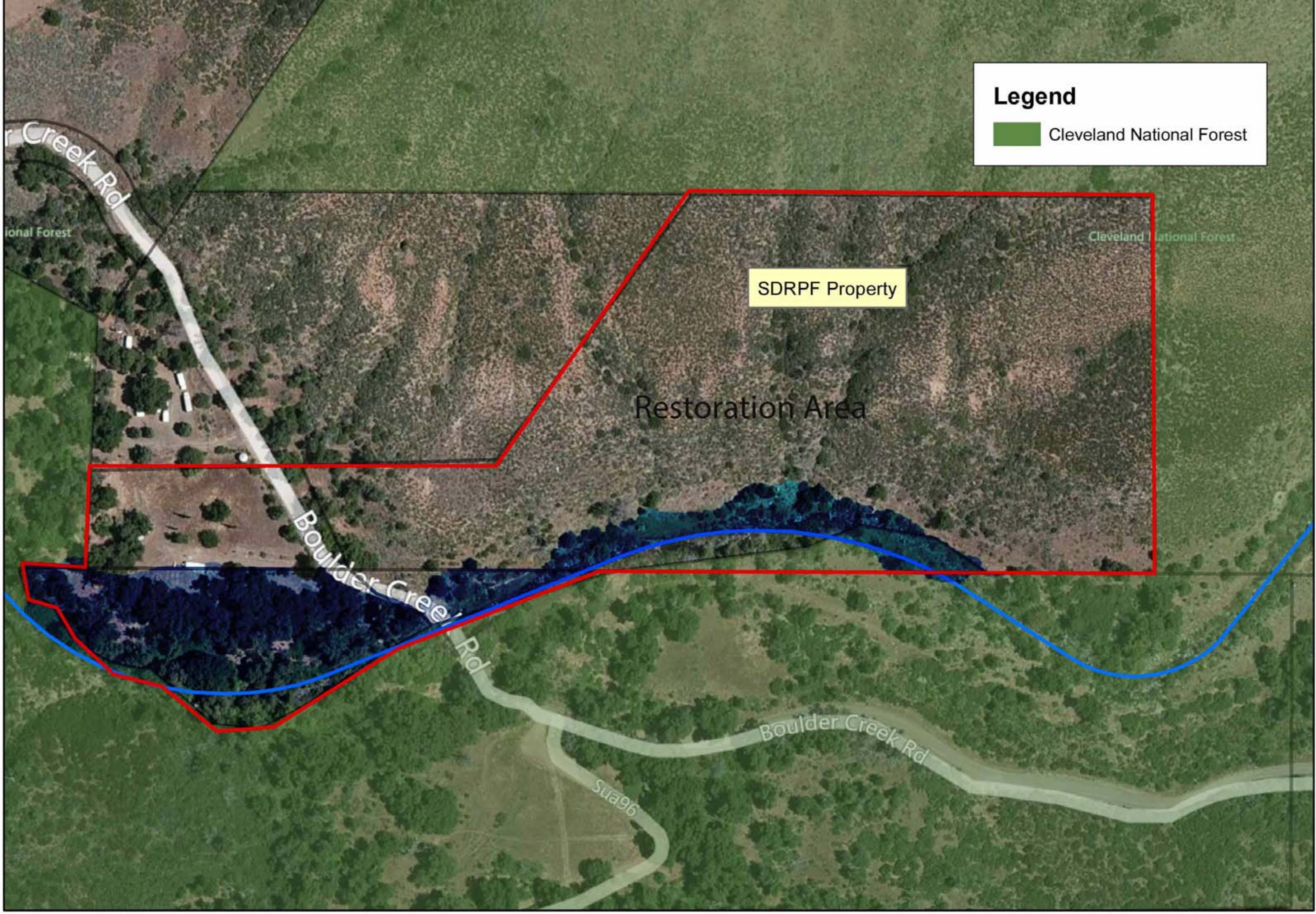
- San Diego River Watershed Workgroup, *San Diego River Watershed Management Plan*, Prepared by Anchor Environmental, Everest International Consultants, KYU&A, Merkel and Associates, TRAC, and Michael Welch. March 2005: Completed.
  - This plan, which is currently complete, contains information regarding the San Diego River Watershed, including watershed issues of concern and the steps necessary to resolve those issues. Final Watershed Management Plan,
- San Diego River Conservancy, *Five Year Strategic and Infrastructure Plan 2006-2011*: Completed.
  - This plan, which is currently complete, contains information regarding the San Diego River Conservancy's strategic plan for the time period of 2006-2011. This plan has relevant information regarding project criteria, land conservation priorities, and other information regarding strategic long-term planning for the San Diego River Watershed.
- San Diego River Conservancy, *Strategic Plan Update (2012-2017)*: Completed.
  - This plan update, which is currently complete, is an update to the San Diego River Conservancy's 2006-2011 Strategic and Infrastructure Plan. This update provides additional information regarding priorities for the San Diego River Watershed.
- San Diego River Coalition *Annual Work Program*, 2012: Completed.
  - The San Diego River Coalition's 2012 Work Plan includes a Headwaters Protection Program, which includes protection of identified lands near El Capitan Reservoir (such as Boulder Creek).

Project Timing and Phasing

This project is not a portion or phase of a larger multi-phased project.

Project Map

Figure 3-7 is a site map showing the project's geographical location and surrounding work boundaries.



Restoration Area
Sustaining Healthy Tributaries to theUpper San Diego River and
Protecting Local Water Supplies
11/22/2012

II. Project Work

(GA) Grant Administration

The San Diego County Water Authority will be responsible for administration and processing of the Implementation Grant contract, including tasks associated with compiling and submitting project invoices, quarterly reports, and completion reports for DWR. All data submitted by project partners as described in Attachment 6 will be compiled by the grant administrator for the San Diego IRWM data management system to be made publicly available. *Sustaining Healthy Tributaries to the Upper San Diego River* will contribute $15,630 to this administrative effort.

Row (a) Direct Project Administration

Task 1: Project Administration

As part of this task, SDRPF will execute a memorandum of understanding (MOU) or multiple MOUs with all project partners, including the Helix Water District, Kumeyaay Digueno Land Conservancy, SDSU, and the San Diego Fly Fishers. The SDRPF will also prepare MOU(s) with other agencies and organizations as necessary to fully implement the project, which may include the City of San Diego, the National Forest Service, and the San Diego River Conservancy. The terms of the MOU(s) will make the SDRPF responsible for project administration. This task will also involve preparing the following deliverables:

- Invoices and required backup documentation for the Water Authority and DWR.
- Contracts needed to complete the work included in the subsequent tasks of this work plan.
- Complete MOU(s) with partners and other agencies on work program, expenses, and matching funds.

Task 2: Labor Compliance Program

SDRPF will contract with a third party labor compliance administrator to put any required Labor Compliance Program in place and monitor labor compliance-related aspects of the project throughout the grant period. Golden State LC has provided a verbal estimate of the anticipated cost. The labor compliance program has not yet been initiated, but is anticipated to be completed by the end of 2013.

Task 3: Reporting

As part of their role as project administrator, the SDRPF will submit quarterly reports throughout the course of the project, as well as a final report upon project completion. This task will also involve the preparation of a draft and final project assessment and evaluation plan (PAEP). In addition, all of the data to be collected as described in Attachment 6 will be submitted to the Water Authority's grant administrator to be submitted to DWR, compiled in the San Diego IRWM Program's Data Management System, and made publicly available.

Table 3-31: Row (a) Direct Project Administration
Sustaining Healthy Tributaries to the Upper San Diego River

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 1: Project Administration				
Preparation of invoices and backup documentation	Quarterly after contract execution	Not yet begun		X
Memorandum of Understandings with project partners	To be completed by September 2014	Not yet begun		X
Task 2: Labor Compliance Program				
Third Party Labor Compliance Contract	Completed by 12/31/2013	Not yet begun		X
Task 3: Reporting				
Submittal of Quarterly Reports	Quarterly after contract execution	Not yet begun		X
Submittal of Final Report	January 2017	Not yet begun		X
Draft and Final PAEP	September 2013-June 2014	Not yet begun		X

Row (b) Land Purchase/Easement

No easement acquisitions and/or right-of-ways will be required for project. Restoration activities will occur on land that is owned by the SDRPF. One property acquisition was completed February 2013 and the other was completed in 2012.

Row (c) Planning/Design/Engineering/Environmental Documentation

Task 4: Assessment and Evaluation

All planning and assessment activities for this effort have been completed (see Completed Works above). No additional planning is included in this work plan.

Task 5: Final Design

This project includes habitat restoration, monitoring, and outreach activities, and therefore does not require formal project design.

Task 6: Environmental Documentation

No new environmental documentation will be required for this project. The CEQA documentation and compliance for this project will be covered under the U.S. Army Corps of Engineers (USACE) Regional General Permit (RGP) No. 41 discussed below. As such, environmental compliance and documentation for this project would be covered under the Environmental Impact Report for the RGP.

Task 7: Permitting

SDRPF anticipates that this project will be permitted for invasive removal and restoration activities under USACE's RGP No. 41-Invasive/Exotic Plant Removal, and will not require additional permitting. The purpose of RGP No. 41 is to provide a mechanism for expedited approval of invasive non-native vegetation removal projects for the general purpose of habitat recovery. Projects whose purpose is both habitat recovery and flood control would be eligible to use the RGP. USACE, in cooperation with the Nature Conservancy, has prepared a technical document on methods for control and management of giant reed (*Arundo donax*). A Section 401 Water Quality Certification has been obtained by the State Water Resources Control Board.

This task also includes activities associated with regulatory agency coordination to ensure coverage under RGP No. 41. A contingency is included if the Regional General Permit takes longer than anticipated or if additional permitting is required. If this work is required, it is anticipated that a contractor would be used for this work.

Table 3-32: Row (c) Planning/Design/Engineering/Environmental Documentation
Sustaining Healthy Tributaries to the Upper San Diego River

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 7: Permitting				
Coordinate with regulatory agencies and obtain required permitting	September 2013-December 2014	Not yet begun		X

Row (d) Construction/Implementation

Task 8: Construction Contracting

Construction oversight would include labor by a project coordinator and a project manager from SDRPF, and is included in the total construction costs in Task 9.

Task 9: Construction

Implementation of this project is divided into 8 subtasks, each described in further detail below. The project will require assessing the feasibility of addressing erosion, scoring, sedimentation, and other hydromodifications in Boulder Creek, developing and implementing a field monitoring program for the San Diego River Watershed, installation of a monitoring station, conducting field assessments and data collection, website updates to better inform stakeholders on creek health and best management practices (BMPs), outreach and education efforts, and habitat restoration along the creek. This task will commence after September 2013.

Subtask 9.1 Complete Two Feasibility Studies for Removal of Hydromodifications:

This task will include hosting a working group of landowners, public agencies and other interested parties to develop feasibility studies for the removal or modification of hydromodifications within the project area with the goal of enhancing the water quality of the affected water body. Any needed agreements will be secured from the interested party, and then a contractor will be selected to perform the study(s). The study(s) will include a cost/benefit analysis of removing or modifying the hydromodifications.

Subtask 9.2 Develop and Implement Field Monitoring Program:

This subtask will organize interested agencies and others to develop a comprehensive stream monitoring program in the upper San Diego River Watershed. Initially, an inventory of existing monitoring activities will be conducted. A program will then be developed that has a goal of assessing the overall health of the streams and the capacity to serve as an early warning system for future stream-health problems. Bioassessments, volunteer-based monitoring, real-time monitoring, flow, and other data sets will be combined into this program. Volunteers will be trained to conduct field monitoring based upon the developed program. Supplies and data collection equipment will be acquired to support the field monitoring including the processing of 10 bioassessments by a laboratory. Collected data will be widely circulated and made publicly available.

Subtask 9.3 Conduct Field Assessments of Tributaries:

In this subtask three main tributaries of the upper San Diego River (Boulder Creek, Cedar Creek, and Conejos Creek) will be assessed. Using GPS units and cameras, field data will be collected on invasive plants, hydromodifications, erosion problems, invasive feral pigs, invasive aquatic mussels, trash, and cultural resources, among others. As part of this task, community members will be trained to participate in the assessment. At least three (3) training sessions will be held for members of the public. In addition, Kumeyaay Digueno Land Conservancy (KDLC) will join with the SDRPF to organize and host a minimum of three (3) training sessions for tribal members of the Viejas, Cosmit, and Inaja Indian Reservations. KDLC will also assist with appropriate sensitivity to cultural resources identified on the assessments. The first year's assessment will be used to develop a baseline condition assessment, while the subsequent two years will be used to develop a trend analysis based upon the baseline. Data will be shared with both the public and relevant land managers. A report will be developed each year with a final report as the deliverable of this subtask.

Subtask 9. 4 Establish One Real-Time Monitoring Station:

In partnership with SDSU, a real-time monitoring station will be developed, installed, and monitored for two years. Also in partnership with SDSU, volunteers will be trained to maintain the monitoring station. This station will become part of a network of similar monitoring stations in the lower part of the San Diego River Watershed. A contract between SDSU and the SDRPF will be developed for this subtask.

Subtask 9.5 Implement Web-based Data Management System:

This subtask involves working with a contractor to enhance an existing web-based data management system so that the data collected in the monitoring and assessment programs of this project can be shared with the public. A scope of work will be developed as part of the Field Monitoring Program (Subtask 9.2) and a contractor selected to perform this work.

Subtask 9.6 Restore 4.4 Acres of Riparian Habitat:

This subtask involves the restoration of approximately 4.4 acres of riparian and buffer habitat along Boulder Creek. The site will be prepared for planting of trees and plants, and erosion control measures installed as needed. Seeds will be collected and plants grown on site. A native plant nursery will be contracted with to collect seeds and grow plants to support the project. Years two and three of the project will include efforts to maintain these plants, plant understory plants, remove invasive plants, and water as needed. Volunteers will also be trained to do restoration activities and to care for the plants. Photo-documentation of the restoration site will be done on a quarterly basis to document success.

Subtask 9.7 Establish Public Information Web Portal:

This subtask involves improving an existing web site to provide information about the project, volunteering, and the importance of the upper San Diego River and its tributaries. The web site will be used to promote volunteer opportunities and provide training materials. A contractor will be selected to perform this work.

Subtask 9.8 Implement Education Plan:

This subtask will involve organizing a working group of educators and naturalists to design methods that promote understanding of the data collected in this project and the value of maintaining good water quality in our local streams. An education plan will be developed about the project and will include information about local fish, including rainbow trout. Materials will be created to provide information at the restoration site as well as for display at other locations. Online surveys will be conducted to measure the impact of this task.

Row (e) Environmental Compliance/ Mitigation/ Enhancement

Task 10: Environmental Compliance / Mitigation / Enhancement

This project will not require environmental compliance, mitigation, or enhancement.

Row (f) Construction Administration

Task 11: Construction Administration (Management)

No construction management is necessary for this project. It is assumed that any necessary oversight of volunteers and project partners will be conducted by the SDRPF. Work associated with such oversight activities is included under Task 9.

Table 3-33: Row (d) Construction/Implementation
Sustaining Healthy Tributaries to the Upper San Diego River

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 9: Construction				
Subtask 9.1 Complete Two Feasibility Studies for Removal of Hydromodifications	**March 2015 – December 2016**			
Work Group Sign-In Sheets	July 2016	Not yet begun		X
Hydromodification Removal Study #1	March - December 2015	Not yet begun		*X*
Hydromodification Removal Study #2	March - December 2016	Not yet begun		*X*
Subtask 9.2 Develop and Implement Field Monitoring Program	**March 2014 – December 2016**			
Report of Existing Monitoring Efforts	March - December 2014	Not yet begun		X
Monitoring Plan	July 2015	Not yet begun		X
Volunteer Sign-In Sheets	December 2016	Not yet begun		X
Final Data Report	December 2016	Not yet begun		X
Subtask 9.3 Conduct Field Assessments of Tributaries	**March 2014 – December 2016**			
Training Sign-In Sheets	July 2016	Not yet begun		X
Baseline Assessment	March - December 2014	Not yet begun		X
Year 2 Report	December 2015	Not yet begun		X
Final Report	December 2016	Not yet begun		X
Subtask 9.4 Establish One Real-Time Monitoring Station	**October 2014 – December 2015**			
Contract with SDSU Foundation for Station Design and Installation	October - December 2014	Not yet begun		X
Photo-documentation of Installed Station	December 2015	Not yet begun		X
Subtask 9.5 Implement Web-based Data Management System	**May 2014 – July 2016**			
Scope of Work for System	May - July 2014	Not yet begun		X
Documentation of Operating System	July 2016	Not yet begun		X
Subtask 9.6 Restore 4.4 Acres of Riparian Habitat	**October 2013 – December 2016**			
Final Restoration Map	October - December 2013	Not yet begun		X
Final Restoration Plan	December 2013	Not yet begun		X
Volunteer Sign-In Sheets	December 2016	Not yet begun		X
Success Report with Quarterly Photo-documentation	December 2016	Not yet begun		X
Subtask 9.7 Establish Public Information Web Portal	**October 2015 – December 2016**			
Contract for Web Portal Design	October - December 2015	Not yet begun		X
Documentation of Operating Web Portal	December 2016	Not yet begun		X
Subtask 9.8 Implement Education Plan	**May 2015 – December 2016**			
Education Plan and Materials	May - July 2015	Not yet begun		X
Working Group Sign-In Sheets	July 2015	Not yet begun		X
Report of User Surveys	December 2016	Not yet begun		X

Project 6: Chollas Creek Integration Project - Phase II

I. Purpose and Need

Project Sponsor

Jacobs Center for Neighborhood Innovation (JCNI) is the sponsor of the *Chollas Creek Integration Project - Phase II*.

Project Need

Stormwater and urban runoff into the urbanized segments of the south branch of Chollas Creek present a serious water quality issue affecting numerous disadvantaged communities located adjacent to this urban stream within southeastern San Diego. Concentrated pollution, coupled with flooding hazards, results from concrete channelization, industry and organic waste, erosion of banks, and the unchecked growth of invasive plant species, especially Arundo, throughout the creek. Through the comprehensive *Chollas Creek Enhancement Program* (adopted by the City of San Diego in 2002), community members have demonstrated that the creek and wetlands are highly valued as a natural/recreational resource. Restoration of the creek requires modification of creek hydraulics at points of greatest urban density, removal of invasive species, and research and shared learning within the community to change attitudes and behaviors contributing to pollution and to foster informed stewardship of the watershed.

As a pioneering example of full creek restoration and enhancement via pedestrian trails within a higher density redevelopment area, Northwest Village Chollas Creek received Proposition 84-Round 1 funding to alter the hydraulics and flow line of 900 linear feet of creek. Funding under Proposition 84-Round 2 will contribute toward completion of the structural and habitat restoration of this 2-acre site.

Project Purpose

The purpose of the *Chollas Creek Integration Project - Phase II* is to improve water quality and prevent flooding through (1) engineered modifications to the channel via installation of headwalls and drop structures that will modify creek flow and prevent erosion, (2) contaminate uptake and natural filtration through invasives removal and restoration with native species, and (3) engagement of community volunteers in water quality monitoring and hands-on watershed education.

Project Abstract

The *Chollas Creek Integration Project - Phase II* aims to improve water and habitat quality in a Chollas Creek segment at Northwest Village, and engage members of the surrounding DAC in water quality monitoring along Chollas Creek. The project will reduce flood damage and improve water quality at Northwest Village Chollas Creek through creek realignment, headwall installation, and drop structures; improve habitat through invasives removal and native riparian revegetation; and conduct pre/post water quality monitoring.

A. Northwest Village Creek Restoration: Construction will accomplish flood damage reduction and water quality improvement through 1) creek re-alignment 2) inlet installation 3) drop structure installation 4) construction of inlets 5) non-native removal/restoration. Specifically, two 3-foot drop structures (rip-rap) will be developed along the northwest and southwest segments of this creek section to slow the creek flow at these points. Plants removed during construction will be replaced with native riparian species to restore habitat disturbed during this phase. The project design is 90% complete with CEQA compliance approval pending in mid-2013.

B. Habitat Improvement Through Invasive Removal: Invasives removal and restoration will improve water quality through erosion control and pollution uptake, and will contribute to improved habitat values for wildlife. Recreational and public access benefits will also be achieved. This Phase II project will support a comprehensive invasives removal effort at Northwest Village Creek (Euclid Avenue and Market Street), as well as 47th Street and Castana. Building upon *Chollas Creek Integration Project - Phase I*, biological site assessment data (delineation of vegetation communities/wetland resources and identification of sensitive plant and animal species) will inform the Phase II invasives removal efforts, reflecting community removal priorities where the greatest water quality, recreation, wildlife conservation,

and stakeholder benefits can be achieved.

C. Water Pollution Source Tracking, Citizen Monitoring, Pollution/Conservation Education, and Community Engagement: Phase II will build upon *Chollas Creek Integration Project - Phase I*'s engagement of institutional stakeholders in the determination of water quality, natural resource, and environmental justice opportunities/constraints. Phase II will expand stakeholder outreach to include residents in water quality monitoring, and conduct targeted educational messaging. Thirty (30) area youth will be trained and employed as water quality monitors. Water quality monitoring will utilize existing City of San Diego stormwater data for pollution source tracking, and will expand upon the San Diego Coastkeeper's Citizen Science Monitoring and Pollution/Conservation Education programs. The project will also partner with Groundwork's Green Team Community Service Project for engagement of student volunteers, and a coalition of institutional stakeholders in the determination of water quality, natural resource, and environmental justice opportunities/constraints.

Project Partners

JCNI is the primary implementing agency (fiscal sponsor, construction, and environmental permitting) with Groundworks San Diego-Chollas Creek (Groundworks) guiding invasive plants removal and San Diego Coastkeeper conducting water quality monitoring and community science education regarding water quality improvement and watershed stewardship.

Project Timing and Phasing

The proposed flood mitigation, water quality improvement, and invasives removal activities are Phase II of a 4-phase project and builds on funding provided for *Chollas Creek Integration Project – Phase I* under the Proposition 84-Round 1 grant cycle.

Project phases are discrete components of effort that include improving creek hydraulics on the north section of the Northwest Village creek segment and an Opportunity Assessment of the entire creek (Phase I), flood prevention and invasives removal at one site (Phase II), development of creek trails (Phase III), and construction of a footbridge and retaining wall to reinforce the trails system (Phase IV). Each phase can be implemented on a stand-alone basis, although construction activities would ideally be performed as an integrated process, followed by trails development (Phase III).

Project Map

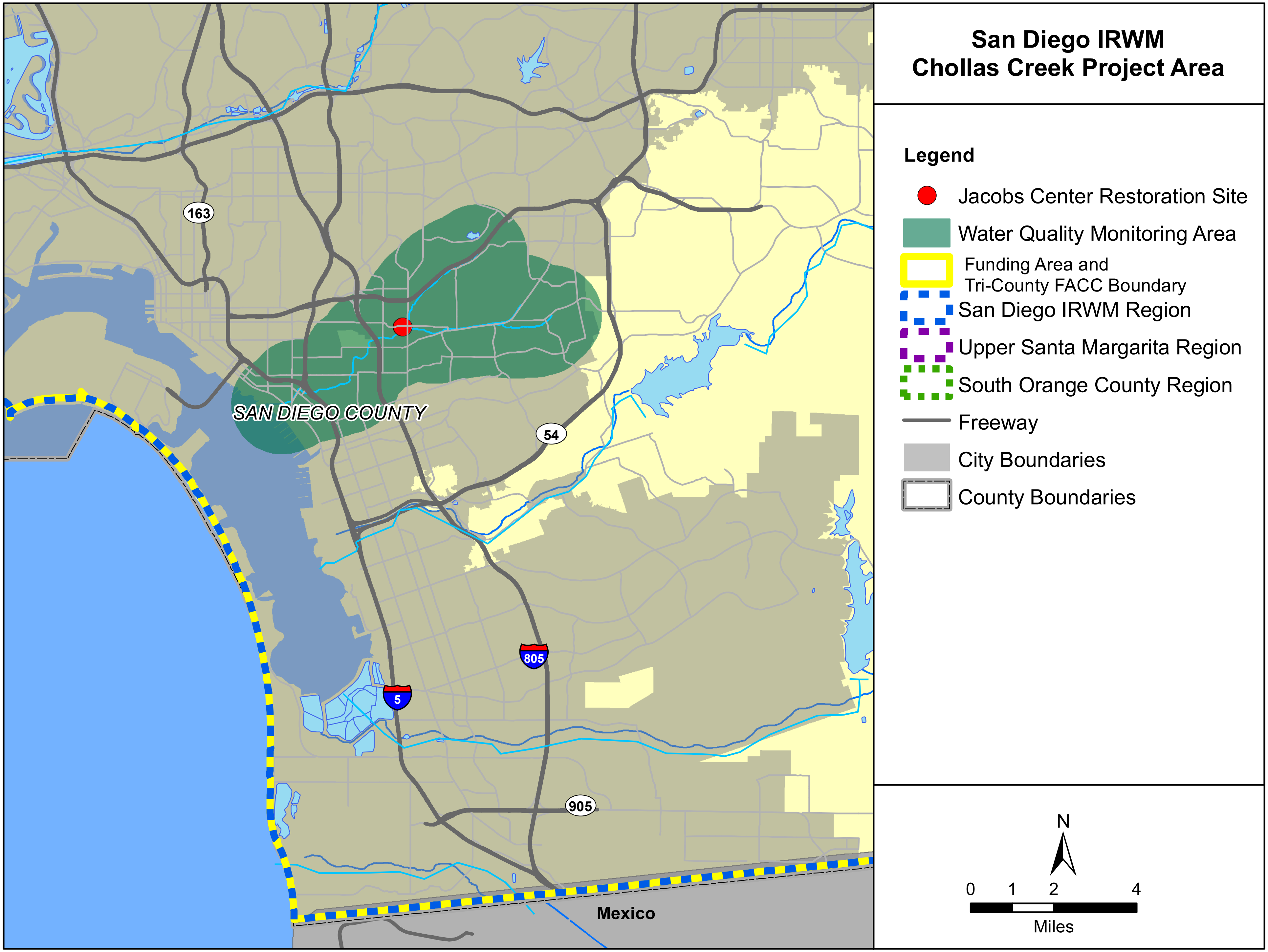
Figure 3-8 is a site map showing the project's geographical location and surrounding work boundaries.

Project Objectives

The *Chollas Creek Integration Project - Phase II* seeks to accomplish the following objectives:

- Reduce the negative effects on waterways and watershed health caused by hydromodification and flooding.
- Improve channel hydraulics to reduce the potential for flood damage
- Effectively reduce sources of pollutants and environmental stressors.
- Protect, restore and maintain habitat and open space.

The table below provides an overview of the draft San Diego IRWM Plan Update objectives that are expected to be directly (●) or in directly (○) achieved through implementation of this project. The San Diego IRWM Prop 84 Implementation Grant Proposal includes an overview of the region's IRWM Plan objectives that are expected to be achieved through the project.



San Diego IRWM
Chollas Creek Project Area
Legend
Jacobs Center Restoration Site
Water Quality Monitoring Area
Funding Area and
Tri-County FACC Boundary
San Diego IRWM Region
Upper Santa Margarita Region
South Orange County Region
Freeway
City Boundaries
County Boundaries
SAN DIEGO COUNTY
163
54
805
5
905
Mexico
N
0
1
2
4
Miles

Table 3-34: Contribution to DRAFT IRWM Plan Update Objectives

Proposal Projects	Contribution to IRWM Plan Objectives										
	A	B	C	D	E	F	G	H	I	J	K
Chollas Creek Integration Project – Phase II	●	●	●				●	●	●		

○ = indirectly related
● = directly related

This project contributes to the draft IRWM Plan Update objectives in the following ways:

Objective A: Integrated solutions to address water management issues and conflicts: This project was developed in part through the Strategic Integration Workshop, described above. It also meets San Diego IRWM Program's Partnerships and Hydrology definitions of integration, also described above.

Objective B: Maximize stakeholder/community involvement and stewardship of water resources, emphasizing education and outreach: Thousands of project area residents will be engaged through public outreach, community leaders will be hired/trained to lead the social values research, resident youth will be employed to conduct research and serve as water quality monitors, educational materials will be disseminated, and creek communities will experience the benefits of improved creek habitats. Data will be shared with the City of San Diego's Think Blue program for the customizing of pollution prevention/water conservation public outreach efforts, includijng media, direct mail, and school programs. CoastKeeper will publish and maintain data on their website. Groundwork will utilize results in its annual school outreach program (Green Team, Student Stream Team), which reaches 300 children annually.

Objective C: Effectively obtain, manage, and assess water resource data and information: Water quality monitoring will provide 300 more Chollas Creek water quality samples (in addition to current baseline monitoring by San Diego Coastkeeper and the City of San Diego). These samples will focus specifically on the area where invasive species removal/restoration will take place, in order to support a robust assessment of impacts on water quality. Data will be shared with Think Blue as well as displayed on San Diego Coastkeeper's web data portal.

Objective G: Enhance natural hydrologic processes to reduce the effects of hydromodification and encourage integrated flood management: Construction will accomplish flood damage reduction and water quality improvement through 1) creek re-alignment, 2) culvert widening/headwall installation, 3) drop structure installation, 4) retaining wall installation, and 5) non-native removal/restoration.

Objective H: Effectively reduce sources of pollutants and environmental stressors to protect and enhance human health, safety, and the environment: Removal of invasive species and stabilization of the Chollas Creek channel will improve water quality within the creek. Vegetation removed during construction will be replanted with native riparian species to restore habitat disturbed during this phase and improve water quality through pollution uptake. Water quality monitoring will focus specifically on the area where invasive species removal/restoration will take place.

Objective I: Protect, restore, and maintain habitat and open space: Phase II will accomplish invasives removal, planting of native plant species, and buffers to protect wildlife and vegetation within the creek to create four acres of publicly accessible green space for disadvantaged communities. When combined with previously restored sections of Chollas Creek within the target area, a total of approximately 15 acres of open space will have been created since 2008.

Project Integration

The *Chollas Creek Integration Project - Phase II* links to the following projects and programs:

- *Chollas Creek Integration Project - Phase I* which received funding under Proposition 84-Round 1 to complete an Opportunities Assessment and construct Phase I of the Northwest Village creek project;
- City of San Diego Think Blue program;
- Jackie Robinson YMCA Sacred Places restoration project;
- Groundwork Green Team Community Service project through youth training/employment;
- San Diego Coastkeeper's Citizen Science Monitoring;

- San Diego Coastkeeper's *San Diego Regional Water Quality Assessment and Outreach Project* which received Proposition 84-Round 1 funding to conduct water quality monitoring countywide, including three locations in the Pueblo Watershed
- I Love A Clean San Diego Creek-to-Bay and Coastal Clean-up for community restoration volunteerism; and
- National Park Service/Groundwork San Diego, River and Trails Partnership.

These linkages provide the basis for a growing regional collaboration to restore and enhance Chollas Creek wetlands and tributaries. Whereas most efforts to address creek problems to date have been site-specific or project by project, an integrated approach among public and private stakeholders, including DAC residents, is required to achieve significant, large-scale outcomes for a healthier watershed. Data sharing among partners is providing the foundation for ongoing learning about the distinct challenges involving this disturbed stream, which is a major conveyor of stormwater runoff into San Diego Bay and a green belt for wildlife habitat, recreational trails, and urban greening opportunities.

Completed Work

The following work has been completed or is expected to be completed prior to the grant award date. Please note that in accordance with guidance from DWR found on Page 11 of the Proposal Solicitation Package, the documents referenced in this section have been provided in an electronic format only (on the supporting CD), and are not included within the printed hard copies that have been mailed to DWR:

- City of San Diego. 2012. *Draft Mitigated Negative Declaration*. Project No. 230777. November 2012
- Design plans for creek construction and habitat restoration (100% design to be completed in June 2013)
- REC Consultants. 2012. *Northwest Village Creek Biological Technical Letter Report*. May 2012
- Rick Engineering. 2011. *Water Quality Technical Report for Northwest Village Creek*. January 2011 (with revisions through June 2012)
- Rick Engineering. 2011. *Drainage Report for Northwest Village Creek*. January 2011 (with revisions through June 2012)
- Southern California Soil & Testing. 2012. *Geotechnical Investigation, Northwest Village Creek, Planned Commercial Building, 504 and 602 Euclid Avenue, San Diego CA*. January 2012.

II. Project Work

(GA) Grant Administration

The San Diego County Water Authority will be responsible for administration and processing of the Proposition 84-Round 2 Implementation Grant contract, including tasks associated with compiling and submitting project invoices, quarterly reports, and completion reports for DWR. All data submitted by project partners as described in Attachment 6 will be compiled by the grant administrator for the San Diego IRWM data management system to be made publicly available. The San Diego IRWM Region will contribute $15,000 (or 3% of this grant request) for grant administration relevant to the *Chollas Creek Integration Project - Phase II*.

Row (a) Direct Project Administration

Task 1: Project Administration

JCNI will have lead responsibility for project administration, including grants management, convening team meetings with partner organizations, submitting invoices, and maintaining financial and MOUs/contractual documentation. Groundworks will administer tasks relating to coordination with San Diego Coastkeeper for student volunteers' recruitment, training, and on-site activities for water quality monitoring. Documentation will be provided to JCNI for inclusion in quarterly reporting, invoicing, and ongoing project monitoring.

Task 2: Labor Compliance Program

Compliance with State of California Prevailing Wage (Davis Bacon Act) and Labor Compliance Program (LCP) requirements will be assured by JCNI as fiscal sponsor through contracted services of a qualified independent consultant, hiring and subcontractor selection practices, and supportive record-keeping. This compliance with labor laws extends to supervision of paid student volunteers.

Task 3: Reporting

This task will involve quarterly grants administration reports, evidence of deliverables and task progress or completion, and project financial reports with detailed narrative describing project status. JCNI will provide all of the reports incorporating information from cooperative partner agencies. In addition, all of the data to be collected as described in Attachment 6 will be submitted to the Water Authority's grant administrator to be submitted to DWR, compiled in the San Diego IRWM Program's Data Management System, and made publicly available.

Table 3-35: Row (a) Direct Project Administration
Chollas Creek Integration Project – Phase II

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 1: Project Administration				
Project Management-Manage Project, design, permits, funding and partnerships	Upon grant award	Not yet begun		X
Task 2: Labor Compliance Program				
Prevailing Wage Compliance	Prior to construction	Not yet begun		X
Supervise Student Water Monitoring & Training	Upon grant award	Not Yet begun		X
Task 3: Reporting				
Submittal of Quarterly Progress Report	Quarterly after contract execution	Not yet begun		X
Project Completion Report with Supporting Documentation	Project Completion	Not yet begun		x

Row (b) Land Purchase/Easement

No easement acquisitions and/or right-of-ways will be required for the project. Land containing the Northwest Village Chollas Creek project site is owned by JCNI (applicant and primary implementer).

Row (c) Planning/Design/Engineering/Environmental Documentation

Task 4: Assessment and Evaluation

As part of the Northwest Village Creek Restoration Project, JCNI completed the following technical studies in 2012:

- ***Drainage Report for Northwest Village Creek*** – This report was originally prepared by Rick Engineering in 2011 and updated in June 2012. This Drainage Report presents pre-project (existing), interim, and post-project condition hydrologic and hydraulic analyses for the Northwest Village Creek project. This report also includes hydraulic analyses of Chollas Creek from Market Street to Euclid Avenue to determine hydraulic grade line (HGL) and velocity information within the channel restoration area as well as to size required riprap slope protection within the channel.
- ***Water Quality Technical Report for Northwest Village Creek*** – This report was originally prepared by Rick Engineering in 2011 and updated in June 2012. This Water Quality Technical Report summarizes storm water protection requirements for the Northwest Village Creek project. This report describes the permanent storm water Best Management Practices (BMPs) that will be

incorporated into the project in order to mitigate the impacts of pollutants in storm water runoff from the proposed project.

- ***Geotechnical Investigation for Northwest Village Creek*** – This study was prepared by Southern California Soil & Testing in 2012. A total of 7 exploratory test borings were drilled using a truck mounted drill rig equipped with a hollow stem auger. The test borings extended between about 5 feet and 30 feet below the existing grade. Selected samples from the borings were tested to evaluate pertinent soil classification and engineering properties and enable development of geotechnical conclusions and recommendations.

As part of the *Chollas Creek Integration Project – Phase II*, water quality monitoring consisting of pre- and post-project water quality testing will be initiated and documented by San Diego Coastkeeper and Groundworks. Samples will be collected by trained student volunteers (Green Team) and submitted for laboratory analysis and reporting. Groundworks will initiate volunteers training and supervise water monitoring. Note that although the Green Team students are considered 'volunteers,' they are paid a small stipend for participating in the water quality monitoring effort.

Task 5: Final Design

The Northwest Village Creek Restoration project (refer to Figure 3-8-1) will accomplish flood damage reduction and water quality improvement through 1) creek re-alignment, 2) culvert widening/headwall installation, 3) drop structure installation, 4) construction of inlets, and 5) non-native removal/restoration. A series of small retaining walls will be constructed to reinforce the northwest bank, which has experienced significant erosion. Specifically, two 3-foot drop structures (rip-rap) will be developed along the northwest and southwest segments of this creek section to slow the creek flow at these points. Plants removed during construction will be replaced with native riparian species to restore habitat disturbed during this phase.

Project design phases undertaken by JCNI in coordination with the City of San Diego will be completed before September 2013, as this task was originally initiated in 2011 for the Northwest Village Chollas Creek site.

Task 6: Environmental Documentation

As part of the City of San Diego's permitting process, the environmental review concerning CEQA compliance for Northwest Village Chollas Creek will be completed before September 2013. A draft Mitigated Negative Declaration (MND) has been developed by the City of San Diego; the final MND will be certified by May 2013.

The draft MND documents that the proposed Northwest Village Chollas Creek could have a significant environmental effect on air quality, biological resources, cultural and paleontological resources, geology and soils, hazardous materials, noise, transportation, and utilities. However, the draft MND provides adequate mitigation measures to effectively reduce these potential impacts to a less than significant level in accordance with CEQA.

Task 7: Permitting

For the Northwest Village Chollas Creek site, JCNI is in the final stage of obtaining permitting approval from the City of San Diego and will submit to state and federal agencies (listed below) in February 2013 for permitting review and authorization. Because the restoration project will include grading and fill within the creek channel, a Streambed Alteration Agreement from California Fish & Wildlife and a Clean Water Act Section 404 Permit from U.S. Army Corps of Engineers are required.

Northwest Village Creek

Phase Plan

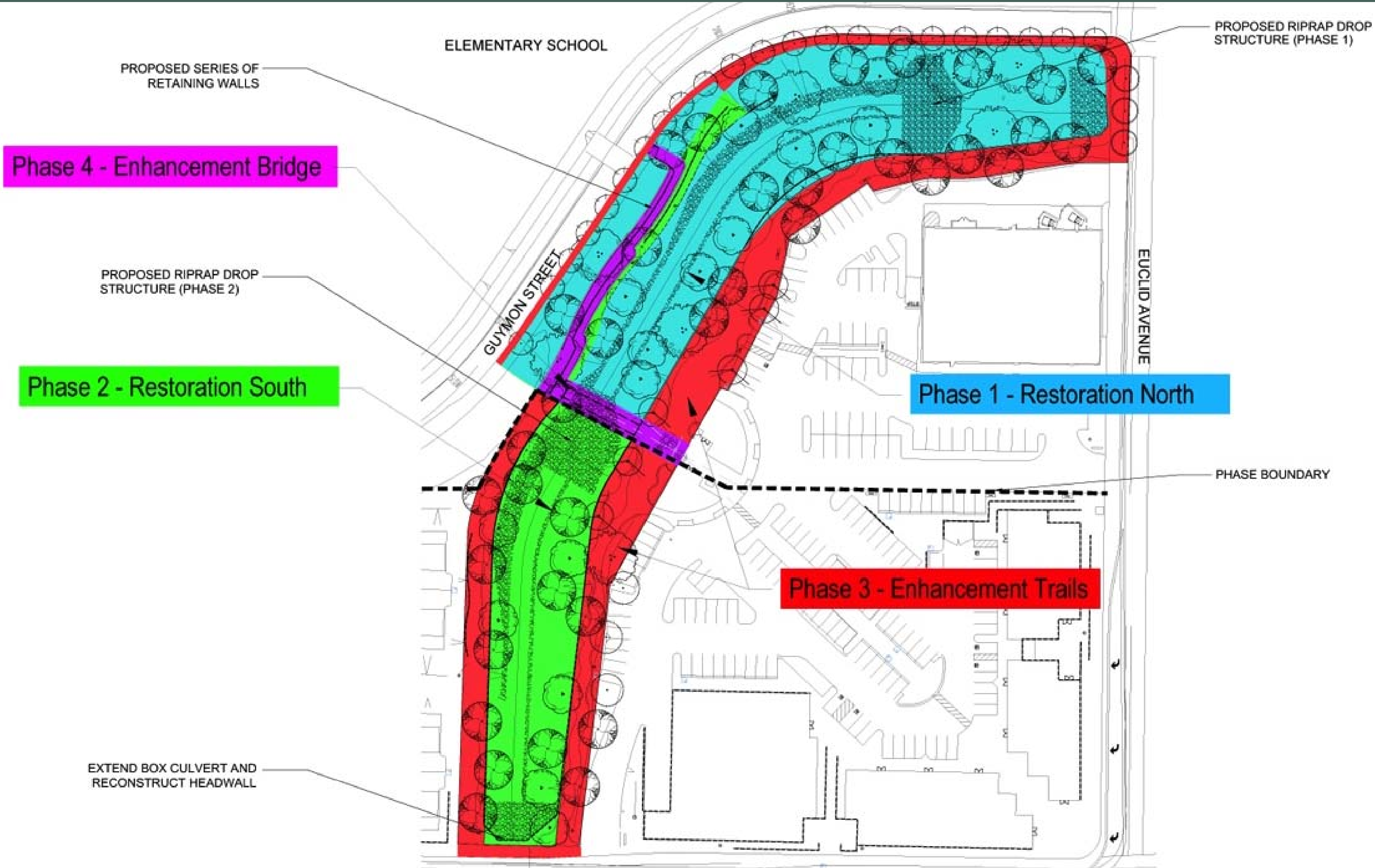


Table 3-36: Row (c) Planning/Design/Engineering/Environmental Documentation
Chollas Creek Integration Project – Phase II

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 4: Assessment and Evaluation				
Drainage Report for Northwest Village Creek	Revisions: March – June 2012	Completed	X	
Water Quality Technical Report for Northwest Village Creek	Revisions: March – June 2012	Completed	X	
Geotechnical Investigation for Northwest Village Creek	December 2011 – January 2012	Completed	X	
Training Students for Monitoring	March - June 2014	Not yet begun		X
Student Water Quality Monitoring Stipends	July 2014 – September 2015	Not yet begun		X
Task 5: Project Design				
100% Design plans for creek construction and habitat restoration	March 2013-June 2013	Not Yet Begun	X	
Task 6: Environmental Documentation				
Mitigated Negative Declaration	June 2012 – May 2013	Draft Completed	X	
Task 7: Permitting				
City of San Diego, Site Development Permit	November 2012 – October 2013	In the process		X
California Fish & Wildlife, Streambed Alteration Agreement	February – October 2013	Permit request underway		X
U.S. Army Corps of Engineers, Section 404 Permit	February – October 2013	Permit request underway		X

Row (d) Construction/Implementation

Task 8: Construction Contracting

JCNI will be responsible for performing construction contracting activities:

- Write, review and approve project specifications
- Prepare bid packages
- Advertise the project bid opportunity and due date for proposals to various targeted and open media sources to assure outreach to disadvantaged and minority/women owned businesses
- Conduct job site meeting to respond to bidders' questions and clarify work scope
- Review competitive bids and select/award qualified contractors

Task 9: Construction/Implementation

Construction will encompass structural improvements to the creek to improve hydraulics, non-native plants removal and replanting with native riparian vegetation with follow-on monitoring, and pre-/post-water quality testing.

Subtask 9.1 Mobilization and Site Preparation:

This task will involve clearing of non-native plants, construction of a fence around the project area, and installation of site erosion control measures.

Subtask 9.2 Project Construction:

This task includes grading and earthwork; installing drop catch basins, storm drains, headwalls, rip-rap segments, irrigation system, and bioswales in the Phase II segment of Northwest Village Chollas Creek; and re-vegetation of targeted areas to prevent soil erosion.

Subtask 9.3 Performance Testing and Demobilization:

This task will involve soils testing, revegetation monitoring/management during establishment, and water quality testing both before and after construction. It will also include installation of project signage and reporting of water quality results to other agencies (e.g., City of San Diego).

Table 3-37: Row (d) Construction/Implementation
Chollas Creek Integration Project – Phase II

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 8: Construction Contracting				
Preparation of Bid Packages, outreach and advertisements, pre-bid meeting, and selection of contractor	October 2013 – February 2014	Not yet begun		X
Task 9: Construction				
Subtask 9.1 Mobilization and Site Preparation				
Clearing and grading, including habitat protection and erosion control	March - May 2014	Not yet begun		X
Subtask 9.2 Project Construction				
Construction of storm drain, catch basins, inlets, rip rap, and bioswales	June 2014 – February 2015	Not yet begun		X
Revegetation	March - May 2015	Not yet begun		X
Subtask 9.3 Performance Testing and Demobilization				
Monitoring and management of revegetation areas, including soils testing	June 2015 – May 2016	Not Yet begun		X
Pre- and Post-Construction Water Quality Reports, including reporting to other agencies	March 2014 – September 2015	Not Yet begun		X

Row (e) Environmental Compliance/Mitigation/Enhancement

Task 10: Environmental Compliance/Mitigation/Enhancement

CEQA compliance will be obtained in mid-2013, as described in Task 6 above. No additional environmental compliance or mitigation is anticipated.

Row (f) Construction Administration

Task 11: Construction Administration

Administration/Management of construction field work will be performed by JCNI for the overall project, with responsibility for oversight of subcontractors/partners, including water quality monitoring.

Student volunteers' recruitment, training and deployment will be managed by Groundworks (cooperating partner) and San Diego Coastkeeper in Task 4 above.

Table 3-38: Row (f) Construction Administration
Chollas Creek Integration Project – Phase II

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 11: Construction Contracting				
Management of Construction Contractors	March 2014 – June 2015	Not Yet begun		X

Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

I. Introduction

Project Sponsor

The County of San Diego is the sponsor for *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II*.

Project Need

The Santa Margarita River (SMR) Watershed provides the greatest remaining expanse of largely undisturbed riparian corridor in coastal southern California. The lower 27 miles of the watershed, comprised of the main river channel and its estuary, is dominated by federal and state land ownership. Consequently, this watershed serves as valuable habitat, providing a home for 1,000 known species, including seven federal or state listed endangered or threatened species, and more than 60 other species listed by the state and other groups as having special concern. Of increasing concern, however, is that the lower watershed is vulnerable to impacts accompanying development and large-scale land use changes upstream. The upper watershed, drained by Temecula and Murrieta Creeks, includes some of the fastest urbanizing areas in the state. This development pressure increases the potential for additional point and nonpoint pollutant loading to the SMR Watershed.

Nitrogen and phosphorous loading from the SMR Watershed can result in low dissolved oxygen (DO) and increased algal blooms in the estuary and stream segments, several of which have been 303(d)-listed for nitrogen, phosphorus, or eutrophication. California's *2010 Integrated Report (Clean Water Act Section 303(d) / 305(b) Report)*[16] lists the following segments of SMR as impaired for nutrients:

- The SMR Estuary (28 acres) is listed as impaired by eutrophication.
- The Upper SMR (18 miles) from its start at the confluence of Temecula and Murrieta Creeks down to De Luz Creek is listed as impaired by phosphorus.
- The Lower SMR (19 miles) from De Luz Creek to the Estuary is listed as impaired by phosphorus and total nitrogen as N.

A nutrient TMDL for Rainbow Creek, a tributary of the SMR, was completed and adopted on February 9, 2005[17] to address elevated nutrient concentrations that have caused excessive algal growth in portions of the creek.

Addressing nutrient loading, low DO, and algal blooms requires use of appropriate water quality objectives (WQOs) based on the level of nutrients a waterbody can sustainably assimilate. This level varies greatly due to site-specific factors such as hydrology, shading, and temperature, which modulate biological response to nutrients. Current N and P WQOs in the *Water Quality Control Plan for the San Diego Basin*[18] are problematic, in part, because they do not consider site-specific factors. The NNE framework, an alternative regulatory approach advocated by the State Water Resources Control Board (SWRCB) staff and U.S. Environmental Protection Agency (USEPA), is currently under development. The *Implementing Nutrient Management in the Santa Margarita River Watershed - Phase II* project will provide data and modeling results that can be used to address data gaps inherent in the NNE framework. The project will result in proposed nutrient water quality goals for the SMR River and selected tributaries that are protective of beneficial uses and can support efforts directed at refining nutrient WQOs for the watershed.

Depending upon the results of the studies, it is possible that a broader range of discharges to the SMR River may be naturally sustained, such as recycled water, if the nutrient levels are protective of the beneficial uses.

[16] SWRCB, 2010, http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
[17] SDRWQCB, 2009, http://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/rainbowcreek.shtml
[18] SDRWQCB, 1994, http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/

Project Purpose

The *Implementing Nutrient Management in the Santa Margarita River Watershed* project aims to establish nutrient water quality goals for the SMR Estuary (Phase I) and to provide additional site-specific studies and propose nutrient water quality goals in the SMR River (Phase II) that may lead to development of nutrient site-specific objectives (SSOs) by the SDRWQCB in the main stem of the river that are protective of beneficial uses.

Project Abstract

Nitrogen and phosphorous loading from the SMR Watershed can result in low DO and increased algal blooms in the estuary and stream segments, several of which have been 303(d)-listed for nitrogen, phosphorus, or eutrophication. Total Maximum Daily Loads (TMDLs) are not currently in place in most of the SMR Watershed segments which are listed for nutrient impairment. However, TMDLs are likely to be instituted in the near future. As there is little scientific knowledge about the appropriate level of nutrients that the SMR can sustainably assimilate, the TMDLs would be based on a generalized approach if no actions are taken.

This project aims to establish the science and seek stakeholder consensus to develop nutrient water quality goals that are protective of beneficial uses and could be employed in the development of alternative nutrient water quality objectives (WQOs) for the SMR Watershed in response to the *Water Quality Control Plan for the San Diego Basin* (Basin Plan) Triennial Update. This is the second phase of work, which consists of continued stakeholder facilitation and continued monitoring, modeling, and data analyses to determine nutrient water quality goals. The project leverages an investment of over $2 million in data collection and other resources contributed by watershed stakeholders and partners. The project aims to:

(1) Maximize community involvement in the SMR watershed through ongoing stakeholder group facilitation (established in Phase I)
(2) Continue work with the group to obtain feedback and critical review of technical work products to achieve consensus on the nutrient water quality goals
(3) Continue core monitoring and special studies to address data gaps required to develop the nutrient water quality goals for the river
(4) Further refine proposed nutrient water quality goals developed as part of Phase I for the SMR Estuary, if deemed necessary by the Stakeholder Group
(5) Develop nutrient water quality goals for the SMR River as needed based on the Nutrient Numeric Endpoints (NNE) approach and local data that are protective of beneficial uses

The project benefits the SMR watershed and the region by providing scientifically–based nutrient water quality goals that will ultimately conserve water and control eutrophication. Stakeholders believe that since the estuary through which the SMR flows is open to the ocean during the winter (the wet season), nutrients in the river only have a short residence time before they enter the ocean. This effort will counteract hydromodifications and lead to improved protection and restoration of habitat and open space, optimize water-based recreational opportunities, and enhance the maintenance of water resources. Within the region, the project will further the technical foundation of water management by demonstrating a science-based approach to establishing nutrient water quality goals that can be developed jointly with the regulatory agencies. If warranted by the results, the scientific studies will provide the underpinnings necessary to support Nutrient Site-Specific Objectives (SSOs) that require a Basin Plan amendment. This effort will serve as a template for similar efforts within the region.

Project Partners

The County of San Diego, in partnership with the Riverside County Flood Control and Water Conservation District (RCFCWCD), is the project sponsor in this joint project between the San Diego IRWM Region and the Upper Santa Margarita Watershed (USMW) IRWM Region, as partners in the Tri-County Funding Area Coordinating Committee (Tri-County FACC).

Project partners include: the Counties of San Diego and Riverside; the Cities of Temecula, Murrieta, Wildomar, and Menifee; Riverside County Flood Control and Water Conservation District (RCFCWCD); Rancho California Water District (RCWD); US Marine Corps (USMC) Camp Pendleton; U.S. Bureau of Reclamation; San Diego Regional Water Quality Control Board (SDRWQCB); Caltrans; Fallbrook Public Utilities District; Southern California Coastal Water Research Project (SCCWRP); Mission Resources Conservation District; San Diego County Farm Bureau, Sierra Club, Elsinore Murrieta Anza Resource Conservation District (EMARCD); and Trout Unlimited.

Project Timing and Phasing

This project is a portion or phase of a larger multi-phased project. The project consists of three phases described below and summarized in Table 3-39:

(1) During Phase I (funded through Proposition 84–Round 1 and currently in progress), the SMR watershed stakeholder group was formed to facilitate discussions, guide project activities, review technical work products, and achieve consensus. As part of Phase I, technical support was provided for the selection of numeric targets, stakeholder consensus, and completion of a Nutrient Water Quality Goals Report for the SMR Estuary that could potentially be used by the San Diego RWQCB in the development of nutrient WQOs for the SMR Estuary (estuarine modeling work is being paid for by USMC Camp Pendleton). The group has identified key study questions, outlined the conceptual approach, evaluated existing data, identified data gaps, and determined specific technical activities and information required. Based on this, the group has developed a Project Monitoring Plan and will provide a Monitoring and Special Studies Report. Data collected during Phase I is being used to further refine study designs to be implemented in Phases II and III.

(2) Phase II (the phase currently proposed for funding) will involve conducting riverine monitoring and special studies to address data gaps identified by stakeholders and will develop nutrient water quality goals for the SMR River and selected tributaries based on the NNE approach using local data. If additional data gaps for the SMR Estuary are identified by the stakeholder group, then these data gaps may also be addressed by conducting special studies as a part of Phase II. Phase II of the project can operate on a standalone basis because the collected data and information generated from modeling efforts during Phase II can be used alone or in combination with any existing data (collected during Phase I and from other studies) to aid in the development of nutrient water quality goals for the SMR Watershed that are protective of beneficial uses.

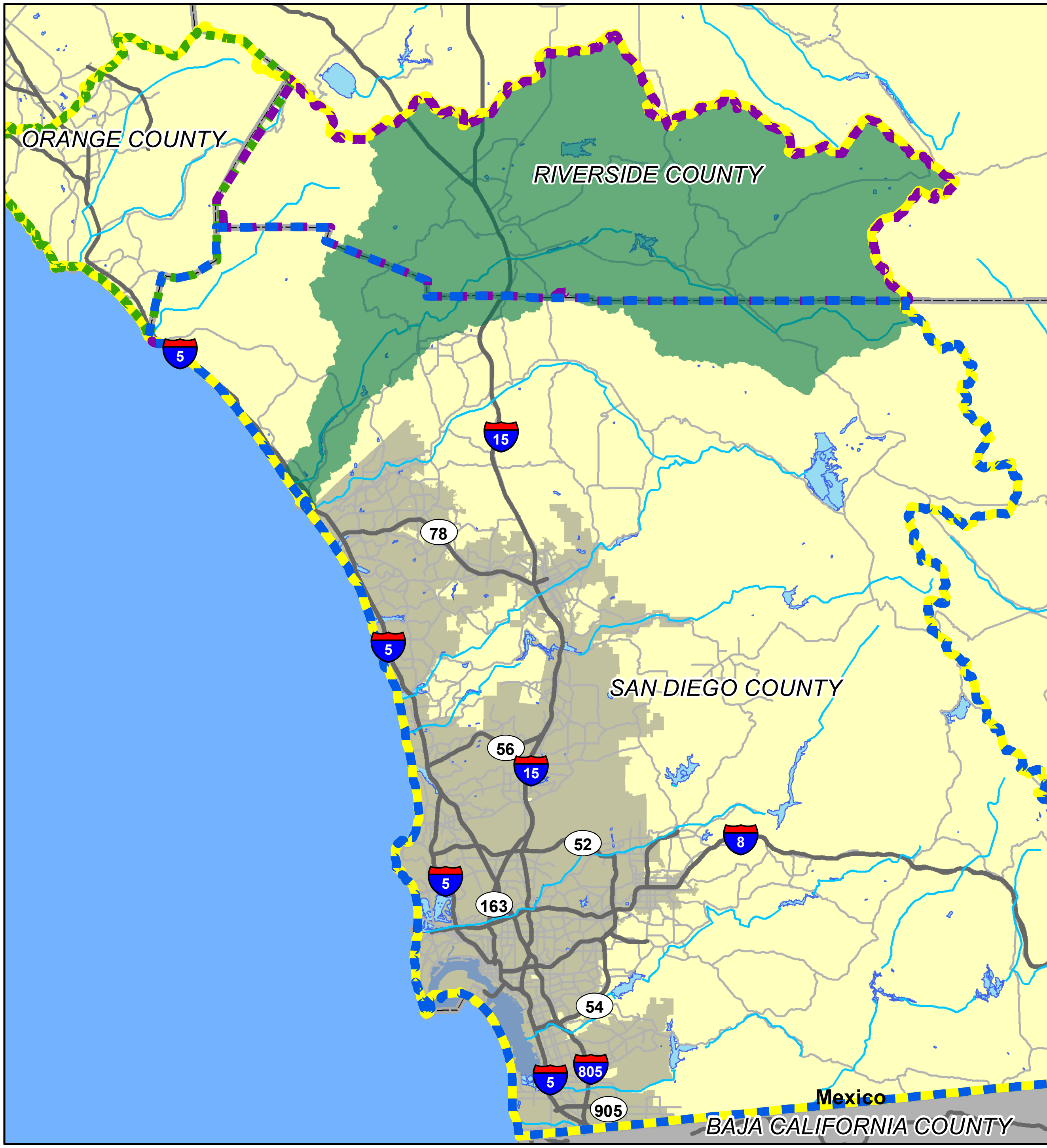
(3) Phase III, which is a project which will be pursued in the future and is not included as part of this project, will consist of monitoring and special studies to address data gaps identified by the stakeholders. It is anticipated that additional tributaries will be monitored and further modeling studies conducted to further refine nutrient water quality goals in these tributaries, as needed. Additionally, work will be conducted to support the implementation of nutrient management activities in the watershed where warranted.

Table 3-39: Phased Activities for *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II*

Activity	Phase I			Phase II			Phase III		
Form and Facilitate SMR Stakeholder Advisory Group	✓	✓	✓	✓	✓	✓	✓	✓	✓
Develop and Submit Project Monitoring Plan	✓			✓			✓		
Conduct Field and Special Studies	✓	✓	✓	✓	✓	✓	✓	✓	✓
Submit Monitoring and Special Studies Report			✓			✓			✓
Develop Nutrient Water Quality Goals for the SMR Estuary	✓	✓	✓	✓[1]	✓[1]	✓[1]			
Develop Nutrient Water Quality Goals for the Lower SMR				✓	✓	✓	✓[1]	✓[1]	✓[1]
Conduct Work to Support the Implementation of Nutrient Management Activities in the SMR Watershed							✓	✓	✓
Develop Nutrient Water Quality Goals for Selected Tributaries and the Upper SMR							✓	✓	✓

1. If the stakeholder group identifies data gaps or requests further refinement of nutrient water quality goals

San Diego IRWM SMR Project Area



Legend

- Santa Margarita Watershed
- Funding Area and Tri-County FACC Boundary
- San Diego IRWM Region
- Upper Santa Margarita Region
- South Orange County Region
- Freeway
- City Boundaries
- County Boundaries

N

0 5 10 20

Miles

Project Map

Figure 3-9 is a site map showing the project's geographical location and surrounding work boundaries.

Project Objectives

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II seeks to achieve the following objectives:

- Continue to facilitate the SMR watershed stakeholder group that will provide feedback, critical review of technical work products, and achieve consensus on the proposed nutrient water quality goals
- Conduct monitoring and/or special studies to address gaps in data required to develop the nutrient water quality goals for the SMR River
- Develop proposed nutrient water quality goals or nutrient numeric targets for the SMR River that are protective of beneficial uses based on the NNE approach and local data
- Encourage the implementation of BMPs to reduce nutrient runoff from wet and dry weather sources by proposing nutrient water quality goals in the SMR watershed that are protective of the beneficial uses

The table below provides an overview of the San Diego IRWM Plan objectives that are expected to be directly (●) achieved through implementation of this project.

Table3-40: Contribution to IRWM Plan Objectives

Proposal Projects	Contribution to IRWM Plan Objectives										
	A	B	C	D	E	F	G	H	I	J	K
Implementing Nutrient Management in the SMR River Watershed – Phase II	●	●	●	●							

● = directly related

This project contributes to the IRWM Plan objectives in the following ways:

Objective A: Integrated solutions to address water management issues and conflicts: This project meets the Partnerships, Beneficial Uses, and Geography definitions of integration used by the San Diego IRWM Program, as described above.

Objective B: Maximize stakeholder and community involvement and stewardship. Stakeholder involvement is central to the goals of this project. The effort would maximize stakeholder involvement in all aspects of the project, fostering a sense of stewardship and consensus to further watershed management goals. The stakeholder group will continue to guide project objectives, identify data gaps, review technical outcomes, and recommend nutrient water quality goals for the SMR River that are protective of beneficial uses and that include protecting current habitats.

Objective C: Effectively obtain, manage, and assess water resources data and information. The project will utilize and expand the existing watershed-wide hydrology and water quality database, leveraged from existing partnerships, to further obtain, manage, and assess water resource data and information.

Objective D: Further the scientific and technical foundation of water management. Consistent with RWQCB Basin Plan Triennial Review priorities to evaluate surface water nutrient WQOs (tier 1 priority) and consider seasonal variation of WQOs (tier 2 priority), this project will scientifically support the development of proposed numeric targets for the SMR River using new and existing water quality data. This work is the logical next step to the work conducted under Phase I. Once established, the proposed numeric targets can be used to support development of SSOs, Total Maximum Daily Loads (TMDLs), or other acceptable alternate approaches to compliance for the SMR Estuary and Watershed. Furthermore, the project will demonstrate an innovative approach to establishing nutrient water quality goals that are protective of beneficial uses by employing open source models, publishing results in peer-reviewed scientific literature, and making presentations to stakeholders, thus improving the technical foundation of water management.

Project Integration

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II has synergies or linkages with a number of other policy, planning, or implementation activities within the San Diego and USMW IRWM regions:

- SMR River conjunctive use project (received Prop 50 funding through San Diego IRWM)
- San Diego Lagoon TMDL Project (received Prop 50 funding through SCCWRP);
- Technical Support for Estuarine Nutrient Numeric Endpoint (SWRCB funded project to SCCWRP)
- Water Augmentation Study (proposed by U.S. Bureau of Reclamation for USMW IRWM funding);
- Murrieta Creek Phase II (proposed by RCFCWCD for USMW IRWM funding)
- Murrieta Creek Phases III and IV (proposed by RCFCWCD for USMW IRWM funding)
- San Mateo Creek Fish Habitat Restoration (proposed by EMARCD partnered with Trout Unlimited for USMW IRWM funding)
- Reclaim and Recycled Anza Farming Irrigation Runoff Water and Other Nearby Contaminated Water (proposed by Anza/Aguanga DAC Group for USMW IRWM funding)
- Agricultural Waiver Project (proposed by RCWD for USMW IRWM funding)
- Sustainable Agriculture (proposed by RCWD for USMW IRWM funding)
- River Salt and Nutrient Groundwater Management Plan (received Prop 84 funding)
- Implementation of Wildomar Master Drainage Plan (proposed by RCFCWCD for USMW IRWM funding)
- Retrofit Public Property with Water Quality Measures (proposed by RCFCWCD for USMW IRWM funding)
- Stream Restoration (SMR Watershed) for Steelhead Trout (proposed by Trout Unlimited for USMW IRWM funding)
- Agricultural Lands Stewardship (proposed by EMARCD for USMW IRWM funding)

Efforts contributed by watershed stakeholders and other partners since 2007 include:

1. Previous and ongoing monitoring by United States Marine Corps (USMC) Camp Pendleton in the lower SMR River and the SMR Estuary,
2. Development of an SMR Estuary Model by Camp Pendleton,
3. Development of the Salt and Nutrient Management Plans by USMC Camp Pendleton, Fallbrook Public Utility District, and Rancho California Water District for underlying groundwater basins,
4. SMR Estuary data collected by MS4 Co-Permittees in response to the SDRWQCB Lagoon Monitoring Order (and Bight '08 Eutrophication Assessment),
5. Watershed modeling support from USEPA Region 9 overseen by the SDRWQCB to aid in the development of estuarine NNEs, and
6. Stakeholder meetings and field studies supported by Phase I.

It will also leverage the existing regional stream bioassessment dataset collected by the Southern California Monitoring Coalition (SMC) Regional Stream Assessment Program (of which Riverside and San Diego Counties are members).

Completed Work

A substantial amount of work has been completed or is expected to be completed prior to the grant award date for *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II.* The following reports provide hydrology, field measurements, and analytical laboratory data for the SMR Estuary. Please note that in accordance with guidance from DWR found on Page 11 of the Proposal Solicitation Package, the documents referenced in this section have been provided in an electronic format only (on the supporting CD), and are not included within the printed hard copies that have been mailed to DWR:

- CDM Federal Programs Corporation. June 2009. Santa Margarita River Lagoon Monitoring Project: Data Usability and Assessment Review, Field Measured Data.
- CDM Federal Programs Corporation. June 2009. Santa Margarita River Lagoon Monitoring Project: Data Usability and Assessment Review, Laboratory Data.

- U.S. Navy Environmental Sciences Branch of the Space and Naval Warfare Systems Center Pacific (SSC-PAC). 2012. Santa Margarita Lagoon Water Quality Monitoring Data.

Water quality, bioassessment, and hydrology data collected in the lower SMR River are available from:

- U.S. Bureau of Reclamation (USBR). 2010. Hydrological and Biological Support to Lower Santa Margarita River Watershed Monitoring Program Water Years 2008-2009.

II. Project Work

(GA) Grant Administration

The San Diego County Water Authority will be responsible for administration and processing of the Proposition 84-Round 2 Implementation Grant contract, including tasks associated with compiling and submitting project invoices, quarterly reports, and completion reports for DWR. All data submitted by project partners as described in Attachment 6 will be compiled by the grant administrator for the San Diego IRWM data management system to be made publicly available. The San Diego IRWM Region will contribute $29,400 (or 3% of this grant request) for grant administration relevant to *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II*.

Row (a) Direct Project Administration

Task 1: Project Administration

This task will involve administering the grant contract, tracking budgets, preparing invoices and quarterly reports, preparing project assessment and evaluation plans (PAEPs), and preparing final reports as required by DWR for IRWM contracting purposes. It is assumed that this work will be completed in-house by a Land Use Environmental Planner III from the County of San Diego. Funds for County of San Diego staff will come from the County of San Diego's General Fund. In addition, all of the data to be collected as described in Attachment 6 will be submitted to the Water Authority's grant administrator to be submitted to DWR, compiled in the San Diego IRWM Program's Data Management System, and made publicly available.

Task 2: Labor Compliance Program

This project will not involve construction activities or any other activities that would necessitate a Labor Compliance Program.

Task 3: Reporting

Reporting for *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* has been included in Task 1: Project Administration.

Table 3-41: Row (a) Direct Project Administration
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 1: Project Administration				
Track budgets, prepare invoices, compile backup documentation, and prepare quarterly reports	Quarterly after contract execution	Not yet begun		X
Prepare and administer PAEP	After contract execution	Not yet begun		X
Prepare project completion report	At conclusion of project	Not yet begun		X

Row (b) Land Purchase/Easement

No easement acquisitions and/or right-of-ways will be required for project.

Row (c) Planning/Design/Engineering/Environmental Documentation

Task 4: Assessment and Evaluation

The following assessments and/or evaluations will be completed as part of this project:

Subtask 4.1: Continue to Facilitate Stakeholder Advisory Group

The stakeholder group will continue to guide project activities and reviews and provide feedback on technical and policy elements of the project. Stakeholders will identify key questions and a conceptual approach, and determine specific technical activities and information required to carry out that approach. The group will continue to evaluate existing data and identify any current data gaps. It is anticipated that the Stakeholder Group or subgroups will meet 15 times during the grant period of four years.

The group will develop a monitoring program to support the development of nutrient water quality goals in the SMR River and in several tributaries, such as the Murrieta and Temecula Creeks, and any follow up work for the estuary necessary to meet project objectives. The resulting deliverable will be *The Project Monitoring Plan – Phase II,* which will describe the core monitoring and special studies to be undertaken to achieve project objectives.

Data collected during the Stakeholder Advisory Group facilitation process will include technical evaluations and feedback from the stakeholders that will be used to identify data gaps. In addition, stakeholders will provide input on the modeling effort to develop nutrient water quality goals for SMR Watershed that are protective of beneficial uses.

This task includes funding for a facilitator, a scientist from SCCWRP and a staff member from the SDRWQCB to attend 15 six-hour combined Stakeholder Advisory Group/Technical or other advisory group meeting, scheduled approximately bimonthly initially and then as needed from contract execution date through August 31, 2017 (15 meetings). The purpose of the meetings will be to take input from the stakeholders regarding the project and provide updates, grant reports, and other information to stakeholders.

Subtask 4.2: Conduct Field and Special Studies

This task will be completed by May 1, 2017. The studies conducted for this task will address site-specific factors controlling algal response. Core monitoring will include approximately 20 sites sampled 2-5 times per year for two years, depending on flow duration. Data generated will include algal bioassessment, water quality data, and site-specific physical and hydrological data. Monitoring and special studies will address data gaps identified by the stakeholder group (as part of Subtask 4.1) necessary to achieve project objectives. The studies may include hydrology measurements as well as water quality sampling. Elements of the SWAMP *Standard Operating Procedures for Collecting Stream Algae Samples and Associated Physical Habitat and Chemical Data for Ambient Bioassessments in California* (May 2010) protocol will be followed (including water chemistry, algal biomass, cover, biovolume, and PHAB protocols).

The special studies may include 1) wet weather studies to evaluate potential impacts to beneficial uses during wet weather, 2) a characterization of the “natural background” conditions of nutrient concentrations and algal growth that will provide information needed to select appropriate algal thresholds and to determine “background” indicator variability (the margin of error), 3) characterization of important nutrient sinks (e.g., denitrification), sources (e.g., groundwater), and rates of nutrient transformation processes, 4) assessment of groundwater exchange with surface waters, 5) investigation of effects of river channel bottom type on rates of algal accrual, and 6) long-term monitoring of algal biomass and dissolved oxygen in the estuary. The specific studies will be prioritized during work plan development with stakeholders.

The resulting deliverable on June 1, 2017 will be *The Monitoring and Special Studies Report* which will provide a synthesis of baseline conditions in the River and a summary of findings of each of the special studies.

Subtask 4.3: Develop Nutrient Water Quality Goals for Santa Margarita River

The monitoring and special studies data collected under subtask 4.2 will be used to conduct riverine modeling. Models will be calibrated and validated, then used to identify, in concert with stakeholders, nutrient water quality goals required to protect riverine and downstream (i.e. estuarine) beneficial uses. The approach for developing nutrient water quality goals for the SMR River leverages two major activities:

1) field data collection in the watershed to characterize stream reaches using the NNE process, and
2) ongoing research and dynamic modeling to develop the freshwater NNE framework, based on algal biomass as an endpoint.

From November 2007 to September 2009, Stetson Engineers, Inc. conducted monitoring throughout the lower portion of the SMR River watershed. As part of this monitoring program, samples were taken at various monitoring locations and analyzed for nutrients. Although this monitoring program did capture some wet weather conditions, capturing wet weather conditions was not the intent of the study, and the majority of the wet season sampling was conducted during dry weather conditions. The report *Hydrological and Biological Support to Lower Santa Margarita River Watershed Monitoring Program Water Years 2008 – 2009* (Stetson Report) details the results of this monitoring program for nutrients in the lower SMR River. The waterbodies were also evaluated for the presence and duration of flow in the various watershed tributaries.

Estuarine modeling work is being paid for by USMC Camp Pendleton and a watershed model is being developed using USEPA funds by the SDRWQCB's contractor, and will be used to develop the nutrient water quality goals for the estuary that will in turn be used in developing the riverine water quality goals. SCCWRP, under a grant with USEPA, is in the process of evaluating the freshwater NNE spreadsheet developed by Tetra-Tech that will further inform and be compared to the dynamic hydrodynamic model developed for this task.

Additional core monitoring to fill data gaps identified by stakeholders is conducted as a portion of the field studies for the *Implementing Nutrient Management in the Santa Margarita River Watershed-Phase 1.* These data will be included in the hydrodynamic model to simulate watershed conditions during dry weather in the lower SMR River.

This project will build on these existing efforts and use monitoring and special studies data collected under Task 4.2 to conduct riverine modeling. Models will be calibrated and validated, then used to identify, in concert with stakeholders, nutrient water quality goals required to protect riverine and downstream (i.e. estuarine) beneficial uses. Project funds will support technical support for selection of numeric targets, stakeholder coordination, and funding for the Regional Board staff to attend meetings.

The resulting deliverable will be *Technical Studies Supporting Proposed Nutrient Water Quality Goals for Santa Margarita River Report.* This report will provide a summary of findings from the modeling work to derive nutrient water quality goals for the SMR River.

Task 5: Project Design

No design deliverables are included as part of this work plan.

Task 6: Environmental Documentation

This project qualifies as a planning study according to Section 15262 of the California Environmental Quality Act (CEQA) Guidelines, because it will identify programs and projects for possible future actions but does not have a legally binding effect on the participating agencies. As such, this project was issued a CEQA Categorical Exemption in October 2012. This project does not require NEPA-related analysis.

Task 7: Permitting

This project will not involve construction and was issued a CEQA Categorical Exemption. Therefore, permitting is not applicable to this project.

Table 3-42: Row (c) Planning/Design/Engineering/Environmental Documentation
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Activity or Deliverable	Schedule	Status	Completion of Task	
			Before Sept 2013	After Sept 2013
Task 4: Assessment and Evaluation				
Subtask 4A: Continue to Facilitate Stakeholder Advisory Group				
Continue to Facilitate Stakeholder Advisory Group	March 2013 – August 2017	In Progress	X	X
County of San Diego Support of Stakeholder Meetings	March 2013 – August 2017	In Progress	X	X
Subtask 4B: Conduct Field and Special Studies				
Monitoring and Special Studies Report Phase II	September 2013 - June 2017	Not Started		X
Hydrological and Biological Support to Lower Santa Margarita River Watershed Monitoring Program - Years 2008 – 2009	June – December 2010	Completed	X	
Subtask 4C: Develop Nutrient Water Quality Goals for SMR				
Technical Studies Supporting Proposed Nutrient Water Quality Goals for Santa Margarita River Report	January - June 2017	Not Started		X
USEPA Grant – SCCWRP NNE Spreadsheet Evaluation (match)	January 2013 - June 2014	In Progress	X	X
USMC Camp Pendleton Lagoon Modeling (match)	January 2013 - March 2014	In Progress	X	X

Row (d) Construction/Implementation

Task 8: Construction Contracting

This project will not require construction contracting.

Task 9: Construction

This project will not involve construction activities.

Row (e) Environmental Compliance/Mitigation/Enhancement

Task 10: Environmental Compliance/Mitigation/Enhancement

This project was issued a CEQA Categorical Exemption, which renders it compliant with CEQA. All tasks carried out for this project (studies) will be conducted in a manner that ensures environmental compliance with all other environmental statutes.

Row (f) Construction Administration

Task 11: Construction Administration

This project will not involve construction administration.

Appendix 3-1: Interregional Project Letter of Support

This appendix contains a letter of support from the San Diego County Water Authority on behalf of the San Diego RWMG. This letter states the nature of the relationship between the San Diego RWMG and Upper Santa Margarita RWMG, as well as how funds will be applied for and divided between the two RWMGs working on *Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II*.

SAN DIEGO
Integrated Regional
Water Management

March 25, 2013

California Department of Water Resources
IRWM Grant Program

Re: Administration of Proposition 84, Round 2, Grant Funding for Project "Implementing Nutrient Management in the Santa Margarita River – Phase II"

To whom it may concern:

The "Implementing Nutrient Management in the Santa Margarita River, Phase II" is an interregional project of both the San Diego Regional Water Management Group (RWMG) and the Upper Santa Margarita RWMG. The project will substantially benefit both regions by developing scientifically based water quality goals for the Santa Margarita River that will lead to more effective water management.

Since the project benefits accrue to both regions, the project is proposed and discussed throughout the Proposition 84, Round 2, IRWM Implementation Grant applications developed by both planning regions. However, to simplify project administration, the two regions have agreed to administer the project under the San Diego RWMG. As such, the project budget and grant request detail is included only in the San Diego RWMG application.

As you may be aware, the San Diego Funding Area maintains an agreement among the RWMGs within the funding area to equitably allocate the funding area's Proposition 84 funds. Consequently, the San Diego RWMG and Upper Santa Margarita RWMG are committed to this interregional project through the provision of matching funds and grant share funds. The total project cost is approximately $1.51 million. Of this amount, the Upper Santa Margarita RWMG has committed $181,875 from the grant funds allocated to it through the agreement mentioned above and $62,500 in matching funds.

Please contact me if you have any questions at 858-522-6735 or mstadler@sdcwa.org.

Sincerely,

Mark Stadler
San Diego County Water Authority
San Diego IRWM Program Manager

cc: Denise Landstedt, Rancho California Water District
Marilyn Thoms, County of Orange
Cathy Pieroni, City of San Diego
Sheri McPherson, County of Orange
Eduardo Pech, DWR Southern Region Office

Appendix 3-2:
Supporting Documentation for Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program

Included in this Appendix are the following documents in support of Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program. Please note that more information is available on the Water Authority's website (http://turfreplacement.watersmartsd.org/) and the City's website (http://www.sandiego.gov/water/conservation/residentialoutdoor/index.shtml), and that some of the documents in this appendix are only a sampling for the information available on these websites.

1. *Customer guidelines and requirements for participation*
2. *Internal protocols for administering the programs*.
3. *Customer on-line training program and customer resource lists*.
4. *Marketing material and related collateral*.
5. *Application forms*.

Supporting documents for other projects in this proposal are provided in electronic format on the accompanying CD, in accordance with guidance from DWR found on Page 11 of the Proposal Solicitation Package.

City of San Diego Public Utilities
COMMERCIAL-MULTI FAMILY OUTDOOR WATER CONSERVATION REBATE PROGRAM

Sustainable Landscape-Turf Replacement Rebate Guidelines

Rebate--$1.50/SF (up to 6,000 SF & $9,000)

Reduce outdoor water use, keep landscapes attractive and healthy and save money on the water bill by replacing thirsty turfgrass with a sustainable and water wise ornamental landscape. City of San Diego Public Utilities Department commercial and multifamily (greater than four units) customers can receive a rebate for replacing turfgrass with sustainable and water wise landscape. Customers using recycled water for irrigation are currently not eligible to apply for this rebate. Funding for a limited number of rebates is available through a State of California grant and will be distributed on a first come, first served basis until exhausted. This program is subject to change without prior notification. Read below for program requirements and application process. Rebate check will be sent to the customer of record 6-8 weeks after application and post-installation site visit are successfully completed. If you have questions after reading these guidelines, please call 619-533-4126 or e-mail waterconservationrebates@sandiego.gov.

Applicant's water account must be in good standing and program requirements must be met to be eligible for rebates. Customer must agree to and sign the application agreement before rebate is administered. Changes made related to rebate program must comply with all laws, codes, policies, covenants, conditions, and restrictions applicable to property. Please consult with a tax advisor for questions about potential tax implications associated with rebates.

Rebate Process

1. Get an application... Go to the City's Water Conservation Website to download the Commercial Outdoor Rebate Program Application. Submit application to Water Conservation Program.

2. Get a survey and pre-site inspection and approval to begin project... After the application is received you will be contacted to schedule a free water conservation survey and pre-site inspection. A Water Conservation representative will evaluate the proposed project area and if qualifications are met you will be given a project start date, at which time the120 day conversion period begins.

3. Submit plans within 45 days .... Scaled design plans are due to the Water Conservation Program within 45 days of the start date. See below for more information on plan submittals.

4. Complete the project and schedule a post-installation visit within 120 days... Call 619-570-1999 to schedule a post-installation site visit once project is complete. Project must be completed and a site visit requested before the 120 day conversion period is over. A Water Conservation representative will verify square footage and that program requirements are met. At this visit please provide representative with original itemized sales receipts which must include vendor and/or company name, contractor license # (if applicable), purchase date, itemized list of products purchased. Note: As of July 1, 2012 labor is not a reimbursable item

5. Receive a rebate... Once application is deemed complete and post-installation site visit is successfully completed please allow 6-8 weeks for the rebate to arrive in the mail.

Program Requirements

- Receive $1.50/SF (up to 6,000 SF) after replacing existing high water using turfgrass with water wise ornamental landscape (using plants that are considered to be moderate, low, or very low in water use requirements). Minimum project conversion area is 1000 SF.
- Existing turf in project area must be living and an in-ground irrigation system must be operational at the time of the pre-site inspection. At maturity, plant density of the converted area must cover at least 50% of the project area. Tree canopy coverage (existing and new trees) will not be counted in the 50% plant coverage calculation.
- Project must replace high water use turf with plants that have moderate, low, or very-low watering requirements as defined in the 2010 Edition UC Davis Arboretum All-Stars brochure, the Water Use Classification of Landscape Species Reference (WUCOLS) or other accepted reference of plant water use).
- A scaled design plan must be completed by a landscape designer, landscape architect, certified landscape irrigation auditor or landscape contractor, and must include:
  - ✓ A legend with plant names (common and scientific) and plant symbols, or plant symbols identified by callouts on the plan.
  - ✓ Planting plan with symbols drawn to scale to represent 75% of mature size
  - ✓ Mulch type and permeable hardscape details
  - ✓ Estimated Total Water Use (ETWU) (See bottom of page 3)
  - ✓ Maximum Applied Watering Allowance (MAWA) – Max. 70% of ET (See bottom of page 3)
  - ✓ Irrigation plan with hydrozones and head, in-line tubing or multli-outlet emitter placement and equipment list (if no irrigation is planned – show hydrozones only)
  - ✓ North arrow and scale
  - ✓ Plant list (may be a separate sheet) must include number of plants, size (in square feet) at maturity and WUCOLS page reference (or other accepted reference of plant water use page reference).
    (See worksheet: http://www.sandiego.gov/water/pdf/conservation/turfreplacementlist.pdf)

- Converted areas must be permeable to air and water (hardscapes must be permeable - ie. gravel, loose flagstone, decomposed granite). Permeable weed barriers are required under hardscapes.
- If project will be irrigated, conversion of existing overhead spray irrigation system to micro-irrigation or low application rate rotating nozzles is highly recommended. The newly converted area must be on a separate irrigation valve from remaining turf. System must be capped if improved area will not have irrigation.
- Mulch must be spread to minimum depth of three inches where new plant material is installed unless a spreading groundcover is indicated.

Pre- and post-site inspections are required as well as submittal of original receipts, invoices, and total project costs. Projects must be completed within 120 days from the date Water Conservation Program representative approves start of project at survey/pre-site inspection.

- Project site must be maintained for a minimum of five years, or for the duration of ownership of the property (whichever is shortest.) Failure to meet this requirement may require customer to refund all or a portion of the rebate. Project site shall be available for future inspection and monitoring (up to five years) by Public Utilities.
- Photos of the project may be taken by Public Utilities staff to illustrate transitions from thirsty landscapes to attractive, water wise landscapes. Addresses to project sites participating in the rebate program will be available to the public. Customer names will not be made public or associated with the address.

What does not qualify for a rebate?

- High water using plants (as classified by WUCOLs)
- Artificial turf
- Vegetable gardens
- Exposed soil surfaces (exceptions made to accommodate specific garden design motifs)
- Impermeable surfaces such as bricks and flagstone mortared into place, or concrete. (Pervious surfaces that are part of the project area are eligible for rebate so long as total project area includes living plant coverage area at maturity of at least 50%)
- Planting of invasive species that have potential to spread aggressively, especially in areas interfacing wild lands, canyons, open space, or parks. For list of invasive species go to the California Integrated Pest Control website or the San Diego County Invasive Ornamental Plant Guide.
- Labor costs
- Sales tax

What is a sustainable landscape?

Sustainable landscapes are intended to be in balance with the local climate and environment and designed to require few added resources, thereby reducing waste and minimizing air, water and soil pollution. The Sustainable Landscape-Turf Replacement Rebate Program is intended to encourage the replacement of high water using turf grass with ornamental plant material that thrives with little to moderate amounts of water during the extended dry periods that characterize San Diego's climate. The scaled use of turf, with a focus on the use of water wise plant material, abundant mulch, efficient irrigation and reduced runoff are all components of sustainable landscaping. The objective of this rebate program is to encourage a reduction in water use through the conversion of grass to water wise plant material, while maintaining a high level of living landscape to benefit the environment.

The following handbook is a valuable guide and provides the MAWA and ETWU calculations on pages 30 and 31.

http://www.sdcwa.org/landscape-guide-flipbook/

Benefits of converting turf to sustainable and water wise landscape.

Turf grass is often the optimal choice for sports and recreational areas, but turf - especially cool season varieties such as tall fescue, Kentucky bluegrass, red fescue, or perennial ryegrass - require frequent watering and maintenance. The Sustainable Landscape -Turf Replacement Rebate Program focuses on the replacement of thirsty turf grass material with ornamental water wise plants that use a moderate to very low amount of water. Additional steps such as converting overhead sprinklers to low flow micro-irrigation and installing a Smart Controller can further reduce water and energy use and help control irrigation runoff.

How much water does a sustainable landscape save?

Typically, cool season turf grass uses between 14 and 40 gallons of water per square foot annually, depending on site conditions. Once established, low to moderate water using plants can require less than half of the water required by cool season turf grass.

Costs that are covered by the sustainable landscape rebate.

The rebate is $1.50/SF of turf grass that is replaced with ornamental water wise landscape--up to a maximum of 6,000 SF and $9,000 per customer. Labor costs and sales tax are not eligible for rebate. Rebate amount will not exceed total project costs.

City of San Diego
PUBLIC UTILITIES
Water & Wastewater

City of San Diego
RESIDENTIAL OUTDOOR WATER CONSERVATION REBATE PROGRAM

Sustainable Landscape-Turf Replacement Rebate Guidelines

Rebate--$1.25 or $1.50/Square Foot up to $3,000

Did you know that more than 50% of the water consumed by most households is used to maintain landscapes and lawns? You can help reduce your outdoor water use, keep your landscape more attractive and healthy--and save money on your water bill--by replacing your thirsty turf grass with a sustainable and water wise ornamental landscape. City of San Diego Public Utilities Department customers residing in a single-family home, duplex, townhome, or condominium that is served by an individual water meter can receive a rebate for turf replacement. Funding for a limited number of rebates is available through a State of California grant and will be distributed on a first come, first served basis until exhausted. This program is subject to change without prior notification. Read below for program requirements and application process. Rebate check will be sent to the customer of record 6-8 weeks after application and post-installation site visit are successfully completed. If you have questions after reading these guidelines, please call 619-533-4126 or e-mail waterconservationrebates@sandiego.gov.

Applicant's water account must be in good standing and program requirements must be met to be eligible for rebates. Customer must agree to and sign the application agreement before rebate is administered. Changes made related to rebate program must comply with all applicable laws, codes, policies, covenants, conditions, and restrictions. Please consult with a tax advisor if you have questions regarding any potential tax implications of your rebate.

Rebate Process

1. **Get an application...** Visit the City's Water Conservation Website to download the Residential Outdoor Rebate Program Application. Submit completed application to Water Conservation Program.

2. **Get a pre-site inspection and approval to begin project...** After the application is received a City scheduler will contact you to schedule a free water conservation survey and pre-site inspection. A Water Conservation Program representative will evaluate the proposed project area and if qualifications are met you will be given a project start date, at which time the 120 day conversion period begins.

3. **Submit plant list or design plans within 45 days of start date ….** Submit plant list within 45 days of project start date if you are applying for the $1.25/SF rebate. Submit scaled design plans within 45 days of project start date if you are applying for the $1.50/SF rebate. See below for more information on plant list and design plan submittals.

4. **Complete the project and schedule a post-installation visit within 120 days…** Call 619-570-1999 to schedule a post-installation site visit once project is completed (site visit must be scheduled before the 120 day conversion period is over). A Water Conservation representative will verify square footage and that program requirements are met. At this visit please provide representative with original itemized sales receipts and invoices from landscape professionals which must include vendor and/or company name, purchase date, date of services, itemized list of products purchased, description of services rendered.

5. **Receive a rebate…** Once application is deemed complete and post-installation site visit is successfully completed please allow 6-8 weeks for the rebate check to arrive in the mail.

Program Requirements:

- Project must replace high water use turf with plants that have moderate, low, or very-low watering requirements as defined in the 2010 Edition UC Davis Arboretum All-Stars brochure, the Water Use Classification of Landscape Species Reference (WUCOLS) or other accepted reference of plant water use.
- At maturity, plant density of the converted area must cover at least 50% of the project area. Tree canopy coverage (existing and new trees) will not be counted in the 50% plant coverage calculation.
- Rebate amount cannot exceed total project cost, up to a maximum of $3,000 per property.
- Minimum project conversion area is 400 SF (front yard lawns with less than 400 SF are eligible if 100% of turf is replaced).
- Existing turf in project area must be living and an in-ground irrigation system must be operational at the time of the survey/pre-site inspection.
- Converted areas must be permeable to air and water (ie. gravel, loose flagstone, decomposed granite). Permeable weed barriers are required under pervious hardscapes.
- If project will be irrigated, conversion of existing overhead spray irrigation system to micro-irrigation or low application rate rotating nozzles is highly recommended. The newly converted area must be on a separate irrigation valve from remaining turf. System must be capped if improved area will not have irrigation.
- Mulch must be spread to minimum depth of three inches where new plant material is installed unless a spreading groundcover is indicated.
- Pre- and post-site inspections are required as well as submittal of original receipts, invoices, and total project costs. Projects must be completed within 120 days from the date Water Conservation Program representative approves start of project at survey/pre-site inspection.

- Project site must be maintained for a minimum of five years, or for the duration of ownership of the property (whichever is shortest). Failure to meet this requirement may require customer to refund all or a portion of the rebate.
- Project site shall be available for future inspection and monitoring (up to five years) by Public Utilities. Photos of the project may be taken by Public Utilities staff to illustrate transitions from thirsty landscapes to attractive, water wise landscapes. Addresses to project sites participating in the rebate program will be available to the public. Customer names will not be made public or associated with the address.

REBATE LEVELS:

- Receive $1.25/SF (up to 2,400 SF). A plant list must be submitted within 45 days of project start date. Plant list can be found in PDF format on the Sustainable Landscape-Turf Replacement webpage on the Water Conservation website. Plant list must include plants that will be planted, number of plants, size at maturity and WUCOLS page reference (or other accepted reference of plant water use page reference).

OR

- Receive $1.50/SF (up to 2,000 SF) after submitting a scaled garden design and irrigation plan. Do-it-yourself garden design plans are not eligible for rebate. A scaled garden design and irrigation plan must be completed by a landscape designer, landscape architect, certified landscape irrigation auditor or landscape contractor, and must include:
  - Plant names (common and scientific) with plant symbols showing coverage at 75-100% maturity and WUCOLs page reference (or other acceptable reference) to verify moderate to low water use
  - Mulch type and permeable hardscape details
  - Estimated Total Water Use (ETWU)
  - Maximum Applied Watering Allowance (MAWA) – Maximum 70% of ET
  - Irrigation plan with hydrozones and head or emitter placement and equipment list (if no irrigation is planned – show hydrozones only)
  - North arrow and scale
  - Plant list must include plants that will be planted, number of plants, size at maturity and WUCOLS page reference (or other accepted reference of plant water use page reference)

What does not qualify for a rebate?

- High water using plants (as classified by WUCOLs)
- Artificial turf
- Vegetable gardens
- Back yard turf conversion
- Exposed soil surfaces (exceptions made to accommodate specific garden design motifs)
- Impermeable surfaces such as bricks and flagstone mortared into place, or concrete. (Pervious surfaces that are part of the project area are eligible for rebate so long as total project area includes living plant coverage area of at least 50% at maturity)
- Water features or fountains (San Diego Municipal Code Land Development Code Appendix E calculates water features at same water coefficient as high water use plants)

- Planting of invasive species that have potential to spread aggressively, especially in areas interfacing wild lands, canyons, open space, or parks. For list of invasive species go to the California Invasive Plant Council website or the San Diego County Invasive Ornamental Plant Guide.

What is a sustainable landscape?

Sustainable landscapes are intended to be in balance with the local climate and environment, and are designed to require few added resources thereby reducing waste and minimizing air, water and soil pollution. The Sustainable Landscape-Turf Replacement Rebate Program is intended to encourage the replacement of high water using turf grass with ornamental plant material that thrives with little to moderate amounts of water during the extended dry periods that characterize San Diego's climate. The scaled use of turf, with a focus on the use of water wise plant material, abundant mulch, efficient irrigation and reduced runoff are components of sustainable landscaping. The objective of this rebate program is to encourage a reduction in water use through the conversion of grass to water wise plant material, while maintaining a high level of living landscape to benefit the environment.

Benefits of converting turf to sustainable and water wise landscape.

Turf grass is often the optimal choice for sports and recreational areas, but turf - especially those that consist of cool season grasses such as tall fescue, Kentucky bluegrass, red fescue, or perennial ryegrass, require frequent watering and maintenance. The Sustainable Landscape-Turf Replacement Rebate Program focuses on the replacement of thirsty turf grass material with ornamental water wise plants that use a moderate to very low amount of water. Additional steps such as converting overhead sprinklers to low flow micro-irrigation and installing a Smart Controller can further reduce water and energy use and help control irrigation runoff.

How much water does a sustainable landscape save?

Typically, cool season turf grass uses between 14 and 40 gallons of water per square foot annually, depending on site conditions. Once established, low to moderate water using plants can require less than half of the water required by cool season turf grass.

Costs that are covered by the sustainable landscape rebate.

The rebate is $1.25/SF for lawn area that is replaced with ornamental water wise landscape. The rebate increases to $1.50/SF if a landscape design professional is used to prepare a scaled design plan showing details such as total water use requirements as a percentage of evapo-transpiration (ET) for the planned landscape, common and scientific plant names, plant coverage at maturity, and irrigation design (hydrozones). Maximum rebate for both rebate levels is $3,000 per customer. Do-it-yourself labor costs are not eligible for rebate. Do-it-yourself garden design plans are not eligible for rebate. Tax is not included. Total rebate amount will not exceed the cost of the material and installation.

Water

A Branch of Public Utilities

Water Conservation

- Water Conservation Home
- Waste No Water Information and Resources
- Plumbing Retrofit Upon Re-Sale Ordinance
- Water Survey Programs
- Rebates & Incentives
- Kids Water Conservation Corner
- Contests

Rebates & Incentives

A water-efficient landscape and irrigation system can reduce outdoor water use and minimize the amount of polluted dry weather runoff that enters the storm drain system. The City of San Diego is working to help customers conserve water by offering rebates for smart controllers, micro-irrigation, and turf replacement. Rebates are offered through a State of California grant and the City's Storm Water Department are available on a first come, first served basis until funding is exhausted. Click on the links below to learn more about the City's residential outdoor water conservation rebate programs and services and specific qualifying requirements.

We Won! San Diego Coastkeeper honored the City's Public Utilities Department with the 2012 Coastal Champion Award in the category of "Water-Wise" for our Residential Outdoor Water Conservation Rebate Program for helping over 300 customers conserve a projected 61.8 million gallons of water over a ten-year period by offering rebates for smart controllers, mico-irrigation, turf replacement and rain barrels. Tap into our rebates today and thanks for the recognition!

Residential Outdoor Water Conservation Rebates

Sustainable Landscape-Turf Replacement Rebates - Currently, City of San Diego customers can choose to participate in one of two turf replacement rebate programs (but may participate in only one program). Note: City Customers are also eligible to apply for other rebates listed on this page in addition to the turf replacement rebate:

- **San Diego County Water Authority Turf Replacement Rebate Program** - Customers can receive a turf replacement rebate of up to **$1.50 per square foot** of front yard turf removed and replaced with water wise plant material (max. rebate is $3,000). Please visit this website to review program guidelines and begin the application process. Customers must install **micro-irrigation, rotating nozzles** or cap the existing irrigation system in the turf replacement project area. At least 400 square feet of turf must be removed.

- **City of San Diego Outdoor Rebate Program** - Customers can receive a turf replacement rebate of up to **$1.25 per square foot** of turf removed and replaced with water wise plant material (max. rebate is $3,000). Please visit this website to review program guidelines and begin the application process. Customers are not required to make changes to their irrigation system in the turf replacement project area. Projects that remove **all** turf from the front yard are eligible, even if less than 400 square feet.
  - Residential Outdoor Water Conservation Rebate Application Form (PDF)
  - Plant Coverage Spreadsheet (PDF)

Smart Controller Rebates - Get up to $400 for upgrading an existing non-weather based irrigation controller to a Smart Controller (also known as a weather based irrigation controller or WBIC).

- Residential Outdoor Water Conservation Rebate Application Form (PDF)

Micro-Irrigation - Get $0.20 per square foot (up to 2400 SF and $480 per customer) for converting an overhead spray sprinkler system to low application rate micro-irrigation (i.e., micro-spray, drip, in-line emitters, etc.)

- Residential Outdoor Water Conservation Rebate Application Form (PDF)

Rainwater Harvesting (Rain Barrel) Rebates **NEW** - Get $1.00 for every gallon of rainwater storage capacity (up to 400 gallons and $400.00) (Program Starts **March 1, 2013**).

SoCalWaterSmart - SoCalWaterSmart provides rebates for nozzles, weather based irrigation controllers, and high efficiency clothes washers.

Free On-Site Water Conservation Surveys - The City of San Diego offers residential customers free on-site indoor and landscape water conservation surveys that provide customized information on how to save water and money.

Mulch from Miramar Greenery - Applying mulch to your garden will reduce the need to water. City of San Diego residents may self-load up to two cubic yards of compost or mulch for free with proof of residency. One cubic yard is equal to the size of six 32-gallon trash cans. Mulch and compost can be loaded by Miramar Greenery staff. Wood chips can be purchased for a modest fee at the Miramar Landfill fee booth located at the landfill's entrance. Please call the Miramar Landfill at (858) 492-6100 to confirm availability on a particular day.

Commercial-Multifamily Outdoor Water Conservation Rebates

Smart Controller Rebates - Get $25 per irrigation station (up to 68 stations and $1,700 per site) for upgrading an existing irrigation controller to a Smart Controller (also known as a weather based irrigation controller or WBIC) found on the SWAT list of Climate Based tested devices..

- Commercial-Multifamily Outdoor Water Conservation Rebate Application Form (PDF)
- Commercial-Multifamily Smart Controller Resource list (PDF)

Micro-Irrigation Rebates - Get $0.20 per square foot (up to 6,000 SF and $1,200 per site) for converting an overhead spray sprinkler system to low application rate micro-irrigation (i.e., micro-spray, drip, in-line emitters, etc.)

- Commercial Multifamily Outdoor Water Conservation Rebate Application Form (PDF)

Sustainable Landscape - Turf Replacement Rebates - Get $1.50 per square foot (up to 6,000 SF and $9,000) for replacing turf grass with water wise landscaping.

SoCalWaterSmart - Regional commercial rebates available for indoor and outdoor water saving devices. Funding is limited and available on a first-come, first-served basis until funding is exhausted. A reservation number is required before you purchase a water-efficient device in order to qualify for a rebate.

Irrigation Controllers	Toilets	Food Steamers	Dry Vacuum Pumps
Rotating Nozzles	In-stem Flow Regulators	Ice machines	Laminar Flow Restrictors
Large Rotary Nozzles	Urinals	Conductivity controllers	

Mulch from Miramar Greenery - Applying mulch to your garden will reduce the need to water. City of San Diego residents may self-load up to two cubic yards of compost or mulch for free with proof of residency. One cubic yard is equal to the size of six 32-gallon trash cans. Mulch and compost can be loaded by Miramar Greenery staff. Wood chips can be purchased for a modest fee at the Miramar Landfill fee booth located at the landfill's entrance. Please call the Miramar Landfill at (858) 492-6100 to confirm availability on a particular day.

On-Site Commercial Landcape Survey - Take advantage of a commercial landscape survey, offered free of charge to multi-family, commercial, industrial and institutional customers in the City of San Diego. Properties will receive an audit of the irrigation system, practical advice, water-saving recommendations and a water-use budget.

water smart
SAN DIEGO COUNTY

San Diego County Water Authority

Turf Replacement Program

Now accepting applications for incentives!

Welcome to the San Diego County Water Authority's WaterSmart Turf Replacement Program. We created this website to help our valued customers replace water-thirsty lawns with beautiful WaterSmart landscapes that are in harmony with our region.

Using water efficiently is a way of life in San Diego County and an important responsibility that comes with living in the beautiful Mediterranean climate that we enjoy. Working together, we can help ensure a reliable water supply while keeping the region prosperous and naturally beautiful for generations to come.

WaterSmart Landscapes provide a number of important benefits.
They include:

Saving Water
WaterSmart landscapes can use about 70% less water than traditional landscaping.

Beautifying Landscapes
WaterSmart landscapes can transform regular yards into neighborhood showpieces.

Reducing Maintenance
State-of-the-art irrigation systems and plants appropriate for the local climate can trim the amount of time spent on yard maintenance.

Minimizing Runoff
WaterSmart landscapes reduce the amount of polluted water that flows into creeks and ultimately ends up in the ocean.

Conserving Energy
WaterSmart landscapes demand less water be treated and transported across the state, saving huge amounts of energy.

Acknowledgements

This program is made possible by financial support from:

- The Bureau of Reclamation through a Water Conservation Field Services Grant

WaterSmart Landscapes

WaterSmart Landscapes combine water-efficient design, state-of-the-art irrigation, climate-appropriate plant selection, and best maintenance practices to create a beautiful and sustainable environment, ideally suited for San Diego County's mild, Mediterranean climate.

- The California Department of Water Resources' Integrated Regional Water Management Program financed under the California Water Security, Clean Drinking Water, Coastal and Beach Protection Fund of 2002

The Water Authority is particularly grateful to the Long Beach Water Department for special assistance developing content and other material for the website.

San Diego County Water Authority

PROCESSING OUTDOOR REBATE APPLICATIONS

When a rebate application is received from a customer here are the steps to take:

1. Log onto the Master Rebate Tracking List at: N:\CustomerSupportDivision\WaterResourcesMgmt\Prop 50 Rebates\Master Rebate Tracking List.xlsx. Click on the Residential or Commercial tab depending on type of application.

2. Assign next application number and fill out all the Residential/Commercial Applicant Information. **[NOTE – IF THE CUSTOMER IS ASKING FOR SUSTAINABLE LANDSCAPE THE CONTROL NUMBER WILL BE UNDER THE RED LINE AND WILL BE ON THE WAIT LIST, IF THE CUSTOMER IS ONLY ASKING FOR SMART CONTROLLER OR MICRO IRRIGATION IT GOES ABOVE THE RED LINE AND WILL NOT HAVE TO BE WAIT LISTED.]** From the application determine what the customer is applying for (Smart Controller, Micro Irrigation, Sustainable Landscape) and fill out the following information (if available on the application):

Residential Smart Controller Rebate

Date SC App Rcvd	Min. 2000 SF / 6 valves?	Make	Model	Potential Rebate Amount up to $400

Commercial Smart Controller Rebate

Date SC App Rcvd	Min. 2000 SF	Make	Model	Potential Rebate Amount ($25 per station up to 68 stations/$1700 per site)	Date SC Rebate Chk issued	SC Rebate Amount Issued

Date application received is the date stamped on the envelope, or date you received the application if no date on the envelope, square footage and valves if listed on application, make and model if listed on the application, and if they included a receipt how much they paid for the controller up to $400 for residential and $1700 for commercial. For Residential if the SF on SC is less than 2000 SF, pay up to $200.

Residential Micro-Irrigation

Date MI App Rcvd	Proposed SF	Potential Rebate Amount ($0.20/SF) up to $480 (2400SF)

Commercial Micro-Irrigation

Date MI App Rcvd	Proposed SF (up to 6000 SF)	Potential Rebate Amount ($0.20/SF) up to $1200	Actual SF (up to 6000 SF)	Actual Rebate Amount ($0.20/SF) up to $1200	Date MI Rebate Chk issued	MI Rebate Amount Issued

Date application received is the date stamped on the envelope, or date you received the application if no date on the envelope, and square footage if listed on application up to 2400 SF Residential / 6000 SF Commercial. If more than 2400/6000 SF then just put 2400/6000.

Residential Sustainable Landscape - Turf Replacement

Date SL TR App Rcvd	Proposed SF	Potential Rebate Amount: w/plan($1.50/SF up to 2000SF +$500 towards design); w/o plan ($1.25/SF up to 2400SF) - Max $3000

Commercial Sustainable Landscape – Turf Replacement

Date SL TR App Rcvd	Proposed SF (up to 6000 SF)	Potential Rebate Amount: $1.50/SF up to 6000 SF and $9,000 Per Customer	Actual SF	Actual Rebate Amount: $1.50/SF up to 6000 SF and $9,000 Per Customer

Date application received is the date stamped on the envelope, or date you received the application if no date on the envelope and square footage if listed on application (up to 2000 SF Residential / 6000 SF Commercial). For Residential check to see if the customer marked $1.25 or $1.50. Then multiply SF by 1.25 or 1.50 accordingly, up to a maximum of $3000. If the SF is 2400 or above just put $3000. For Commercial it is always $1.50. If the SF is above 6000 just put 6000.

3. Fill out the Internal Tracking Form and the Start Date Form with as much information as you can get off of the application. The Start Date Form is for SL/TR program only. If the customer is not applying for that program you don't need to fill out the Start Date Form. These forms are found in the Residential Info and Commercial Info folders on Maureen's desk in the File Folder Rack. Electronic copies are on the 'N' Drive.

4. Create a file folder for the application. On the tab of the file folder right the application number and the person's last name or if commercial the business name. IE: R13-XXX Doe, or C13-XXX Doe Corporation. Extra file folders can be obtained from Carmela.

5. Log onto N:\CustomerSupportDivision\WaterResourcesMgmt\Prop 50 Rebates and go to the Residential or Commercial tab and create a folder for your application. Folders names are App (Number) (Last Name), i.e.: App R13-1000 Smith. Check to see if the Irrigation Auditor's have already done a pre-site for this address and see if they have filed pictures in the N drive as well. The pictures will be listed by address or last name. If so, move that whole file (just click and drag) into the Application Folder.

6. Scan the application and tracking forms into your computer and file them in the Application Folder on the 'N' Drive, calling them Application, Tracking Forms, etc.

7. Give to Vinnie to schedule a pre-site (if none done.)

Daily - check the Mailbox named WaterConservationReb on Maureen's computer. This mailbox can be found on the lower left hand column of Outlook. Delete the mass city emails and respond to any customer emails. Keep the emails in the WaterConservationReb folder. You may want to first forward the emails to yourself and answer them from your email account so if they email back it will go to you directly. Maureen's log on is mahall and her password is TapsDC12.

When a folder is received back from Kevin, Chad or Hector, after the pre-site here are the steps to take:

Log onto the Master Rebate Tracking List at: N:\CustomerSupportDivision\WaterResourcesMgmt\Prop 50 Rebates\Master Rebate Tracking List.xlsx. Click on the Residential or Commercial tab depending on type of application, and fill out the following information depending on the type of rebate(s) applied for:

Residential Smart Controller Rebate

Min. 2000 SF / 6 valves?	Make	Model	Potential Rebate Amount up to $400

Commercial Smart Controller Rebate

Date SC App Rcvd	Min. 2000 SF	Make	Model	Potential Rebate Amount ($25 per station up to 68 stations/$1700 per site)

The pre-site information will have the exact SF and exact number of valves; you can change whatever you had put in there previously. It may also list the make and model, and may include the invoice/receipt for the rebate amount. If it does, add it to the spreadsheet as well. For Residential if the SF on SC is less than 2000 SF, pay up to $200.

Add this information to the Tracking Form as well.

Residential Micro-Irrigation

Date MI App Rcvd	Proposed SF	Potential Rebate Amount ($0.20/SF) up to $480 (2400SF)

Commercial Micro-Irrigation

Date MI App Rcvd	Proposed SF (up to 6000 SF)	Potential Rebate Amount ($0.20/SF) up to $1200

The pre-site information will have the exact SF; you can change whatever you had put in there previously. If it is changed then change the potential rebate amount as well by multiplying the SF by .20. Remember, there is a maximum of 2400 SF and $480 for Residential and 6000 SF and $1200 for Commercial.

Add this information to the tracking form as well.

Residential Sustainable Landscape - Turf Replacement

Date SL TR App Rcvd	Proposed SF	Potential Rebate Amount: w/plan($1.50/SF up to 2000SF +$500 towards design); w/o plan ($1.25/SF up to 2400SF) - Max $3000

Commercial Sustainable Landscape – Turf Replacement

Date SL TR App Rcvd	Proposed SF (up to 6000 SF)	Potential Rebate Amount: $1.50/SF up to 6000 SF and $9,000 Per Customer

The pre-site information will have the exact SF; you can change whatever you had put in there previously. If it is changed then change the potential rebate amount as well by multiplying the SF by 1.25 or 1.50 accordingly for Residential and $1.50 for Commercial. Remember, there is a maximum of 2400 SF and $3000 for Residential and 6000 SF and $9000 for Commercial.

Add this to the tracking form as well.

You will also determine the following:

Project Start Date Assigned	45 days from pre-site	Reminder date (1 week ahead of 45 days)	120 days from pre-site	Reminder date (14 days ahead of 120 day)

FILL OUT ONLY IF THE APPLICATION IS NOT ON THE WAIT LIST. The project start date is generally the pre-site date, unless the customer asks for a different date, which Kevin or Chad or Hector will record on the tracking form.

45 days from pre-site is determined by taking the "Reminder and Due Date Calendar" and counting 6 weeks and 3 days from the pre-site date. If the 45^{th} day falls on a Saturday, Sunday or Holiday record the following work day as the 45^{th} day. Record this on the calendar as R13-XXX – 45 Day, and in the appropriate box on the spreadsheet.

Reminder date is the date 1 week ahead of the 45^{th} day. Record this on the calendar as R13-XXX - 45 Day Reminder.

120 days is determined by taking the "Reminder and Due Date Calendar" and counting 17 weeks and 1 day from the pre-site date. Remember the Saturday/Sunday/Holiday note from above. Record this on the calendar as R13-XXX – Final.

Reminder date is 2 weeks ahead of the final day. Record this on the calendar as R13-XXX – Final Reminder.

Add this information to the Tracking Form as well.

File the folder in the top drawer of Vinnie's office.

When plant list/plans are received from a customer look up the application number on the Master Rebate Tracking List and pull the folder. Paperclip the Plant List/plans to the folder and put the folder/plant list on Zeek's desk for review. Note "Plant List Received DATE" on the Notes / Comments section of the spreadsheet.

Answer any questions from customers as you can. Questions you can't answer can be referred to Joey, Kevin, Chad, or Hector. Record any notes, questions, concerns etc under the Notes / Comments section of the spreadsheet.

When customers call for a post-site pull the folder and give it to Vinnie telling her to schedule a post-site inspection. Vinnie will schedule it with whoever did the pre-site. Note this under the Notes / Comments section of the spreadsheet.

After the post-site inspection the Irrigation Auditor will give the folder to you to process.

When a folder is received back from Kevin, Chad or Hector, after the pos-site here are the steps to take:

Log onto the Master Rebate Tracking List at: N:\CustomerSupportDivision\WaterResourcesMgmt\Prop 50 Rebates\Master Rebate Tracking List.xlsx. Click on the Residential or Commercial tab depending on type of application, and fill out the following information depending on the type of rebate(s) applied for:

Residential Smart Controller Rebate

Min. 2000 SF / 6 valves?	Make	Model	Potential Rebate Amount up to $400	SC Rebate Amount Issued- IO 11002138

Commercial Smart Controller Rebate

Min. 2000 SF	Make	Model	Potential Rebate Amount ($25 per station up to 68 stations/$1700 per site)	Date SC Rebate Chk issued	SC Rebate Amount Issued

The post-site information will have the exact SF and exact number of valves; you can change whatever you had put in there previously. It may also list the make and model, and may include the invoice/receipt for the rebate amount. If it does, add it to the spreadsheet as well. If the receipt is not attached call the customer for the receipt. Remember cost cannot exceed $400 for Residential and $25 per Station and $1700 for Commercial. For Residential if SF is below 2000 SF the rebate amount cannot exceed $200. If the application came in BEFORE July 1, 2012 labor costs will be rebated, after July 1, 2012 pay on controller cost only.

Add this to the Tracking Form as well.

Residential Micro-Irrigation

Actual SF	Actual Rebate Amount ($0.20/SF) up to $480 (2400SF)	Post-Site Date	MI Rebate Amount Issued- IO 11002138

Commercial Micro-Irrigation

Actual SF (up to 6000 SF)	Actual Rebate Amount ($0.20/SF) up to $1200	Date MI Rebate Chk issued	MI Rebate Amount Issued

The post-site information will have the exact SF; you can change whatever you had put in there previously. If it is changed then change the potential rebate amount as well by multiplying the SF by .20. Remember, there is a maximum of 2400 SF and $480 for Residential and 6000 SF and $1200 for Commercial. If the receipts are included add up all the costs and pay that amount up to $480/$1200. If the application came in BEFORE July 1, 2012 labor costs will be rebated, after July 1, 2012 pay on material cost only. If the receipts are not included call the customer for the receipts.

Add this to the Tracking Form as well.

Residential Sustainable Landscape - Turf Replacement

Actual SF	Actual Rebate Amount: w/plan($1.50/SF up to 2000SF + $500 towards design); w/o plan ($1.25/SF up to 2400SF) - Max $3000	Post-Site Date	Actual SL TR Rebate Amount - IO 11002139

Commercial Sustainable Landscape – Turf Replacement

Actual SF	Actual Rebate Amount: $1.50/SF up to 6000 SF and $9,000 Per Customer	Post-Site Date	Actual SL TR Rebate Amount

The post-site information will have the exact SF; you can change whatever you had put in there previously. If it is changed then change the potential rebate amount as well by multiplying the SF by 1.25 or 1.50 accordingly for Residential and $1.50 for Commercial. If the receipts are included add up all the costs and pay that amount up to $3000/$9000. If the application came in BEFORE July 1, 2012 labor costs will be rebated, after July 1, 2012 pay on material cost only. If the receipts are not included call the customer for the receipts.

If there are a large number of receipts there is a receipt breakdown spreadsheet you can use. It is located at N:\CustomerSupportDivision\WaterResourcesMgmt\Prop 50 Rebates\Receipt

Breakdown Template.xlsx. Immediately do a "save as" and save it in the proper application folder as RXX-XXX Receipt Breakdown.

Add all this to the Tracking Form as well.

In the Notes/Comments section **IN BOLD RED CAPITOL LETTERS** record **OK TO PAY $X ($X FOR SC, $X FOR MI, $X FOR SLTR.)** Also record how much receipts were for, or if receipts do not add up to square footage, how much could have been paid for square footage. Highlight whole line green.

With a green sharpie write OK TO PAY $X ($X FOR SC, $X FOR MI, $X FOR SLTR) and the date on the tracking sheet, application, and folder cover. Give to Carmela to scan and pay.

Sustainable Landscape-Turf Replacement Rebate Program
Resource List

This incomplete list of places and websites to visit to help you complete your project is for your reference only. The City of San Diego does not offer any endorsement or warranty regarding these vendors.

Remember to contact Dig Alert before you dig! Simply dial 811!
(visit the Dig Alert website for additional information: http://www.digalert.org/index.asp)

Demonstration Gardens-great places to look for design & planting ideas:

Water Conservation Garden at Cuyamaca College

12122 Cuyamaca College Drive West, El Cajon, CA 92019
619-660-0614
www.thegarden.org

City of San Diego's Balboa Park Desert Garden

East of Park Blvd. and Zoo Place intersection, in Balboa Park

San Diego Botanic Garden

230 Quail Gardens Drive, Encinitas, CA 92024
760-436-3036
www.sdbgarden.org

Buena Creek Gardens

418 Buena Creek Gardens, San Marcos, CA 92069
760-744-2810
www.buenacreekgardens.org

Wild Animal Park's Nativescapes Garden

15500 San Pasqual Valley Rd, Escondido, CA 92027
www.sandiegozoo.org/CF/plants/gardendetail.cfm?ID=20

Local Nurseries Featuring Water-Wise Plant Selection:

Mission Hills Nursery

1525 Fort Stockton Dr., San Diego, CA 92103

Miramar Wholesale Nursery

5400 Governor Dr., San Diego, CA 92112

Walter Anderson Nursery

3246 Enterprise St., San Diego, CA 92107
12755 Danielson Ct., Poway, CA, 92064

City Farmers Nursery
4832 Home Ave., San Diego, CA 92105

Recon Nursery (wholesale only)
1755 Saturn Blvd., San Diego, CA 92154

Anderson's La Costa Nursery
400 La Costa Ave, Encinitas, CA 92024

Cedros Gardens
330 Cedros Ave., Solana Beach, CA 92075

Tree of Life Nursery (specializing in CA native plants)
33201 Ortega Highway, San Juan Capistrano, CA 92675
www.californianativeplants.com (great resources on how to kill your lawn)

El Plantio Nursery-Landscaping, Inc.
1322 San Pasqual Valley Rd, Escondido, CA 92027

Las Pilitas Nursery
8331 Nelson Way, Escondido, CA 92026

Kniffings Discount Nursery
14940 Oak Creek Rd., El Cajon, CA 92021

Cuyamaca College Nursery
900 Rancho San Diego Pkwy, El Cajon, CA 92019

Rancho Jojoba Nursery/Kuma Bonsai
11935 Hwy 67, Lakeside, CA 92040

Websites offering information on Drought Tolerant Gardens:

Metropolitan Water District's Conservation Website: www.bewaterwise.com

City of San Diego Public Utilities Department- Water Conservation Program website:
www.sandiego.gov/water/conservation

San Diego County Water Authority: www.sdcwa.org

Southern Nevada Water Authority: www.snwa.com

WUCOLS Database -Estimating Watering Needs: www.owue.water.ca.gov/docs/wucols00.pdf

The WUCOLS database attempts to answer this question: "In order to be maintained in good condition, in the region you are considering, and under the standard conditions outlined, does the species need HIGH, MODERATE, LOW or VERY LOW amounts of irrigation water?"

Rancho Santa Ana Botanical Garden: www.rsabg.org

San Marcos Growers: Irrigation practices website:
http://www.smgrowers.com/resources/Irrigation.asp

Links to on-line articles on how to get rid of turf:

www.findarticles.com/p/articles/mi_m1216/is_3_223/ai_n35638326/

http://www.finegardening.com/how-to/articles/4-ways-to-remove-sod.aspx

In addition, local retail outlets including but not limited to Home Depot, Lowe's, Dixieline, and Ace Hardware Stores carry varieties of water wise plants.

San Diego County Water Authority

Turf Replacement Program

Turf Replacement Study Guide

Use this study guide as a tool for preparing for the online test.

Your WaterSmart Landscape project is very important ›

City of San Diego Customers!

Residential Outdoor Water Conservation Rebates

Are you interested in: ✔ Reducing your outdoor water use? ✔ Maintaining a healthy landscape? This is a **limited** opportunity for City of San Diego Public Utility customers residing in a single-family home, duplex, townhome or condo.

- Smart Controller Rebates: up to $400
- Micro-irrigation Rebates: $0.20/sq. ft. up to $480
- Sustainable Landscape – Turf Replacement Rebates: $1.25 or $1.50/sq. ft. up to $3,000 (front yards only)

See Program Guidelines & Application for Detailed Requirements at:
www.sandiego.gov/water/conservation or call (619) 533-4126

RESIDENTIAL OUTDOOR
REBATE PROGRAM

The City of San Diego | City of San Diego Public Utilities Water & Wastewater | think BLUE San Diego

This program is made possible by the City of San Diego Public Utilities & Storm Water Departments and an Integrated Regional Water Management grant from the State Department of Water Resources. Rebates are available on a first come, first served basis Program requirements are subject to change.

This information is available in alternative formats upon request.

City of San Diego Customers!

Commercial – Multifamily Outdoor Water Conservation Rebates

Are you interested in: ✔ Reducing your outdoor water use? ✔ Maintaining a healthy landscape? This is a **limited** opportunity for City of San Diego Public Utility commercial and multifamily customers.

- Smart Controller Rebates: up to $1,700/$25 per station
- Micro-irrigation Rebates: $0.20/sq. ft. up to $1,200
- Sustainable Landscape – Turf Replacement Rebates: $1.50/sq. ft. up to $9,000

See Program Guidelines & Application for Detailed Requirements at:
www.sandiego.gov/water/conservation or call (619) 533-4126

COMMERCIAL OUTDOOR
REBATE PROGRAM

The City of San Diego | City of San Diego Public Utilities Water & Wastewater | think BLUE San Diego

This program is made possible by the City of San Diego Public Utilities & Storm Water Departments and an Integrated Regional Water Management grant from the State Department of Water Resources. Rebates are available on a first come, first served basis Program requirements are subject to change.

This information is available in alternative formats upon request.

Office Use Only:	Application#:________________
Form Date: 1-10-12	Date:________________

City of San Diego Public Utilities Department
RESIDENTIAL OUTDOOR WATER CONSERVATION REBATE APPLICATION

Smart Controller, Micro-Irrigation, Sustainable Landscape-Turf Replacement

- Customers may submit more than one application form, or apply for multiple rebates on one application form.
- Prior to completing this application please review the rebate guideline for each rebate type. Go to: www.sandiego.gov/water/conservation for more information on the rebate programs.
- Rebates are available to existing residential customers (including individually metered single family homes, duplexes, condominiums, and townhomes) within the service area of the City of San Diego Public Utilities Department. Renters may be eligible for rebates with written consent of property owner. Renter's name must be on water bill.
- Rebate checks will be sent to the customer of record 6-8 weeks after application is deemed complete and post-installation site visits are successfully completed.
- The City of San Diego is not responsible for any taxes, fees, or tariffs that may be imposed as a result of rebate-related device purchase(s) or work performed.
- **Funding for rebates is limited and available on a first come, first served basis. Program requirements are subject to change without prior notification.**

APPLICANT & SITE INFORMATION

Application must be signed. Mail this form with a copy of water bill.

Applicant name: ______________________________ ______________
(customer to receive rebate) Last Name First Name

Property address: ______________________________ ______________
Street Address Zip Code

Mailing address: ______________________________ ______________
Street Address, Apt.#, P.O Box Zip Code

Telephone number: ______________________________ ______________
Home Cell/Work

Account number: ______________________________ ______________
Located on your water bill) E-mail

If applicant is renting the property, property owner must provide signature:

Property owner name:______________________________ ______________
(if different from Applicant name) Last Name First Name

Property owner signature: ____

CHECK BOX FOR REBATE(S) YOU WISH TO APPLY FOR AND PROVIDE REQUESTED INFORMATION:

☐ **Smart Controller Rebate:** Up to $400 per address (see list of SWAT list of approved devices on Resource and SWAT list PDF).

Estimated total square feet under automated irrigation (must be at least 500 SF): ____________________

Number of irrigation valves/stations: ____________________

Existing irrigated landscape, operable valves and existing irrigation controller will be verified at the pre-site inspection. Original receipts must be submitted to qualify for rebate.

☐ **Micro-Irrigation Rebate:** $0.20 per SF of area converted from overhead spray irrigation to micro-irrigation. Maximum rebate amount is $480 per address.

Estimated SF of area converted _____________x 0.20 = $ ____________ (Minimum conversion is 200 SF)

Existing planted area with operable overhead irrigation will be verified at the pre-site inspection.
Original receipts must be submitted to qualify for rebate.

☐ **Sustainable Landscape-Turf Replacement Rebate:**

Which rebate level would you like:

☐$1.25 per SF of turfgrass replaced by water wise landscape (up to 2,400 SF and $3,000, plant list only required).

☐$1.50 per SF of turfgrass replaced by water wise landscape (up to 2,000 SF and $3,000, design plans, irrigation plans, plant list, MAWA and ETWU calculations required).

Estimated total SF of **FRONT YARD** turf to be replaced with water wise landscape:__________________________
(Minimum 400 SF)

Existing living turf area with operable, overhead irrigation system will be verified at the pre-site inspection.
Original receipts must be submitted to qualify for rebate.

Customer Agreement

I, the undersigned, understand that this is a limited, first come, first-served program, that rebates are given only for projects which have applications that are approved, and that the City of San Diego Public Utilities Department can deny any application that does not meet program requirements (which can change without notification). I have voluntarily determined to participate in the City of San Diego's Outdoor Conservation Rebate Program and understand that no rebate will exceed the cost of the item purchased or exceed the stated maximum total dollar amount per customer rebate. I understand that my Public Utilities account must be in good standing to receive a rebate check. I agree that all work performed will comply with applicable state and local laws, ordinances, and regulations. If this application is approved, I agree that Public Utilities Water Conservation staff can conduct a water conservation survey/pre-site inspection and a post-installation site visit at my property, and verify that the project has been completed according to program requirements.

I understand that installation of devices and material are my responsibility, as is determination of the adequacy and compatibility of the existing irrigation system. Smart Controllers, Micro-Irrigation, and Sustainable Landscape-Turf Replacement projects must be installed within the Public Utilities service area. I understand that with the post-installation visit, Public Utilities makes no determination with respect to choice, quality or suitability of workmanship, materials or equipment. I acknowledge that installation of irrigation equipment or landscape materials may not result in lower water bills, and that rebates do not apply to sales tax charge.

I understand that project site shall be available for future inspection and monitoring (up to five years) by Public Utilities. Photos of the project may be taken by Public Utilities staff to illustrate transitions from thirsty landscapes to attractive, water wise landscapes. Addresses to project sites participating in the rebate program will be available to the public. Customer names will not be made public nor associated with the site address.

I understand that Public Utilities is not responsible for items lost or destroyed in the mail/transit.

If this application is approved by Public Utilities and the work proceeds, I agree to defend, indemnify, and hold harmless Public Utilities, its agents and employees against any and all loss, liability, expense, claims, suits and damages, including attorney's fees, arising out of or resulting from the installation of irrigation equipment and landscape equipment. I have read, understand, and agree to the terms and conditions of the rebate(s) for which I am applying.

Please consult with a tax advisor if you have questions regarding any potential tax implications of your rebate.

Customer Signature: ______________________________

Date: ______________________________

How did you hear about the rebates? ______________________________

Application must be signed by water account holder. Mail this form with a copy of your water bill. Please keep copies of all submittals.

Mail to: City of San Diego Public Utilities Department Attn: Outdoor Water Conservation Rebates, 600 B Street, Suite 400, San Diego, CA 92101.

For important information about rebate programs please read the guidelines for each specific rebate type (www.sandiego.gov/water/conservation). If you have questions e-mail waterconservationrebates@sandiego.gov. or call 619-533-4126 Monday – Friday 8:00 AM-5:00 PM

City of San Diego
RESIDENTIAL OUTDOOR WATER CONSERVATION REBATE PROGRAM

Sustainable Landscape-Turf Replacement Rebate Guidelines
Rebate--$1.25 or $1.50/Square Foot up to $3,000

Did you know that more than 50% of the water consumed by most households is used to maintain landscapes and lawns? You can help reduce your outdoor water use, keep your landscape more attractive and healthy--and save money on your water bill--by replacing your thirsty turf grass with a sustainable and water wise ornamental landscape. City of San Diego Public Utilities Department customers residing in a single-family home, duplex, townhome, or condominium that is served by an individual water meter can receive a rebate for turf replacement. Funding for a limited number of rebates is available through a State of California grant and will be distributed on a first come, first served basis until exhausted. This program is subject to change without prior notification. Read below for program requirements and application process. Rebate check will be sent to the customer of record 6-8 weeks after application and post-installation site visit are successfully completed. If you have questions after reading these guidelines, please call 619-533-4126 or e-mail waterconservationrebates@sandiego.gov.

Applicant's water account must be in good standing and program requirements must be met to be eligible for rebates. Customer must agree to and sign the application agreement before rebate is administered. Changes made related to rebate program must comply with all applicable laws, codes, policies, covenants, conditions, and restrictions. Please consult with a tax advisor if you have questions regarding any potential tax implications of your rebate.

Rebate Process

1. **Get an application...** Visit the City's Water Conservation Website to download the Residential Outdoor Rebate Program Application. Submit completed application to Water Conservation Program.

2. **Get a pre-site inspection and approval to begin project...** After the application is received a City scheduler will contact you to schedule a free water conservation survey and pre-site inspection. A Water Conservation Program representative will evaluate the proposed project area and if qualifications are met you will be given a project start date, at which time the 120 day conversion period begins.

3. **Submit plant list or design plans within 45 days of start date ….** Submit plant list within 45 days of project start date if you are applying for the $1.25/SF rebate. Submit scaled design plans within 45 days of project start date if you are applying for the $1.50/SF rebate. See below for more information on plant list and design plan submittals.

4. **Complete the project and schedule a post-installation visit within 120 days…** Call 619-570-1999 to schedule a post-installation site visit once project is completed (site visit must be scheduled before the 120 day conversion period is over). A Water Conservation representative will verify square footage and that program requirements are met. At this visit please provide representative with original itemized sales receipts and invoices from landscape professionals which must include vendor and/or company name, purchase date, date of services, itemized list of products purchased, description of services rendered.

5. **Receive a rebate…** Once application is deemed complete and post-installation site visit is successfully completed please allow 6-8 weeks for the rebate check to arrive in the mail.

Program Requirements:

- Project must replace high water use turf with plants that have moderate, low, or very-low watering requirements as defined in the 2010 Edition UC Davis Arboretum All-Stars brochure, the Water Use Classification of Landscape Species Reference (WUCOLS) or other accepted reference of plant water use.
- At maturity, plant density of the converted area must cover at least 50% of the project area. Tree canopy coverage (existing and new trees) will not be counted in the 50% plant coverage calculation.
- Rebate amount cannot exceed total project cost, up to a maximum of $3,000 per property.
- Minimum project conversion area is 400 SF (front yard lawns with less than 400 SF are eligible if 100% of turf is replaced).
- Existing turf in project area must be living and an in-ground irrigation system must be operational at the time of the survey/pre-site inspection.
- Converted areas must be permeable to air and water (ie. gravel, loose flagstone, decomposed granite). Permeable weed barriers are required under pervious hardscapes.
- If project will be irrigated, conversion of existing overhead spray irrigation system to micro-irrigation or low application rate rotating nozzles is highly recommended. The newly converted area must be on a separate irrigation valve from remaining turf. System must be capped if improved area will not have irrigation.
- Mulch must be spread to minimum depth of three inches where new plant material is installed unless a spreading groundcover is indicated.
- Pre- and post-site inspections are required as well as submittal of original receipts, invoices, and total project costs. Projects must be completed within 120 days from the date Water Conservation Program representative approves start of project at survey/pre-site inspection.

- Project site must be maintained for a minimum of five years, or for the duration of ownership of the property (whichever is shortest). Failure to meet this requirement may require customer to refund all or a portion of the rebate.
- Project site shall be available for future inspection and monitoring (up to five years) by Public Utilities. Photos of the project may be taken by Public Utilities staff to illustrate transitions from thirsty landscapes to attractive, water wise landscapes. Addresses to project sites participating in the rebate program will be available to the public. Customer names will not be made public or associated with the address.

REBATE LEVELS:

- Receive $1.25/SF (up to 2,400 SF). A plant list must be submitted within 45 days of project start date. Plant list can be found in PDF format on the Sustainable Landscape-Turf Replacement webpage on the Water Conservation website. Plant list must include plants that will be planted, number of plants, size at maturity and WUCOLS page reference (or other accepted reference of plant water use page reference).

OR

- Receive $1.50/SF (up to 2,000 SF) after submitting a scaled garden design and irrigation plan. Do-it-yourself garden design plans are not eligible for rebate. A scaled garden design and irrigation plan must be completed by a landscape designer, landscape architect, certified landscape irrigation auditor or landscape contractor, and must include:
  - Plant names (common and scientific) with plant symbols showing coverage at 75-100% maturity and WUCOLs page reference (or other acceptable reference) to verify moderate to low water use
  - Mulch type and permeable hardscape details
  - Estimated Total Water Use (ETWU)
  - Maximum Applied Watering Allowance (MAWA) – Maximum 70% of ET
  - Irrigation plan with hydrozones and head or emitter placement and equipment list (if no irrigation is planned – show hydrozones only)
  - North arrow and scale
  - Plant list must include plants that will be planted, number of plants, size at maturity and WUCOLS page reference (or other accepted reference of plant water use page reference)

What does not qualify for a rebate?

- High water using plants (as classified by WUCOLs)
- Artificial turf
- Vegetable gardens
- Back yard turf conversion
- Exposed soil surfaces (exceptions made to accommodate specific garden design motifs)
- Impermeable surfaces such as bricks and flagstone mortared into place, or concrete. (Pervious surfaces that are part of the project area are eligible for rebate so long as total project area includes living plant coverage area of at least 50% at maturity)
- Water features or fountains (San Diego Municipal Code Land Development Code Appendix E calculates water features at same water coefficient as high water use plants)

- Planting of invasive species that have potential to spread aggressively, especially in areas interfacing wild lands, canyons, open space, or parks. For list of invasive species go to the California Invasive Plant Council website or the San Diego County Invasive Ornamental Plant Guide.

What is a sustainable landscape?

Sustainable landscapes are intended to be in balance with the local climate and environment, and are designed to require few added resources thereby reducing waste and minimizing air, water and soil pollution. The Sustainable Landscape-Turf Replacement Rebate Program is intended to encourage the replacement of high water using turf grass with ornamental plant material that thrives with little to moderate amounts of water during the extended dry periods that characterize San Diego's climate. The scaled use of turf, with a focus on the use of water wise plant material, abundant mulch, efficient irrigation and reduced runoff are components of sustainable landscaping. The objective of this rebate program is to encourage a reduction in water use through the conversion of grass to water wise plant material, while maintaining a high level of living landscape to benefit the environment.

Benefits of converting turf to sustainable and water wise landscape.

Turf grass is often the optimal choice for sports and recreational areas, but turf - especially those that consist of cool season grasses such as tall fescue, Kentucky bluegrass, red fescue, or perennial ryegrass, require frequent watering and maintenance. The Sustainable Landscape-Turf Replacement Rebate Program focuses on the replacement of thirsty turf grass material with ornamental water wise plants that use a moderate to very low amount of water. Additional steps such as converting overhead sprinklers to low flow micro-irrigation and installing a Smart Controller can further reduce water and energy use and help control irrigation runoff.

How much water does a sustainable landscape save?

Typically, cool season turf grass uses between 14 and 40 gallons of water per square foot annually, depending on site conditions. Once established, low to moderate water using plants can require less than half of the water required by cool season turf grass.

Costs that are covered by the sustainable landscape rebate.

The rebate is $1.25/SF for lawn area that is replaced with ornamental water wise landscape. The rebate increases to $1.50/SF if a landscape design professional is used to prepare a scaled design plan showing details such as total water use requirements as a percentage of evapo-transpiration (ET) for the planned landscape, common and scientific plant names, plant coverage at maturity, and irrigation design (hydrozones). Maximum rebate for both rebate levels is $3,000 per customer. Do-it-yourself labor costs are not eligible for rebate. Do-it-yourself garden design plans are not eligible for rebate. Tax is not included. Total rebate amount will not exceed the cost of the material and installation.

Attachment 4

Budget

Attachment 4

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2
Budget

Attachment 4 consists of the following items:

1. **Proposal Budget(s).** The Summary Budget (Table 4-1) provides a budget estimate for each project within this Implementation Grant Proposal, as well as summary budget for the entire proposal. Each section following includes the proposed budget for each individual project in this proposal.

The proposal budget provides detailed budget documentation to support each cost shown in the tables below under the section entitled Detailed Proposal Work Item Budgets. Please note that for many of the budget categories shown in Tables 4-2 – 4-67, there may be several tasks and sub-tasks.

Tables 4-2 – 4-67 also present the proposed funding match for each project within the Proposal, including information that describes how each project will contribute to the overall funding match. Although each individual project may not contribute a full 25%, the proposal as a whole far exceeds the Department of Water Resources (DWR) funding match criteria of 25%. As a whole, this proposal contains a 60% funding match. None of the seven projects will apply for a funding match waiver, even those projects that are addressing critical water supply and/or water quality issues for a disadvantaged community (DAC).

Total Proposal Cost Estimate

As described in Attachment 3, the *San Diego IRWM Implementation Grant Proposal – Round 2* involves implementation of seven projects to meet the region's water management needs. These projects are:

1) North San Diego County Regional Recycled Water Project – Phase II
2) Turf Replacement and Agricultural Irrigation Efficiency Program
3) Rural Disadvantaged Community (DAC) Partnership Program
4) Failsafe Potable Reuse at the Advanced Water Treatment Facility
5) Sustaining Healthy Tributaries to the Upper San Diego River
6) Chollas Creek Integration Project – Phase II
7) Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

The total budget for this proposal is $31,886,921. Of this amount, $10,511,225 (33% percent) is being requested from DWR through the IRWM Grant Program, $19,050,289 (60% percent) is being provided through non-State funding sources (funding match), and $1,943,610 is being provided through other State funds and is not being used towards the Proposal's funding match.

Table 4-1 presents the overall cost of proposal implementation. Detailed cost estimates for each project contained in the proposal follow. The specific work items outlined in Attachment 3 are reflected in the detailed cost estimates.

Table 4-1: Summary Budget (PSP Table 8)

Proposal Title: San Diego IRWM Implementation Grant Proposal – Round 2						
		(a)	(b)	(c)	(d)	(e)
Individual Project Title		Requested Grant Amount	Cost Share: Non-State Fund Source (Funding Match)	Cost Share: Other State Fund Source	Total Cost	% Funding Match
(1)	North San Diego County Regional Recycled Water Project – Phase II	$3,555,560	$15,594,668	$0	$19,150,228	81%
(2)	Turf Replacement and Agricultural Irrigation Efficiency Program	$592,760	$191,831	$0	$784,591	24%
(3)	Rural Disadvantaged Community (DAC) Partnership Project – Phase II	$1,943,610	$1,550,271	$2,325,407	$5,819,288	27%
(4)	Failsafe Potable Reuse at the Advanced Water Purification Facility	$2,176,390	$975,313	$0	$3,151,703	31%
(5)	Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies	$536,630	$175,224	$0	$711,854	25%
(6)	Chollas Creek Integration Project – Phase II	$515,000	$163,723	$0	$678,723	24%
(7)	Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II	$1,191,275	$399,259	$0	$1,590,534	25%
	Proposal Total	**$10,511,225**	**$19,050,289**	**$2,325,407**	**$31,886,921**	**60%**
	DAC Funding Match Waiver Total	**$0**	**$0**	**$0**	**$0**	**N/A**
	Grand Total	**$10,511,225**	**$19,050,289**	**$2,325,407**	**$31,886,921**	**60%**

Note that due to rounding, the total costs presented herein are not necessarily equal to the hourly wage multiplied by the number of hours. As the hourly wages and total costs are fixed, the hours expended will be adjusted as necessary to account for rounding discrepancies.

Grant Administration

During project selection, the San Diego IRWM Regional Advisory Committee (RAC) recommended that approximately 3% of the entire grant request be allocated for grant administration. This recommendation was based on the Region's experience from *Proposition 50 Implementation Grant* and *Proposition 84 Implementation Grant – Round 1* contracting. As such, $300,855 was distributed proportionally across all seven proposed projects. As the region's grant administrator, San Diego County Water Authority (Water Authority) staff will manage the grant contract.

The Water Authority's Grant Administrator will manage the grant contract, amendment requests, and reporting requirements, along with communications with DWR staff. The Water Authority's Assistant Management Analyst will receive and reconcile the invoices for both grant reimbursables and funding match from the project sponsors, and compile them into an overall regional grant invoice for DWR. Costs are based on the Grant Administrator working 3,175 hours (~53 hours per month) and the Assistant Management Analyst working 1,908 (~32 hours per month) over five years (2013 – 2017), as shown in Table 4-2. Even with 3% of the grant request allocated to grant administration and individual project administration costs, administration costs to be reimbursed by the grant remain well under the 5% of total proposal cost limit set by DWR.

As described above, the grant administration costs are distributed proportionately across the seven proposed projects; see the individual Detailed Proposal Work Item Budgets below.

Table 4-2: Row (GA) Overall Grant Administration Costs

Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Grant Administrator	$71.15	3,175	$225,901	$225,901	$0
Assistance Management Analyst	$39.29	1,908	$74,954	$74,954	$0
Row (GA) Total for Proposal			**$300,855**	**$300,855**	**$0**

Interregional Project

The *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* project included in this funding application is an interregional project being implemented jointly by the San Diego IRWM and Upper Santa Margarita IRWM regions. Although the Upper Santa Margarita IRWM region is a full partner and benefits will accrue across watershed boundaries to both regions, the entire project work plan, budget, and benefits for the project have been included in this funding application in order to simplify project administration and contracting.

The San Diego Funding Area maintains the Tri-County FACC, an agreement among the three Regional Water Management Groups (RWMGs) to equitably allocate the Funding Area's Proposition 84 funds. Consequently, the Upper Santa Margarita RWMG has committed both grant funds (per the aforementioned agreement) and matching funds to support this interregional project. Please refer to Appendix 3-1 in Attachment 3 for a letter of support for the interregional project from our San Diego IRWM Program Manager.

Detailed Proposal Work Item Budgets

Detailed budgets for each of the projects included within this proposal, including a summary budget and supporting cost information are provided in the following sections.

Project 1: North San Diego County Regional Recycled Water Project – Phase II

The *North San Diego County Regional Recycled Water Project (NSDCRRWP) – Phase II* will provide for a comprehensive recycled water program by consolidating and interconnecting North San Diego recycled water purveyors with regional customers across jurisdictional boundaries. The project provides a sustainable, reliable, water resource for North San Diego County by connecting existing demand with available supply. Funding for this project is primarily for construction activities.

Table 4-3 provides an overview of the ten project components and the volume of recycled water produced and distributed by each component.

Table 4-3: Recycled Water Distributed Via NSDCRRWP-Phase II Components

NSDCRRWP-Phase II Component	Recycled Water (AFY)
Component 1-1: LWD Regional System Connection	250
Component 1-2: VWD Pump Improvements	300
Component 1-3: VID Golf Course Recycled Water	200
Component 1-4: RMWD Northwest Recycled Water Expansion	16
Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water	350
Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements	50
Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion	454
Component 1-8: Escondido Recycled Water Easterly Main Extension	4,570
Component 1-9: Oceanside Reclaimed Water Main Extension	600
Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage	*
Total	**6,790**
* Provides 350 AFY storage for Component 1-5	

The total cost associated with the *North San Diego County Regional Recycled Water Project – Phase II* is $19,150,228. Of these total costs, $3,555,560 is being requested for grant funding through the IRWM Grant Program. The remaining $15,594,668 will be funded through the Capital Improvement Programs (CIPs) of the participating project partners. In total, the non-State share of the total project cost (funding match) is 81%for this project.

Table 4-4 below provides a more detailed break-down of the total project budget.

Table 4-4: Total Project Budget
North San Diego County Regional Recycled Water Project – Phase II

Proposal Title: San Diego IRWM Implementation Grant Proposal – Round 2
Project Title: North San Diego County Regional Recycled Water Project – Phase II
Project serves a need of a DAC?: ☐ Yes ☒ No
Funding Match Waiver request?: ☐ Yes ☒ No

		(a)	(b)	(c)	(d)
	Category	**Requested Grant Amount**	**Cost Share: Non-State Fund Source* (Funding Match)**	**Cost Share: Other State Fund Sources***	**Total**
(GA)	Grant Administration	$103,560	$0	$0	$103,560
(a)	Direct Project Administration	$69,000	$0	$0	$69,000
(b)	Land Purchase/ Easement	$0	$0	$0	$0
(c)	Planning/ Design/ Engineering/ Environmental Documentation	$96,000	$32,000	$0	$128,000
(d)	Construction/ Implementation	$3,287,000	$15,562,668	$0	$18,849,668
(e)	Environmental Compliance/ Mitigation/ Enhancement	$0	$0	$0	$0
(f)	Construction Administration	$0	$0	$0	$0
(g)	Other Costs	$0	$0	$0	$0
(h)	Construction/ Implementation Contingency	$0	$0	$0	$0
(i)	**Grand Total**	**$3,555,560**	**$15,594,668**	**$0**	**$19,150,228**

This Implementation Grant Proposal is requesting funding for two project tasks identified within the *North San Diego County Regional Recycled Water Project – Phase II* work plan (refer to Attachment 3).

The sections below provide detailed descriptions of each of the row and task budgets (where applicable). In addition, each description below describes how cost estimates for each of the tasks or rows were calculated.

(GA) Grant Administration

As part of this proposal, each project has agreed to allocate an amount equivalent to 3% of their grant request to pay for the cost for grant administration by the Water Authority. The *North San Diego County Regional Recycled Water Project – Phase II* project's contribution will be $103,560 to this effort.

Row (a) Direct Project Administration Costs

Total direct project administration costs included in the proposed budget for *North San Diego County Regional Recycled Water Project – Phase II* are $69,000, as shown in Table 4-5

Task 1: Project Administration

Not applicable.

Task 2: Labor Compliance Program

Not applicable.

Task 3: Reporting

This task includes the costs associated with preparing invoice work summaries, quarterly progress reports, and final reports for submittal to the Water Authority and DWR. This is based on the estimate that approximately 35 hours will be spent by OMWD's Analyst on a quarterly basis, for a total of 690 hours over the five-year grant contract.

Table 4-5: Row (a) Direct Project Administration
North San Diego County Regional Recycled Water Project – Phase II

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 3: Reporting						
OMWD Reporting for Grant Contract (2%)	Analyst	$100	690	$69,000	$69,000	$0
Task 3 Total				**$69,000**	**$69,000**	**$0**
Row (a) Total				**$69,000**	**$69,000**	**$0**

Row (b) Land Purchase/ Easement

Not applicable.

Row (c) Planning/ Design/ Engineering/ Environmental Documentation

The project will not require planning, design, engineering or environmental documentation for nine of the ten project components. *Component 1-6: SFID's Onsite Recycled Water Irrigation System Improvements* will require final design work, at a cost of $128,000. Table 4-6 provides a summary of Row (c) costs.

Task 4: Assessment and Evaluation

Not applicable.

Task 5: Final Design

Final design for *Component 1-6: SFID's Onsite Recycled Water Irrigation System Improvements* will include costs for a design consultant to complete preliminary concept (30%), draft final (90%), and final (100%) design drawings and specifications. This cost is based on SFID's experience with recycled water retrofit design and construction. Approximately $96,000 is being requested from the IRWM Grant Program, while $32,000 will be provided by SFID as funding match.

Task 6: Environmental Documentation

Not applicable.

Task 7: Permitting

Not applicable.

Table 4-6: Row (c) Planning/ Design/ Engineering/ Environmental Documentation
North San Diego County Regional Recycled Water Project – Phase II

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 5: Final Design						
Component 1-6: SFID On-site Recycled Water Irrigation System Improvements Project						
Preliminary Concept Drawings and Specifications (30 % Design)	Design Consultants	$160.00	320	$51,200	$38,400	$12,800
Draft Final Drawings and Specifications (90% Design)	Design Consultants	$160.00	320	$51,200	$38,400	$12,800
Final Drawings and Specifications with DEH Approvals (100%)	Design Consultants	$160.00	160	$25,600	$19,200	$6,400
Task 5 Total				**$128,000**	**$96,000**	**$32,000**
Row (c) Total				**$128,000**	**$96,000**	**$32,000**

Row (d) Construction/ Implementation

Construction costs for this project are estimated to be $18,849,668. Table 4-7 provides a summary of all applicable costs. Details of each subproject's construction budget are provided in Tables 4-7-1 through 4-7-10.

Task 8: Construction Contracting: Construction contracting will be implemented by each partner agency independently; those costs have not been included in this budget.

Task 9: Construction: Implementation costs for this project are divided between three categories: materials, equipment, and labor. These costs, which are summarized below, will support construction of the *North San Diego County Regional Recycled Water Project – Phase II* infrastructure described within Task 9 of the work plan (refer to Attachment 3).

- **Materials:** Materials for the project include various retrofit-related materials, pipeline and tank materials, various construction materials, education and training materials, technical resources, and marketing and outreach materials.
- **Equipment:** Equipment for the project includes various construction equipment necessary for retrofits, pump and pipeline installations, tank repair and replacement, and associated supporting equipment.
- **Labor:** Labor required to fulfill the construction task includes construction and installation foremen, laborers, operators, and inspectors.

Table 4-7: Row (d) Construction/ Implementation Summary
North San Diego County Regional Recycled Water Project – Phase II

Component	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 9: Construction/ Implementation					
Component 1-1LWD Regional System Connection Project					
Materials	See Table 4-8		$738,060	$338,300	$399,760
Equipment	See Table 4-8		$124,380	$0	$124,380
Labor	See Table 4-8		$1,137,560	$0	$1,137,560
Component 1-1 Total			$2,000,000	$338,300	$1,661,700
Component 1-2VWD Pump Improvements					
Materials	See Table 4-9		$319,200	$239,400	$79,800
Equipment	See Table 4-9		$26,887	$20,198	$6,689
Labor	See Table 4-9		$104,936	$78,702	$26,234
Component 1-2 Total			$451,023	$338,300	$112,723
Component 1-3VID Golf Course Recycled Water Project					
Materials	See Table 4-10		$608,200	$195,200	$413,000
Equipment	See Table 4-10		$47,400	$35,550	$11,850
Labor	See Table 4-10		$143,400	$107,550	$35,850
Component 1-3 Total			$799,000	$338,300	$460,700
Component 1-4RMWD Northwest Recycled Water Expansion Project					
Materials	See Table 4-11		$129,316	$76,348	$52,968
Equipment	See Table 4-11		$188,895	$111,524	$77,371
Labor	See Table 4-11		$254,595	$150,428	$104,167
Component 1-4 Total			$572,806	$338,300	$234,506
Component 1-5OMWD Conversion of Distribution Facilities to Recycled Water					
Materials	See Table 4-12		$883,500	$51,615	$831,885
Equipment	See Table 4-12		$1,222,305	$65,137	$1,157,168
Labor	See Table 4-12		$2,211,995	$221,548	$1,990,447
Component 1-5 Total			$4,317,800	$338,300	$3,979,500
Component 1-6SFID Onsite Recycled Water Irrigation System Improvements Project					
Materials	See Table 4-13		$161,500	$108,000	$53,500
Equipment	See Table 4-13		$56,400	$41,900	$14,500
Labor	See Table 4-13		$129,600	$92,400	$37,200
Component 1-6 Total			$347,500	$242,300	$105,200
Component 1-7Carlsbad MWD Recycled Water Pipeline Expansion Project					
Materials	See Table 4-14		$403,321	$201,961	$201,361
Equipment	See Table 4-14		$1,240,696	$0	$1,240,696
Labor	See Table 4-14		$1,639,854	$136,340	$1,503,515
Component 1-7 Total			$3,283,871	$338,300	$2,945,571
Component 1-8Escondido Recycled Water Easterly Main Extension Project					
Materials	See Table 4-15		$1,955,600	$147,371	$1,808,229
Equipment	See Table 4-15		$727,600	$54,831	$672,769
Labor	See Table 4-15		$1,806,000	$136,098	$1,669,902
Component 1-8 Total			$4,489,200	$338,300	$4,150,900
Component 1-9Oceanside Reclaimed Water Main Extension Project					
Materials	See Table 4-16		$511,129	$81,436	$429,692
Equipment	See Table 4-16		$428,742	$68,599	$360,143
Labor	See Table 4-16		$1,176,656	$188,265	$988,391
Component 1-9 Total			$2,116,527	$338,300	$1,778,227
Component 1-10SEJPA Conversion of Existing Tanks to Recycled Water Storage Project					
Materials	See Table 4-17		$280,293	$188,819	$91,474
Equipment	See Table 4-17		$56,240	$43,867	$12,373
Labor	See Table 4-17		$135,408	$105,614	$29,794
Component 1-10 Total			$471,941	$338,300	$133,641
Task 9 Total			**$18,849,668**	**$15,562,668**	**$3,287,000**
Row (d) Total			**$18,849,668**	**$15,562,668**	**$3,287,000**

Construction costs for each of the ten project components are described below, along with a breakdown of these costs.

Component 1-1: LWD Regional System Connection Project

Quotes from material suppliers were used as the foundation of the estimate of materials, equipment, and labor needed to complete the project. The labor and equipment needed to install the quantities of identified items is also included in the engineer's estimate of construction cost. Construction of a new pump station wet well will be required and quantities of materials were estimated for excavation, backfill, and construction of concrete. Total estimated construction costs are $2,000,000 as shown in Table 4-8 below.

Table 4-8: Row (d) Construction/ Implementation – Details for 1-1
North San Diego County Regional Recycled Water Project – Phase II
Component 1-1: LWD Regional System Connection Project

Materials						
Activity or Deliverable	**Units**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Bonds and Insurance - 5%	Each	$100,000.00	1	$100,000	$0	$100,000
Field Office with Utilities For Duration	Each	$40,000.00	1	$40,000	$0	$40,000
Prepare & Submit Detailed Schedule & Schedule of Values	Each	$2,500.00	1	$2,500	$0	$2,500
Traffic Control Plans, Encroachment Permit, Signage, K-Rail	Each	$2,500.00	1	$2,500	$0	$2,500
Groundwater Testing & Discharge Permit	Each	$2,500.00	1	$2,500	$0	$2,500
Storm Water Pollution Prevention Plan - Silt Fence, straw waddles, stakes, sand bags	Each	$4,500.00	1	$4,500	$0	$4,500
Mobilize Equipment and Crews	Each	$250.00	1	$260	$0	$260
Subtotals				$152,260	$0	$152,260
Subtask 9.2 Project Construction						
16" DIP Transmission Pipe	LF	$42.88	200	$8,575	$8,575	$0
16" Pipe Fittings and Valves	Each	$9,068.76	1	$9,069	$9,069	$0
12" PVC Transmission Pipe	LF	$21.02	1,000	$21,017	$21,017	$0
12" Pipe Fittings and Valves	Each	$17,095.63	1	$17,096	$17,096	$0
Excavation and Recompaction	CY	$40.00	1,200	$48,000	$0	$48,000
Paving	SF	$10.00	6,000	$60,000	$0	$60,000
Concrete & Reinforcing Steel	CY	$750.00	120	$90,000	$0	$90,000
125 Horsepower Pumps and Motors	Each	$81,000.00	2	$162,000	$162,000	$0
Variable Frequency Drives	Each	$40,500.00	2	$81,000	$81,000	$0
Motor Control Center Expansion	Each	$32,400.00	1	$32,400	$32,400	$0
Conduit & Wire, Lock-Out Switch - Materials	Each	$21,600.00	1	$7,144	$7,144	$0
SCADA, SCADA Integration, Telephone Telemetry	Each	$30,000.00	1	$30,000	$0	$30,000
Subtotals				$566,300	$338,300	$228,000

Materials						
Activity or Deliverable	**Units**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.3 Performance Testing and Demobilization						
Soil & Concrete Testing	Each	$5,000.00	1	$5,000	$0	$5,000
Horsepower, Flow, & Pressure Testing	Each	$2,500.00	3	$7,500	$0	$7,500
Operating Manuals	Each	$200.00	10	$2,000	$0	$2,000
Demobilize Equipment and Crews	Each	$5,000.00	1	$5,000	$0	$5,000
Subtotals				$19,500	$0	$19,500
Materials Total				**$738,060**	**$338,300**	**$399,760**

Equipment						
Activity or Deliverable	**Units**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Installation of Construction Office - Truck Tractor	Hour	$45.00	24	$1,080	$0	$1,080
Pick-Up Trucks	Hour	$20.00	160	$3,200	$0	$3,200
			Subtotal	$4,280	$0	$4,280
Subtask 9.2 Project Construction						
Pipeline & Structure Excavation/Backfill - Excavator - 1 cu yd bucket	Hour	$39.00	480	$18,720	$0	$18,720
Pipeline & Structure Excavation/Backfill - Dump Trucks - 8 cu yd	Hour	$35.00	480	$16,800	$0	$16,800
Pipe Installation, Set Forms, Place Concrete - Crane	Hour	$95.00	300	$28,500	$0	$28,500
Concrete Pumper Truck	Hour	$45.00	40	$1,800	$0	$1,800
Across All Activities- Pick-Up Trucks	Hour	$20.00	2,500	$50,000	$0	$50,000
Subtotal				$115,820	$0	$115,820
Subtask 9.3 Performance Testing and Demobilization						
Remove Construction Office - Truck Tractor	Hour	$45.00	24	$1,080	$0	$1,080
Across All Activities - Pick-Up Trucks	Hour	$20.00	160	$3,200	$0	$3,200
Subtotal				$4,280	$0	$4,280
Equipment Total				**$124,380**	**$0**	**$124,380**

Labor						
Activity or Deliverable	**Units**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Project Manager	Hour	$120.00	40	$4,800	$0	$4,800
Superintendent	Hour	$90.00	40	$3,600	$0	$3,600
Land Surveying - Surveyor Crew	Hour	$160.00	32	$5,120	$0	$5,120
Traffic Control Implementation - Laborers	Hour	$44.00	160	$7,040	$0	$7,040
Mobilize Equipment and Crews	Hour	$45.00	40	$1,800	$0	$1,800
Subtotal				$22,360	$0	$22,360

Labor						
Activity or Deliverable	**Units**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.2 Project Construction						
Operating Engineers For All Equipment inc Pickups	Hour	$60.00	1,430	$85,800	$0	$85,800
Laborers	Hour	$44.00	10,900	$479,600	$0	$479,600
Cement Masons - Engineering Construction	Hour	$43.00	1,300	$55,900	$0	$55,900
Carpenters	Hour	$50.00	4,150	$207,500	$0	$207,500
Superintendent	Hour	$90.00	2,300	$207,000	$0	$207,000
Contractors Office Engineering Support	Hour	$120.00	320	$38,400	$0	$38,400
Subtotal				$1,074,200	$0	$1,074,200
Subtask 9.3 Performance Testing and Demobilization						
Construction Inspector	Hour	$60.00	120	$7,200	$0	$7,200
Soils and Material Tester	Hour	$60.00	480	$28,800	$0	$28,800
Concrete Site and Lab Techs	Hour	$5,000.00	1	$5,000	$0	$5,000
Subtotal				$41,000	$0	$41,000
Labor Total				**$1,137,560**	**$0**	**$1,137,560**
Component 1-1 Total				**$2,000,000**	**$338,300**	**$1,661,700**

Component 1-2: VWD Pump Improvements

Estimated materials costs were based on pricing from previous construction contracts and cost figures commonly used in the water and wastewater industry. Equipment rates were taken from the U.S. Department of Homeland Security Federal Emergency Management Agency's *2010 Schedule of Equipment Rates*. Labor costs were taken from the *San Diego Prevailing Wage List*. Total estimated construction costs are $451,023 as shown in Table 4-9 below.

Table 4-9: Row (d) Construction/Implementation– Details for 1-2
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-2: VWD Pump Improvements

Materials						
Activity or Deliverable	**Units**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Mobilize Equipment and Crews	Each	$12,000.00	1	$12,000	$9,000	$3,000
Insurance and Bonds	Each	$17,000.00	1	$17,000	$12,750	$4,250
Permits and Safety Plan	Each	$1,500.00	1	$1,500	$1,125	$375
Subtotal				$30,500	$22,875	$7,625
Subtask 9.2 Project Construction						
2,000 GPM Pump and 125 HP Motor	EA	$74,000.00	1	$74,000	$55,500	$18,500
VFD/MCC, Instrumentation and Wiring	EA	$33,000.00	1	$33,000	$24,750	$8,250
10" DIP and Fittings	LF	$70.00	30	$2,100	$1,575	$525
12" DIP and Fittings	LF	$100.00	20	$2,000	$1,500	$500
16" DIP and Fittings	LF	$150.00	60	$9,000	$6,750	$2,250
8" Check Valve	Each	$6,500.00	1	$6,500	$4,875	$1,625
8" Gate Valve	Each	$5,500.00	2	$11,000	$8,250	$2,750
16" Gate Valve	Each	$12,500.00	2	$25,000	$18,750	$6,250

Materials						
Activity or Deliverable	**Units**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
16" Flow Meter	Each	$11,500.00	1	$11,500	$8,625	$2,875
Reinforced Concrete Pump Base	Each	$2,000.00	1	$2,000	$1,500	$500
Pre-Cast Concrete Vault	Each	$9,800.00	1	$9,800	$7,350	$2,450
Electrical Service Enclosure	SF	$180.00	40	$7,200	$5,400	$1,800
Electrical Service and Auto Transfer Switch	Each	$36,000.00	1	$36,000	$27,000	$9,000
Electrical Conduit and Wiring	Each	$8,500.00	1	$8,500	$6,375	$2,125
Overhead Crane Structural Reinforcement	Each	$35,000.00	1	$35,000	$26,250	$8,750
Asphalt Concrete Paving	Each	$12.00	300	$3,600	$2,700	$900
Landscape Restoration	Each	$2,500.00	1	$2,500	$1,875	$625
Subtotal				$278,700	$209,025	$69,675
Subtask 9.3 Performance Testing and Demobilization						
Soil & Concrete Testing	Each	$2,000.00	1	$2,000	$1,500	$500
Horsepower, Flow, & Pressure Testing	Each	$1,000.00	1	$1,000	$750	$250
Operating Manuals	Each	$200.00	5	$1,000	$750	$250
Demobilize Equipment and Crews	Each	$6,000.00	1	$6,000	$4,500	$1,500
Subtotal				$10,000	$7,500	$2,500
Materials Total				**$319,200**	**$239,400**	**$79,800**

Equipment						
Activity or Deliverable	**Units**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Breaker, Pavement - 70 hp	Hour	$31.25	20	$625	$469	$156
Compactor - 10 hp	Hour	$11.00	20	$220	$165	$55
Compactor, Vib. Drum - 75 hp	Hour	$25.00	20	$500	$375	$125
Loader-Backhoe, Wheel - 1 cy	Hour	$23.50	20	$470	$353	$118
Mixer, Concrete, Trailer Mntd.	Hour	$15.25	20	$305	$229	$76
Trailer, Equip - 30 ton	Hour	$10.25	20	$205	$154	$51
Truck, Dump - 8 cy	Hour	$35.00	20	$700	$525	$175
Subtotal				$3,025	$2,269	$756
Subtask 9.2 Project Construction						
Air Compressor - 30 hp	Hour	$7.00	120	$840	$630	$210
Breaker, Pavement - 70 hp	Hour	$31.25	16	$500	$375	$125
Compactor - 10 hp	Hour	$11.00	60	$660	$495	$165
Compactor, Vib. Drum - 75 hp	Hour	$25.00	16	$400	$300	$100
Generator - 10 hp	Hour	$3.25	160	$520	$390	$130
Jackhammer (Dry) - 45 lb	Hour	$1.00	40	$40	$30	$10
Loader-Backhoe, Wheel - 1 cy	Hour	$23.50	120	$2,820	$2,115	$705
Mixer, Concrete, Trailer Mntd.	Hour	$15.25	40	$610	$490	$120
Pick-up, Asphalt - 200 hp	Hour	$110.00	40	$4,400	$3,300	$1,100
Saw, Concrete - 26 in. blade	Hour	$13.50	40	$540	$405	$135
Trailer, Equip - 30 ton	Hour	$10.25	80	$820	$615	$205
Truck, Dump - 8 cy	Hour	$35.00	32	$1,120	$840	$280
Truck, Pick-up - 1 ton	Hour	$20.00	380	$7,600	$5,700	$1,900

Equipment						
Activity or Deliverable	**Units**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Welder, Portable - 34 hp	Hour	$11.50	64	$736	$552	$184
Subtotal				$21,606	$16,237	$5,369
Subtask 9.3 Performance Testing and Demobilization						
Breaker, Pavement - 70 hp	Hour	$31.25	5	$156	$117	$39
Compactor - 10 hp	Hour	$11.00	5	$55	$41	$14
Compactor, Vib. Drum - 75 hp	Hour	$25.00	5	$125	$94	$31
Loader-Backhoe, Wheel - 1 cy	Hour	$23.50	5	$118	$88	$29
Mixer, Concrete, Trailer Mntd.	Hour	$15.25	5	$76	$57	$19
Trailer, Equip - 30 ton	Hour	$10.25	5	$51	$38	$13
Truck, Dump - 8 cy	Hour	$35.00	5	$175	$131	$44
Pump & Pressure Testing, Disinfection Equipment	Lump Sum	$1,500.00	1	$1,500	$1,125	$375
Subtotal				$2,256	$1,692	$564
Equipment Total				**$26,887**	**$20,198**	**$6,689**

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Labor						
Activity or Deliverable	**Units**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Project Manager	Hour	$120.00	8	$960	$720	$240
Superintendent	Hour	$90.00	40	$3,600	$2,700	$900
Land Surveying - Surveyor Crew	Hour	$160.00	20	$3,200	$2,400	$800
Operating Engineer	Hour	$60.00	80	$4,800	$3,600	$1,200
Laborer - Pipeline	Hour	$45.00	40	$1,800	$1,350	$450
Mobilize Equipment and Crews	Hour	$45.00	32	$1,440	$1,080	$360
Subtotal				$15,800	$11,850	$3,950
Subtask 9.2 Project Construction						
Cement Mason - Engr. Construction	Hour	$43.00	120	$5,160	$3,870	$1,290
Laborer - Pump Installation	Hour	$45.00	64	$2,880	$2,160	$720
Laborer - Pipeline	Hour	$45.00	120	$5,400	$4,050	$1,350
Laborer - Electrical	Hour	$45.00	120	$5,400	$4,050	$1,350
Project Manager	Hour	$120.00	120	$14,400	$10,800	$3,600
Superintendent	Hour	$90.00	140	$12,600	$9,450	$3,150
Contractors Office Engr. Support	Hour	$120.00	80	$9,600	$7,200	$2,400
Operating Engineer	Hour	$60.00	120	$7,200	$5,400	$1,800
Laborer - Landscape/Irrigation	Hour	$42.00	60	$2,520	$1,890	$630
Welder - Overhead Crane and Piping Modifications	Hour	$46.50	64	$2,976	$2,232	$744
Laborer - Paving	Hour	$45.00	40	$1,800	$1,350	$450
Construction Inspector	Hour	$60.00	160	$9,600	$7,200	$2,400
Materials Tester	Hour	$60.00	40	$2,400	$1,800	$600
Subtotal				$81,936	$61,452	$20,484
Subtask 9.3 Performance Testing and Demobilization						
Laborer	Hour	$45.00	32	$1,440	$1,080	$360
Project Manager	Hour	$120.00	16	$1,920	$1,440	$480
Superintendent	Hour	$90.00	16	$1,440	$1,080	$360

Labor						
Activity or Deliverable	**Units**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Construction Inspector	Hour	$60.00	16	$960	$720	$240
Demobilize Equipment and Crews	Hour	$45.00	32	$1,440	$1,080	$360
Subtotal				$7,200	$5,400	$1,800
Labor Total				**$104,936**	**$78,702**	**$26,234**
Component 1-2 Total				**$451,023**	**$338,300**	**$112,723**

Component 1-3: VID Golf Course Recycled Water

The budget for this project was developed using a combination of prior experience and knowledge by VID engineering and construction staff, as well as information on file from a private contractor currently providing similar work for the District. Labor and equipment rates were estimated using information supplied by a private contractor as part of a time and materials work breakdown for similar work. An average labor rate for all of the trades utilized in the work was calculated to be $85 per hour (including a 40.25% labor surcharge and a 30% markup). An average equipment rate of $40 per hour was calculated from the type and number of hours the equipment was used to complete the time and materials work. Equipment included back hoe, track hoe, crew truck, water truck and compactor. Additionally, the time and materials work breaks down to be approximately 50% labor, 15% equipment and 35% materials. Using this information and prior experience from VID engineering and construction staff, the budget estimate was estimated to generally reflect this distribution of labor, equipment and materials. Total estimated construction costs are $799,000 as shown in Table 4-10 below.

Table 4-10: Row (d) Construction/ Implementation– Details for 1-3
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-3: VID Golf Course Recycled Water

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Staging site, staking, potholing, saw cutting, etc	Fencing, stakes, asphalt	$2,000.00	LS	$2,000	$1,500	$500
Acquisition of the failsafe pipeline from City of Vista	Purchase depreciated value of existing 14” & 16" pipeline	$500,000.00	LS	$500,000	$114,050	$385,950
Subtotal				$502,000	$115,550	$386,450
Subtask 9.2 Project Construction						
Metered Connection to CMWD	10" water meter	$8,000.00	1	$8,000	$6,000	$2,000
	Concrete vault	$15,000.00	1	$15,000	$11,250	$3,750
	12" gate valve & tapping saddle	$4,500.00	1	$4,500	$3,375	$1,125
	12" PVC pipe	$15.00	100	$1,500	$1,125	$375
	Backfill import/export (cu yd)	$15.00	60	$900	$675	$225

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
	Asphalt (sq ft)	$10.00	250	$2,500	$1,875	$625
	SCADA (Telemetry)	$5,000.00	LS	$5,000	$3,750	$1,250
400 feet of 8-inch Pipeline & Connection to Existing Pipes	8" PVC pipe (feet)	$10.00	400	$4,000	$3,000	$1,000
	8" gate valve & tapping sleeve	$2,000.00	1	$2,000	$1,500	$500
	Backfill import/export (cu yd)	$15.00	240	$3,600	$2,700	$900
	Asphalt (sq ft)	$10.00	1000	$10,000	$7,500	$2,500
	16"x8" adapters, thrust blocks, etc	$15,000.00	LS	$15,000	$11,250	$3,750
Restrain Joints on Existing Failsafe Pipeline	Concrete (cu yd)	$120.00	60	$7,200	$5,400	$1,800
Install 4" Potable Water Meter	4" water meter	$6,000.00	1	$6,000	$4,500	$1,500
	4" lateral, valve, paving, traffic control, etc	$100.00	100	$10,000	$7,500	$2,500
	Concrete vault	$10,000.00	1	$10,000	$7,500	$2,500
Subtotal				$105,200	$78,900	$26,300
Subtask 9.3 Performance Testing and Demobilization						
Flush and Pressure Test Pipelines	Water, etc	$1,000.00	LS	$1,000	$750	$250
Subtotal				$1,000	$750	$250
Materials Total				**$608,200**	**$195,200**	**$413,000**

Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Staging site, staking, potholing, saw cutting, etc	Backhoe, sawcutter, survey equip	$40.00	40	$1,600	$1,200	$400
Subtotal				$1,600	$1,200	$400
Subtask 9.2 Project Construction						
Metered Connection to CMWD	Backhoe, front loader, dump truck, compactor	$40.00	375	$15,000	$11,250	$3,750

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
400 feet of 8-inch Pipeline & Connection to Existing Pipes	Backhoe, front loader, dump truck, compactor	$40.00	370	$14,800	$11,100	$3,700
Restrain Joints on Existing Failsafe Pipeline	Backhoe, front loader, dump truck, compactor	$40.00	275	$11,000	$8,250	$2,750
Install 4" Potable Water Meter	Backhoe, dump truck, compactor	$40.00	100	$4,000	$3,000	$1,000
Subtotal			$1,120	$44,800	$33,600	$11,200
Subtask 9.3 Performance Testing and Demobilization						
Flush and Pressure Test Pipelines	Fire hose, gauges, water truck	$1,000.00	LS	$1,000	$750	$250
Subtotal				$1,000	$750	$250
Equipment Total				**$47,400**	**$35,550**	**$11,850**
Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Staging site, staking, potholing, saw cutting, etc	Foreman/ Labor	$100.00	40	$4,000	$3,000	$1,000
Subtotal				$4,000	$3,000	$1,000
Subtask 9.2 Project Construction						
Metered Connection to CMWD	Operator/ Labor	$85.00	550	$46,750	$35,063	$11,688
400 feet of 8-inch Pipeline & Connection to Existing Pipes	Operator/ Labor	$85.00	600	$51,000	$38,250	$12,750
Restrain Joints on Existing Failsafe Pipeline	Operator/ Labor	$85.00	300	$25,500	$19,125	$6,375
Install 4" Potable Water Meter	Operator/ Labor	$85.00	150	$12,750	$9,563	$3,188
Subtotal				$136,000	$102,000	$34,000
Subtask 9.3 Performance Testing and Demobilization						
Flush and Pressure Test Pipelines	Operator/ Labor	$85.00	40	$3,400	$2,550	$850
Subtotal				$3,400	$2,550	$850
Labor Total				**$143,400**	**$107,550**	**$35,850**
Component 1-3 Total				**$799,000**	**$338,300**	**$460,700**

Component 1-4: RMWD Northwest Recycled Water Extension

A consultant prepared the cost estimate based on the 90% complete design. The estimate is based on the quantities and unit price models developed from the design, quotations from general contractors and site conditions. The estimate includes direct labor costs, bulk purchased materials, construction equipment, and indirect costs (sales tax and transportation). This original estimate has labor and equipment combined based on material quantities. To separate the labor component, costs were calculated based on estimated crew hours and prevailing wages. Total estimated construction costs are $572,806 as shown in Table 4-11 below.

Table 4-11: Row (d) Construction/ Implementation– Details for 1-4
North San Diego County Regional Recycled Water Project – Phase II: Component 1-4: RMWD Northwest Recycled Water Extension

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
N/A						
Subtask 9.2 Project Construction						
AC Sawcut and Removal (SY)				$0	$0	$0
AC Pavement Replacement (SY)	Asphalt	$27.00	636	$17,172	$10,138	$7,034
Grading (SY)			128	$0	$0	$0
Fencing (LF)	Chain Link	$7.00	26	$182	$107	$75
Remove Fencing (LF)			41	$0	$0	$0
Equipment Pad (CY)	Cement	$405.00	3	$1,215	$717	$498
Curb (LF)	Cement	$6.00	67	$402	$237	$165
Stormdrain Wingwall (EA)	Cement	$1,400.00	1	$1,400	$827	$573
4" C900 Installation (LF)	PVC	$9.75	2100	$20,475	$12,088	$8,387
6" DI Installation (LF)	Ductile Iron	$28.00	50	$1,400	$827	$573
6" C900 Installation (LF)	PVC	$16.50	1400	$23,100	$13,638	$9,462
24" C905 SD Installation (LF)	PVC	$13.50	20	$270	$159	$111
Laterals and Meters (EA)	Copper Pipe	$1,100.00	4	$4,400	$2,598	$1,802
1" Air Valve (EA)	Copper Pipe	$1,100.00	2	$2,200	$1,299	$901
2" Blowoff (EA)	Copper Pipe	$1,100.00	1	$1,100	$649	$451
Fittings and Specials (EA)	Misc	$14,000.00	4	$56,000	$33,062	$22,938
Subtotal				$129,316	$76,348	$52,968
Subtask 9.3 Performance Testing and Demobilization						
N/A						
Materials Total				**$129,316**	**$76,348**	**$52,968**

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Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Mobilization (LS)		$1,840.00	1	$1,840	$1,086	$754
Surveying (LS)		$420.00	1	$420	$248	$172
Traffic Control (LS)	Signs / Cones	$5,690.00	1	$5,690	$3,359	$2,331
Subtotal				$7,950	$4,694	$3,256
Subtask 9.2 Project Construction						
AC Sawcut and Removal (SY)	Saw, Excavator	$6.70	585	$3,920	$2,314	$1,606

Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
AC Pavement Replacement (SY)	Paver	$17.31	636	$11,010	$6,500	$4,510
Grading (SY)	Excavator	$56.88	128	$7,280	$4,298	$2,982
4" C900 Installation (LF)	Excavator	$36.81	2100	$77,300	$45,638	$31,662
6" DI Installation (LF)	Excavator	$38.60	50	$1,930	$1,139	$791
6" C900 Installation (LF)	Excavator	$31.39	1400	$43,940	$25,942	$17,998
24" C905 SD Installation (LF)	Excavator	$33.50	20	$670	$396	$274
Laterals and Meters (EA)	Excavator	$340.00	4	$1,360	$803	$557
1" Air Valve (EA)	Excavator	$485.00	2	$970	$573	$397
2" Blowoff (EA)	Excavator	$485.00	1	$485	$286	$199
Fittings and Specials (EA)	Excavator	$6,250.00	4	$25,000	$14,760	$10,240
Subtotal				$173,865	$102,650	$71,215
Subtask 9.3 Performance Testing and Demobilization						
Demobilization (LS)		$1,840.00	1	$1,840	$1,086	$754
Cleanup and Disposal (LS)	Sweeper, Dump Truck	$2,240.00	1	$2,240	$1,322	$918
Testing (LS)	Samples	$3,000.00	1	$3,000	$1,771	$1,229
Subtotal				$7,080	$4,180	$2,900
Equipment Total				**$188,895**	**$111,524**	**$77,371**

Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Mobilization	(1)Foreman, (5)Operator/ Laborer	$285.00	10	$2,850	$1,683	$1,167
Surveying	2 Man Survey Crew	$225.00	16	$3,600	$2,125	$1,475
Traffic Control	(2)Operator/ Laborer	$90.00	26	$2,340	$1,382	$958
Subtotal				$8,790	$5,190	$3,600
Subtask 9.2 Project Construction						
AC Sawcut and Removal	(1)Foreman, (3)Operator/ Laborer	$195.00	12	$2,340	$1,382	$958
AC Pavement Replacement	(1)Foreman, (4)Operator/ Laborer	$240.00	64	$15,360	$9,069	$6,291
Grading	(1)Foreman, (1)Operator	$105.00	110	$11,550	$6,819	$4,731
Fencing	(3)Operator/ Laborer	$135.00	14	$1,890	$1,116	$774
Remove Fencing	(3)Operator/ Laborer	$135.00	8	$1,080	$638	$442
Equipment Pad	(3)Operator/ Laborer	$135.00	20	$2,700	$1,594	$1,106
Curb	(3)Operator/ Laborer	$135.00	6	$810	$478	$332

Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Stormdrain Wingwall	(3)Operator/ Laborer	$135.00	20	$2,700	$1,594	$1,106
4" C900 Installation	(1)Foreman, (5)Operator/ Laborer	$285.00	320	$91,200	$53,844	$37,356
6" DI Installation	(1)Foreman, (5)Operator/ Laborer	$285.00	12	$3,420	$2,019	$1,401
6" C900 Installation	(1)Foreman, (5)Operator/ Laborer	$285.00	240	$68,400	$40,383	$28,017
24" C905 SD Installation	(1)Foreman, (3)Operator/ Laborer	$195.00	4	$780	$461	$319
Laterals and Meters	(1)Foreman, (5)Operator/ Laborer	$285.00	14	$3,990	$2,356	$1,634
1" Air Valve	(1)Foreman, (5)Operator/ Laborer	$285.00	6	$1,710	$1,010	$700
2" Blowoff	(1)Foreman, (5)Operator/ Laborer	$285.00	3	$855	$505	$350
Fittings and Specials	(1)Foreman, (5)Operator/ Laborer	$285.00	100	$28,500	$16,826	$11,674
Subtotal				$237,285	$140,093	$97,192
Subtask 9.3 Performance Testing and Demobilization						
Demobilization	(1)Foreman, (5)Operator/ Laborer	$285.00	10	$2,850	$1,683	$1,167
Cleanup and Disposal	(3)Operator/ Laborer	$135.00	28	$3,780	$2,232	$1,548
Testing	(3)Operator/ Laborer	$135.00	14	$1,890	$1,231	$659
Subtotal				$8,520	$5,146	$3,374
Labor Total				**$254,595**	**$150,428**	**$104,167**
Component 1-4 Total				**$572,806**	**$338,300**	**$234,506**

Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water

The budget for this project was developed based upon data and figures contained the update of the *Potable and Recycled Water Master Plan Capital Improvement Program*, *Northwest Quadrant/Village Park Recycled Water Study*, *Study of Recycled Water Supply Options for the Northwest Quadrant*, and the preliminary design report for the *Northwest Quadrant Recycled Water Facilities Phase II*. Total estimated construction costs are $4,317,800 as shown in Table 4-12 below.

Table 4-12: Row (d) Construction/Implementation– Details for 1-5
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Pump Stations	Staging site, staking, potholing, saw cutting	$5,250.00	1	$5,250	$5,250	$0
Village Park	Staging site, staking, potholing, saw cutting	$24,850.00	1	$24,850	$24,850	$0
Subtotal				$30,100	$30,100	$0
Subtask 9.2 Project Construction						
Pump Stations	Pump Stations, prefabricated by EFI	$250,000.00	2	$500,000	$12,799	$487,201
Village Park	12-inch PVC pipeline in Gardenview	$10.00	6,500	$65,000	$1,664	$63,336
	12-inch gate valves	$1,500.00	5	$7,500	$192	$7,308
	8-inch PVC pipeline in Village Park	$7.50	20,000	$150,000	$3,840	$146,160
	8-inch gate valves	$1,200.00	10	$12,000	$307	$11,693
	asphalt (26,500 LF x 4 ft wide tranch)	$106,000.00	1	$106,000	$2,713	$103,287
Subtotal				$840,500	$21,515	$818,985
Subtask 9.3 Performance Testing and Demobilization						
Pump Stations	test pipeline, demobilization	$2,250.00	1	$2,250	$0	$2,250
Village Park	test pipeline, demobilization	$10,650.00	1	$10,650	$0	$10,650
Subtotal				$12,900	$0	$12,900
Materials Total				**$883,500**	**$51,615**	**$831,885**
Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Pump Stations	Backhoe, sawcutter, survey equip	$3,000.00	1	$3,000	$3,000	$0
Village Park	Backhoe, sawcutter, survey equip	$31,950.00	1	$31,950	$31,950	$0
Subtotal				$34,950	$34,950	$0

Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.2 Project Construction						
Pump Stations	Crane	$4,002.50	2	$8,005	$205	$7,800
Village Park	12-inch install- Backhoe, front loader, dump truck, compactor	$40.00	6,500	$260,000	$6,655	$253,345
	8-inch install- Backhoe, front loader, dump truck, compactor	$40.00	20,000	$800,000	$20,478	$779,522
	Misc. equipment - Gardenview	$5.00	6,500	$32,500	$832	$31,668
	Misc. equipment -Village Park	$2.50	20,000	$50,000	$1,280	$48,720
	Traffic sign boards (2x12 mo)	$1,200.00	24	$28,800	$737	$28,063
Subtotal				$1,179,305	$30,187	$1,149,118
Subtask 9.3 Performance Testing and Demobilization						
Pump Stations	Fire hose, gauges	$4,500.00	1	$4,500	$0	$4,500
Village Park	Fire hose, gauges	$3,550.00	1	$3,550	$0	$3,550
Subtotal				$8,050	$0	$8,050
Equipment Total				**$1,222,305**	**$65,137**	**$1,157,168**

Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Pump Stations	Foreman	$60.00	100	$6,000	$6,000	$0
	Operator/ Laborer	$45.00	533	$23,985	$23,985	$0
Village Park	Foreman	$60.00	475	$28,500	$28,500	$0
	Operator/ Laborer	$45.00	2,525	$113,625	$113,625	$0
Subtotal				$172,110	$172,110	$0
Subtask 9.2 Project Construction						
Pump Stations	Foreman	$60.00	500	$30,000	$768	$29,232
	Operator/ Laborer	$45.00	2,666	$119,970	$3,071	$116,899
	Inspection (1/8 Time 4 Mo.)	$100.00	80	$8,000	$205	$7,795

Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Village Park	12-inch PL Foreman	$60.00	1,358	$81,480	$2,086	$79,394
	12-inch PL Operator/ Laborer	$45.00	7,244	$325,980	$8,344	$317,636
	8-inch PL Foreman	$60.00	4,207	$252,420	$6,461	$245,959
	8-inch PL Operator /Laborer	$45.00	22,435	$1,009,575	$25,842	$983,733
	Inspection (1/2 Time 12 mo.)	$100.00	1,040	$104,000	$2,661	$101,339
	Construction Administration	$80.00	281	$22,480	$0	$22,480
Subtotal				$1,953,905	$49,438	$1,904,467
Subtask 9.3 Performance Testing and Demobilization						
Pump Stations	Foreman	$60.00	50	$3,000	$0	$3,000
	Operator/ Laborer	$45.00	266	$11,970	$0	$11,970
Village Park	Foreman	$60.00	237	$14,220	$0	$14,220
	Operator/ Laborer	$45.00	1,262	$56,790	$0	$56,790
Subtotal				$85,980	$0	$85,980
Labor Total				**$2,211,995**	**$221,548**	**$1,990,447**
Component 1-5 Total				**$4,317,800**	**$338,300**	**$3,979,500**

Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements

The material, equipment, and labor costs are based on *RS Means 2012 Catalog*. Materials estimates are based on Section 328423.10- Sprinkler Irrigation System. Equipment estimates are based on Section 01543320 for equipment rental costs. Labor estimates are based on Crew B9 and 10 in the RS Means 2012 Catalog. Total estimated construction costs are $347,500 as shown in Table 4-13 below.

Table 4-13: Row (d) Construction/Implementation – Details for 1-6
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Mobilization	Temp. Irrigation Pipe	$5.00 / L.F.	100	$500	$0	$500
Subtotal				$500	$0	$500
Subtask 9.2 Project Construction						
Install Proper Recycled Water Identification	Tags/Labels, Valve Boxes, Signs	$20.00 / tag	500	$10,000	$7,000	$3,000
Replace Sprinkler Heads	Sprinkler Heads, Quick Coupler Valves, Drinking Fountains	$52.00 / head	500	$26,000	$19,000	$7,000

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Install New Small Diameter Recycled Water Irrigation	1" / 2" IRR Pipe, Control Valves, Bedding/ Backfill	$5.00 / L.F.	5000	$25,000	$18,000	$7,000
Install Backflow Devices	Backflow Prevention Devices	$500.00 / RPPD	5	$2,500	$1,000	$1,500
Install Small Skid Mounted On-Site Booster Pumps	Booster Pumps, Electrical Service	$20,000.00 / BPS	3	$60,000	$35,000	$25,000
Install Recycled Water Service	Meter/Meter Box, Service Conn./Corp, Service Piping, Bedding/Backfill	$7,500.00 / service	5	$37,500	$28,000	$9,500
Subtotal				$161,000	$108,000	$53,000
Subtask 9.3 Performance Testing and Demobilization						
Demobilization	N/A					
Materials Total				**$161,500**	**$108,000**	**$53,500**

Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units/ Days**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Mobilization	Flat-bed truck, Loader	$1,000.00 / day	2.5	$2,500	$2,000	$500
Subtotal				$2,500	$2,000	$500
Subtask 9.2 Project Construction						
Install Proper Recycled Water Identification	Crew-truck w/ Hand-held irrigation tools	$400.00 / day	10	$4,000	$3,000	$1,000
Replace Sprinkler Heads	Crew truck w/ Hand-held irrigation tools	$400.00 / day	10	$4,000	$3,000	$1,000
Install New Small Diameter Recycled Water Irrigation	Trencher, Back-hoe with bucket, Crew truck w/ Hand-held irrigation tools	$1,400.00 / day	15	$21,000	$15,000	$6,000
Install Backflow Devices	Back-hoe with bucket, Crew truck	$1,000.00 / day	5	$5,000	$4,000	$1,000
Install Small Skid Mounted On-Site Booster Pumps	Truck mounted Crane, Back-hoe with bucket, Front-end loader, Crew truck	$3,100.00 / day	3	$9,300	$7,000	$2,300

Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units/ Days**	**Total ($)**	**Grant Request**	**Funding Match**
Install Recycled Water Service	Back-hoe with bucket, Front-end loader, Crew truck	$2,000.00 / day	5	$10,000	$7,500	$2,500
Subtotal				$53,300	$39,500	$13,800
Subtask 9.3 Performance Testing and Demobilization						
Demobilization	Flat-bed truck, Loader	$200.00 / day	3	$600	$400	$200
Subtotal				$600	$400	$200
Equipment Total				**$56,400**	**$41,900**	**$14,500**
Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Mobilization	Operators (3), Laborers (2), Foremen (1)	$325.00 / Crew-Hours	20	$6,500	$4,000	$2,500
Subtotal				$6,500	$4,000	$2,500
Subtask 9.2 Project Construction						
Install Proper Recycled Water Identification	Laborers (3), Foremen (1)	$220.00 / Crew-Hours	80	$17,600	$13,000	$4,600
Replace Sprinkler Heads	Laborers (3), Foremen (1)	$220.00 / Crew-Hours	80	$17,600	$13,000	$4,600
Install New Small Diameter Recycled Water Irrigation	Operator (1), Labors (2), Foremen (1)	$220.00 / Crew-Hours	120	$26,400	$19,000	$7,400
Install Backflow Devices	Operator (1), Laborers (2), Foremen (1)	$220.00 / Crew-Hours	40	$18,000	$13,000	$5,000
Install Small Skid Mounted On-Site Booster Pumps	Operators (3), Laborers (2), Foremen (1)	$325.00 / Crew-Hours	80	$26,000	$19,000	$7,000
Install Recycled Water Service	Operators (2), Laborers (2), Foremen (1)	$275.00 / Crew-Hours	40	$11,000	$8,000	$3,000
Subtotal				$116,600	$85,000	$31,600
Subtask 9.3 Performance Testing and Demobilization						
Demobilization	Operators (3), Laborers (2), Foremen (1)	$325.00 / Crew-Hours	20	$6,500	$3,400	$3,100
Subtotal				$6,500	$3,400	$3,100
Labor Total				**$129,600**	**$92,400**	**$37,200**
Component 1-6 Total				**$347,500**	**$242,300**	**$105,200**

Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion

The *Phase III Feasibility Report* project description includes 43,330 linear feet of pipeline for the Expansion Segment 5. A local pipe supplier provided a detailed cost estimate for the pipeline material. The equipment and labor rates are from the *2012 General Prevailing Wage Rates*. The number of hours estimated for equipment and labor were based on 75 feet a day production, which is a total of 578 days or 4,622 hours. The values in the grant request only include the pipe excavation, installation, and backfill which will all occur simultaneously. Total estimated construction costs are $3,283,871 as shown in Table 4-14 below.

Table 4-14: Row (d) Construction/ Implementation – Details for 1-7
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-7: Carlsbad MWD Recycled Water Pipeline Expansion

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
N/A						
Subtask 9.2 Project Construction						
4-inch C-900 PVC Pipe	6,300	$3.17	LF	$19,971	$9,986	$9,986
6-inch C-900 PVC Pipe	6,700	$6.31	LF	$42,277	$21,139	$21,139
8-inch C-900 PVC Pipe	30,300	$10.91	LF	$330,573	$165,287	$165,287
2-inch Water Service	21	$500.00	Ea	$10,500	$5,550	$4,950
Subtotal				$403,321	$201,961	$201,361
Subtask 9.3 Performance Testing and Demobilization						
N/A						
Materials Total				**$403,321**	**$201,961**	**$201,361**
Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
N/A						
Subtask 9.2 Project Construction						
Pipeline Installation	Excavator 195Hp	$120.00	4622	$554,640	$0	$554,640
	Loader Wheel	$52.00	4622	$240,344	$0	$240,344
	Truck, Dump 10cy	$45.00	4622	$207,990	$0	$207,990
	Truck, Water	$31.00	4622	$143,282	$0	$143,282
	Truck, Pickup	$20.00	4622	$92,440	$0	$92,440
Subtotal				$1,238,696	$0	$1,238,696
Subtask 9.3 Performance Testing and Demobilization						
Pressure testing and staging area restoration	Truck, Pickup	$20.00	100	$2,000	$0	$2,000
Subtotal				$2,000	$0	$2,000
Equipment Total				**$1,240,696**	**$0**	**$1,240,696**

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Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Staging Area	Laborer	$43.27	100	$4,327	$0	$4,327
	Forman	$63.40	100	$6,340	$0	$6,340
Subtotal				$10,667	$0	$10,667
Subtask 9.2 Project Construction						
Pipeline Installation	Laborer	$43.27	4622	$199,994	$33,640	$166,354
	Pipelayer	$45.46	4622	$210,116	$35,400	$174,716
	Backhoe Operator	$61.78	4622	$285,547	$43,300	$242,247
	Loader Operator	$61.78	4622	$285,547	$24,000	$261,547
	Forman	$63.40	4622	$293,035	$0	$293,035
	Superintendent	$72.91	4622	$336,990	$0	$336,990
Subtotal				$1,611,229	$136,340	$1,474,890
Subtask 9.3: Performance Testing and Demobilization						
Pressure testing and staging area restoration	Laborer	$43.27	100	$4,327	$0	$4,327
	Forman	$63.40	100	$6,340	$0	$6,340
	Superintendent	$72.91	100	$7,291	$0	$7,291
Subtotal				$17,958	$0	$17,958
Labor Total				**$1,639,854**	**$136,340**	**$1,503,515**
Component 1-7 Total				**$3,283,871**	**$338,300**	**$2,945,571**

Component 1-8: Escondido Recycled Water Easterly Main Extension

Estimated costs have been derived from actual construction costs and public bids for similar pipeline projects within the City of Escondido where the work will be done, along with design specifics from the City of Escondido's *Easterly Recycled Water Main Extension Preliminary Design Report*. Total estimated construction costs are $4,489,200 as shown in Table 4-15 below.

Table 4-15: Row (d) Construction/ Implementation – Details for 1-8
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-8: Escondido Recycled Water Easterly Main Extension

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
N/A						
Subtask 9.2 Project Construction						
24" HDPE Pipe	HDPE	$55.00	25300	$1,391,500	$104,862	$1,286,638
Bore Casing	Steel	$242.00	800	$193,600	$14,589	$179,011
Fittings	HDPE	$1,325.00	40	$53,000	$3,994	$49,006
Isolation Valves	Valve	$7,500.00	25	$187,500	$14,130	$173,370
Combination Air Valves	Valve	$4,500.00	13	$58,500	$4,408	$54,092
Blowoff/Drain	HDPE	$5,500.00	13	$71,500	$5,388	$66,112
Subtotal				$1,955,600	$147,371	$1,808,229
Subtask 9.3 Performance Testing and Demobilization						
N/A						
Materials Total				**$1,955,600**	**$147,371**	**$1,808,229**

Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Truck, Pickup		$21.00	1000	$21,000	$1,583	$19,417
Subtotal				$21,000	$1,583	$19,417
Subtask 9.2 Project Construction						
Backhoe-Loader, Wheeled	1.5 cy	$33.00	3000	$99,000	$7,461	$91,539
Compactor, Pneumatic wheeled	Wheeled	$30.00	2000	$60,000	$4,522	$55,478
Compactor, Pneumatic wheeled	Wheeled	$30.00	2000	$60,000	$4,522	$55,478
Loader, Wheeled	Bucket, 2.0 cy	$30.00	4000	$120,000	$9,043	$110,957
Paver, Asphalt		$115.00	1200	$138,000	$10,399	$127,601
Trailer, Equipment	12 ton	$25.00	3570	$89,250	$6,726	$82,524
Truck, Dump	18 cy	$35.00	3410	$119,350	$8,994	$110,356
Subtotal				$685,600	$51,666	$633,934
Subtask 9.3 Performance Testing and Demobilization						
Truck, Pickup		$21.00	1000	$21,000	$1,583	$19,417
Subtotal				$21,000	$1,583	$19,417
Equipment Total				**$727,600**	**$54,831**	**$672,769**
Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Site Prep and Staging	Labor	$50.00	1000	$50,000	$3,768	$46,232
Pothole Utilities	Underground	$125.00	200	$25,000	$1,884	$23,116
Subtotal				$75,000	$5,652	$69,348
Subtask 9.2 Project Construction						
Operator	Eq. Op	$60.00	5000	$300,000	$22,608	$277,392
Operator	Eq. Op	$60.00	5000	$300,000	$22,608	$277,392
Laborer	Pipe Inst'l	$50.00	7500	$375,000	$28,259	$346,741
Laborer	General	$40.00	4500	$180,000	$13,565	$166,435
Laborer	General	$40.00	4000	$160,000	$12,057	$147,943
Dump Truck	Dump Drive	$45.00	2000	$90,000	$6,782	$83,218
Superintendent	Contractor	$50.00	3000	$150,000	$11,304	$138,696
Project Manager	Contractor	$60.00	2100	$126,000	$9,495	$116,505
Subtotal				$1,681,000	$126,678	$1,554,322
Subtask 9.3 Performance Testing and Demobilization						
Pressure Testing	Testing	$50.00	1000	$50,000	$3,768	$46,232
Subtotal				$50,000	$3,768	$46,232
Labor Total				**$1,806,000**	**$136,098**	**$1,669,902**
Component 1-8 Total				**$4,489,200**	**$338,300**	**$4,150,900**

Component 1-9: Oceanside Reclaimed Water Main Extension

The materials, equipment, and labor were estimated from historical contract documents from projects of similar size and nature constructed within the City of Oceanside. The costs of the pipe and large appurtenances were quoted from a local supplier. Other material and appurtenances were taken from previous jobs and a Department Unit Price List. The labor and equipment rates were taken from the *San Diego Prevailing Wage Rates* and FEMA's *2010 Schedule of Equipment Rates* respectively. Total estimated construction costs are $2,116,527 as shown in Table 4-16 below.

Table 4-16: Row (d) Construction/ Implementation – Details for 1-9
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-9: Oceanside Reclaimed Water Main Extension

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Mobilization of Equipment and personnel	-	Lump Sum	100000	$100,000	$15,656	$84,344
Subtotal				$100,000	$15,656	$84,344
Subtask 9.2 Project Construction						
12-inch C200 PVC reclaimed water main	PVC	$22.33	8140	$181,766	$29,083	$152,684
8-inch C200 PVC reclaimed water main	PVC	$10.53	6300	$66,339	$10,614	$55,725
Soil and material export	-	Lump Sum	10000	$10,000	$1,600	$8,400
Gate Valves 12-inch (Line Valves)	Valves	$2,953.00	8	$23,624	$3,780	$19,844
Gate Valves 8-inch (Line Valves)	Valves	$1,120.00	6	$6,720	$1,075	$5,645
Tee Fittings (12x8x8)	Cast Iron	$1,504.72	2	$3,009	$482	$2,528
Air-Valves		$2,200.00	2	$4,400	$704	$3,696
Thrust Blocks	Concrete	$175.00	188	$32,900	$5,264	$27,636
Copper Services (2-inch)	Copper Pipe	$3,183.00	10	$31,830	$5,093	$26,737
Subtotal				$360,589	$57,694	$302,894
Subtask 9.3 Performance Testing and Demobilization						
AC Pavement Resurface	AC	$1.00	43320	$43,320	$6,931	$36,389
Chlorination and Bacteriological	gallon	$0.50	14440	$7,220	$1,155	$6,065
Subtotal				$50,540	$8,086	$42,454
Materials Total				**$511,129**	**$81,436**	**$429,692**
Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Trailer, Office	Office Trailer	$350/mo	36	$12,600	$2,016	$10,584
Mobilization of Equipment and personnel	Truck	$43/hr.	250	$10,750	$1,720	$9,030
Subtotal				$23,350	$3,736	$19,614
Subtask 9.2 Project Construction						
Backhoe-Loader, Wheeled	1.5 cy	$33.00/hr.	1400	$46,200	$7,392	$38,808
Broom, Pavement		$19.72/hr.	350	$6,902	$1,104	$5,798
Compactor, Pneumatic wheeled	Wheeled	$29.00/hr.	700	$20,300	$3,248	$17,052
Excavator, Hydraulic	Bucket, 1.5 cy	$65.00/hr.	1200	$78,000	$12,480	$65,520
Loader, Wheeled	Bucket, 2.0	$28.75/hr.	1400	$40,250	$6,440	$33,810

Equipment						
Activity or Deliverable	**Equipment Used**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Paver, Asphalt		$115.00/hr.	360	$41,400	$6,624	$34,776
Pick-up, Asphalt		$83.00/hr.	360	$29,880	$4,781	$25,099
Stripper, Paint		$19.00/hr.	40	$760	$122	$638
Trailer, Equipment	12 ton	$25.00/hr.	1400	$35,000	$5,600	$29,400
Truck, Dump	18 cy	$65.00/hr.	1400	$91,000	$14,560	$76,440
Trench Plates (recessed)	Plates	$3.25/hr.	1600	$5,200	$832	$4,368
Subtotal				$394,892	$63,183	$331,709
Subtask 9.3 Performance Testing and Demobilization						
Compaction Testing	Nuclear Gauge	$15.00	700	$10,500	$1,680	$8,820
Subtotal				$10,500	$1,680	$8,820
Equipment Total				**$428,742**	**$68,599**	**$360,143**

Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Pothole Utilities	Underground	$125.00	200	$25,000	$4,000	$21,000
Preconstruction Videotaping	Video	$100.00	100	$10,000	$1,600	$8,400
Erosion Control/Storm Water Pollution Prevention Plan	Environ.	$150.00	100	$15,000	$2,400	$12,600
Subtotal				$50,000	$8,000	$42,000
Subtask 9.2 Project Construction						
Operator (Group 10)	Eq. Operator	$61.90	2600	$160,940	$25,750	$135,190
Operator (Group 10)	Eq. Operator	$61.90	2400	$148,560	$23,770	$124,790
Laborer (Group 4)	Pipelayer	$46.07	3500	$161,245	$25,799	$135,446
Laborer (Group 1-General)	General	$44.36	3500	$155,260	$24,842	$130,418
Laborer(Group 4)	Pipelayer	$46.07	3500	$161,245	$25,799	$135,446
Dump Truck	Dump Drive	$46.39	1400	$64,946	$10,391	$54,555
Superintendent	Contractor	$51.48	2000	$102,960	$16,474	$86,486
Project Manager	Contractor	$57.14	2000	$114,280	$18,285	$95,995
Subtotal				$1,069,436	$171,110	$898,326
Subtask 9.3 Performance Testing and Demobilization						
Pressure Testing	Testing	$0.50	14440	$7,220	$1,155	$6,065
Compaction Testing	Geotechnical	$100.00	500	$50,000	$8,000	$42,000
Subtotal				$57,220	$9,155	$48,065
Labor Total				**$1,176,656**	**$188,265**	**$988,391**
Component 1-9 Total				**$2,116,527**	**$338,300**	**$1,778,227**

Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage

The proposed costs are based on recently completed planning and study efforts, augmented with SEJPA staff knowledge and project understanding. Upon completion of the construction bidding documents, including plans and specifications, an engineer's opinion of probable cost will be completed. Anticipated completion date for construction documents and engineer's estimate is early 2014. Total estimated construction costs are $471,941 as shown in Table 4-17 below.

Table 4-17: Row (d) Construction/ Implementation – Details for 1-10
North San Diego County Regional Recycled Water Project – Phase II:
Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage

Materials						
Activity or Deliverable	**Units**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Bonds and Insurance - 5%	Each	$20,000.00	1	$20,000	$0	$20,000
Field Office with Utilities For Duration	Each	$15,000.00	1	$15,000		$15,000
Prepare & Submit Detailed Schedule & Schedule of Values	Each	$2,500.00	1	$2,500	$0	$2,500
Traffic Control Plans, Encroachment Permit, Signage, K-Rail	Each	$2,000.00	1	$2,000	$1,000	$1,000
Storm Water Pollution Prevention Plan - Silt Fence, straw waddles, stakes, sand bags	Each	$3,500.00	1	$3,500	$2,730	$770
Subtotal				$43,000	$3,730	$39,270
Subtask 9.2 Project Construction						
12" Pipe Fittings and Valves	Each	$240.00	12	$2,880	$2,246	$634
12" PVC, C900, Transmission Pipe	LF	$24.00	900	$21,600	$16,848	$4,752
Excavation and Recompaction	CY	$40.00	900	$36,000	$28,080	$7,920
Paving	SF	$10.00	3,600	$36,000	$28,080	$7,920
Concrete pad for new inlet to Tank (12'x20' pad = 240 sf @ $5 per sf)	SF	$5.00	240	$1,200	$936	$264
SCADA Cabinet, Communication Equipment & Radio	Each	$8,000.00	1	$8,000	$6,240	$1,760
12" welded steel pipe for reconfiguared tank inlet & outlet (prevent short circuiting)	LF	$32.00	120	$3,840	$2,995	$845
12" welded steel pipe for potable water air-gap connection (supplemental water backup)	LF	$32.00	44	$1,408	$1,098	$310
Preparing & Recoating inside of tank (125' diameter, 32' height = 24,900 SF @ $4.25 per SF)	SF	$4.25	24,900	$105,825	$82,544	$23,282
Replacement of catodic protection zinc anodes	Each	$180.00	28	$5,040	$3,931	$1,109
Subtotal				$221,793	$172,999	$48,794
Subtask 9.3 Performance Testing and Demobilization						
Soil & Concrete Testing	Each	$4,500.00	1	$4,500	$3,510	$990
Horsepower, Flow, & Pressure Testing	Each	$2,500.00	3	$7,500	$5,850	$1,650
Demobilize Equipment and Crews	Each	$3,500.00	1	$3,500	$2,730	$770
Subtotal				$15,500	$12,090	$3,410
Materials Total				**$280,293**	**$188,819**	**$91,474**

Equipment						
Activity or Deliverable	**Units**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Installation of Construction Office - Truck Tractor	Hour	$45.00	24	$1,080	$842	$238
Crew Trucks	Hour	$20.00	320	$6,400	$4,992	$1,408
Subtotal				$7,480	$5,834	$1,646
Subtask 9.2 Project Construction						
Pipeline & Structure Excavation/Backfill - Excavator - 1 cu yd bucket	Hour	$39.00	200	$7,800	$6,084	$1,716
Pipeline & Structure Excavation/Backfill - Dump Trucks - 8 cu yd	Hour	$35.00	240	$8,400	$6,552	$1,848
Pipe Installation, backhoe	Hour	$35.00	320	$11,200	$8,736	$2,464
Pipe Installation, water truck	Hour	$32.00	240	$7,680	$5,990	$1,690
Crew Trucks (Plumbing)	Hour	$20.00	160	$3,200	$2,496	$704
Crew Trucks (Electrical)	Hour	$20.00	80	$1,600	$1,248	$352
Man Lift	Hour	$22.00	180	$3,960	$3,089	$871
Concrete Pumper Truck - new inlet & outlet structure	Hour	$45.00	40	$1,800	$1,404	$396
Subtotal				$45,640	$35,599	$10,041
Subtask 9.3 Performance Testing and Demobilization						
Remove Construction Office - Truck Tractor	Hour	$45.00	16	$720	$562	$158
Across All Activities - Pick-Up Trucks	Hour	$20.00	120	$2,400	$1,872	$528
Subtotal				$3,120	$2,434	$686
Equipment Total				**$56,240**	**$43,867**	**$12,373**

Labor						
Activity or Deliverable	**Units**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Project Manager	Hour	$120.00	16	$1,920	$1,498	$422
Superintendent	Hour	$90.00	16	$1,440	$1,123	$317
Land Surveying - Surveyor Crew	Hour	$160.00	24	$3,840	$2,995	$845
Traffic Control Implementation - Laborers	Hour	$44.00	48	$2,112	$1,647	$465
Mobilize Equipment and Crews	Hour	$44.00	40	$1,760	$1,373	$387
Subtotal				$11,072	$8,636	$2,436
Subtask 9.2 Project Construction						
Operating Engineers For All Equipment nic Pickups	Hour	$60.00	320	$19,200	$14,976	$4,224
Laborers	Hour	$44.00	640	$28,160	$21,965	$6,195
Cement Masons - Engineering Construction	Hour	$44.00	128	$5,632	$4,393	$1,239
Painters	Hour	$44.00	320	$14,080	$10,982	$3,098
Superintendent	Hour	$90.00	200	$18,000	$14,040	$3,960

Labor						
Activity or Deliverable	**Units**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Contractors Office Engineering Support	Hour	$120.00	200	$24,000	$18,720	$5,280
Subtotal				$109,072	$85,076	$23,996
Subtask 9.3 Performance Testing and Demobilization						
Construction Inspector	Hour	$60.00	120	$7,200	$5,616	$1,584
Soils and Material Tester	Hour	$60.00	40	$2,400	$1,872	$528
Welding/Coating Special Inspection	Hour	$60.00	24	$1,440	$1,123	$317
Site Cleanup - Laborers	Hour	$44.00	96	$4,224	$3,291	$933
Subtotal				$15,264	$11,902	$3,362
Labor Total				**$135,408**	**$105,614**	**$29,794**
Component 1-10 Total				**$471,941**	**$338,300**	**$133,641**

Row (e) Environmental Compliance/ Mitigation/ Enhancement

Task 10: Environmental Compliance/ Mitigation/ Enhancement

Not applicable.

Row (f) Construction Administration

Task 11: Construction Administration

Not applicable.

Row (g) Other Costs

Other costs are not required for this project.

Row (h) Construction/Implementation Contingency

Construction/Implementation contingency are not included in the proposed budget.

Row (i) Grand Total

The Grand Total for the *North San Diego County Regional Recycled Water Project – Phase II* ($19,150,228) was calculated as the sum of rows (GA) through (h).

Table 4-18: Row (i) Grand Total Costs
North San Diego County Regional Recycled Water Project – Phase II

	Category	**Total**
(GA)	Grant Administration	$103,560
(a)	Direct Project Administration	$69,000
(b)	Land Purchase/ Easement	$0
(c)	Planning/ Design/ Engineering/ Environmental Documentation	$128,000
(d)	Construction/ Implementation	$18,849,668
(e)	Environmental Compliance/ Mitigation/ Enhancement	$0
(f)	Construction Administration	$0
(g)	Other Costs	$0
(h)	Construction/ Implementation Contingency	$0
(i)	**Grand Total**	**$19,150,228**

Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program

The *Turf Replacement and Agricultural Irrigation Efficiency Program* will involve financial incentives, technical assistance, support and guidance, training, and resource lists to encourage and support projects that reduce water use and improve irrigation efficiency. Funding for this project involves the following aspects of project implementation: project administration and construction/ implementation costs.

The total cost associated with the *Turf Replacement and Agricultural Irrigation Efficiency Program* is $784,591. Of these total costs, $592,760 is being requested for grant funding through the IRWM Grant Program. The remaining $191,831 will be funded through in-kind labor and the general funds of the participating project partners. The Water Authority and City of San Diego will be using in-house labor as in-kind contribution to administer their respective programs and also to administer the grant contract. In addition, the Water Authority used an vendor to develop a microsite for its Turf Replacement Program, which was completed December 2012.This work will also be reported as in-kind contribution. In total, the non-State share of the total project cost (funding match) is 24%for this program.

Table 4-19 below provides a more detailed break-down of the total project budget.

Table 4-19: Total Project Budget
Turf Replacement and Agricultural Irrigation Efficiency Program

Proposal Title: San Diego IRWM Implementation Grant Proposal – Round 2
Project Title: Turf Replacement and Agricultural Irrigation Efficiency Program
Project serves a need of a DAC?: ☐ **Yes** ☒ **No**
Funding Match Waiver request?: ☐ **Yes** ☒ **No**

		(a)	(b)	(c)	(d)
	Category	**Requested Grant Amount**	**Cost Share: Non-State Fund Source* (Funding Match)**	**Cost Share: Other State Fund Sources***	**Total**
(GA)	Grant Administration	$17,265			$17,265
(a)	Direct Project Administration	$11,510	$3,837	$0	$15,347
(b)	Land Purchase/Easement	$0	$0	$0	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$0	$0	$0	$0
(d)	Construction/Implementation	$563,985	$187,994	$0	$751,979
(e)	Environmental Compliance/ Mitigation/Enhancement	$0	$0	$0	$0
(f)	Construction Administration	$0	$0	$0	$0
(g)	Other Costs	$0	$0	$0	$0
(h)	Construction/Implementation Contingency	$0	$0	$0	$0
(i)	**Grand Total**	**$592,760**	**$191,831**	**$0**	**$784,591**

**** Sources of funding:*** *The Water Authority and City of San Diego will be using in-house labor as in-kind contribution to administer their respective programs and also to administer the grant. In addition, the Water Authority used an vendor to develop a microsite for its Turf Replacement Program, which was completed December 2012.This work will also be reported as in-kind contribution.*

This Implementation Grant Proposal is requesting funding for two project tasks identified within the *Turf Replacement and Agricultural Irrigation Efficiency Program* work plan (refer to Attachment 3).

The sections below provide detailed descriptions of each of the row and task budgets (where applicable). In addition, each description below describes how cost estimates for each of the tasks or rows were calculated.

(GA) Grant Administration

As part of this proposal, each project has agreed to allocate an amount equivalent to 3% of their grant request to pay for the cost for grant administration by the San Diego County Water Authority. The *Turf Replacement and Agricultural Irrigation Efficiency Program*'s contribution will be $17,265 to this effort.

Row (a) Direct Project Administration

The total direct project administration costs for the project are $15,347. Table 4-20 provides a detailed listing of all applicable costs.

Task 1: Project Administration

This includes the cost for all administration of the project, which involves labor costs for a Water Resources Specialist from the Water Authority. Project administration will involve administering the grant contract, tracking budgets, developing and administering the MOU between the Water Authority and the City, and establishing and administering vendor contracts. This task will also include efforts necessary to prepare invoices, quarterly reports, project assessment and evaluation plans (PAEPs), and final reports as required by DWR for IRWM contracting purposes. The costs associated with this task were determined based on the estimated amount of time required to manage each of the activities described above (approximately 216 hours), which will be undertaken by a Water Resources Specialist.

This budget assumes that $3,837 (25%) of the total time required to complete this task will be funded by the Water Authority through in-kind labor and will therefore be considered matching funds. The rest of the funding required to complete this task, $11,510, is being requested as grant funding from DWR.

Task 2: Labor Compliance Program

Construction projects are not part of the scope of the *Turf Replacement and Agricultural Irrigation Efficiency Program*. Therefore, a Labor Compliance Program is not anticipated to be required for this project.

Task 3: Reporting

Costs for grant reporting have been included in staff labor estimated under Task 1: Project Administration, above.

Table 4-20: Row (a) Direct Project Administration Budget
Turf Replacement and Agricultural Irrigation Efficiency Program

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 1: Project Administration						
Project administration, including invoicing and reporting	Water Resources Specialist	$70.89	216	$15,347	$11,510	$3,837
Task 1 Total				**$15,347**	**$11,510**	**$3,837**
Row (a) Total				**$15,347**	**$11,510**	**$3,837**

Row (b) Land Purchase/ Easement

Not applicable.

Row (c) Planning/ Design/ Engineering/ Environmental Documentation

Not applicable

Task 4: Assessment and Evaluation

Not applicable.

Task 5: Final Design

Not applicable.

Task 6: Environmental Documentation

Not applicable.

Task 7: Permitting

Not applicable.

Row (d) Construction/ Implementation

The *Turf Replacement and Agricultural Irrigation Efficiency Program* does not involve construction but will include implementation efforts. Implementation will involve in-house administration for the City of San Diego and the San Diego County Water Authority, management of vendor contracts, rebates, and incentives for program participation and implementation.

Task 8: Construction Contracting

Not applicable.

Task 9: Construction/ Implementation

This task will include the implementation of the program. It is divided into five subtasks:

- ***Subtask 9.1 Water Authority Turf Replacement – In House****:* Administration of the Water Authority's Turf Replacement Program, management of vendor to operate program, and program rebates.
- ***Subtask 9.2 Water Authority Turf Replacement – Vendor****:* Operation of Turf Replacement Program in Water Authority's service area. Reviewing and processing rebate applications and submittals, tracking and reporting program progress, disbursing rebates, conducting inspections, providing customer service, and marketing and outreach.
- ***Subtask 9.3 City of San Diego Turf Replacement – In House****:* Administration and implementation of the City of San Diego's Turf Replacement Rebate Program. Application review, site visits, verification of project completion, customer support, rebate processing, program website, and rebate funding.
- ***Subtask 9.4 Water Authority Agricultural Irrigation Efficiency – In House****:* Administration of the Agricultural Efficiency Program, vendor management. This task also includes budgeted funds for agricultural incentives. Eligible costs include, but are not limited to, various hardware, such as reclamation pipe, weather-based irrigation controllers (WBICs), space tubing, mesh basket, meters and various valves.
- ***Subtask 9.5 Water Authority Agricultural Irrigation Efficiency – Vendor****:* Operation of the Agricultural Efficiency Incentive Program by the vendor selected and contracted with by the Water Authority.

In-house labor costs were calculated by estimating the amount of time necessary for program management, invoice processing, site visits, and rebate processing, and using the wage rates for the responsible parties (Water Resources Specialist, Management Analysts, Associate Analysts, Program Manager, Inspector, Field Representative, and Word Processing Operator). In-house labor hours were estimated to total 2,650 hours. Vendor costs were calculated in a similar way: estimated amount of time to operate the program and process incentives (383 hours) times the billing rate.

This task also includes funding for the rebates themselves. The rebates will cover up to 50% of the cost of the hardware needed to convert agricultural lands to recycled water, and various maximum amounts depending on lot size for urban users. Rebate structures and guidelines are detailed in Water Authority and City of San Diego protocols and informational handouts (see Appendix 3-2). Costs of equipment necessary for conversion were priced and a maximum number of units chosen to estimate total funding for agricultural irrigation efficiency implementation, and a maximum number of square footage at a rate of $1.50 per square foot was used to determine turf replacement rebate totals. The square footage assumed for the Water Authority's turf replacement activities is 81,800 and the square footage assumed for the City's turf replacement activities is 237,870. For the agricultural irrigation efficiency program, it is assumed that 50 acres of agricultural land on a minimum of two sites will be converted to recycled water use; the cost estimate provided is based on the necessary hardware to retrofit this amount of land.

The total cost for implementation for the *Turf Replacement and Agricultural Irrigation Efficiency Program* is $751,979.

Table 4-21: Row (d) Construction/ Implementation
Turf Replacement and Agricultural Irrigation Efficiency Program

Incentives						
Activity or Deliverable	**Incentives**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Task 9: Construction/ Implementation						
Subtask 9.1 Water Authority Turf Replacement – In House						
Rebates - Water Authority	Sq. ft. of turf replaced	$ 1.50	81802	$122,703	$122,703	$0
Subtotal				$122,703	$122,703	$0
Subtask 9.3 City of San Diego Turf Replacement - In House						
Rebates - City of San Diego	Sq. ft. of turf replaced	$ 1.50	237871	$356,807	$356,807	$0
Subtotal				$356,807	$356,807	$0
Subtask 9.4 Water Authority Agricultural Irrigation Efficiency – In House						
H-Ward strainer mesh basket	each	$1,200.00	8	$9,600	$9,600	$0
.75" recycled water pipe	per ft	$0.75	500	$375	$375	$0
1.5" recycled water pipe	per ft	$0.80	500	$400	$400	$0
2" main pipe	per ft	$40.00	250	$10,000	$10,000	$0
4" main pipe	per ft	$80.00	200	$16,000	$16,000	$0
PC .6gph 12" space tubing	per 500 ft	$210.00	5	$1,050	$1,050	$0
WBIC	each	$1,200.00	6	$7,200	$7,200	$0
meter	each	$850.00	3	$2,550	$2,550	$0
valves	each	$175.00	15	$2,625	$2,625	$0
Subtotal				$49,800	$49,800	$0
Incentives Total				**$529,309**	**$529,309**	**$0**
.						
Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Water Authority Turf Replacement – In House						
Labor - Water Authority staff to administer program	Water Resources Specialist	$ 70.89	930.52	$65,964	$0	$65,964
Labor - Water Authority staff to process invoices	Mgmt. Analyst	$ 67.49	24.00	$1,620	$0	$1,620
Labor - Water Authority vendor to develop program microsite	Droplet Technologies	Lump Sum		$19,990	$0	$19,990
Subtotal				$87,574	$0	$87,574
Subtask 9.2 Water Authority Turf Replacement - Vendor						
Labor - Water Authority vendor to operate program	Program Manager	$ 90.00	279.73	$25,176	$25,176	$0
	Inspector	$ 110.00	50.00	$5,500	$5,500	$0

Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtotal				$30,676	$30,676	$0
Subtask 9.3 City of San Diego Turf Replacement - In House						
Labor - City staff processing applications, site visits, issuing rebate checks to customers	Associate Analyst	$ 84.41	297.34	$25,100	$0	$25,100
	Field Rep	$ 50.28	1010.95	$50,834	$0	$50,834
	Word Processing Operator	$ 48.99	133.76	$6,553	$0	$6,553
Subtotal				$82,487	$0	$82,487
Subtask 9.4 Water Authority Agricultural Irrigation Efficiency - In House						
Labor - Water Authority staff to administer program	Water Resources Specialist	$ 70.89	252.97	$17,933	$0	$17,933
Subtotal				$17,933	$0	$17,933
Subtask 9.5 Water Authority Agricultural Irrigation Efficiency - Vendor						
Labor - Water Authority's contract with vendor to process pass-thru incentives	Project Manager	$ 75.00	53.33	$4,000	$4,000	$0
Subtotal				$4,000	$4,000	$0
Labor Total				**$222,670**	**$34,676**	**$187,994**
Task 9 Total				**$751,979**	**$563,985**	**$187,994**
Row (d) Total				**$751,979**	**$563,985**	**$187,994**

Row (e) Environmental Compliance/Mitigation/Enhancement

Although the *Turf Replacement and Agricultural Irrigation Efficiency Program* provides incentives and rebates, it is not responsible for individual/on-site environmental compliance. Responsibility for such issues lay with the site owner or representative. Therefore, no Environmental Compliance/Mitigation/ Enhancement is included in the Work Plan or Budget.

Task 10: Environmental Compliance/Mitigation/Enhancement

Not applicable.

Row (f) Construction Administration

Construction will not be performed as part of this project; construction administration is not applicable to this project and is not included within the Work Plan or Budget.

Task 11: Construction Administration

Not applicable.

Row (g) Other Costs

No other costs are required for this project.

Row (h) Construction/Implementation Contingency

Construction will not be performed as part of this project, therefore construction/implementation contingency is not required.

Row (i) Grand Total

The Grand Total for the *Turf Replacement and Agricultural Irrigation Efficiency Program* ($784,591) was calculated as the sum of rows (GA) through (h) for each column.

Table 4-22: Row (i) Grand Total Costs
Turf Replacement and Agricultural Irrigation Efficiency Program

	Category	Total
(GA)	Grant Administration	$17,265
(a)	Direct Project Administration	$15,347
(b)	Land Purchase/Easement	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$0
(d)	Construction/Implementation	$751,979
(e)	Environmental Compliance/ Mitigation/Enhancement	$0
(f)	Construction Administration	$0
(g)	Other Costs	$0
(h)	Construction/Implementation Contingency	$0
(i)	**Grand Total**	**$784,591**

Project 3: Rural Disadvantaged Community (DAC) Partnership Program

The *Rural DAC Partnership Program* will address inadequate water supply and water quality issues affecting rural DACs, including tribal communities, in the San Diego IRWM Region. Funding for this project involves several aspects of program implementation including: direct project administration, planning/ design/ engineering/ environmental documentation, and construction/ implementation.

The total cost associated with the *Rural DAC Partnership Program* is $5,819,288. Of these total costs, $1,943,610 is being requested for grant funding through the IRWM Grant Program. The remaining $1,550,271 will be funded by project partners, including the Rural Communities Assistance Corporation (RCAC) and other available State and federal funding programs. The RCAC will continue to leverage these programs – including Indian Health Services, State Water Resources Control Board's Clean Water State Revolving Fund, and U.S. Department of Agriculture's Rural Development Program – to meet the needs of the rural DACs in the San Diego IRWM Region. In total, the non-State share of the total project cost (funding match) is 27%for this program.

Table 4-23 below provides a more detailed break-down of the total project budget.

Table 4-23: Total Project Budget
Rural DAC Partnership Program

Proposal Title: San Diego IRWM Implementation Grant Proposal – Round 2					
Project Title: Rural DAC Partnership Program					
Project serves a need of a DAC?: ☒ **Yes** ☐ **No**					
Funding Match Waiver request?: ☐ **Yes** ☒ **No**					
		(a)	**(b)**	**(c)**	**(d)**
Category		**Requested Grant Amount**	**Cost Share: Non-State Fund Source* (Funding Match)**	**Cost Share: Other State Fund Sources***	**Total**
(GA)	Grant Administration	$56,610	$0	$0	$56,610
(a)	Direct Project Administration	$51,619	$0	$0	$51,619
(b)	Land Purchase/Easement	$0	$0	$0	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$9,982	$0	$0	$9,982
(d)	Construction/Implementation	$1,825,399	$1,550,271	$2,325,407	$5,701,077
(e)	Environmental Compliance/ Mitigation/Enhancement	$0	$0	$0	$0
(f)	Construction Administration	$0	$0	$0	$0
(g)	Other Costs	$0	$0	$0	$0
(h)	Construction/Implementation Contingency	$0	$0	$0	$0
(i)	**Grand Total**	**$1,943,610**	**$1,550,271**	**$2,325,407**	**$5,819,288**
**** Sources of funding:*** *Non-State funding match will come in part through IHS, which will partner with some projects to provide design, construction management services, and construction costs, such as the 50% funding for Example Project 3-3. Other non-state funds will come from project proponents, RCAC, or from Federal grants through the USEPA and USDA.*					

The Implementation Grant Proposal is requesting funding for five project tasks identified within the *Rural DAC Partnership Project – Phase II* work plan (refer to Attachment 3).

The sections below provide detailed descriptions of each of the row and task budgets (where applicable). In addition, each description below describes how cost estimates for each of the tasks or rows were calculated.

(GA) Grant Administration

As part of this proposal, each project has agreed to allocate an amount equivalent to 3% of their grant request to pay for the cost for grant administration by the San Diego County Water Authority. *Rural DAC Partnership Program* will contribute $56,610 to the cost of this effort.

Row (a) Direct Project Administration

The total direct project administration costs for the project are $51,619. Table 4-24 provides a list of all applicable costs.

Task 1: Project Administration

This includes the cost for overall contract management. This task covers preparation of invoices and backup documentation, as well as management oversight. The costs were determined based on an hourly wage for RCAC Project Manager and Support Staff, based on the necessary time commitment estimated from past experience.

Task 2: Labor Compliance Program

RCAC will implement a Labor Compliance Program (LCP) for the *Rural DAC Partnership Program* as necessary. Costs for this task are estimated to total $14,042.

Task 3: Reporting

This task involves submitting quarterly progress reports. Costs for this task were included in Task 1: Project Administration above.

Table 4-24: Row (a) Direct Project Administration
Rural DAC Partnership Program

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 1: Project Administration						
Management Oversight - Preparation of invoices, quarterly reports, and backup documentation	Project Management	$118.57	160	$18,971	$18,971	$0
	Staff Support	$70.21	265	$18,606	$18,606	$0
Task 1 Total				**$37,577**	**$37,577**	**$0**
Task 2- Labor Compliance Program						
Labor Compliance - Monitoring and reporting	Support Staff	$70.21	200	$14,042	$14,042	$0
Task 2 Total				**$14,042**	**$14,042**	**$0**
Row (a) Grand Total				**$51,619**	**$51,619**	**$0**

Row (b) Land Purchase/Easement

All land to be used is already owned by project partners, and is not included in the costs for this project.

Row (c) Planning/Design/Engineering/Environmental Documentation

The total planning/design/engineering/environmental documentation costs for the project are $9,982. Table 4-25 provides a detailed listing of all applicable costs.

Task 4: Assessment and Evaluation

This task includes facilitation of the Rural DAC stakeholder Committee, documentation of the project selection process, and preparation of formal program guidelines:

- ***Subtask 4.1: Facilitation of Rural DAC Stakeholder Committee*** will involve convening the stakeholder group in order to review the priority list of projects to ensure readiness to proceed and commitment of funding match and, if necessary, reviewing and selecting additional projects for funding.

- ***Subtask 4.2: Rural DACs Project Assessment and Selection Study*** will involve soliciting for additional critical water quantity and/or quality projects from rural DACs (if necessary), finalizing project selection criteria, evaluating other available funding resources to leverage Proposition 84 dollars, providing outreach and program information, and assisting with project scope, readiness, and project documentation for funding.
- ***Subtask 4.3: Rural DACs Partnership Program Guidelines*** will be prepared to provide small and tribal water system operators with the information needed to contract with RCAC under this program.

Task 5: Final Design

Not applicable.

Task 6: Environmental Documentation

Not applicable.

Task 7: Permitting

Not applicable.

Table 4-25: Row (c) Planning/Design/Environmental Documentation
Rural DAC Partnership Program

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 4: Assessment and Evaluation						
Subtask 4.1: Facilitation of Rural DAC Stakeholder Committee	Project Manager	$118.57	12	$1,423	$1,423	$0
	Support Staff	$70.21	24	$1,685	$1,685	$0
Subtask 4.2: Rural DACs Project Assessment and Selection Study	Project Manager	$118.57	20	$2,371	$2,371	$0
	Support Staff	$70.21	36	$2,528	$2,528	$0
Subtask 4.3: Rural DACs Partnership Program Guidelines	Project Manager	$118.57	6	$711	$711	$0
	Support Staff	$70.21	18	$1,264	$1,264	$0
Task 4 Total				**$9,982**	**$9,982**	**$0**
Row (c) Total				**$9,982**	**$9,982**	**$0**

Row (d) Construction/Implementation

The Construction/Implementation costs for the project are estimated to be $5,701,077. Table 4-26 provides a detailed listing of all applicable costs.

Task 8: Construction Contracting

Not applicable.

Task 9: Construction/Implementation

Total costs for Task 9 are $5,701,077. Construction costs for this project are divided between two subtasks: program implementation and reimbursements for infrastructure construction. These costs, summarized below, are anticipated for construction/ implementation of the selected DAC projects.

- ***Subtask 9.1: Rural DACs Partnership Program Implementation***: The total cost for this subtask is $37,577. This was estimated based on RCAC experience managing implementation of construction project for small, rural water systems in the San Diego IRWM Region.
- ***Subtask 9.2: Rural DACs Infrastructure Reimbursements***: The costs for this subtask include materials such as pipes, tanks, concrete, valves, and connectors, as well as all labor for installation. To simplify program management, any additional costs necessary to complete final design and/or environmental documentation prior to construction were also included. The total estimated cost for this subtask is $3,663,500.

Table 4-26: Row (d) Construction/Implementation
Rural DAC Partnership Program

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total ($)	Grant Request	Funding Match
Task 9: Construction/ Implementation						
Subtask 9.1: Rural DACs Partnership Program Implementation						
Program Implementation	Project Manager	$118.57	160	$18,971	$18,971	$0
	Support Staff	$70.21	265	$18,606	$18,606	$0
Subtotal				$37,577	$37,577	$0
.						
Materials / Labor						
Activity or Deliverable	**Discipline/ Materials/ Equipment**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.2: Rural DACs Infrastructure Reimbursements						
Design associated with infrastructure upgrades:						
Preliminary engineering reports	A&E	$200.00	800	$160,000	$48,000	$112,000
Final design and specifications	A&E	$200.00	1800	$360,000	$108,000	$252,000
Design Subtotal				$520,000	$156,000	$364,000
Environmental compliance associated with infrastructure upgrades:						
CEQA/NEPA Compliance - Categorical Exclusion; Negative Declaration; FONSI	A&E	$200.00	600	$120,000	$36,000	$84,000
Environmental Subtotal				$120,000	$36,000	$84,000
Construction activities associated with infrastructure upgrades:						
Construction of new storage tanks and foundations	200,000 gal welded	$545,000	3	$1,635,000	$490,500	$1,144,500
Connection of the new storage tanks to existing water mains	Connection	$5,000	6	$30,000	$9,000	$21,000
Demolition or abandonment in place of storage tanks	Demolition	$35,000	3	$105,000	$31,500	$73,500
Abandonment in place of altitude valves	Abandonment	$5,000	4	$20,000	$6,000	$14,000
Installation of a pressure reducing valve stations	PRV Station	$30,000	4	$120,000	$36,000	$84,000
Construction of new sections of water main	8" PVC	$45	1800	$81,000	$24,300	$56,700

Materials / Labor						
Activity or Deliverable	**Discipline/ Materials/ Equipment**	**Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Installation of air relief valves	Valve	$4,000	8	$32,000	$9,600	$22,400
Installation of gate valves	Valve	$3,600	14	$50,400	$15,120	$35,280
Construction of new groundwater wells	Well	$ 620,000	3	$1,860,000	$558,000	$1,302,000
Construction of piping to connect new wells to existing distribution system	8" PVC	$ 45	1400	$63,000	$18,900	$44,100
Pressure testing		$3,500.00	8	$28,000	$8,400	$19,600
Mobilization (10% of construction costs)			10%	$399,640	$66,230	$333,410
Contingency (15% of construction costs)			15%	$599,460	$322,272	$277,188
Construction Subtotal				$5,023,500	$1,595,822	$3,427,678
Subtotal				**$5,663,500**	**$1,787,822**	**$3,875,678**
Task 9 Total				**$5,701,077**	**$1,825,399**	**$3,875,678**
Row (d) Total				**$5,701,077**	**$1,825,399**	**$3,875,678**

The budget for infrastructure reimbursements will be dependent on DAC project selection (Task 4).

Example Project Implementation

A construction/ implementation cost breakdown for each example project is found in the tables below (Tables 4-27 through 4-29).

Table 4-27: Row (d) Construction/Implementation Costs – Details for Example 3-1
Rural DAC Partnership Program: Phoenix House School

Activity or Deliverable	**Discipline**	**Hourly Wage ($/hr)**	**Number of Hours**	**Total**	**Grant Request**	**Funding Match**
Example 3-1: Phoenix House School						
Design associated with infrastructure upgrades:						
Preliminary Engineering and Final Design	Engineering	$200.00	278	$55,600	$11,120	$44,480
Environmental associated with infrastructure upgrades:						
Prepare CEQA Negative Declaration	A&E	$200.00	70	$14,000	$2,800	$11,200
Construction associated with infrastructure upgrades:						
Mobilization (10% of construction costs)			10%	$29,750	$5,950	$23,800
New well		$297,500	1	$297,500	$59,500	$238,000
Performance testing		$2,618	1	$2,618	$524	$2,094
Contingency (15% of construction costs)			15%	$44,625	$8,925	$35,700
Example 3-1 Total				**$444,093**	**$88,819**	**$355,274**

Table 4-28: Row (d) Construction/Implementation Costs – Details for Example 3-2
Rural DAC Partnership Program: Rancho Estates MWC

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Example 3-2: Rancho Estates MWC						
Design associated with infrastructure upgrades:						
Preliminary Engineering and Final Design	Engineering	$200.00	1782	$356,400	$71,280	$285,120
Environmental associated with infrastructure upgrades:						
N/A						
Construction associated with infrastructure upgrades:						
Install 3,000 feet of 4” pipe		$37.00	3000	$111,000	$22,200	$88,800
Install 13,500 feet of 6” pipe		$40.00	13500	$540,000	$108,000	$432,000
41 new hydrants		$1,000	41	$41,000	$8,200	$32,800
50,000 water storage tank		$55,000	1	$55,000	$11,000	$44,000
500 gallon hydropnuematic tank		$15,000	1	$15,000	$3,000	$12,000
60 household connections and meters		$2,400	60	$144,000	$28,800	$115,200
Construction Labor		$85.00	1,765	$150,000	$30,000	$120,000
Contingency				$369,600	$73,920	$295,680
Example 3-2 Total				**$1,636,800**	**$327,360**	**$1,309,440**

Table 4-29: Row (d) Construction/Implementation Costs – Details for Example 3-3
Rural DAC Partnership Program: San Pasqual District B Water System

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Example 3-3: San Pasqual District B Water System						
Design associated with infrastructure upgrades:						
Final Design	Engineering	$200.00	542	$108,417	$54,209	$54,209
Environmental associated with infrastructure upgrades:						
Prepare NEPA FONSI	A&E	$200.00	12	$2,400	$1,200	$1,200
Construction associated with infrastructure upgrades:						
Mobilization (10% of construction costs)			10%	$62,454	$31,227	$31,227
Tank and foundation - 250,000 gal welded		$590,000	1	$590,000	$295,000	$295,000
Water main connection		$6,000	3	$18,000	$9,000	$9,000
Tank Demolition		$25,000	1	$25,000	$12,500	$12,500
Tank piping - 8" PVC		$38.00	400	$15,200	$7,600	$7,600
Gate valve - 8"		$3,500	4	$14,000	$7,000	$7,000
Pressure testing		$5,652	1	$5,652	$2,826	$2,826
Contingency (15% of construction costs)			15%	$99,330	$49,665	$49,665
Example 3-3 Total				**$940,453**	**$470,226**	**$470,226**

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Row (e) Environmental Compliance/Mitigation/Enhancement

Task 10: Environmental Compliance/Mitigation/Enhancement

Not applicable.

Row (f) Construction Administration

Task 11: Construction Administration

Not applicable.

Row (g) Other Costs

Not applicable.

Row (h) Construction/Implementation Contingency

Not applicable.

Row (i) Grand Total

The Grand Total for the *Rural DAC Partnership Program* ($5,819,288) was calculated as the sum of rows (GA) through (h).

Table 4-30: Row (i) Grand Total Costs
Rural DAC Partnership Program

	Category	Total
(GA)	Grant Administration	$56,610
(a)	Direct Project Administration	$51,619
(b)	Land Purchase/Easement	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$9,982
(d)	Construction/Implementation	$5,701,077
(e)	Environmental Compliance/ Mitigation/Enhancement	$0
(f)	Construction Administration	$0
(g)	Other Costs	$0
(h)	Construction/Implementation Contingency	$0
(i)	**Grand Total**	**$5,819,288**

Project 4: Failsafe Potable Reuse at the Advanced Water Purification Facility

The *Failsafe Potable Reuse at the Advanced Water Purification Facility* project will provide comprehensive testing, evaluation, and demonstration of failsafe treatment trains for potable reuse without an environmental buffer. Funding for the project involves planning/ design/ engineering/ environmental documentation and construction/ implementation tasks.

The total cost associated with the *Failsafe Potable Reuse at the Advanced Water Purification Facility* project is $3,151,703. Of these total costs, $2,176,390 is being requested for grant funding through the IRWM Grant Program. The remaining $975,313 will be funded by the WateReuse Research Foundation (WRRF) and the City of San Diego. In total, the non-State share of the total project cost (funding match) is 31%for this project.

Table 4-31 below provides a more detailed break-down of the total project budget.

Table 4-31: Total Project Budget
Failsafe Potable Reuse at the Advanced Water Purification Facility

Proposal Title: San Diego IRWM Implementation Grant Proposal – Round 2 **Project Title: Failsafe Potable Reuse at the Advanced Water Purification Facility** **Project serves a need of a DAC?:** ☐ **Yes** ☒ **No** **Funding Match Waiver request?:** ☐ **Yes** ☒ **No**					
		(a)	**(b)**	**(c)**	**(d)**
	Category	**Requested Grant Amount**	**Cost Share: Non-State Fund Source* (Funding Match)**	**Cost Share: Other State Fund Sources***	**Total**
(GA)	Grant Administration	$63,390	$0	$0	$63,390
(a)	Direct Project Administration	$0	$0	$0	$0
(b)	Land Purchase/Easement	$0	$0	$0	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$666,540	$975,313	$0	$1,641,853
(d)	Construction/Implementation	$1,446,460	$0	$0	$1,446,460
(e)	Environmental Compliance/ Mitigation/Enhancement	$0	$0	$0	$0
(f)	Construction Administration	$0	$0	$0	$0
(g)	Other Costs	$0	$0	$0	$0
(h)	Construction/Implementation Contingency	$0	$0	$0	$0
(i)	Grant Total	**$2,176,390**	**$975,313**	**$0**	**$3,151,703**
**** Sources of funding:*** *Project partners will be using in-house labor as in-kind funding match, and has secured in-kind matches in the form of equipment loans and lab analysis from universities and water purification technology companies. All funding matches are being made under Task 4.*					

The Implementation Grant Proposal is requesting funding for three project tasks identified within the *Failsafe Potable Reuse at the Advanced Water Purification Facility* Work Plan (refer to Attachment 3).

The sections below provide detailed descriptions of each of the row and task budgets (where applicable). In addition, each description below describes how cost estimates for each of the tasks or rows were calculated.

(GA) Grant Administration

As part of this proposal, each project has agreed to allocate an amount equivalent to 3% of their grant request to pay for the cost for grant administration by the San Diego County Water Authority. The *Failsafe Potable Reuse at the Advanced Water Purification Facility* project will contribute $63,390 to this cost.

Row (a) Direct Project Administration

Task 1: Project Administration

Not applicable.

Task 2: Labor Compliance Program

Not applicable.

Task 3: Reporting

To simplify billing for this project, WRRF staff labor costs associated with reporting are included as part of Task 5.1 below.

Row (b) Land Purchase/ Easement

Not applicable.

Row (c) Planning/ Design/ Engineering/ Environmental Documentation

The total planning/ design/ engineering/ environmental documentation costs for the project are $1,641,853. Table 4-32 provides a summary of the applicable costs; Tables 4-33 and 4-34 below provide a detailed cost breakdown for Tasks 4 and 5, respectively.

Table 4-32: Row (c) Planning/ Design/ Environmental Documentation
Failsafe Potable Reuse at the Advanced Water Treatment Facility

Activity or Deliverable	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 4: Assessment and Evaluation					
Subtask 4.1 Background Research and Criteria Development	See Table 4-33		$216,930	$0	$216,930
Subtask 4.2 Toolbox for Integrated Treatment Trains	See Table 4-33		$94,952	$0	$94,952
Subtask 4.3 Treatment Train Development and Validation	See Table 4-33		$254,183	$0	$254,183
Subtask 4.4 In-kind Equipment and Water Quality Tests	See Table 4-33		$409,248	$0	$409,248
Task 4 Total			**$975,313**	**$0**	**$975,313**
Task 5: Final Design					
Subtask 5.1 Project Management and Coordination with Participating Agencies	See Table 4-34		$127,922	$127,922	$0
Subtask 5.2 Expert Panel Workshop to Develop Guidelines for Failsafe Potable Reuse	See Table 4-34		$177,826	$177,826	$0
Subtask 5.3 Develop Comprehensive Test Plan for Potable Reuse	See Table 4-34		$120,472	$120,472	$0
Subtask 5.4 Final Report on Complete Strategy for Failsafe Potable Reuse	See Table 4-34		$240,320	$240,320	$0
Task 5 Total			**$666,540**	**$666,540**	**$0**
Row (c) Total			**$1,641,853**	**$666,540**	**$975,313**

Task 4: Assessment and Evaluation

The total cost for this task is $975,313 and includes costs for four major subtasks, as detailed below. All costs for Task 4 activities were developed by WRRF staff and consultants, based on experience developing and managing potable reuse projects within the State of California.

- ***Subtask 4.1: Background Research and Criteria Development:*** Costs for this subtask include labor expenses for a Principal Investigators (PI), Co-PIs, a California Department of Public Health (CDPH) Expert, an International Expert, and Project Engineers. These expenses were calculated based on estimated time to accomplish each aspect of the subtask and each participant's hourly wage. Time estimates were made based on prior experience. The total cost for this subtask is $216,930. Various activities to be accomplished in this subtask include workshops, review of scientific knowledge on potable reuse and public health criteria, development of criteria, and a report of findings.
- ***Subtask 4.2: Toolbox for Integrated Treatment Trains:*** This subtask will include developing a computer model that delivers information on integrated water reuse treatment trains for potable reuse. Accomplishing this will require a PI, Co-PIs, Project Engineers, and an International Expert. Costs for this subtask are based on labor rates and the estimated time to accomplish the items in the subtask. These estimates are made based on past experience to calculate a total cost of $94,952 for this subtask.
- ***Subtask 4.3: Treatment Train Development and Validation:*** This subtask involved identifying and validating the most promising treatment train alternatives for direct potable reuse based on the information gathered in the previous tasks. This will require a Principal Investigator, Co-PIs, an International Expert, a Project Engineer, and the Los Angeles County Sanitation District to develop a treatment train, validate it, and write a report. The total cost for this subtask is $254,183, and is based on prior experience to estimate the time needed to accomplish these goals and the labor costs for the people involved.
- ***Subtask 4.4: In-kind Equipment and Water Quality Tests*:** Throughout this stage of the project, in-kind contributions from the University of Arizona, GE Water, ITT Water & Tech, and APT Water totaling $409,248 will provide for water quality testing and pilot equipment. The value of these in-kind contributions was calculated based on these organizations' standard billing rate and the agreed terms of the contribution (number of samples processed, length of time for equipment use).

Table 4-33: Row (c) Planning/ Design/ Environmental Documentation – Task 4
Failsafe Potable Reuse at the Advanced Water Treatment Facility

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 4: Assessment and Evaluation						
Subtask 4.1 Background Research and Criteria Development						
Subtask 4.1a - Literature review on potable reuse	Principal Investigator	$283	8	$2,264	$0	$2,264
	Co-PI	$216	8	$1,728	$0	$1,728
	Co-PI	$197	84	$16,548	$0	$16,548
	Co-PI	$136	120	$16,320	$0	$16,320
	CDPH Expert	$200	10	$2,000	$0	$2,000
	International Expert	$350	6	$2,100	$0	$2,100
	Project Engineer	$117	80	$9,360	$0	$9,360
Subtask 4.1b - Review of public health criteria	Principal Investigator	$283	8	$2,264	$0	$2,264
	Co-PI	$216	2	$432	$0	$432
	Co-PI	$136	24	$3,264	$0	$3,264

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
	CDPH Expert	$200	30	$6,000	$0	$6,000
	International Expert	$350	6	$2,100	$0	$2,100
	Project Engineer	$117	40	$4,680	$0	$4,680
Subtask 4.1c - Panel workshop to Develop Criteria for Direct Potable Reuse	Principal Investigator	$283	80	$22,640	$0	$22,640
	Co-PI	$216	18	$3,888	$0	$3,888
	Co-PI	$197	42	$8,274	$0	$8,274
	Co-PI	$136	78	$10,608	$0	$10,608
	CDPH Expert	$200	64	$12,800	$0	$12,800
	International Expert	$350	32	$11,200	$0	$11,200
	Panelists	$200	84	$16,800	$0	$16,800
	Project Engineer	$117	34	$3,978	$0	$3,978
Subtask 4.1d - Additional criteria development	Principal Investigator	$283	6	$1,698	$0	$1,698
	Co-PI	$216	6	$1,296	$0	$1,296
	Co-PI	$136	4	$544	$0	$544
	Project engineer	$117	8	$936	$0	$936
	Project Engineer	$140	40	$5,600	$0	$5,600
Subtask 4.1e - State of the Science and Criteria Reports	Principal Investigator	$283	32	$9,056	$0	$9,056
	Co-PI	$216	32	$6,912	$0	$6,912
	Co-PI	$136	140	$19,040	$0	$19,040
	CDPH Expert	$200	20	$4,000	$0	$4,000
	International Expert	$350	8	$2,800	$0	$2,800
	Project Engineer	$117	40	$4,680	$0	$4,680
	Project Engineer	$140	8	$1,120	$0	$1,120
Subtask 4.1 Total				**$216,930**	**$0**	**$216,930**
Subtask 4.2 Toolbox for Integrated Treatment Trains						
Subtask 4.2a - Develop a list of unit processes and associated variables	Principal Investigator	$283	1	$283	$0	$283
	Co-PI	$216	1	$216	$0	$216
	Co-PI	$197	10	$1,970	$0	$1,970

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
	Co-PI	$136	1	$136	$0	$136
	Project Engineer	$165	48	$7,920	$0	$7,920
	Project Engineer	$134	28	$3,752	$0	$3,752
Subtask 4.2b - Identify existing models	Principal Investigator	$283	1	$283	$0	$283
	Co-PI	$216	1	$216	$0	$216
	Co-PI	$197	7	$1,379	$0	$1,379
	Co-PI	$136	1	$136	$0	$136
	Project Engineer	$140	8	$1,120	$0	$1,120
	Project Engineer	$165	48	$7,920	$0	$7,920
	Project Engineer	$134	25	$3,350	$0	$3,350
Subtask 4.2c - Develop and refine description of individual unit process models	Principal Investigator	$283	1	$283	$0	$283
	Co-PI	$216	1	$216	$0	$216
	Co-PI	$197	10	$1,970	$0	$1,970
	Co-PI	$136	1	$136	$0	$136
	Project Engineer	$165	47	$7,755	$0	$7,755
	Project Engineer	$134	28	$3,752	$0	$3,752
Subtask 4.2d - Integrate unit process models into a unified toolbox	Principal Investigator	$283	1	$283	$0	$283
	Co-PI	$216	1	$216	$0	$216
	Co-PI	$197	10	$1,970	$0	$1,970
	Co-PI	$136	1	$136	$0	$136
	Project Engineer	$165	48	$7,920	$0	$7,920
	Project Engineer	$134	28	$3,752	$0	$3,752
Subtask 4.2e - Validate toolbox using data from existing systems practicing indirect potable reuse	Principal Investigator	$283	1	$283	$0	$283
	Co-PI	$216	1	$216	$0	$216
	Co-PI	$197	10	$1,970	$0	$1,970
	Co-PI	$136	40	$5,440	$0	$5,440
	Project Engineer	$165	48	$7,920	$0	$7,920
	Project Engineer	$134	28	$3,752	$0	$3,752
Subtask 4.2f - Toolbox report	Principal Investigator	$283	1	$283	$0	$283
	Co-PI	$216	1	$216	$0	$216
	Co-PI	$197	10	$1,970	$0	$1,970

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
	Co-PI	$136	10	$1,360	$0	$1,360
	International Expert	$350	8	$2,800	$0	$2,800
	Project Engineer	$165	48	$7,920	$0	$7,920
	Project Engineer	$134	28	$3,752	$0	$3,752
Subtask 4.2 Total				**$94,952**	**$0**	**$94,952**
Subtask 4.3 Treatment Train Development and Validation						
Subtask 4.3a - Develop treatment train	Principal Investigator	$283	16	$4,528	$0	$4,528
	Co-PI	$216	24	$5,184	$0	$5,184
	Co-PI	$197	15	$2,955	$0	$2,955
	Co-PI	$136	120	$16,320	$0	$16,320
	International Expert	$350	8	$2,800	$0	$2,800
	Project Engineer	$136	20	$2,720	$0	$2,720
Subtask 4.3b - Validate the treatment train	Principal Investigator	$283	24	$6,792	$0	$6,792
	Co-PI	$216	40	$8,640	$0	$8,640
	Co-PI	$197	14	$2,758	$0	$2,758
	Co-PI	$136	208	$28,288	$0	$28,288
	International Expert	$350	8	$2,800	$0	$2,800
	Project Engineer	$136	80	$10,880	$0	$10,880
	LACSD - Pilot O&M	$100	1000	$100,000	$0	$100,000
Subtask 4.3c - Treatment train report	Principal Investigator	$283	24	$6,792	$0	$6,792
	Co-PI	$216	50	$10,800	$0	$10,800
	Co-PI	$197	14	$2,758	$0	$2,758
	Co-PI	$136	208	$28,288	$0	$28,288
	Project Engineer	$136	80	$10,880	$0	$10,880
Subtask 4.3 Total				**$254,183**	**$0**	**$254,183**
Subtask 4.4 In-kind Equipment and Water Quality Tests						
Subtask 4.4a - Lab analysis for water quality testing	University of Arizona	$500/ sample	100 samples	$50,000	$0	$50,000
Subtask 4.4b - In-Kind Pilot Equipment (ITT Water, GE Water, APT Water)	GE Water	$11,667/ month	6 months	$70,000	$0	$70,000
	ITT Water & Tech	$16,500/ month	12 months	$198,000	$0	$198,000
	APT Water	$7,604/ month	12 months	$91,248	$0	$91,248
Subtask 4.4 Total				**$409,248**	**$0**	**$409,248**
Task 4 Total				**$975,313**	**$0**	**$975,313**

Task 5: Final Design

This task includes the total cost for developing information on proper design and operational concepts for failsafe potable reuse treatment trains. There are subtasks whose costs are detailed below, for a total cost of $666,540. All costs for Task 5 activities were developed by WRRF staff and consultants, based on experience developing and managing potable reuse projects within the State of California.

- ***Subtask 5.1: Project Management and Coordination with Participating Agencies*****:** This subtask provides for weekly and bi-monthly progress meetings with project partners and the WateReuse Foundation, and quarterly updates with CDPH. Costs for this subtask include travel and labor costs for a Senior Officer, Project Manager, and Project Engineer, as well as meeting support costs. These costs total $127,922.
- ***Subtask 5.2: Expert Panel Workshop to Develop Guidelines for Failsafe Potable Reuse*****:** This subtask involves creating an expert panel and running an international workshop to develop guidelines that will address hazard analysis, critical control points, redundancy requirements, and water quality monitoring techniques for direct potable reuse. Costs for this subtask include labor costs for a Senior Officer, Project Manager, Project Engineer, Associate Engineer, and costs for panel members. These costs were calculated based on the estimated time to prepare for the workshop and its findings, as well as prior experience with workshop expenses. The total cost for this subtask is $177,826.
- ***Subtask 5.3: Develop Comprehensive Test Plan for Potable Reuse*****:** This subtask includes the costs related to developing and writing a comprehensive test plan based on the failsafe guidelines produced in Subtask 5.2. The total cost of this subtask is $120,472, and is calculated based on the labor costs and estimated time to accomplish subtask goals for a Senior Officer, Project managers, Project engineers, and associate engineers involved with this subtask.
- ***Subtask 5.4: Final Report on Complete Strategy for Failsafe Potable Reuse*****:** This subtask will draft and finalize a report on a complete strategy for failsafe potable reuse without an environmental buffer based on the findings of the previous tasks. Costs will include the labor and time of a Senior Officer, Project manager, Project engineer, and Associate engineer, and are estimated using prior experience. The total cost for this subtask is $240,320.

Table 4-34: Row (c) Planning/ Design/ Environmental Documentation Costs – Task 5
Failsafe Potable Reuse at the Advanced Water Treatment Facility

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Subtask 5.1 Project Management and Coordination with Participating Agencies						
Subtask 5.1a - Meetings, agendas and meeting minutes	Senior officer	$280	96	$26,880	$26,880	$0
	Project manager	$215	96	$20,640	$20,640	$0
	Project engineer	$146	192	$28,032	$28,032	$0
	Mileage			$1,050	$1,050	$0
Subtask 5.1b - Conference calls	Senior officer	$280	26	$7,280	$7,280	$0
	Project manager	$215	78	$16,770	$16,770	$0
	Project engineer	$146	86	$12,556	$12,556	$0
	Line charges			$210	$210	$0
Subtask 5.1c - Progress reports and invoicing	Project manager	$215	24	$5,160	$5,160	$0
	Project	$146	64	$9,344	$9,344	$0

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
	engineer					
Subtask 5.1				**$127,922**	**$127,922**	**$0**
Subtask 5.2 Expert Panel Workshop to Develop Guidelines for Failsafe Potable Reuse						
Subtask 5.2a - Perform literature review and develop straw man for expert panel to consider for failsafe concept	Senior officer	$280	64	$17,920	$17,920	$0
	Project manager	$215	64	$13,760	$13,760	$0
	Project engineer	$146	80	$11,680	$11,680	$0
	Associate engineer	$100	56	$5,600	$5,600	$0
Subtask 5.2b - Develop workshop presentations and arrange logistics	Senior officer	$280	40	$11,200	$11,200	$0
	Project manager	$215	40	$8,600	$8,600	$0
	Project engineer	$146	74	$10,804	$10,804	$0
	Associate engineer	$100	60	$6,000	$6,000	$0
Subtask 5.2c - Workshop with expert panel to develop failsafe guidelines	Senior officer	$280	16	$4,480	$4,480	$0
	Project manager	$215	16	$3,440	$3,440	$0
	Project engineer	$146	16	$2,336	$2,336	$0
	Associate engineer	$100	16	$1,600	$1,600	$0
	Panel members	Lump Sum Cost		$63,000	$63,000	$0
Stubtask 5.2d - Expert panel report review and post workshop analysis	Senior officer	$280	16	$4,480	$4,480	$0
	Project manager	$215	6	$1,290	$1,290	$0
	Project engineer	$146	66	$9,636	$9,636	$0
	Associate engineer	$100	20	$2,000	$2,000	$0
Subtask 5.2				**$177,826**	**$177,826**	**$0**
Subtask 5.3 Develop Comprehensive Test Plan for Potable Reuse						
Subtask 5.3a - Develop test objectives for failsafe potable reuse	Senior officer	$280	40	$11,200	$11,200	$0
	Project manager	$215	80	$17,200	$17,200	$0
	Project engineer	$146	80	$11,680	$11,680	$0
	Associate engineer	$100	24	$2,400	$2,400	$0
Subtask 5.3b - Incorporate comments from review of test objectives by City, CDPH and CA WateReuse	Senior officer	$280	24	$6,720	$6,720	$0
	Project manager	$215	24	$5,160	$5,160	$0
	Project engineer	$146	12	$1,752	$1,752	$0

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
	Associate engineer	$100	12	$1,200	$1,200	$0
Subtask 5.3c - Develop comprehensive test, monitoring and challenge plan (bench-, pilot-, demo-scale)	Senior officer	$280	40	$11,200	$11,200	$0
	Project manager	$215	40	$8,600	$8,600	$0
	Project engineer	$146	120	$17,520	$17,520	$0
	Associate engineer	$100	102	$10,200	$10,200	$0
Subtask 5.3d - Finalize test plan after review by City, CDPH and CA WateReuse	Senior officer	$280	8	$2,240	$2,240	$0
	Project manager	$215	24	$5,160	$5,160	$0
	Project engineer	$146	40	$5,840	$5,840	$0
	Associate engineer	$100	24	$2,400	$2,400	$0
Subtask 5.3				**$120,472**	**$120,472**	**$0**
Subtask 5.4 Final Report on Complete Strategy for Failsafe Potable Reuse						
Subtask 5.4a - Draft final report with failsafe guidelines, test objectives, demonstration testing results, and final outcomes/recommendations for failsafe potable reuse	Senior officer	$280	200	$56,000	$56,000	$0
	Project manager	$215	240	$51,600	$51,600	$0
	Project engineer	$146	480	$70,080	$70,080	$0
	Associate engineer	$100	130	$13,000	$13,000	$0
Subtask 5.4b - Finalize report after review by City, CDPH and CA WateReuse	Senior officer	$280	80	$22,400	$22,400	$0
	Project manager	$215	8	$1,720	$1,720	$0
	Project engineer	$146	120	$17,520	$17,520	$0
	Associate engineer	$100	80	$8,000	$8,000	$0
Subtask 5.4				**$240,320**	**$240,320**	**$0**
Task 5 Total				**$666,540**	**$666,540**	**$0**

Task 6: Environmental Documentation

Not applicable.

Task 7: Permitting

Not applicable.

Row (d) Construction/Implementation

The construction/implementation costs for the project are estimated to be $1,466,460. Table 4-35 provides a detailed listing of all applicable construction/implementation costs, all of which are being requested as part of the IRWM Grant Program.

Task 8: Construction Contracting

Not applicable.

Task 9: Construction/Implementation

Implementation of the test plan finalized in Task 5 will occur at the City of San Diego's Advanced Water Treatment Facility, with tests occurring over a span of 52 weeks. Implementation costs will total $1,466,460 for both labor and materials during the testing phase. These activities are described in detail in the work plan (see Attachment 3). All costs for Task 9 activities were developed by City of San Diego staff and consultants, based on experience operating the demonstration plant.

- ***Subtask 9.1: Perform Demonstration-Scale Testing:*** This subtask involves operating the City of San Diego's advanced water purification demonstration facility to collect data for evaluating failsafe concepts from workshop.
- ***Subtask 9.2: Bench-Scale Experiments on Indicators and Surrogates:*** This subtask will involve testing to better define a surrogate and indicator framework for advanced treated water.
- ***Subtask 9.3: Develop Meaningful Correlations Calibrations for Emerging Technologies:*** Subtask 9.3 includes coordination with manufacturers to develop proper calibrations and reliable information.
- ***Subtask 9.4: Challenge Testing for Indicators with Surrogate Monitoring*****:** In this subtask, the demonstration plant operator will challenge the system with intentional failures to test monitoring equipment response and redundancy treatments.

The costs associated with each activity are divided between materials and labor:

- **Materials:** Materials for the project may include, but are not limited to: water treatment chemicals such as sodium hydroxide, sodium hypochlorite, citric acid, antiscalane/CIP chemicals, hydrogen peroxide, CECs, NDMA, Dioxane, TOC, EEM, UV, bacteria and protozoa, and others. It also includes the cost of an on-site trailer. Materials costs total $895,336.
- **Labor:** Labor is required to perform testing and experiments, coordinate with manufacturers to confirm data and assess reliability, and conduct challenge testing. Types of laborers involved in this task will include Senior Officer, Project Manager, Project Engineer, and Associate Engineer. These costs are based on projected timeline and time requirements for each step, determined by prior experience. Labor costs are expected to total $551,124.

Table 4-35: Row (d) Construction/ Implementation
Failsafe Potable Reuse at the Advanced Water Purification Facility

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Task 9: Construction/ Implementation						
Subtask 9.1 - Perform Demonstration-Scale Testing	Ammonia hydroxide	$1.31	38000	$49,630	$49,630	$0
	Sodium hypochlorite	$1.98	13000	$25,709	$25,709	$0
	Citric acid	$1.05	2800	$2,942	$2,942	$0
	Sodium hydroxide	$1.98	2760	$5,458	$5,458	$0
	Antiscalant/ CIP chemicals	$7.64	1692	$12,931	$12,931	$0
	Hydrogen peroxide	$0.42	33403	$14,054	$14,054	$0
	On-site trailer	$224	12	$2,682	$2,682	$0
	CECs, NDMA,	$800	364	$291,200	$291,200	$0

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
	Dioxane					
	TOC, EEM, UV	$200	400	$80,000	$80,000	$0
	THM, HAA, etc.	$500	300	$150,000	$150,000	$0
	Coliphage	$20	1248	$24,960	$24,960	$0
	Coliform	$10	625	$6,250	$6,250	$0
	Protozoa	$100	315	$31,500	$31,500	$0
Subtask 9.2 - Bench-scale Experiments on Indicators and Surrogates	CECs, NDMA, Dioxane	$800	40	$32,000	$32,000	$0
	TOC, EEM, UV	$200	160	$32,000	$32,000	$0
	THM, HAA, etc.	$500	40	$20,000	$20,000	$0
	Coliphage	$20	126	$2,520	$2,520	$0
	Coliform	$10	120	$1,200	$1,200	$0
	Protozoa	$100	60	$6,000	$6,000	$0
Subtask 9.3 - Develop Meaningful Correlations Calibrations for Emerging Technologies	CECs, NDMA, Dioxane	$800	26	$20,800	$20,800	$0
	TOC, EEM, UV	$200	26	$5,200	$5,200	$0
	THM, HAA, etc.	$500	26	$13,000	$13,000	$0
	Coliphage	$20	160	$3,200	$3,200	$0
	Coliform	$10	160	$1,600	$1,600	$0
	Protozoa	$100	80	$8,000	$8,000	$0
Subtask 9.4 - Challenge Testing for Indicators with Surrogate Monitoring	Stock MS2	$2,000	9	$18,000	$18,000	$0
	Stock coliform	$1,000	8	$8,000	$8,000	$0
	Stock C. parvum	$5,000	3	$15,000	$15,000	$0
	Coliphage	$20	175	$3,500	$3,500	$0
	Coliform	$10	200	$2,000	$2,000	$0
	Protozoa	$100	60	$6,000	$6,000	$0
Materials Total				**$895,336**	**$895,336**	**$0**

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Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 - Perform Demonstration-Scale Testing	Senior officer	$280	52	$14,560	$14,560	$0
	Project manager	$215	104	$22,360	$22,360	$0
	Project engineer	$146	986	$143,956	$143,956	$0
	Associate engineer	$100	2067	$206,700	$206,700	$0

Labor						
Activity or Deliverable	Discipline	Hourly Wage ($)	Number of Hours	Total ($)	Grant Request	Funding Match
Subtask 9.2 - Bench-scale Experiments on Indicators and Surrogates	Senior officer	$280	40	$11,200	$11,200	$0
	Project manager	$215	24	$5,160	$5,160	$0
	Project engineer	$146	160	$23,360	$23,360	$0
	Associate engineer	$100	240	$24,000	$24,000	$0
Subtask 9.3 - Develop Meaningful Correlations Calibrations for Emerging Technologies	Senior officer	$280	24	$6,720	$6,720	$0
	Project manager	$215	40	$8,600	$8,600	$0
	Project engineer	$146	66	$9,708	$9,708	$0
	Associate engineer	$100	160	$16,000	$16,000	$0
Subtask 9.4 - Challenge Testing for Indicators with Surrogate Monitoring	Senior officer	$280	8	$2,240	$2,240	$0
	Project manager	$215	80	$17,200	$17,200	$0
	Project engineer	$146	160	$23,360	$23,360	$0
	Associate engineer	$100	160	$16,000	$16,000	$0
Labor Total				**$551,124**	**$551,124**	**$0**
Task 9 Total				**$1,446,460**	**$1,446,460**	**$0**
Row (d) Total				**$1,446,460**	**$1,446,460**	**$0**

Row (e) Environmental Compliance/ Mitigation/ Enhancement

Task 10: Environmental Compliance/ Mitigation/ Enhancement

Not applicable.

Row (f) Construction Administration

Task 11: Construction Administration

Not applicable.

Row (g) Other Costs

Not applicable.

Row (h) Construction/Implementation Contingency

Not applicable.

Row (i) Grand Total

The Grand Total for the *Failsafe Potable Reuse at the Advanced Water Treatment Facility* project ($3,151,703) was calculated as the sum of rows (GA) through (h) for each column.

Table 4-36: Row (i) Grand Total Costs
Failsafe Potable Reuse at the Advanced Water Treatment Facility

	Category	Total
(GA)	Grant Administration	$63,390
(a)	Direct Project Administration	$0
(b)	Land Purchase/Easement	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$1,641,853
(d)	Construction/Implementation	$1,446,460
(e)	Environmental Compliance/ Mitigation/Enhancement	$0
(f)	Construction Administration	$0
(g)	Other Costs	$0
(h)	Construction/Implementation Contingency	$0
(i)	**Grand Total**	**$3,151,703**

Project 5: Sustaining Healthy Tributaries to the Upper San Diego River

The *Sustaining Healthy Tributaries to the Upper San Diego River* project will involve tasks necessary for creating a baseline for healthy creeks in the San Diego River watershed, including habitat restoration, data collection and monitoring, and education and outreach. Funding for this project is needed for direct project administration, planning/ designing/ engineering/ environmental documentation, and construction/ implementation.

The total cost associated with the *Sustaining Healthy Tributaries to the Upper San Diego River* project is $711,854. Of these total costs, $536,630 is being requested for grant funding through the IRWM Grant Program, and the project will not involve other sources of State funding. The remaining $175,224 will be funded through in-kind labor by project partners, including the San Diego River Park Foundation (SDRPF), San Diego Fly Fishers, San Diego State University, Kumeyaay Digueno Land Conservancy, and Helix Water District. In total, the non-State share of the total project cost (funding match) is 25%.

Table 4-37 below provides a more detailed break-down of the total project budget.

Table 4-37: Total Project Budget
Sustaining Healthy Tributaries to the Upper San Diego River

Proposal Title: San Diego IRWM Implementation Grant Proposal – Round 2					
Project Title: Sustaining Healthy Tributaries to the Upper San Diego River					
Project serves a need of a DAC?: ☐ **Yes** ☒ **No**					
Funding Match Waiver request?: ☐ **Yes** ☒ **No**					
		(a)	**(b)**	**(c)**	**(d)**
Category		**Requested Grant Amount**	**Cost Share: Non-State Fund Source* (Funding Match)**	**Cost Share: Other State Fund Sources***	**Total**
(GA)	Grant Administration	$15,630	$0	$0	$15,630
(a)	Direct Project Administration	$21,146	$17,750	$0	$38,896
(b)	Land Purchase/ Easement	$0	$0	$0	$0
(c)	Planning/ Design/ Engineering/ Environmental Documentation	$10,086	$0	$0	$10,086
(d)	Construction/ Implementation	$489,768	$157,475	$0	$647,243
(e)	Environmental Compliance/ Mitigation/ Enhancement	$0	$0	$0	$0
(f)	Construction Administration	$0	$0	$0	$0
(g)	Other Costs	$0	$0	$0	$0
(h)	Construction/ Implementation Contingency	$0	$0	$0	$0
(i)	**Grant Total**	**$536,630**	**$175,224**	**$0**	**$711,854**
**** Sources of funding:*** *SDRPF will provide in-house labor for the funding match for Direct Project Administration and the Construction/Implementation activities..*					

This Implementation Grant Proposal is requesting funding for three project tasks identified within the *Sustaining Healthy Tributaries to the Upper San Diego River* work plan (refer to Attachment 3).

The sections below provide detailed descriptions of each of the row and task budgets (where applicable). In addition, each description below describes how cost estimates for each of the tasks or rows were calculated.

(GA) Grant Administration

As part of this proposal, each project has agreed to allocate an amount equivalent to 3% of their grant request to pay for the cost for grant administration by the San Diego County Water Authority. The *Sustaining Healthy Tributaries to the Upper San Diego River* project will contribute $15,630 to this cost.

Row (a) Direct Project Administration

SDRPF will carry out project administration tasks relating to direct project administration per its MOU with project partners. Costs for Tasks 1 and 3 were calculated based on SDRPF labor costs and Task 2 on estimated consultant costs, along with the estimated amount of time required to complete each task. These costs are detailed in Table 4-38 below.

Task 1: Project Administration

SDRPF will be responsible for Project Administration per the MOU with project partners. This task is expected to cost $18,086 for 320 hours by a Project Administrator.

Task 2: Labor Compliance Program

SDRPF will hire a third party labor compliance consultant to manage any necessary Labor Compliance Programs. This is estimated to cost $5,900 and will be provided as funding match.

Task 3: Reporting

This task will involve quarterly progress reports throughout the project implementation, as well as a final project report upon project completion.

Table 4-38: Row (a) Direct Project Administration
Sustaining Healthy Tributaries to the Upper San Diego River

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 1: Project Administration						
Project Administration	Project Administrator	$56.52	320	$18,086	$8,000	$10,086
Task 1 Total				**$18,086**	**$8,000**	**$10,086**
Task 2: Labor Compliance Program						
Manage Labor Compliance Program	Project Manager	$31.28	16	$500	$0	$500
Third Party Labor Compliance Contract	Contractor	$5,000.00	Lump Sum	$5,000	$0	$5,000
ODCs				$400	$400	$0
Task 2 Total				**$5,900**	**$400**	**$5,500**
Task 3: Reporting						
Reporting and Invoicing	Administrative Associate	$19.72	112	$2,209	$2,209	$0
	Project Manager	$31.28	208	$6,506	$4,521	$1,985
	Project Administrator	$56.52	12	$678	$500	$178
PAEP and Final Report	Project Coordinator	$27.08	200	$5,416	$5,416	$0
ODCs				$100	$100	$0
Task 3 Total				**$14,909**	**$12,746**	**$2,163**
Row (a) Total				**$38,896**	**$21,146**	**$17,750**

Row (b) Land Purchase/Easement

Not applicable.

Row (c) Planning/Design/Engineering/Environmental Documentation

Much of the planning, assessment and evaluation for this project has already been completed and funded through other means, and are not included within the proposed budget.

Task 4: Assessment and Evaluation

Not applicable.

Task 5: Final Design

Not applicable.

Task 6: Environmental Documentation

Not applicable.

Task 7: Permitting

This task involves obtaining required permitting, anticipated to be part of Regional General Permit No. 41. It will also involve coordination with regulatory agencies. In the event that other permits are required, a $6,000 contingency cost has been included in the proposed budget. This cost is based upon SDRPF experience obtaining permits for habitat restoration projects throughout the San Diego River watershed. The total cost for this task will be $10,086.

Table 4-39: Row (c) Planning/Design/Engineering/Environmental Documentation
Sustaining Healthy Tributaries to the Upper San Diego River

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 7: Permitting						
Coordination with Regulatory Agencies	Project Manager	$31.28	80	$2,502	$2,502	$0
	Project Coordinator	$27.08	40	$1,083	$1,083	$0
Contingency	Cost of unanticipated permits			$6,000	$6,000	$0
ODCs	Lump Sum			$500	$500	$0
Task 7 Total				**$10,086**	**$10,086**	**$0**
Row (c) Total				**$10,086**	**$10,086**	**$0**

Row (d) Construction/Implementation

The Construction/Implementation costs for the project are estimated to be $647,243. Table 4-40 below provides a detailed listing of all applicable costs.

Task 8: Construction Contracting

No construction contracting will be required for this project.

Task 9: Construction

Labor for this task will total $344,168, while materials and equipment are expected to cost $303,075. This task is divided into eight subtasks, each of which is summarized below. Construction costs were developed by SDRPF and partner staff, based on their experience implementing similar habitat restoration and monitoring programs throughout the region.

- ***Subtask 9.1 Complete Two Feasibility Studies for Removal of Hydromodifications*****:** The costs associated with this task include the labor and materials necessary to host a working group, create agreements with interested parties, and select a contractor to perform the study.
- ***Subtask 9.2 Develop and Implement Field Monitoring Program*****:** The costs associated with the project's Field Monitoring Program include labor for developing the monitoring program and monitoring supplies and equipment. Additionally, other associated direct costs for materials are anticipated.
- ***Subtask 9.3 Conduct Field Assessments of Tributaries:*** The costs associated with performance testing include a consultant contract, estimated based on agency experience managing such contracts.

- ***Subtask 9. 4 Establish One Real-Time Monitoring Station:*** The costs for this subtask include the labor for a Project Manager and Project Coordinator from SDRPF, and the cost of a contract with the San Diego State University Foundation to perform the work.
- ***Subtask 9.5 Implement Web-based Data Management System:*** The costs for this subtask will include a contractor to expand the current web-based data management system, a Project Manager and Project Coordinator to oversee the work, and other direct costs associated with website development.
- ***Subtask 9.6 Restore 4.4 Acres of Riparian Habitat:*** This is the most costly of the eight subtasks, utilizing 4,000 hours of volunteer work valued at just over $87,000, a Project Manager, Project Coordinator, and Field Associates, in addition to the physical supplies necessary for restoration work.
- ***Subtask 9.7 Establish Public Information Web Portal:*** This task includes the costs for the consultant who will be contracted to improve and update the project website, and oversight of the consultant.
- ***Subtask 9.8 Implement Education Plan:*** These costs include labor for a Project Coordinator, Project Manager, and Project Administrator, as well as the supplies for producing interpretive and educational materials.

Table 4-40: Row (d) Construction/Implementation
Sustaining Healthy Tributaries to the Upper San Diego River

Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of hours**	**Total ($)**	**Grant Request**	**Funding Match**
Task 9: Construction						
Subtask 9.1 Complete Two Feasibility Studies for Removal of Hydromodifications	Project Coordinator	$27.08	120	$3,250	$2,166	$1,084
	Project Manager	$31.28	40	$1,251	$1,251	$0
Subtask 9.2 Develop and Implement Field Monitoring Program	Project Coordinator	$27.08	800	$21,664	$10,832	$10,832
	Project Manager	$31.28	360	$11,261	$11,261	$0
Subtask 9.3 Conduct Field Assessments of Tributaries	Field Associate	$24.57	1000	$24,570	$20,000	$4,570
	Project Coordinator	$27.08	600	$16,248	$16,248	$0
	Volunteer In-Kind	$21.79	1200	$26,148	$0	$26,148
Subtask 9.4 Establish One Real-Time Monitoring Station	Project Coordinator	$27.08	80	$2,166	$2,166	$0
	Project Manager	$31.28	8	$250	$0	$250
Subtask 9.5 Implement Web-based Data Management System	Project Coordinator	$27.08	150	$4,062	$3,900	$162
	Project Manager	$31.28	60	$1,877	$1,877	$0
Subtask 9.6 Restore 4.4 Acres of Riparian Habitat	Field Associate	$24.57	2400	$58,968	$43,968	$15,000
	Project Coordinator	$27.08	1440	$38,995	$33,000	$5,995
	Project Manager	$31.28	800	$25,024	$25,024	$0
	Volunteer In-kind	$21.79	4000	$87,160	$0	$87,160

Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.7 Establish Public Information Web Portal	Project Manager	$31.28	40	$1,251	$0	$1,251
	Project Administrator	$56.52	40	$2,261	$2,000	$261
Subtask 9.8 Implement Education Plan	Project Coordinator	$27.08	480	$12,998	$11,000	$1,998
	Project Manager	$31.28	80	$2,502	$0	$2,502
	Project Administrator	$56.52	40	$2,261	$2,000	$261
Labor Total				**$344,168**	**$186,693**	**$344,168**

Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Complete Two Feasibility Studies for Removal of Hydromodifications	Consultant	$27,500	2	$55,000	$55,000	$0
	ODC	$500	1	$500	$500	$0
Subtask 9.2 Develop and Implement Field Monitoring Program	Monitoring Supplies	$26,000	1	$26,000	$26,000	$0
	ODC	$500	1	$500	$500	$0
Subtask 9.3 Conduct Field Assessments of Tributaries	Training Materials	$15.00	500	$7,500	$7,500	$0
	Contract with KDLC	$7,500	1	$7,500	$7,500	$0
	Assessment Supplies	$7,500	1	$7,500	$7,500	$0
	ODC	$500	1	$500	$500	$0
Subtask 9.4 Establish One Real Time Monitoring Station	Contract with SDSU Foundation	$75,000	1	$75,000	$75,000	$0
Subtask 9.5 Implement Web-based Data Management System	Contract	$15,000	1	$15,000	$15,000	$0
	ODC	$500	1	$500	$500	$0
Subtask 9.6 Restore 4.4 Acres of Riparian Habitat	Restoration Materials and Supplies	$10,000	4.4 acres	$44,000	$44,000	$0
	Toilet Rental	$250	12	$3,000	$3,000	$0
	Generator Rental	$100	12	$1,200	$1,200	$0
	Auger Rental	$450	12	$5,400	$5,400	$0
	Debris Removal	$500	6	$3,000	$3,000	$0
	Pump	$75.00	1	$75	$75	$0
	Gloves	$4.00	100	$400	$400	$0
	Hand Tools	$20.00	100	$2,000	$2,000	$0
	Fencing	$3.00	400	$1,200	$1,200	$0
	Trailer Rental	$150	12	$1,800	$1,800	$0
Subtask 9.7 Establish Public Information Web Portal	Consultant	$15,000	1	$15,000	$15,000	$0
Subtask 9.8 Implement Education Plan	Printing	$2.50	2000	$5,000	$5,000	$0
	Supplies	$1,000	1	$1,000	$1,000	$0
	ODC	$500	1	$500	$500	$0
	Displays	$2,000	12	$24,000	$24,000	$0

Materials						
Activity or Deliverable	Materials Used	Unit Costs ($)	Number of Units	Total ($)	Grant Request	Funding Match
Materials Total				**$303,075**	**$303,075**	**$0**
Task 9 Total				**$647,243**	**$489,768**	**$157,475**
Row (d) Total				**$647,243**	**$489,768**	**$157,475**

Row (e) Environmental Compliance/Mitigation/Enhancement

Task 10: Environmental Compliance/Mitigation/Enhancement

Not applicable.

Row (f) Construction Administration

Task 11: Construction Administration

Not applicable.

Row (g) Other Costs

Not applicable.

Row (h) Construction/Implementation Contingency

No construction contingency costs are included in this budget.

Row (i) Grand Total

The Grand Total for the *Sustaining Healthy Tributaries to the Upper San Diego River* project ($711,854) was calculated as the sum of rows (GA) through (h).

Table 4-41: Row (i) Grand Total Costs
Sustaining Healthy Tributaries to the Upper San Diego River

	Category	Total
(GA)	Grant Administration	$15,630
(a)	Direct Project Administration	$38,896
(b)	Land Purchase/Easement	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$10,086
(d)	Construction/Implementation	$647,243
(e)	Environmental Compliance/ Mitigation/Enhancement	$0
(f)	Construction Administration	$0
(g)	Other Costs	$0
(h)	Construction/Implementation Contingency	$0
(i)	**Grand Total**	**$711,854**

Project 6: Chollas Creek Integration Project – Phase II

The *Chollas Creek Integration Project – Phase* II will reduce flood damage and improve water quality at Northwest Village Chollas Creek through creek realignment, headwall installation, and drop structures; improve habitat through invasives removal and native riparian revegetation; and conduct pre/post water quality monitoring. Funding for this project involves all aspects of project implementation including project administration, planning/ design/ engineering/ environmental documentation, construction/ implementation, construction administration, and construction/ implementation contingency.

The total cost associated with the *Chollas Creek Integration Project – Phase II* is $678,723. Of these total costs, $515,000 is being requested for grant funding through the IRWM Grant Program. The remaining $163,723 will be funded by contributions from the project partners including Jacobs Center for Neighborhood Innovation (JCNI), Groundworks San Diego-Chollas Creek (Groundworks), and San Diego Coastkeeper. In total, the non-State share of the total project cost (funding match) is 24% for this project.

Table 4-42 below provides a more detailed break-down of the total project budget.

Table 4-42: Total Project Budget
Chollas Creek Integration Project – Phase II

Proposal Title: San Diego IRWM Implementation Grant Proposal –Round 2
Project Title: Chollas Creek Integration Project – Phase II
Project serves a need of a DAC?: ☐ Yes ☒ No
Funding Match Waiver request?: ☐ Yes ☒ No

		(a)	(b)	(c)	(d)
Category		**Requested Grant Amount**	**Cost Share: Non-State Fund Source* (Funding Match)**	**Cost Share: Other State Fund Sources***	**Total**
(GA)	Grant Administration	$15,000	**0**	**0**	$15,000
(a)	Direct Project Administration	$20,000	$23,250	$0	$43,250
(b)	Land Purchase/Easement	$0	$0	$0	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$10,000	$64,505	$0	$74,505
(d)	Construction/Implementation	$436,456	$61,718	$0	$498,174
(e)	Environmental Compliance/ Mitigation/Enhancement	$0	$0	$0	$0
(f)	Construction Administration	$0	$14,250	$0	$14,250
(g)	Other Costs	$0	$0	$0	$0
(h)	Construction/Implementation Contingency	$33,544	$0	$0	$33,544
(i)	**Grand Total**	**$515,000**	**$163,723**	**$0**	**$678,723**

**** Sources of funding:*** *Operating budgets from JCNI, Groundworks, and Coastkeeper.*

The Implementation Grant Proposal is requesting funding for four project tasks identified within the *Chollas Creek Integration Project – Phase II* work plan (refer to Attachment 3).

The sections below provide detailed descriptions of each of the row and task budgets (where applicable). In addition, each description below describes how cost estimates for each of the tasks or rows were calculated.

(GA) Grant Administration

As part of this proposal, each project has agreed to allocate an amount equivalent to 3% of their grant request to pay for the cost for grant administration by the San Diego County Water Authority. The *Chollas Creek Integration Project – Phase II* will contribute $15,000 to this cost.

Row (a) Direct Project Administration

The total direct project administration costs for the project are $43,250, $20,000 of which is being requested through the IRWM Grant Program. Table 4-43 provides a detailed listing of all applicable costs.

Task 1: Project Administration

This includes the cost for project management, including labor costs for a JCNI Project Manager and a Groundworks Project Manager. Project administration will include grant management, coordination with partners, invoicing, and financial, MOU, and contractual documentation. Project Administration costs will total $31,250.

Task 2: Labor Compliance Program

JCNI will hire a consultant for the *Chollas Creek Integration Project – Phase II* to ensure compliance with State labor laws*.* Included in the Task 2 budget are the consultant costs as well, as the costs for Groundworks to supervise paid student labor per State law. Total costs for Task 2 are $8,250.

Task 3: Reporting

This task includes the staff labor from JCNI for preparing quarterly progress reports and the Project Completion Report. Costs for grant reporting total $3,750.

Table 4-43: Row (a) Direct Project Administration Budget
Chollas Creek Integration Project – Phase II

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 1: Administration						
Project Management- Manage Project, design, permits, funding and partnerships	JCNI Project Manager	$75.00	250	$18,750	$0	$18,750
	Groundswork Project Manager	$75.00	58	$12,500	$12,500	$0
Task 1 Total				**$31,250**	**$12,500**	**$18,750**
Task 2: Labor Compliance Program						
Prevailing Wage Compliance	Consultant	$75.00	60	$4,500	$0	$4,500
Student Labor Supervision	Groundswork Project Manager	$75.00	160	$3,750	$3,750	$0
Task 2 Total				**$8,250**	**$3,750**	**$4,500**
Task 3: Reporting						
Quarterly Progress Reports	JCNI Project Manager	$75	50	$3,750	$0	$3,750
Final/Project Close out Report with Supporting Documentation	JCNI Project Manager	Shovels, buckets, etc.		$3,666	$3,666	$0
Task 3 Total				**$3,750**	**$3,750**	**$0**
Row (a) Total				**$43,250**	**$20,000**	**$23,250**

Row (b) Land Purchase/Easement

The land containing the project site is already owned by the Jacobs Center for Neighborhood Innovation (Lead partner) and so Land Purchase/Easement is not applicable.

Row (c) Planning/Design/Engineering/Environmental Documentation

The total planning/ design/ engineering/ environmental documentation costs for the project are $74,505. Table 4-44 provides a detailed listing of all applicable costs.

Task 4: Assessment and Evaluation

This task includes costs for development of a Hydrology and Water Quality Study, a Geotechnical Study, and costs associated with pre- and post- project water quality testing. Groundworks will recruit and train student volunteers for water quality monitoring, and will also pay stipends ($10/hour) for their time.

This cost was determined based on the anticipated labor costs of those involved in creating these documents. This task will require a Civil Engineer, an Environmental Engineer, a Geologist, paid student workers, and Groundworks employees to train students for completion of the various studies and water quality monitoring. Total costs for Task 4 are $37,525.

Task 5: Final Design

This task includes the cost for finalizing design of the project. This task was initiated in 2011 and will be completed before September 2013, so will be used as matching funds. This task's costs will consist of labor costs for a Civil Engineer to complete the working drawing, which will total $18,980.

Task 6: Environmental Documentation

This task includes the cost for contributions by a JCNI consultant toward the preparation of a draft Mitigated Negative Declaration (MND), expected to be complete before September 2013. These costs were determined based only on JCNI contributions to MND development; the actual document was prepared entirely in-house by the City of San Diego as part of their permitting process. Costs are estimated to total $3,000.

Task 7: Permitting

This task includes the cost for obtaining all necessary permits to implement the project, including obtaining permits for a City of San Diego Site Development Permit, a California Fish & Wildlife, Streambed Alteration Agreement, and a U.S. Army Corp of Engineers, Section 404 Permit. This cost was determined based on the consultant costs necessary to support JCNI in obtaining these permits. Permitting costs are anticipated to total $15,000.

Table 4-44: Row (c) Planning/ Design/ Environmental Documentation
Chollas Creek Integration Project – Phase II

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 4: Assessment and Evaluation						
Drainage Report for Northwest Village Creek	Civil Engineer	$135.00	45	$6,075	$0	$6,075
Water Quality Technical Report for Northwest Village Creek	Environmental Engineer	$120.00	85	$10,200	$0	$10,200
Geotechnical Investigation for Northwest Village Creek	Geologist	$125.00	30	$3,750	$0	$3,750
Training Students for Monitoring	Groundworks Project Manager	$75.00	100	$7,500	$0	$7,500
Student Water Quality Monitoring Stipends	Groundworks	$10.00	1000	$10,000	$10,000	$0
Task 4 Total				**$37,525**	**$10,000**	**$27,525**
Task 5: Final Design						
100% Design plans for construction and restoration	Civil Engineer	$135.00	141	$18,980	$0	$18,980
Task 5 Total				**$18,980**	**$0**	**$18,980**

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 6: Environmental Documentation						
Mitigated Negative Declaration	A & E	$150.00	20	$3,000	$0	$3,000
Task 6 Total				**$3,000**	**$0**	**$3,000**
Task 7: Permitting						
City of San Diego, Site Development Permit	A & E	$100.00	100	$10,000	$0	$10,000
California Fish & Wildlife, Streambed Alteration Agreement	A & E	$150.00	20	$3,000	$0	$3,000
U.S. Army Corp of Engineers, Section 404 Permit	A & E	$125.00	16	$2,000	$0	$2,000
Task 7 Total				**$15,000**	**$0**	**$15,000**
Row (c) Total				**$74,505**	**$10,000**	**$64,505**

Row (d) Construction/ Implementation

The Construction and Implementation costs for the project are estimated to be $498,174. Table 4-45 provides a detailed listing of all applicable costs.

Task 8: Construction Contracting

JCNI will be responsible for preparation of Bid Packages, outreach and advertisements, pre-bid meeting, and selection of contractor. These costs are anticipated to total $6,000.

Task 9: Construction/ Implementation

Construction costs for this project are divided between three subtasks: Mobilization and Site Preparation, Project Construction, and Performance Testing and Demobilization. These costs will total $492,174, of which $61,718 in matching funds will be provided.

- ***Subtask 9.1 Mobilization and Site Preparation***: The costs included in this subtask are labor (mainly contractors), equipment, and materials necessary to properly prepare the Chollas Creek project site for construction activities. This includes protecting existing habitat, clearing and grubbing, preparing storm drains and catch basins, and other general mobilization activities.
- ***Subtask 9.2 Project Construction***: This subtask includes all construction activities for the *Chollas Creek Integration Project – Phase II*, such as grading, cut and fill, installation of headwalls, rip rap, and irrigation systems, and erosion control. Costs were calculated from contractor costs, materials required, and equipment needed.
- ***Subtask 9.3 Performance Testing and Demobilization***: The costs included in this subtask include the labor, materials, and equipment necessary for all testing and demobilization activities. This activities include soils testing, water metering, installation of project signage, installation of bioswales, water quality testing, project monitoring, general demobilization, and reporting activities.

Materials costs are estimated to total $280,862, while labor costs are estimated to total $211,313. Construction costs were estimated by a consultant, based on prior experience and project scope.

Table 4-45: Row (d) Construction/ Implementation
Chollas Creek Integration Project – Phase II

Activity or Deliverable	Discipline	Hourly Wage ($)	Number of hours	Total ($)	Grant Request	Funding Match
Task 8: Construction Contracting						
Preparation of Bid Packages, outreach and advertisements, pre-bid meeting, and selection of contractor	JCNI Project Manager	$75.00	80	$6,000	$6,000	$0
Task 8 Total				**$6,000**	**$6,000**	**$0**
.						
Materials						
Activity or Deliverable	**Materials Used**	**Unit Costs ($)**	**Number of Units**	**Total ($)**	**Grant Request**	**Funding Match**
Task 9: Construction/ Implementation						
Subtask 9.1 Mobilization and Site Preparation						
Mobilization	Lump Sum	$5,000.00	1	$5,000	$5,000	$0
Clear & Grub	Tractor Cubic Yards	$14,000.00	0	$3,500	$3,500	$0
Construction Fence	Lump Sum	$3,000.00	1	$3,000	$3,000	$0
Subtotal				$11,500	$11,500	$0
Subtask 9.2 Project Construction						
Storm Drain	Pipe Lineal Feet	$65.00	50	$3,250	$3,250	$0
Catch Basin	Basin	$5,000.00	2	$10,000	$10,000	$0
Headwall	Headwall	$8,000.00	2	$16,000	$16,000	$0
Rip rap	Rocks/Stones Cubic Yards	$60.00	610	$36,600	$36,600	$0
Grading	Tractor Cubic Yards	$14.90	12000	$178,846	$178,846	$0
Cut & fill	Tractor Cubic Yards	$14.00	100	$14,000	$14,000	$0
Bioswales	Contractor Lineal Feet	$5.00	300	$1,500	$1,500	$0
Tools/Digging Equipment	Estimate	$3,666.00	1	$3,666	$0	$3,666
Subtotal				$263,862	$260,196	$3,666
Subtask 9.3 Performance Testing and Demobilization						
Project Signage	Contractor Number of Each	$500.00	1	$500	$0	$500
Water Meter	Lump Sum	$2,000.00	1	$2,000	$433	$1,567
Lab Testing Equipment	Lump Sum	$3,000.00	1	$3,000		$3,000
Subtotal				$5,500	$433	$5,067
Materials Total				**$280,862**	**$272,129**	**$8,733**
Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Subtask 9.1 Mobilization and Site Preparation						
Existing habitat Protection	Lump Sum	$5,000.00	1	$50,000	$50,000	$0
Install crosion control measures	Contractor-Hours	$45.00	85	$3,825	$2,843	$982
Subtotal				$53,825	$52,843	$982
Subtask 9.2 Project Construction						
Install drop catch basins	Contractor-Hours	$45.00	600	$27,000	$27,000	$0
Install storm drains	Contractor-Hours	$45.00	480	$21,600	$21,600	$0

Labor						
Activity or Deliverable	**Discipline**	**Hourly Wage ($)**	**Number of Hours**	**Total ($)**	**Grant Request**	**Funding Match**
Install rip-rap segments	Contractor-Hours	$45.00	100	$4,500	$4,500	$0
Install irrigation systems	Contractor-Hours	$45.00	180	$8,100	$8,100	$0
Install bioswales	Contractor-Hours	$45.00	460	$20,700	$20,700	$0
Replant vegetation	Contractor Hours	$45.00	850	$38,250	$23,584	$14,666
Subtotal				$120,150	$105,484	$14,666
Subtask 9.3 Performance Testing and Demobilization						
Monitoring/Management of Revegetation Areas	Contractor-Hours	$15.00	1667	$24,998	$0	$24,997
Soils Test	Geologist Lump sum	$1.00	2500	$2,500	$0	$2,500
Water Quality Sampling & Analysis	Contractor-Hours	$80.00	62	$4,960	$0	$4,960
Reporting to other Agencies	Contractor-Hours	$80.00	61	$4,880	$0	$4,880
Subtotal				$37,338	$0	$37,337
Labor Total				**$211,313**	**$158,327**	**$52,985**
Task 9 Total				**$492,174**	**$430,456**	**$61,718**
Row (d) Total				**$498,174**	**$436,456**	**$61,718**

Row (e) Environmental Compliance/ Mitigation/ Enhancement

Task 10: Environmental Compliance/ Mitigation/ Enhancement:

Not applicable.

Row (f) Construction Administration

The Construction Administration costs for the project are estimated to be $14,250. Table 4-46 provides a detailed listing of all applicable costs.

Task 11: Construction Administration

The total construction administration costs consist of labor required for managing the construction contractor. The hours estimated were based on prior experience, and as per the estimated design and construction schedule. These costs will be provided as matching funds totaling $14,250.

Table 4-46: Row (f) Construction Administration
Chollas Creek Integration Project – Phase II

Activity or Deliverable	**Discipline**	**Hours**	**Number of Hours**	**Total Costs ($)**	**Grant Request**	**Funding Match**
Task 11: Construction Administration						
Manage Contractor and construction/field activities	JCNI Project Manager	$ 75	190.00	$14,250	$0	$14,250
Task 11 Total				**$14,250**	**$0**	**$14,250**
Row (f) Total				**$14,250**	**$0**	**$14,250**

Row (g) Other Costs

Not applicable.

Row (h) Construction/Implementation Contingency

The Construction/Implementation Contingency for project is estimated to be $33,544. This was estimated based on approximately 7% of the construction contract amount budgeted for unforeseen emergencies or design shortfalls.

Row (i) Grand Total

The Grand Total for the *Chollas Creek Integration Project – Phase II* ($678,723) was calculated as the sum of rows (GA) through (h).

Table 4-47: Row (i) Grand Total Costs
Chollas Creek Integration Project – Phase II

	Category	Total
(GA)	Grant Administration	$15,000
(a)	Direct Project Administration	$43,250
(b)	Land Purchase/Easement	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$74,505
(d)	Construction/Implementation	$498,174
(e)	Environmental Compliance/ Mitigation/Enhancement	$0
(f)	Construction Administration	$14,250
(g)	Other Costs	$0
(h)	Construction/Implementation Contingency	$33,544
(i)	**Grand Total**	**$678,723**

Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

The *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* project will involve establishing nutrient water quality objectives for the Santa Margarita River (SMR) watershed, which could be used in the development of alternative nutrient water quality objectives by the San Diego RWQCB in its Basin Plan Triennial Update. This is the second of a three phase project. Phase I was funded through Proposition 84-Round 1 Implementation Grant, and created an SMR Watershed Stakeholder Group, developed a monitoring plan, conducted initial studies, and developed water quality goals for the SMR Estuary. Phase II will expand on the work of Phase I by extending studies out to the watershed as a whole, developing water quality goals for the Lower Santa Margarita River, and incorporating information learned in Phase I. Funding for the project involves two aspects of project implementation: grant administration and planning/design/engineering/environmental documentation.

The total cost associated with the *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* project is $1,590,534. This is a joint project with one of our Tri-County FACC partners, the Upper Santa Margarita RWMG, to address surface water quality for a watershed that crosses IRWM Region boundaries. To simplify grant contracting, the *San Diego IRWM Implementation Grant Proposal – Round 2* contains the project in its entirety. However, it should be noted that the project benefits will accrue to both regions. Of the $1,191,275 grant funding requested, $181,875 has been allocated by the Upper Santa Margarita IRWM Region from their Tri-County FACC MOU allocation. The remaining $399,259 will be funded by non-State funding sources provided by project partners. In total, the non-State share of the total project cost (funding match) is 25% for this project.

Table 4-48 below provides a more detailed break-down of the total project budget.

Table 4-48: Total Project Budget
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Proposal Title: San Diego IRWM Implementation Grant Proposal –Round 2
Project Title: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II
Project serves a need of a DAC?: ☐ Yes ☒ No
Funding Match Waiver request?: ☐ Yes ☒ No

		(a)	(b)	(c)	(d)
	Category	**Requested Grant Amount**	**Cost Share: Non-State Fund Source* (Funding Match)**	**Cost Share: Other State Fund Sources***	**Total**
(GA)	Grant Administration	$29,400	$0	$0	$29,400
(a)	Direct Project Administration	$0	$51,072	$0	$51,072
(b)	Land Purchase/Easement	$0	$0	$0	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$1,161,875	$348,187	$0	$1,510,062
(d)	Construction/Implementation	$0	$0	$0	$0
(e)	Environmental Compliance/ Mitigation/Enhancement	$0	$0	$0	$0
(f)	Construction Administration	$0	$0	$0	$0
(g)	Other Costs	$0	$0	$0	$0
(h)	Construction/Implementation Contingency	$0	$0	$0	$0
(i)	**Grand Total**	**$1,191,275**	**$399,259**	**$0**	**$1,590,534**

**** Sources of funding:*** *Funding match will be provided by the project partners primarily as in-house labor.*

The Implementation Grant Proposal is requesting funding for one project task identified within the *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* work plan (refer to Attachment 3).

The sections below provide detailed descriptions of each of the row and task budgets (where applicable). In addition, each description below describes how cost estimates for each of the tasks or rows were calculated.

(GA) Grant Administration

As part of this proposal, each project has agreed to allocate an amount equivalent to 3% of their grant request to pay for the cost for grant administration by the San Diego County Water Authority. Note that for this project, grant administration is 2.5% of the project's grant request due to the interregional agreement with the Upper Santa Margarita IRWM Region. The *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* project will contribute $29,400 to this cost.

Row (a) Direct Project Administration

The County of San Diego staff will support Direct Project Administration activities, with the matching funds for these activities coming from the County of San Diego's General Fund. Costs for this row are estimated to total $51,072.

Task 1: Project Administration

The County of San Diego will carry out project administration tasks relating to direct project administration and reporting for this project. Costs are estimated to total $51,072.

Task 2: Labor Compliance Program

Not applicable

Task 3: Reporting

Not applicable.

Table 4-49: Row (a) Direct Project Administration
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total	Grant Request	Funding Match
Task 1: Project Administration						
Track budgets, prepare invoices, compile backup documentation, and prepare quarterly reports	Land Use Environmental Planner III	$127.68	316	$40,347	$0	$40,347
Prepare and administer PAEP	Land Use Environmental Planner III	$127.68	36	$4,596	$0	$4,596
Prepare project completion report	Land Use Environmental Planner III	$127.68	48	$6,129	$0	$6,129
Task 1 Total				**$51,072**	**$0**	**$51,072**
Row (a) Total				**$51,072**	**$0**	**$51,072**

Row (b) Land Purchase/ Easement

Not applicable.

Row (c) Planning/Design/Engineering/Environmental Documentation

Total planning/ design/ engineering/ environmental documentation costs for the project are $1,510,062. Approximately $1,161,875 of this is included in this grant request, and $348,187 will be provided in matching funds. Table 4-50 provides a detailed listing of all applicable costs.

Task 4: Assessment and Evaluation

The total cost for this task will be $1,510,062 for the following activities.

- ***Subtask 4.1 Continue to Facilitate Stakeholder Advisory Group*****:** Costs for this task include all people, activities, and materials necessary to continue facilitating a stakeholder advisory group. Facilitating the stakeholder group requires Principal Scientists and Facilitators, meeting supplies, travel expenses for meetings, and miscellaneous support. It also will provide for a staff member from the San Diego RWQCB to attend 15 group meetings, approximately six hours each. These costs total $407,015, and was estimated based on salary and anticipated time for labor, as well as prior experience for the costs of materials and travel for meetings.
- ***Subtask 4.2 Conduct Field and Special Studies*****:** Costs for this task include labor costs necessary to conduct field and special studies, as well as costs for laboratory analysis, supplies, and travel. These costs, at a total of $760,493, were estimated by SCCWRP for conducting the monitoring special studies and based on actual consultant invoices for the *USMC Hydrological and Biological Support to Lower SMR Watershed Monitoring Program - Years 2008–2009*.
- ***Subtask 4.3 Develop Nutrient WQOs for Santa Margarita River*****:** Costs for this task include labor costs necessary to conduct technical modeling of the Santa Margarita River that will lead to the development of nutrient water quality objectives for the SMR estuary. These costs were estimated by SCCWRP for conducting the technical studies, while others were based on documented funding through USEPA grants and US Marine Corps Camp Pendleton modeling.

Task 5: Final Design

Not applicable.

Task 6: Environmental Documentation

Not applicable.

Task 7: Permitting

Not applicable.

Table 4-50: Row (c) Planning/ Design/ Engineering/ Environmental Documentation
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total Costs	Grant Request	Funding Match
Task 4: Assessment and Evaluation						
Subtask 4.1 Continue to Facilitate Stakeholder Advisory Group						
Continue to Facilitate Stakeholder Advisory Group	Principal Scientist	$180	375	$67,612	$67,612	$0
	Facilitator	$215	375	$80,673	$80,673	$0
	Miscellaneous Support and Supplies	Lump sum	Lump Sum	$7,871	$7,871	$0
	Program Coordinator	144	240	$34,675	$0	$34,675
	Land Use Environmental Planner III	128	240	$30,643	$0	$30,643
	RWQCB, 15 Meetings	$150	450	$67,540	$67,540	$0

Activity or Deliverable	Discipline	Hourly Wage ($/hr)	Number of Hours	Total Costs	Grant Request	Funding Match
County of San Diego Support of consultants to the Stakeholder Advisory Group, including note-taking	Senior Civil Engineer	$139	22	$3,097	$0	$3,097
	Land Use Environmental Planner III	$116	129	$14,903	$0	$14,903
	Principal Scientist*	$180	253	$45,596	$0	$45,596
	Facilitator*	$215	253	$54,404	$0	$54,404
Subtask 4.1 Total				$407,015	$223,697	$183,318
Subtask 4.2 Conduct Field and Special Studies						
Monitoring and Special Studies Report	Principal Scientist	328	328	$59,430	$59,430	$0
	Senior Scientist	1,407	1,407	$208,799	$208,799	$0
	Senior Research Technician	1,408	1,408	$149,248	$149,248	$0
	Research Technician	1,406	1,406	$119,229	$119,229	$0
USMC Hydrological and Biological Support to Lower SMR Watershed Monitoring Program - Years 2008–2009 (Stetson Report)	Principal Scientist*	67	67	$12,073	$0	$12,073
	Senior Scientist*	67	67	$9,943	$0	$9,943
	Laboratory Analysis	Lump Sum	Lump Sum	$154,399	$154,399	$0
	Supplies	Lump Sum	Lump Sum	$47,373	$47,373	$0
Subtask 4.2 Total				$760,493	$738,478	$22,016
Subtask 4.3 Develop Nutrient Water Quality Goals for the Santa Margarita River						
Technical Studies Supporting Proposed Nutrient Water Quality Goals for Santa Margarita River Report	Principal Scientist	320	320	$57,661	$57,661	$0
	Senior Scientist	100	100	$14,840	$14,840	$0
	Scientist	1,000	1,000	$127,200	$127,200	$0
USEPA Funds - SCCWRP NNE Spreadsheet Evaluation	Principal Scientist*	116	116	$20,902	$0	$20,902
	Senior Scientist*	205	205	$30,422	$0	$30,422
USMC Camp Pendleton Lagoon Modeling	Principal Scientist*	195	195	$35,137	$0	$35,137
	Senior Scientist*	380	380	$56,392	$0	$56,392
Subtask 4.3 Total				$342,554	$199,701	$142,853
Task 4 Total				**$1,510,062**	**$1,161,875**	**$348,187**
Row (c) Total				**$1,510,062**	**$1,161,875**	**$348,187**

Row (d) Construction/ Implementation

Task 8: Construction Contracting

Not applicable.

Task 9: Construction

Not applicable.

Row (e) Environmental Compliance/ Mitigation/ Enhancement

Task 10: Environmental Compliance/ Mitigation/ Enhancement

Not applicable

Row (f) Construction Administration

Task 11: Construction Administration

Not applicable

Row (g) Other Costs

Not applicable.

Row (h) Construction/Implementation Contingency

Not applicable.

Row (i) Grand Total

The Grand Total for the *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* project ($1,590,534) was calculated as the sum of rows (GA) through (h).

Table 4-51: Row (i) Grand Total Costs
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

	Category	Total
(GA)	Grant Administration	$29,400
(a)	Direct Project Administration	$51,072
(b)	Land Purchase/Easement	$0
(c)	Planning/Design/Engineering/ Environmental Documentation	$1,510,062
(d)	Construction/Implementation	$0
(e)	Environmental Compliance/ Mitigation/Enhancement	$0
(f)	Construction Administration	$0
(g)	Other Costs	$0
(h)	Construction/Implementation Contingency	$0
(i)	**Grand Total**	**$1,590,534**

Attachment 5

Schedule

Attachment 5

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Schedule

Attachment 5 consists of the following items:

✓ **Proposal Schedule(s).** The attached schedules provide a timeline for implementation of each project within the Proposal, including the sequence and timing of each project.

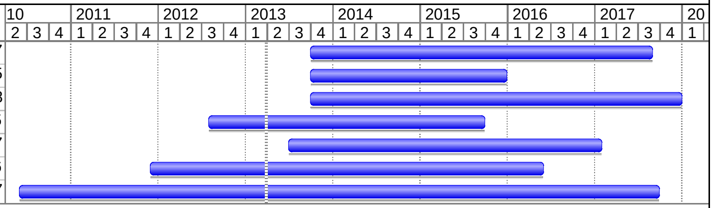
The enclosed proposal schedule provides start and end dates as well as milestones for each Work Plan task, consistent with the Work Plan (refer to Attachment 3) and Budget (refer to Attachment 4). The assumed start date is October 1, 2013, and each project has an assumed end date that is reasonable based on their individual Work Plan and Budget. Tasks that were not included as part of the Work Plan or Budget are not included in this schedule.

Figure 5-1 is an overall schedule for the entire proposal, while Figures 5-2 through 5-8 are schedules for each project included in this proposal. As indicated in these schedules, five of the seven projects in this proposal will begin Task 9: Construction/Implementation before or during the first construction cycle (April 2014-October 2014):

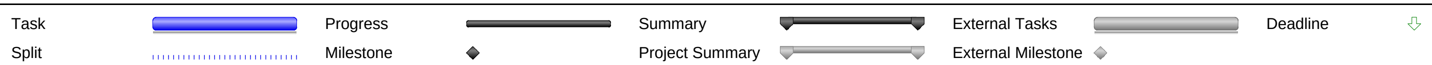
- Project 1: North San Diego County Regional Recycled Water Project – Phase II (Construction begins October 2013)
- Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program (Implementation begins October 2013)
- Project 4: Failsafe Potable Reuse at the Advanced Water Purification Facility (Implementation begins March 2014)
- Project 5: Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies (Construction/Implementation begins October 2013)
- Project 6: Chollas Creek Integration Project – Phase II (Construction Begins March 2014)

Proposal Summary

ID		Task Name	Duration	Start	Finish
1		Project 1: North San Diego County Regional Recycled Water Project - Phase I	1023 days?	Tue 10/1/13	Thu 8/31/17
2		Project 2: Turf Replacement and Agricultural Irrigation Efficiency Progra	588 days	Tue 10/1/13	Thu 12/31/15
3		Project 3: Rural Disadvantaged Community (DAC) Partnership Progra	1110 days?	Tue 10/1/13	Mon 1/1/18
4		Project 4: Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility	826 days	Wed 8/1/12	Wed 9/30/15
5		Project 5: Sustaining Healthy Tributaries to the Upper San Diego Rive	937 days	Mon 7/1/13	Tue 1/31/17
6		Project 6: Chollas Creek Integration Project - Phase I	1175 days?	Thu 12/1/11	Wed 6/1/16
7		Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed - Phase II	1914 days?	Tue 6/1/10	Fri 9/29/17

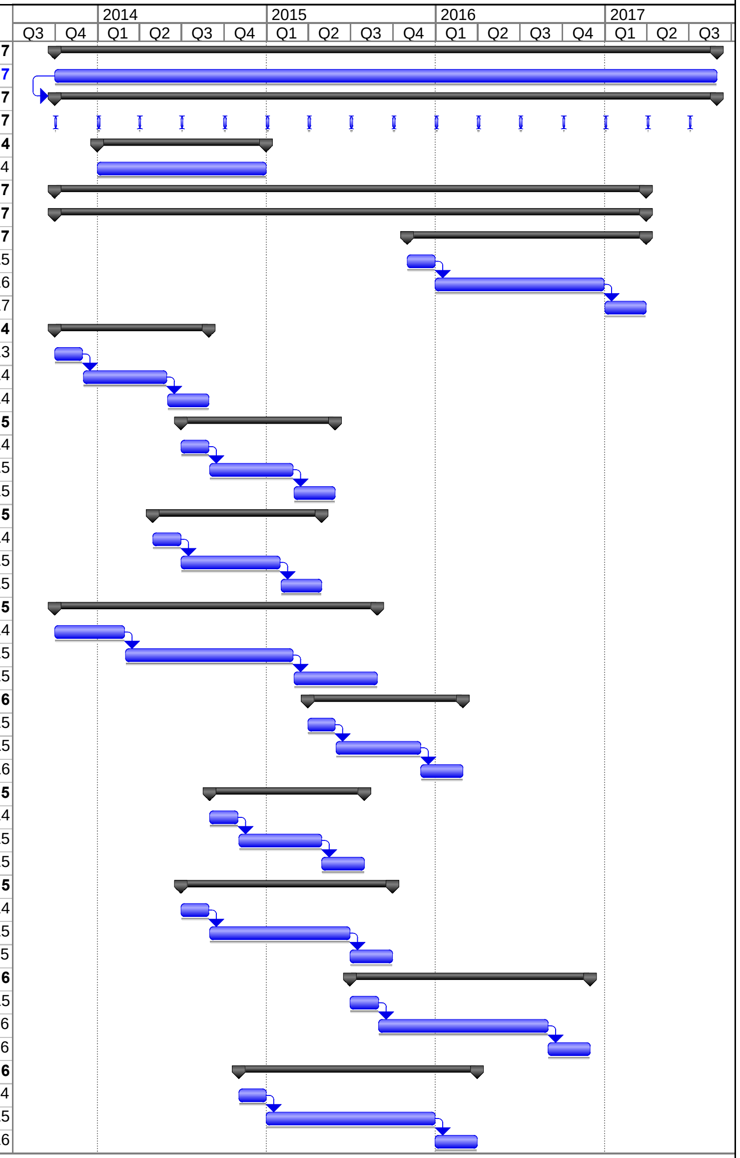


Project: Proposal Schedule.mpp
Date: Tue 3/26/13



North San Diego County Regional Recycled Water Project - Phase II Schedule

ID	Task Name	Duration	Start	Finish
1	**North San Diego County Regional Recycled Water Project - Phase II**	**1023 days?**	**Tue 10/1/13**	**Thu 8/31/17**
2	**Grant Award Date**	**1023 days**	**Tue 10/1/13**	**Thu 8/31/17**
3	**Budget Category (a): Direct Project Administration**	**1023 days?**	**Tue 10/1/13**	**Thu 8/31/17**
4	**Task 3: Reporting**	**1023 days?**	**Tue 10/1/13**	**Thu 8/31/17**
22	**Budget Category (c): Planning/Design/Engineering/Environmental Documentation**	**261 days?**	**Wed 1/1/14**	**Wed 12/31/14**
23	Task 5: Project Design	261 days?	Wed 1/1/14	Wed 12/31/14
24	**Budget Category (d): Construction/Implementation**	**914 days?**	**Tue 10/1/13**	**Fri 3/31/17**
25	**Task 9: Construction**	**914 days?**	**Tue 10/1/13**	**Fri 3/31/17**
26	**1-1 LWD Regional System Connection Project**	**370 days?**	**Mon 11/2/15**	**Fri 3/31/17**
27	Subtask 9.1.1: Mobilization and Site Preparation	44 days?	Mon 11/2/15	Thu 12/31/15
28	Subtask 9.1.2: Project Construction	261 days?	Fri 1/1/16	Fri 12/30/16
29	Subtask 9.1.3: Performance Testing and Demobilization	65 days?	Mon 1/2/17	Fri 3/31/17
30	**1-2 VWD Pump Improvements**	**239 days?**	**Tue 10/1/13**	**Fri 8/29/14**
31	Subtask 9.2.1: Mobilization and Site Preparation	44 days?	Tue 10/1/13	Fri 11/29/13
32	Subtask 9.2.2: Project Construction	130 days?	Mon 12/2/13	Fri 5/30/14
33	Subtask 9.2.3: Performance Testing and Demobilization	65 days?	Mon 6/2/14	Fri 8/29/14
34	**1-3 VID Golf Course Recycled Water**	**239 days?**	**Tue 7/1/14**	**Fri 5/29/15**
35	Subtask 9.3.1: Mobilization and Site Preparation	44 days?	Tue 7/1/14	Fri 8/29/14
36	Subtask 9.3.2: Project Construction	130 days?	Mon 9/1/14	Fri 2/27/15
37	Subtask 9.3.3: Performance Testing and Demobilization	65 days?	Mon 3/2/15	Fri 5/29/15
38	**1-4 RMWD Northwest Recycled Water Expansion**	**261 days?**	**Thu 5/1/14**	**Thu 4/30/15**
39	Subtask 9.4.1: Mobilization and Site Preparation	43 days?	Thu 5/1/14	Mon 6/30/14
40	Subtask 9.4.2: Project Construction	154 days?	Tue 7/1/14	Fri 1/30/15
41	Subtask 9.4.3: Performance Testing and Demobilization	64 days?	Mon 2/2/15	Thu 4/30/15
42	**1-5 OMWD Conversion of Distribution Facilities to Recycled Water**	**499 days?**	**Tue 10/1/13**	**Fri 8/28/15**
43	Subtask 9.5.1: Mobilization and Site Preparation	109 days?	Tue 10/1/13	Fri 2/28/14
44	Subtask 9.5.2: Project Construction	260 days?	Mon 3/3/14	Fri 2/27/15
45	Subtask 9.5.3: Performance Testing and Demobilization	130 days?	Mon 3/2/15	Fri 8/28/15
46	**1-6 SFID Onsite Recycled Water Irrigation System Improvements**	**239 days?**	**Wed 4/1/15**	**Mon 2/29/16**
47	Subtask 9.6.1: Mobilization and Site Preparation	43 days?	Wed 4/1/15	Fri 5/29/15
48	Subtask 9.6.2: Project Construction	131 days?	Mon 6/1/15	Mon 11/30/15
49	Subtask 9.6.3: Performance Testing and Demobilization	65 days?	Tue 12/1/15	Mon 2/29/16
50	**1-7: Carlsbad MWD Recycled Water Main Pipeline Extension**	**240 days?**	**Mon 9/1/14**	**Fri 7/31/15**
51	Subtask 9.7.1: Mobilization and Site Preparation	45 days?	Mon 9/1/14	Fri 10/31/14
52	Subtask 9.7.2: Project Construction	129 days?	Mon 11/3/14	Thu 4/30/15
53	Subtask 9.7.3: Performance Testing and Demobilization	66 days?	Fri 5/1/15	Fri 7/31/15
54	**1-8 Escondido Recycled Water Easterly Main Extension**	**327 days?**	**Tue 7/1/14**	**Wed 9/30/15**
55	Subtask 9.8.1: Mobilization and Site Preparation	44 days?	Tue 7/1/14	Fri 8/29/14
56	Subtask 9.8.2: Project Construction	217 days?	Mon 9/1/14	Tue 6/30/15
57	Subtask 9.8.3: Performance Testing and Demobilization	66 days?	Wed 7/1/15	Wed 9/30/15
58	**1-9 Oceanside Melrose Drive Reclaimed Water Main Extension**	**371 days?**	**Wed 7/1/15**	**Wed 11/30/16**
59	Subtask 9.9.1: Mobilization and Site Preparation	44 days?	Wed 7/1/15	Mon 8/31/15
60	Subtask 9.9.2: Project Construction	262 days?	Tue 9/1/15	Wed 8/31/16
61	Subtask 9.9.3: Performance Testing and Demobilization	65 days?	Thu 9/1/16	Wed 11/30/16
62	**1-10 SEJPA Conversion of Existing Tanks to Recycled Water Storage**	**369 days?**	**Mon 11/3/14**	**Thu 3/31/16**
63	Subtask 9.10.1: Mobilization and Site Preparation	43 days?	Mon 11/3/14	Wed 12/31/14
64	Subtask 9.10.2: Project Construction	261 days?	Thu 1/1/15	Thu 12/31/15
65	Subtask 9.10.3: Performance Testing and Demobilization	65 days?	Fri 1/1/16	Thu 3/31/16

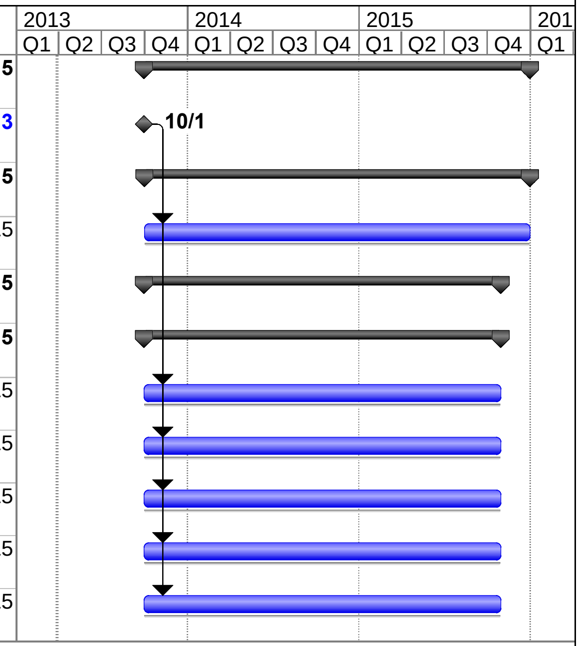


Project: 5.Project# Schedule
Date: Wed 3/27/13

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program

ID		Task Name	Duration	Start	Finish
1		**Project Name**	**588 days**	**Tue 10/1/13**	**Thu 12/31/15**
2		**Grant Award Date**	**0 days**	**Tue 10/1/13**	**Tue 10/1/13**
3		**Budget Category (a): Direct Project Administration**	**587 days**	**Wed 10/2/13**	**Thu 12/31/15**
4		Task 1: Project Administration	587 days	Wed 10/2/13	Thu 12/31/15
5		**Budget Category (d): Construction/Implementation**	**544 days**	**Tue 10/1/13**	**Fri 10/30/15**
6		Task 9: Construction	**544 days**	**Tue 10/1/13**	**Fri 10/30/15**
7		Subtask 9.1: Water Authority Turf Replacement - In-house	544 days	Tue 10/1/13	Fri 10/30/15
8		Subtask 9.2: Water Authority Turf Replacement - Vendor	544 days	Tue 10/1/13	Fri 10/30/15
9		Subtask 9.3 City of SD Turf Replacement - In-house	544 days	Tue 10/1/13	Fri 10/30/15
10		Subtask 9.4 Water Authority Agricultural Program - In-house	544 days	Tue 10/1/13	Fri 10/30/15
11		Subtask 9.5 Water Authority Agricultural Program - Vendor	544 days	Tue 10/1/13	Fri 10/30/15

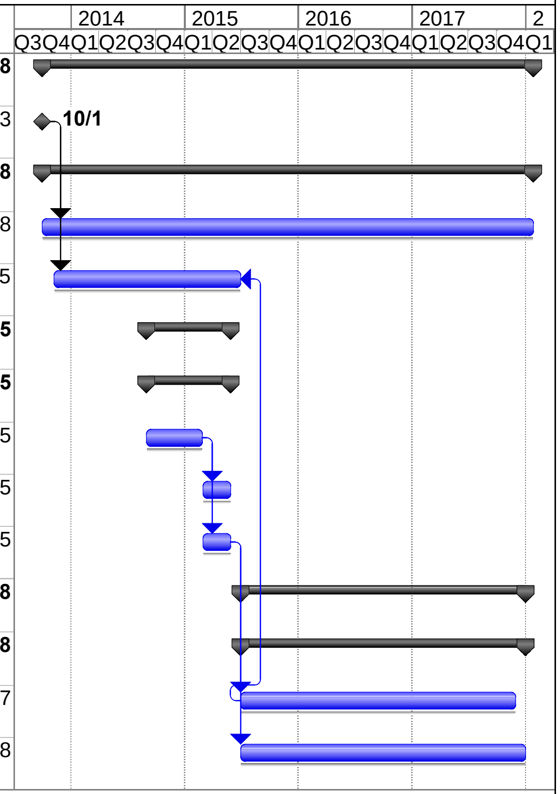


Project: 5.Project# Schedule
Date: Wed 3/27/13

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

Project 3: Rural Disadvantaged Community (DAC) Partnership Program Schedule

ID	Task Name	Duration	Start	Finish
1	**Rural Disadvantaged Community (DAC) Partnership Program**	**1129 days?**	**Tue 10/1/13**	**Fri 1/26/18**
2	Grant Award	0 days	Tue 10/1/13	Tue 10/1/13
3	**Budget Category (a): Direct Project Administration**	**1129 days?**	**Tue 10/1/13**	**Fri 1/26/18**
4	Task 1: Project Administration	1129 days	Tue 10/1/13	Fri 1/26/18
5	Task 2: Labor Compliance Program	428 days?	Fri 11/8/13	Wed 7/1/15
6	**Budget Category (c): Planning/Design/Engineering/Environmental Documen**	**195 days?**	**Mon 9/1/14**	**Fri 5/29/15**
7	**Task 4: Assessment and Evaluation**	**195 days?**	**Mon 9/1/14**	**Fri 5/29/15**
8	Subtask 4-1: Facilitation of Rural DACs Stakeholder Committee	130 days?	Mon 9/1/14	Fri 2/27/15
9	Subtask 4-2: Preparation of Rural DACs Project Assessment and Select	65 days?	Mon 3/2/15	Fri 5/29/15
10	Subtask 4-3: Rural DACs Partnership Program Guidelines	65 days?	Mon 3/2/15	Fri 5/29/15
11	**Budget Category (d): Construction/Implementation**	**654 days?**	**Wed 7/1/15**	**Mon 1/1/18**
12	**Task 9: Construction**	**654 days?**	**Wed 7/1/15**	**Mon 1/1/18**
13	Subtask 9.1: Rural DACs Partnership Program Implementation	632 days?	Wed 7/1/15	Thu 11/30/17
14	Subtask 9.2: Rural DACs Infrastructure Reimbursements	654 days?	Wed 7/1/15	Mon 1/1/18

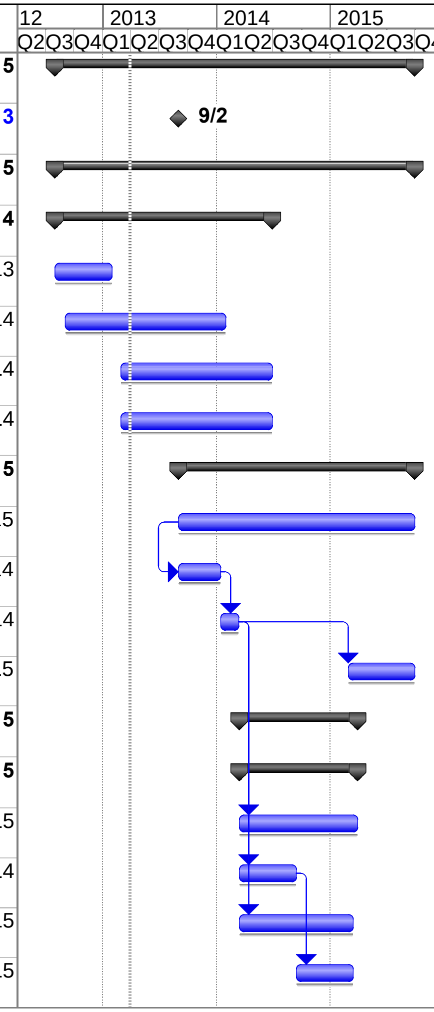


Project: 3_Rural DAC_Schedule_7Mar
Date: Wed 3/27/13

Task	Milestone	External Tasks
Split	Summary	External Milestone
Progress	Project Summary	Deadline

Project 4: Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility Schedule

ID		Task Name	Duration	Start	Finish
1		**Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility**	**826 days?**	**Wed 8/1/12**	**Wed 9/30/15**
2		**Grant Award Date**	**0 days**	**Mon 9/2/13**	**Mon 9/2/13**
3		**Budget Category (c): Planning/Design/Engineering/Environmental Documentation**	**826 days?**	**Wed 8/1/12**	**Wed 9/30/15**
4		**Task 4: Assessment and Evaluation**	**499 days?**	**Wed 8/1/12**	**Mon 6/30/14**
5		Subtask 4-1: Expert Panel Report and state of the Science Report	132 days?	Wed 8/1/12	Thu 1/31/13
6		Subtask 4-2: Treatment Toolbox and Report	370 days?	Mon 9/3/12	Fri 1/31/14
7		Subtask 4-3: Alternative Treatment Train Validation Report	347 days?	Fri 3/1/13	Mon 6/30/14
8		Subtask 4.4: In-kind Equipment and WQ Tests	347 days?	Fri 3/1/13	Mon 6/30/14
9		**Task 5: Final Design**	**543 days?**	**Mon 9/2/13**	**Wed 9/30/15**
10		Subtask 5-1: Project Management	543 days?	Mon 9/2/13	Wed 9/30/15
11		Subtask 5-2: Workshop and Failsafe Guidelines	98 days?	Mon 9/2/13	Wed 1/15/14
12		Subtask 5-3: Test Plan	42 days?	Thu 1/16/14	Fri 3/14/14
13		Subtask 5-4: Final Report	153 days?	Mon 3/2/15	Wed 9/30/15
14		**Budget Category (d): Construction/Implementation**	**272 days?**	**Mon 3/17/14**	**Tue 3/31/15**
15		**Task 9: Construction**	**272 days?**	**Mon 3/17/14**	**Tue 3/31/15**
16		Subtask 9-1: Demonstration Testing	272 days?	Mon 3/17/14	Tue 3/31/15
17		Subtask 9-2: Bench-scale Testing	131 days?	Mon 3/17/14	Mon 9/15/14
18		Subtask 9-3: Develop Calibrations	261 days?	Mon 3/17/14	Mon 3/16/15
19		Subtask 9-4: Challenge Testing	130 days?	Tue 9/16/14	Mon 3/16/15

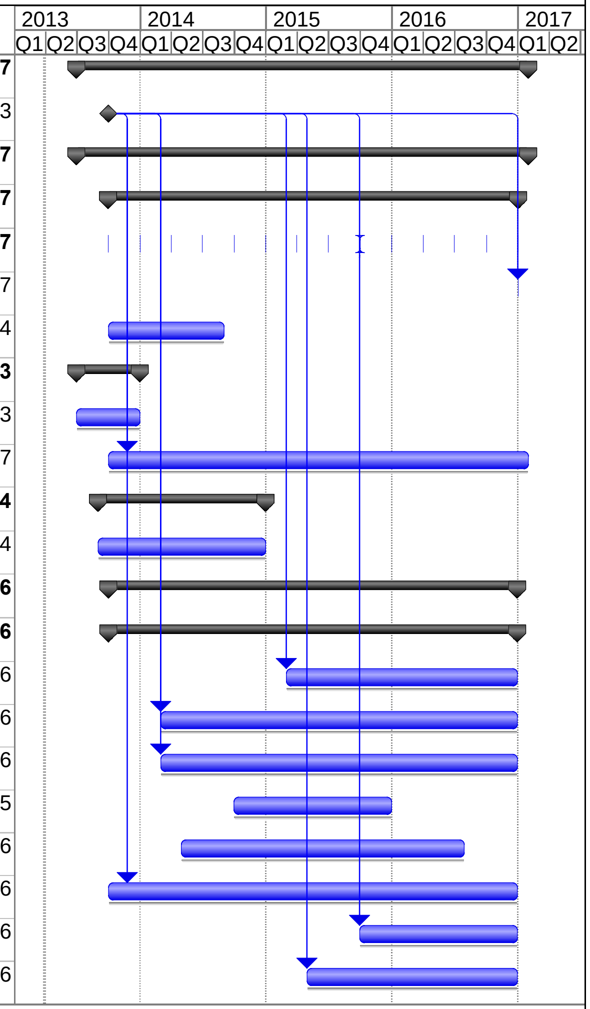


Project: 5.Project# Schedule
Date: Wed 3/27/13

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Project 5: Sustaining Healthy Tributaries to the Upper San Diego River Schedule

ID	Task Name	Duration	Start	Finish
1	**Sustaining Healthy Tributaries to the Upper San Diego River**	**937 days?**	**Mon 7/1/13**	**Tue 1/31/17**
2	Grant Award Date	1 day?	Tue 10/1/13	Tue 10/1/13
3	**Budget Category (a): Direct Project Administration**	**937 days?**	**Mon 7/1/13**	**Tue 1/31/17**
4	**Task 1: Project Administration**	**850 days?**	**Tue 10/1/13**	**Mon 1/2/17**
5	**Project Administration**	**850 days**	**Tue 10/1/13**	**Mon 1/2/17**
19	Project Administration 14	1 day	Mon 1/2/17	Mon 1/2/17
20	MOU with Project Partners	239 days?	Wed 10/2/13	Mon 9/1/14
21	**Task 2: Labor Compliance Program**	**132 days?**	**Mon 7/1/13**	**Tue 12/31/13**
22	Contract with Golden State LC	132 days?	Mon 7/1/13	Tue 12/31/13
23	Task 3: Reporting	870 days	Wed 10/2/13	Tue 1/31/17
24	**Budget Category (c): Planning/Design/Engineering/Environmental Docu**	**348 days?**	**Mon 9/2/13**	**Wed 12/31/14**
25	Task 7: Permitting	348 days?	Mon 9/2/13	Wed 12/31/14
26	**Budget Category (d): Construction/Implementation**	**848 days?**	**Wed 10/2/13**	**Fri 12/30/16**
27	**Task 9: Construction - Project 1**	**848 days?**	**Wed 10/2/13**	**Fri 12/30/16**
28	Subtask 9.1 Complete Two Feasibility Studies for Removal of Hydr	480 days?	Mon 3/2/15	Fri 12/30/16
29	Subtask 9.2 Develop and Implement Field Monitoring Program	740 days?	Mon 3/3/14	Fri 12/30/16
30	Subtask 9.3 Conduct Field Assessments of Tributaries	740 days?	Mon 3/3/14	Fri 12/30/16
31	Subtask 9. 4 Establish One Real-Time Monitoring Station	327 days?	Wed 10/1/14	Thu 12/31/15
32	Subtask 9.5 Implement Web-based Data Management System	587 days?	Thu 5/1/14	Fri 7/29/16
33	Subtask 9.6 Restore 4.4 Acres of Habitat	848 days?	Wed 10/2/13	Fri 12/30/16
34	Subtask 9.7 Establish Public Information Web Portal	327 days?	Thu 10/1/15	Fri 12/30/16
35	Subtask 9.8 Implement Education Plan	436 days?	Fri 5/1/15	Fri 12/30/16

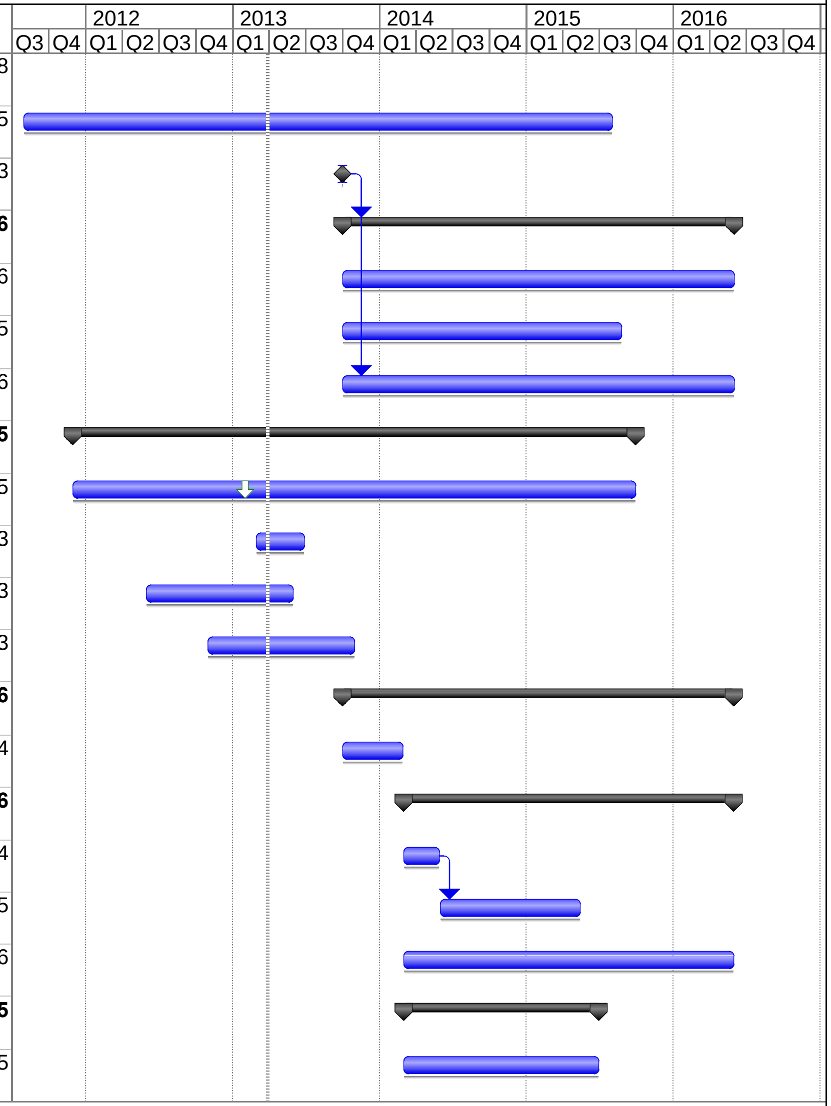


Project: Healthy Trib_Schedule_21Fel
Date: Wed 3/27/13

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

Project 6: Chollas Creek Integration Project - Phase II Schedule

ID		Task Name	Duration	Start	Finish
1		**Chollas Creek Integration Project - Phase II**	1 day?	Mon 6/2/08	Mon 6/2/08
2		Chollas Creek Integration Project - Phase I (for reference)	1046 days	Mon 8/1/11	Mon 8/3/15
3		Start of Grant Contract	1 day	Tue 10/1/13	Tue 10/1/13
4		**Budget Category Row (a): Direct Project Administration**	**696 days?**	**Wed 10/2/13**	**Wed 6/1/16**
5		Task 1: Project Administration	696 days?	Wed 10/2/13	Wed 6/1/16
6		**Task 2: Labor Compliance Program**	496 days?	Wed 10/2/13	Wed 8/26/15
7		Task 3: Reporting	696 days?	Wed 10/2/13	Wed 6/1/16
8		**Budget Category Row (c): Planning/Design/Engineering/**	**1000 days?**	**Thu 12/1/11**	**Wed 9/30/15**
9		Task 4: Assessment & Evaluation	1000 days?	Thu 12/1/11	Wed 9/30/15
10		Task 5: Final Design	86 days	Fri 3/1/13	Fri 6/28/13
11		Task 6 Environmental Documentation	261 days?	Fri 6/1/12	Fri 5/31/13
12		Task 7: Permitting	261 days	Thu 11/1/12	Thu 10/31/13
13		**Budget Category Row (d): Construction/Implementation**	**695 days?**	**Wed 10/2/13**	**Tue 5/31/16**
14		Task 8: Construction Contracting	108 days	Wed 10/2/13	Fri 2/28/14
15		**Task 9: Construction**	**587 days?**	**Mon 3/3/14**	**Tue 5/31/16**
16		Subtask 9-1: Mobilization and Site Preparation	65 days?	Mon 3/3/14	Fri 5/30/14
17		Subtask 9.2 Project Construction	250 days	Mon 6/2/14	Fri 5/15/15
18		Subtask 9.3 Performance Testing and Demobilizati	587 days	Mon 3/3/14	Tue 5/31/16
19		**Budget Category Row (f): Construction Administration**	**347 days?**	**Mon 3/3/14**	**Tue 6/30/15**
20		Task 11: Construction Administration	347 days?	Mon 3/3/14	Tue 6/30/15

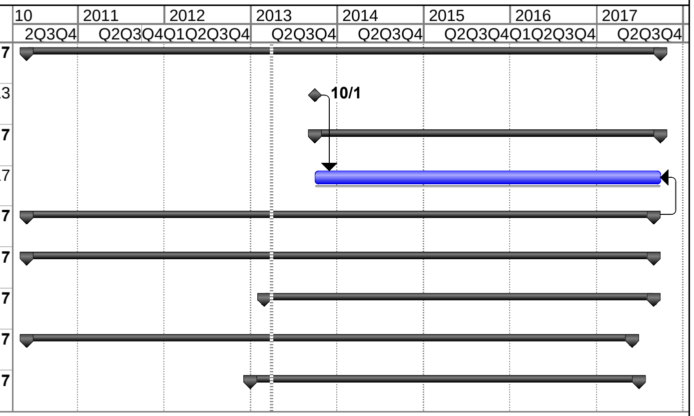


Project: Schedule_CombinedFinal 11.(
Date: Wed 3/27/13

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed - Phase II Schedule

ID		Task Name	Duration	Start	Finish
1		**Implementing Nutrient Management in the Santa Margarita River Watershed - Phase II**	**1914 days?**	**Tue 6/1/10**	**Fri 9/29/17**
2		**Grant Award Date**	0 days	Tue 10/1/13	Tue 10/1/13
3		**Budget Category (a): Direct Project Administration**	**1044 days?**	**Tue 10/1/13**	**Fri 9/29/17**
4		Task 1: Project Administration	1044 days?	Tue 10/1/13	Fri 9/29/17
5		**Budget Category (c): Planning/Design/Engineering/Environmental Documentation**	**1893 days?**	**Tue 6/1/10**	**Thu 8/31/17**
6		**Task 4: Assessment and Evaluation**	**1893 days?**	**Tue 6/1/10**	**Thu 8/31/17**
7		**Subtask 4A: Continue to Facilitate Stakeholder Advisory Group**	**1175 days?**	**Fri 3/1/13**	**Thu 8/31/17**
10		**Subtask 4B: Conduct Field and Special Studies**	**1828 days?**	**Tue 6/1/10**	**Thu 6/1/17**
13		**Subtask 4C: Develop Nutrient Water Quality Goals for SMR**	**1174 days?**	**Tue 1/1/13**	**Fri 6/30/17**



Project: 07_SMR Nutrients_Attachmen
Date: Wed 3/27/13

Task	Progress	Summary	External Tasks	Deadline
Split	Milestone	Project Summary	External Milestone	

Attachment 6

Monitoring, Assessment, and Performance Measures

Attachment 6

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Monitoring, Assessment, and Performance Measures

Attachment 6 consists of the following item:

✓ **Performance Measures.** The purpose of this attachment is to describe the monitoring, assessment, and performance measures that will be used to evaluate each proposed project. These measures will ensure that this proposal meets its intended goals, achieves measurable outcomes, and provides value to the Region and the State of California.

For each project in this *San Diego IRWM Implementation Grant Proposal – Round 2*, specific performance measures and monitoring approaches have been developed to assess project performance on an ongoing basis. The purpose of this attachment is to provide a discussion of the monitoring system to be used to verify project performance with respect to the project benefits or objectives identified. For each proposed project, listed below, this attachment will identify data collection and analysis to be used.

This attachment will also discuss how monitoring data will be used to measure the performance in meeting the overall goals and objectives of the San Diego IRWM Plan. Each project applicant has prepared a Project Performance Measures Table (included in this attachment) that includes the following:

- *Project goals* – specific goals of the proposed project as they relate to the San Diego IRWM Plan objectives
- *Desired outcomes* – specific deliverables of the proposed project
- *Targets* – measureable targets that are feasible to meet during the life of the project (targets from IRWM Plan)
- *Performance indicators* – measures to evaluate change that is a direct result of the project being built (metrics from IRWM Plan)
- *Measurement tools and methods* – agency monitoring/reporting on the metrics

Project 1: North San Diego County Regional Recycled Water Project – Phase II

The *North San Diego County Regional Recycled Water Project (NSDCRRWP) – Phase II* will provide for a comprehensive recycled water program by consolidating and interconnecting North San Diego recycled water purveyors with regional customers across jurisdictional boundaries. The project provides a sustainable, reliable, water resource for North San Diego County by connecting existing demand with available supply.

Below is a list of project goals to be achieved for the successful implementation of the project. To ensure that project goals are on course, monitoring programs for each project goal will be established. Table 6-1 provides a detailed Project Performance Measures Table.

Project Goals

A. Integrate solutions to water management issues and conflicts: This project developed in part through the Strategic Integration Workshop. This project is also achieves the Integrated Solutions objective by meeting the Partnership, Beneficial Uses, and Geography definitions of integration.

B. Maximize stakeholder and community involvement and stewardship: This project will involve community outreach and education components about the benefits of using recycled water for non-potable uses. All 10 partners in this process will conduct specific outreach to potential recycled water users and document those efforts. Outreach records and data on new recycled water customer connections will be submitted to measure the partner's success at maximizing stakeholder involvement and stewardship.

C. Effectively obtain, manage, and assess water resources data: Project partners will collect and assess data related to recycled water systems within their service areas. This data will be consolidated into a data set that identifies existing and planned recycled water facilities in the North San Diego County region. Local stakeholders will be provided access to this recycled water data set through the San Diego IRWM Data Management System (DMS) currently under development.

E. Develop and maintain a diverse mix of water resources: Customer recycled water use records will provide data that will reveal recycled water use trends. Increasing recycled water use will indicate a greater diversity in water resources since potable (which is primarily imported) water use is being reduced. Therefore, tracking recycled water use will monitor the development of a diverse mix of water resources. The ten partner agencies will submit recycled water customer purchase data to document the increased water supply and compliance with the IRWM Plan.

F. Construct, operate, and maintain a reliable infrastructure: Construction of this project will build connections between discreet recycled water systems and make other system improvements to increase distribution capacity. This will help maintain recycled water service in the event of system disturbance from earthquakes or other sources. It will also reduce risks of leaks, pipe failure, and contamination of potable supplies through updated infrastructure. The ten partner agencies will provide construction and pump station/storage operation records to document that reliable infrastructure is, in fact, in place as a result of the proposed project.

H. Effectively reduce sources of pollutants and environmental stressors: The successful implementation of a regional recycled water system will reduce wastewater discharges into the ocean. Calculated discharge reduction volumes will be assumed equivalent to the amount of new recycled water purchased through the expanded system.

K. Effectively address climate change through adaptation or mitigation in water resource management: Expanded recycled water use would reduce greenhouse gas (GHG) emissions associated with the conveyance and treatment of imported water. Diversifying local water supplies is an important climate change adaptation measure for the San Diego Region. Calculated kWh and GHG reduction will be assumed equivalent to the amount of new recycled water purchased through the expanded system.

Monitoring System

Each of the ten partner agencies involved in the *NSDCRRWP – Phase II* will provide monitoring data associated with 1) customer outreach records, 2) construction records, 3) recycled water customer purchase data, and 4) pump station and storage operation records (as applicable). As the project sponsor, OMWD will provide the calculated wastewater discharge reduction and kWh and GHG reduction based on the compiled recycled water customer purchase data. This calculation will be submitted with annual performance data.

Table 6-1: Performance Measures Table
North San Diego County Regional Recycled Water Program –Phase II

Benefit Type	Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
B. Maximize stakeholder involvement and stewardship:	Increase awareness of water supply challenges and benefits from non-potable reuse	Outreach activities to targeted potential customers in the combined service areas	New recycled water customers in the combined service areas	1. List of potential customers reached 2. Number of new recycled water customers acquired	1. Customer outreach records 2. Recycled water customer purchase data
C. Effectively obtain, manage, and assess water resource data	Collect and assess data related to the recycled water systems within combined service areas	Construct recycled water customer database and compile data for recycled water infrastructure	Record recycled water system expansion and customer database development	Existing customer and Planned recycled water facilities layers in SDIRWM DMS	1. Construction records compiled from 10 agencies. 2. Recycled water customer purchase data
E. Develop and maintain a diverse mix of water	Diversify water resources within the project area	Increased recycled water use in the combined service areas.	Identify new recycled water users and increase recycled water supply	AFY of recycled water produced and delivered	Recycled water customer purchase data
F. Construct, operate, and maintain a reliable infrastructure system	Construct new facilities to deliver recycled water	Connect to prospect recycled water customers	Build recycled water pipeline, storage tank and pump station to deliver recycled water to customer	1. LF of pipeline 2. MG of storage 3. MGD of pump capacity	1. Engineering/ construction records 2. Pump and storage operation records
H. Effectively reduce sources of pollutants	Improve water quality in coastal habitat	Reduce wastewater discharge to ocean outfall	Reduce WWTP discharge to ocean outfall in the combined service area	Volume of discharge reduced from outfall	Calculated discharge reduction equivalent to the amount of recycled water purchased
K. Effectively address climate change	Reduce GHG emission associated with water use and enhance resource stewardship	Reduce energy consumption associated with conveyance and treatment of imported water.	Replace existing infrastructure to recycled water	1.AFY of avoided imported water 2. kWh of energy offset 3. GHG emissions offset or neutralized	kWh and GHG reduction calculated from recycled water billing data multiplied by power consumption and emission factors

Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program

The *Turf Replacement and Agricultural Irrigation Efficiency Program* will promote outdoor water use efficiency in the residential and commercial sectors by providing financial incentives to replace turf grass with water-wise plant material and to upgrade overhead sprinkler irrigation systems to high-efficiency irrigation systems. The program will also offer incentives to agricultural customers to convert potable water irrigation systems to recycled water systems

Below is a list of project goals to be achieved for the successful implementation of the project. To ensure that project goals are on course monitoring programs for each project goal will be established. Table 6-2 provides a detailed Project Performance Measures Table.

Project Goals

B. Maximize stakeholder and community involvement and stewardship: As part of the Turf Replacement Program, the City of San Diego Public Utilities Water Conservation Program and the City of San Diego Transportation & Storm Water Pollution Prevention and Think Blue Programs will promote an education and outreach campaign for its service area on water efficiency and storm water-friendly landscaping that will promote changes in norms and behaviors toward the use of water and enhance and support responsible stewardship of limited water resources while reducing the impact of dry weather flows caused by irrigation. A list of events that the agencies attended and promoted the program with an estimated attendance and number of contacts made at the event will be maintained that will provide a measure the partner's success at maximizing stakeholder involvement and stewardship.

C. Effectively obtain, manage, and assess water resource data and information: The San Water Authority and the City of San Diego will evaluate a sampling of pre- and post-conversion water use data from their Turf Replacement Rebate programs to determine if estimated water savings was achieved. The partners will provide an analysis of sample sites that evaluate before and after water consumption as well as apply assumed water savings per square foot of turf replaced. For the Water Authority's Agricultural Irrigation Efficiency program, the Water Authority will record pre- and post-conversion water savings using potable water billing records and provide a list of customers and associated acreage that is converted from potable to recycled water.

E. Develop and maintain a diverse mix of water: The program is intended to improve water supply reliability and reduce dependence on imported water in urban landscapes and agriculture over the long-term, resulting in increased water use efficiency and increased use of recycled water. For the Water Authority's Agricultural Irrigation Efficiency program, the Water Authority will provide water billing data to document that source substitution has occurred by participating customers and, if available, will provide records documenting the conversion of agricultural sites using potable water irrigation systems to recycled water systems.

H. Effectively reduce sources of pollutants and environmental stressors: This program will educate residential, commercial, and agricultural sector customers about limiting runoff from their properties as they go through the process of making water-efficient enhancements. The program will also highlight the importance of reducing runoff into the municipal storm drain system and other waterways.

K. Effectively address climate change through adaptation or mitigation in water resource management: This program will reduce the use of imported and highly treated potable water. Reducing water use and converting to recycled water reduces the energy needed to supply water, and therefore, reduces GHGs. This will help indirectly address climate change concerns. Calculated kWh and GHG reduction will be assumed equivalent to the amount of potable water conserved through program activities.

Monitoring System

Both partner agencies involved in the *Turf Replacement and Agricultural Irrigation Efficiency Program* will provide monitoring data associated with 1) a list of events that the agencies attended and promoted the program, 2) water billing data to document that source substitution has occurred by participating customers and, if available, records documenting the conversion of agricultural sites using potable water irrigation systems to recycled water systems, 3) calculation of estimated water savings (based upon industry-standard valuations) for all turf replaced and agricultural sites converting from potable water irrigation systems to recycled water systems, and 4) sampling of before and after water use consumption based on water billing data. As the project sponsor, the Water Authority will provide the estimated kWh savings and GHG reductions associated with water savings that are based on industry-standard valuations. This calculation will be submitted with annual performance data.

Table 6-2: Performance Measures Table
Turf Replacement and Agricultural Efficiency Program

Benefit Type	Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
B. Maximize stakeholder involvement and stewardship	Change norms and behaviors on water conservation	Education and outreach campaign for the community on efficient irrigation	Improved public awareness and involvement on water efficiency	List of events, estimated attendance and contacts made by agency staff promoting program.	Total estimated contacts made and event attendance.
C. Effectively obtain, manage, and assess water resource data	Collect, assess and effectively use data related to irrigation efficiency	1. Estimated water savings from conservation effort 2. Compile key water resources data for agricultural retrofits	1. Estimated water savings pre- and post-conversion	Estimated AFY of potable water use pre- and post-project implementation in SDIRWM DMS	Calculated water savings and sampling of pre- and post-project water consumption records.
E. Develop and maintain a diverse mix of water	Improve water supply reliability and reduce dependence on imported water	Conserve existing potable water resource via conservation	1. Increased eco-friendly landscape 2. Improved irrigation efficiency	1. Acres of landscaping converted 2. Estimated AFY of potable water saved	1. Calculated water savings and sampling of pre and post project water consumption records 2.Records documenting conversion of agricultural sites to recycled water systems, if available
		Convert existing irrigation infrastructure for recycled water use and install on-site new facilities for recycled water delivery.	Replace potable water irrigation demand with recycled water	1. # of connected recycled water irrigation customers 2. Estimated AFY of recycled water used	1. Records documenting conversion of agricultural sites using potable water irrigation systems to recycled water systems, if available 2. Customer purchase data for recycled water
H. Effectively reduce sources of pollutants	Prevent degradation of water quality in natural water bodies and reservoirs.	Educate customers on importance of preventing over-irrigation and reducing runoff	Educational material provided in pre-site inspection and other material distributed about reducing irrigation runoff	City can make a note in file about observations of overspray and runoff present at pre- and post-site inspection	City can make a note in file about observations of overspray and runoff present at pre and post site
K. Effectively address climate change	Reduce GHG emission associated with water use and enhance resource stewardship	Reduce energy consumption associated with imported water.	1. Reduced reliance on imported water supplies, resulting in reduced energy/GHG emissions 2. Increased recycled water use in irrigation	1.Estimated AFY of recycled water used 2. Estimated kWh of energy offset 3. Estimated GHG emissions offset	Estimated kWh and GHG reduction calculated from volume of water conserved multiplied by power consumption and emission factors

Project 3: Rural Disadvantaged Community (DAC) Partnership Program

The goal of the *Rural DAC Partnership Program* is to provide funding to address inadequate water supply and water quality affecting rural DACs, including tribal communities. The project will reduce potential for high public health risks in water and/or wastewater systems. The program will help rural water systems to provide a safe water quality source that is not contaminated with nitrates, bacteria, or other contaminants. The program reduces potential for high public health risks in water and/or wastewater systems through infrastructure improvements and helps small water systems to provide sufficient quantities of safe drinking water to the residents served by their systems. Public safety will be improved by providing adequate storage necessary for fire-fighting and emergency conditions.

Below is a list of project goals to be achieved for the successful implementation of the project. To ensure that project goals are on course monitoring programs for each project goal will be established. Table 6-3 provides a detailed Project Performance Measures Table.

Project Goals

<u>B: Maximize stakeholder/community involvement and stewardship of water resources:</u> Selection of DAC projects for funding will be decided by a Rural DAC Stakeholder Committee with representatives from RCAC, CDPH, County DEH, IHS, and RWMG. Additionally, project solicitation outreach meetings will be conducted to inform citizens of the importance of environmental stewardship emphasizing conservation, regulatory (drinking water quality) compliance, and utility efficiency. RCAC will submit contact and meeting records to document their success at maximizing stakeholder involvement and stewardship.

<u>C: Effectively obtain, manage, and assess water resource data and information</u>. To effectively measure if DAC health risks are being addressed, RCAC will verify the successful completion of the project and system compliance with state and local regulations. All pertinent water quality data associated with the proper functioning of the subject PWS will be obtained and provided to the IRWM DMS. However, there may be an exception for some information obtained from Indian tribes that have restrictions on data distribution and use.

<u>D: Further scientific and technical foundation of water management</u>. RCAC works closely with CDPH (small PWS) and USEPA Region 9 (tribal PWS) drinking water divisions addressing compliance issues and data collection, water quality data, and technical information. The technical, managerial, and financial (TMF) capacity assessment requires each community water system to evaluate its anticipated growth and water demand and to compare this with its existing source capacity and ability to deliver water. The comparison will help a water system anticipate needed changes or additions to their sources in order to allow them to plan accordingly. The TMF capacity assessment will indicate if there has been capacity development. The evaluation will also reveal water system issues and needs that can be mitigated by sustainability efforts. The TMF capacity assessment, in practice, will be the measurement of progress toward improving the technical foundation of water management in rural DACs. Further, all pertinent water quality data associated with the proper functioning of the subject PWS will be obtained and provided to the IRWM DMS.

<u>E: Develop and maintain a diverse mix of water resources</u>: The rural DAC projects funded through this program are intended to provide and/or protect water supply for rural DAC communities. They will reduce water loss to leakage, and improve water supply reliability for rural DACs through upgraded storage. RCAC will provide construction records and water use data to document that improvements to the PWS' water supply systems have been completed.

<u>F: Construct, operate, and maintain a reliable infrastructure system</u>. Sustainability will be a priority in the development of DAC funded projects. Measurements that will indicate that projects are implemented and solving DAC critical water system issues include the successful completion of the project and verbal conversations, written conversations, or written correspondence with regulators. Recorded communications will signify DAC critical water infrastructure project implementation.

<u>H: Effectively reduce sources of pollutants and environmental stressors</u>: By improving water supply infrastructure, the program will reduce potential contaminants in water supplies, protect finished water

supplies by providing covered storage, and prevent potential contamination from leaks. The completion of a public health risk project and its conformance to state and local regulations reduces public health risks regarding water infrastructure. Measurements that will show that pollutant source related issues are being solved include the successful completion of the project and verbal conversations, written conversations or written correspondence with regulators. Recorded communications will signify whether DAC wastewater systems projects concerning source pollutants are being implemented. Further, all pertinent water quality data associated with the proper functioning of the subject PWS will be obtained and provided to the IRWM DMS.

K: Effectively address climate change through adaptation or mitigation in water resource management: This program will enable small water systems in the Region's backcountry to adapt to climate change vulnerabilities associated with the increased potential for wildfires by increasing storage for emergency response. RCAC will compile construction records to document the amount of increased storage and fire suppression capability has been constructed through the program.

Monitoring System

RCAC will submit monitoring data associated with 1) contact and meeting records, 2) TMF meeting and support records, 3) and construction records. RCAC will also record communications with regulators (CDPH and USEPA) and compile water quality monitoring data for the PWS to document implementation of projects addressing rural DAC issues.

Table 6-3: Performance Measures Table
Rural Disadvantaged Community (DAC) Partnership Program

Benefit Type	Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
B. Maximize stakeholder involvement and stewardship:	Outreach to rural DACs to identify critical infrastructure improvement projects	Solicit and implement DAC projects through rural and tribal community outreach	1. List of critical projects 2. Increased stakeholder involvement 3. Identify project priorities	1. List of outreach contact made 2. List of stakeholder meeting 3. List of projects prioritized and implemented	1. Contact records 2. Meeting records 3. List of implemented projects
C. Effectively obtain, manage, and assess water resource data and information	Collect, assess and effectively use water resources data within project's service area.	1. Confirm water quality compliance with current potable water standards	Collect and assess water quality data	1. Water quality data in DMS	1. Water quality monitoring data
D: Further scientific and technical foundation	Work with CDPH, PWS and USEPA Region 9 to address compliance issues	Improved TMF support for rural DAC	Improved operation of small local systems to achieve water quality objectives	TMF support and meeting records	1. TMF meeting and support records by RCAC 2. Water quality monitoring data
E. Develop and maintain a diverse mix of water	Enhance resource stewardship and improve water supply reliability for rural DACs.	Reduce water loss due to leakage, Improve drinking water quality	1. Rehabilitated leaking pipes 2. Increased reliable potable water storage 3. Improved water quality	1. LF pipeline improvements 2. MG storage facility installed/upgraded 3. MGD leakage prevented	1. Construction records for new facilities 2. Water use data
F. Construct, operate, and maintain a reliable infrastructure system	Improve infrastructure and operation to enhance water quality and supply	Upgrade existing infrastructure and provide necessary training to local operator	Rehabilitate selected critical infrastructures	Pipes and tanks upgraded and installed	1. Construction records 2. Recorded communications with regulators
H. Effectively reduce sources of pollutants and environmental stressors	Protect water quality from contamination	Promote infrastructure upgrades and prevent pollutant from entering the drinking water system	1. Covered tanks 2. Repaired leaking pipes	MGD of drinking water quality protected	1. Recorded communications with regulators 2. Water quality monitoring records
K. Effectively address climate change	Protect the rural DACs from increased wild fire	Provide additional water storage capacity for fire fighting	Upgrade existing storage facility and build new storage that could be used for fire fighting	Volume of storage upgraded or installed	Construction records

Project 4: Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility

The *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project will develop and demonstrate proper design and process engineering for failsafe potable reuse treatment trains. The project will include developing expert panel guidelines on hazard analysis, redundancy, reliability, and monitoring requirements for potable reuse without an environmental buffer; developing a comprehensive test plan for a failsafe potable reuse system; performing a bench-scale, pilot-scale and demonstration-scale testing at the City of San Diego's existing water purification demonstration facility; and preparing a final report that can be shared with water suppliers throughout the State.

Below is a list of project goals to be achieved for the successful implementation of the project. To ensure that project goals are on course monitoring programs for each project goal will be established. Table 6-4 provides a detailed Project Performance Measures Table.

Project Goals

B: Maximize stakeholder/community involvement and stewardship of water resources. As the project will involve testing at the City's existing demonstration facility, this facility will continue to be open to the public for tours during the operation of the project to educate the community about San Diego's water supply challenges and the role that full advanced water treatment technology and potable reuse can have in addressing those challenges. The City of San Diego will compile tour records and guest evaluations to document the breadth of outreach completed through this project.

C: Effectively obtain, manage, and assess water resource data and information. Potable reuse creates a valuable and sustainable water resource, and the water quality and treatment performance data developed through this project will increase industry and regulatory knowledge of how to regulate and implement potable reuse. Water quality, treatment performance, and failsafe testing data will be compiled into the final report that is produced for Statewide distribution by the WateReuse Research Foundation (WRRF) and submittal to the IRWM Data Management System (DMS).

D: Further scientific and technical foundation of water management. This project develops and implements guidelines to demonstrate a failsafe potable reuse concept that builds upon the millions in funds that the WateReuse Research Foundation has invested to research this topic. Without this project, CDPH will face a daunting challenge in assessing the viability of potable reuse without an environmental boundary. The significant benefit of this project is that it will present thorough guidelines and a detailed scientific assessment that will make CDPH much more constructive when providing comments on SB 918. Water quality, treatment performance, and failsafe testing data will be compiled into the final report that is produced for Statewide distribution by the WRRF.

E: Develop and maintain a diverse mix of water resources. This project would facilitate development of a major new water source under local control, thus diversifying and expanding the region's water supply. Findings and concepts developed through this project will greatly expand the number of potable reuse endeavors throughout the San Diego Region and entire State. This larger goal will be achieved through the distribution of the final report far and wide.

H: Effectively reduce sources of pollutants and environmental stressors. This project would facilitate increased recycling through potable reuse, which would in turn reduce wastewater discharges to the marine environment. The treatment process for producing water for reuse would destroy chemical and microbial pollutants and reduce TDS in water supplies. Water quality and treatment performance data will be compiled into the final report.

Additionally, because this is a demonstration project, the advanced treated wastewater will be discharged with other wastewater supplies through the ocean outfall, temporarily improving the quality of ocean discharges. The City of San Diego will document the volume of advanced treated wastewater being discharged to document compliance with this IRWM Plan objective.

K: Effectively address climate change through adaptation or mitigation in water resource management. This project will contribute to the development of a significant local water source. This will reduce the need for imported water, reducing the GHGs associated with importing water to the Region. Calculated kWh and GHG reduction will be assumed equivalent to the volume of advanced treated wastewater produced and discharged to the ocean.

Monitoring System

WRRF will prepare the final report that documents the *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project and includes water quality, treatment performance, and failsafe testing data. The City of San Diego will contribute tour records and guest evaluations for the demonstration facility, as well as the calculated of volume of advanced treated wastewater discharged and kWh and GHG reduction associated with that discharge. This calculation will be submitted with annual performance data.

Table 6-4: Performance Measures Table
Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility

Benefit Type	Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
B. Maximize stakeholder involvement and stewardship:	Increase awareness of water supply challenges and knowledge on advanced water treatment technology	Educational tour offered to guests on advanced water treatment technology and potable reuse	Improved public consent on potable water reuse with increased awareness on advanced water treatment technology	1. List of events and attendees 2. Attendants knowledge on potable water reuse after tours	1. Tour records 2. Guests evaluation
C. Effectively obtain, manage, and assess water resource data	Collect, assess and effectively use data related to potable reuse	Water quality and treatment performance data	Proven product water quality and fail safe protocol targeted for direct potable reuse	Failsafe protocol, water quality and treatment performance data in SDIRWM DMS	1. Water quality data 2. Treatment performance data 3. Failsafe testing records
D: Further scientific and technical foundation	Assist CDPH in assessing the viability of potable reuse	Provide failsafe performance data necessary to develop future guideline	Discussion from collected water quality and treatment performance data on protocol reliability	Proven success from testing of the failsafe alternatives	1. WaterReuse Foundation report
E. Develop and maintain a diverse mix of water	Improve water supply reliability	Test the use of recycled water as a major new water source under local control	Assess potential to replace potable water demand with recycled water	Completion and success of failsafe protocol allowing potable reuse of product water	1. WaterReuse Foundation report
H. Effectively reduce sources of pollutants	Prevent degradation of water quality in the marine environment	Reduced wastewater discharges should direct potable reuse be implemented	Confirmed discharge reduction pre- and post-project	Quantify the amount of wastewater discharged at potable standard	1. MGD of advanced treated wastewater discharged 2. Water quality data
K. Effectively address climate change	Reduce GHG emission associated with water use and enhance resource stewardship	Reduce energy consumption associated with conveyance and treatment of imported water.	Future reduction in imported water demand through direct potable reuse	1.AFY of future imported water avoided 2. kWh of energy offset 3. GHG emissions offset or neutralized	kWh and GHG reduction calculated from MGD of advanced treated wastewater produced

Project 5: Sustaining Healthy Tributaries to the Upper San Diego River

The *Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies* project will protect and study Boulder Creek, collect data from Boulder Creek to establish an appropriate baseline for creek health in the watershed, establish a community-supported monitoring program for the watershed, and educate land owners on maintaining or improving stream health in order to protect stream habitat as well as the El Capitan Reservoir.

Below is a list of project goals to be achieved for the successful implementation of the project. To ensure that project goals are on course monitoring programs for each project goal will be established. Table 6-5 provides a detailed Project Performance Measures Table.

Project Goals

B: Maximize stakeholder/community involvement and stewardship of water resources. This project will engage volunteers in stewardship activities, and will also include extensive water management outreach to area residents, including three tribal nations. San Diego River Park Foundation (SDRPF) will document outreach efforts through meeting records, monitoring program participation records, and online survey results.

C: Effectively obtain, manage, and assess water resource data and information. This project will include collection of real-time water quality data, which will be integrated into an existing public website that has been developed to provide public access to water resources data. Geographic data associated with real-time monitoring, bioassessments, species surveys, and restoration activities will be developed and submitted to the IRWM DMS and the SDRPF web portal.

D: Further scientific and technical foundation of water management. This project will include the development of water quality assessments to determine beneficial use and other data applicable to a baseline creek (Boulder Creek). This data can be used to further the scientific and technical understanding of baseline creek data for the San Diego River Watershed and the Region. A final tributaries assessment report will be developed and submitted to stakeholders throughout the watershed.

E: Develop and maintain a diverse mix of water resources. This project will help to maintain local water supplies by implementing source water protection guidelines for El Capitan Reservoir, which is an important part of the Region's water supply infrastructure and is currently impaired by water quality concerns. Post-restoration water quality data, specifically measuring sediments, will be provided to document how restoration of upper watershed areas will protect downstream reservoirs.

G. Enhance natural hydrologic processes and encourage integrated flood management. This project will help to maintain and restore Boulder Creek, which is an important natural water conveyance system for water transfers between Lake Cuyamaca and El Capitan Reservoir. SDRPF will submit construction records and a final tributaries assessment report to document implementation of this goal.

H: Effectively reduce sources of pollutants and environmental stressors. This project would monitor water quality impacts in the source waters for El Capitan Reservoir and actively help to manage those source waters to improve watershed health, actively address environmental stressors such as sedimentation, and protect the water quality of El Capitan Reservoir, which is an important part of the Region's water supply. Water quality data, along with distribution of educational materials and the final report, will show that the proposed project has contributed to this IRWM Objective.

I: Protect, restore, and maintain habitat and open space. This project would include efforts to actively restore functioning riparian habitat and associated buffer habitat, monitor for quagga mussels and other nuisance species, including feral pigs. Quarterly photo records of the restoration effort, along with the final report, will demonstrate SDRPF's efforts to protect and restore San Diego River watershed habitats.

J: Optimize water-based recreational opportunities. This project would include public education about fishing and other water-based recreation opportunities in the project area. In addition, the project will help to restore Boulder Creek, which is known to provide habitat for local fish such as trout. Outreach records will be used to document how residents and visitors have been informed about the watershed's water-based recreational opportunities.

Monitoring System

SDRPF will work with its project partners to compile and submit monitoring data including 1) outreach and monitoring program participation records, 2) real-time monitoring data, bioassessment data, species surveys, and water quality data, 3) pre- and post-restoration water quality data, and 4) final tributaries assessment report.

Table 6-5: Performance Measures Table
Sustaining Healthy Tributaries to the Upper San Diego River

Benefit Type	Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
B. Maximize stakeholder involvement and stewardship:	1. Stakeholder input in channel restoration feasibility study 2. Provide 'hands- on" stewardship opportunities	1. Hold workshops of interest groups for feasibility study 2. Engage community and tribal members in watershed monitoring	1. Obtain required agreements from interested parties 2. Trained community and tribal members for field assessments	1. List of workshops and attendees 2. List of volunteers involved in monitoring 3. Education material produced	1. Outreach records 2. Monitoring program participation records 3. On-line survey results
C. Effectively obtain, manage, and assess water resource data	Collect, assess and effectively use data related to Boulder Creek watershed management	1. Real-time monitoring 2. Bio-assessments 3. Native/exotic species surveys	1. Establish baseline condition in Boulder Creek watershed 2. Record habitat restoration projects	1. Watershed monitoring data in DMS 2. Restoration map layer in SDIRWM DMS and Public Web Portal	1. Real-time monitoring data 2. Bio- assessments data 3. Species survey data 4. Restoration records
D: Further scientific and technical foundation	Develop integrated robust monitoring and assessment program for the watershed	Provide baseline condition and monitoring program for San Diego River Watershed	Develop watershed monitoring program and baseline condition	1. Field monitoring program 2. Watershed monitoring data	Final tributaries assessment report
E. Develop and maintain a diverse mix of water	Protect local surface water supplies	Protect water storage capacity in El Capitan by reducing erosion and sedimentation	AFY of water storage in El Capitan	Reduced post-project erosion and sedimentation in Boulder Creek	Erosion/ sedimentation data
G. Enhance natural hydrologic processes and encourage integrated flood management	Restore Boulder Creek that has been damaged by private development and wildfire.	Enhance creek functioning via channel restoration	Sediment and erosion control and flow velocity reduction through habitat restoration	Flow velocity reduction or stabilization pre- and post-project	1. Restoration records 2. Final tributaries assessment report
H. Effectively reduce sources of pollutants	Reduce runoff and prevent degradation of water quality in Boulder Creek and El Capitan reservoir	Provide recommendation to private owner on preventing pollution and improve water quality	1. Provide educational materials on ways to protect watershed 2. Improved water quality from habitat restoration and behavioral change.	1. Pollutant concentration pre- and post-project 2. Compliance with MCLs relevant to downstream reservoir	1. Education material deliver record 2. Final tributaries assessment report 3. Water quality data
I. Protect, restore, and maintain habitat and open space	Restore natural habitat and buffer space along Boulder Creek	1. Native species survey 2. Restore native plants 3. Install erosion control measures	Identify species and restore habitat through invasive species removal, replanting, and erosion control	1. Acres of habitat restored 2. % of native planting survival	1. Quarterly photo record of restoration 2. Final tributaries assessment report
J: Optimize water-based recreational opportunities	Stakeholder outreach about fishing and other water-based recreation opportunities	Engage community and tribal members in watershed protection	Increase awareness about recreational opportunities and need for watershed protection	List of workshops or other outreach activities	Outreach records

Project 6: Chollas Creek Integration Project - Phase II

The purpose of the *Chollas Creek Integration Project - Phase II* is to improve water quality and prevent flooding through (1) engineered modifications to the channel via installation of headwalls and drop structures that will modify creek flow and prevent erosion, (2) contaminate uptake and natural filtration through invasives removal and restoration with native species, and (3) engagement of community volunteers in water quality monitoring and hands-on watershed education.

Below is a list of project goals to be achieved for the successful implementation of the project. To ensure that project goals are on course monitoring programs for each project goal will be established. Table 6-6 provides a detailed Project Performance Measures Table.

Project Goals

B: Maximize stakeholder/community involvement and stewardship of water resources: Thousands of project area residents will be engaged through public outreach, community leaders will be hired/trained to lead the social values research, resident youth will be employed to conduct research and serve as water quality monitors, and educational materials will be disseminated. Data will be shared with the City of San Diego's Think Blue program for the customizing of pollution prevention/water conservation public outreach efforts, including media, direct mail, and school programs. CoastKeeper will publish and maintain data on their website. Groundwork will utilize results in its annual school outreach program (Green Team, Student Stream Team), which reaches 300 children annually.

C: Effectively obtain, manage, and assess water resource data and information: Water quality monitoring will provide 300 Chollas Creek water quality samples (in addition to current baseline monitoring by San Diego CoastKeeper and the City of San Diego). These samples will focus specifically on the area where invasive species removal/restoration will take place, in order to support a robust assessment of impacts on water quality. Data will be shared with Think Blue, displayed on San Diego CoastKeeper's web data portal, and shared with stakeholders through the IRWM DMS. Jacobs Center for Neighborhood Innovation (JCNI) will compile outreach records to document all of these project-related activities.

G: Enhance natural hydrologic processes to reduce the effects of hydromodification and encourage integrated flood management: Construction will accomplish flood damage reduction and water quality improvement through 1) creek re-alignment, 2) construction of inlets, 3) drop structure installation, and 4) non-native removal/restoration. To monitor the improvements in creek hydrology that result from the project, JCNI will provide construction records and monitoring flood elevation pre- and post-construction.

H: Effectively reduce sources of pollutants and environmental stressors: Removal of invasive species and stabilization of the Chollas Creek channel will improve water quality within the creek. Vegetation removed during construction will be replanted with native riparian species to restore habitat disturbed during this phase and improve water quality through pollution uptake. Water quality monitoring will focus specifically on the area where invasive species removal/restoration will take place, in order to support a robust assessment of impacts on water quality.

I: Protect, restore, and maintain habitat and open space: Phase II will accomplish invasives removal, planting of native plant species, and buffers to protect wildlife and vegetation within the creek to create four acres of publicly accessible green space for urban DACs. When combined with previously restored sections of Chollas Creek within the target area, a total of approximately 15 acres of open space will have been created since 2008. Groundworks and JCNI will provide construction records to document the restoration of creek habitats that help to accomplish this goal.

Monitoring System

JCNI will work with Groundworks-Chollas Creek and San Diego CoastKeeper to submit monitoring data associated with 1) outreach and monitoring program participation records, 2) pre- and post-construction water quality data, and 3) pre- and post-construction flood elevation data. JCNI and Groundworks will also submit construction records for all restoration activities.

Table 6-6: Performance Measures Table
Chollas Creek Integration Project - Phase II

Benefit Type	Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
B. Maximize stakeholder and community involvement and stewardship:	Provide 'hands- on" stewardship opportunities in the regions watersheds	1. Increased awareness of resource conservation 2. Engage stakeholders in water quality monitoring efforts	Increased community awareness and involvement in watershed conservation	1. List of events and attendees 2. Education material distributed 3. # of volunteers involved in monitoring	1. Outreach records 2. Monitoring program participation records
C. Effectively obtain, manage, and assess water resource data and information	Collect, assess and effectively use data related to Chollas Creek water quality	Water quality monitoring data on areas where invasive species removal/restoration takes place	Collect and compile water quality data pre- and post-project from participants	Water quality data in SDIRWM DMS, Think Blue and Coastkeeper's data portal	Water quality monitoring data
G. Enhance natural hydrologic processes and encourage integrated flood management	Reduce potential flood damage in Chollas Creek	1. Creek re-alignment 2.Construction of inlets 3. Install drop structures	1. Reduced flood elevations 2. Stabilized creek channel	Flood elevations pre- and post-project	1. Construction records 2. Flood elevation monitoring records
H. Effectively reduce sources of pollutants and environmental stressors	Reduce non-point source pollutant discharge and prevent degradation of water quality in natural water bodies	Improve water quality and restore watershed hydrology	Improved water quality through invasive species removal, habitat restoration and behavioral changes	Water quality data pre- and post-project	Water quality monitoring data
I. Protect, restore, and maintain habitat and open space	Restore natural habitat and construct open space in Chollas Creek watershed	1. Replace invasive species with native species 2. Provide buffering through construction of public open space	1. Restore natural habitat through invasive species removal and replanting native vegetation 2. Provide public open space and buffer for wildlife	1. Acres of invasives removed 2. Acres of habitat or open space restored	1. Invasive removal record 2. Construction record

Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

The *Implementing Nutrient Management in the Santa Margarita River Watershed* project aims to establish nutrient water quality goals for the SMR Estuary (Phase I) and to provide additional site-specific studies and propose nutrient water quality goals in the Santa Margarita River (Phase II) that may lead to development of nutrient site specific objectives (SSOs) by the SDRWQCB in the main stem of the river that are protective of beneficial uses.

Below is a list of project goals to be achieved for the successful implementation of the project. To ensure that project goals are on course monitoring programs for each project goal will be established. Table 6-7 provides a detailed Project Performance Measures Table.

Project Goals

B: Maximize stakeholder and community involvement and stewardship. Stakeholder involvement is central to the goals of this project. The Stakeholder Advisory Group will continue to guide project objectives, identify data gaps, review technical outcomes, and recommend nutrient water quality goals for the Santa Margarita River that are protective of beneficial uses and that include protecting current habitats. The County of San Diego will record meeting agendas, notes, and data review comments to document the diversity of stakeholder participation in the SSO development process.

C: Effectively obtain, manage, and assess water resources data and information. The project will utilize and expand the existing watershed-wide hydrology and water quality database, leveraged from existing partnerships, to further obtain, manage, and assess water resource data and information. Bioassessment, water quality, physical, and hydrologic data will be compiled into the technical studies and data layers will be made publically available through the IRWM DMS.

D: Further the scientific and technical foundation of water management. Consistent with RWQCB Basin Plan Triennial Review priorities to evaluate surface water nutrient water quality objectives (WQOs) (tier 1 priority) and consider seasonal variation of WQOs (tier 2 priority), this project will scientifically support the development of proposed numeric targets for the SMR River using new and existing water quality data. This work is the logical next step to the work conducted under Phase I. Once established, the proposed numeric targets can be used to support development of SSOs, Total Maximum Daily Loads (TMDLs), or other acceptable alternate approaches to compliance for the SMR Estuary and Watershed. Furthermore, the project will demonstrate an innovative approach to establishing nutrient water quality goals that are protective of beneficial uses by employing open source models, publishing results in peer-reviewed scientific literature, and making presentations to stakeholders, thus improving the technical foundation of water management. The technical deliverables from this project will support these end goals.

Monitoring System

The State Water Quality Control Board's Surface Water Ambient Monitoring Plan protocols will be used to conduct field studies. Modeling efforts will use open source codes and collaborate with the Stakeholder Advisory Group which will include staff from the SDRWQCB. The County of San Diego will submit bioassessment, water quality, physical, and hydrologic data the technical studies and data layers will be made publically available through the IRWM DMS.

Table 6-7: Performance Measures Table
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Benefit Type	Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
B. Maximize stakeholder and community involvement and stewardship:	Review project progress and provide guidance and feedback in updating WQO	Facilitate discussions among stakeholders to identify gaps in the field monitoring data and promote protection for beneficial uses during WQO update	1. Monitoring data gaps identified 2. Beneficial uses protected	1. List of meetings and attendees 2. List of gaps in field data	1. Meeting records 2. Data review comments
C. Effectively obtain, manage, and assess water resource data and information	Collect, assess and effectively use data related to SMR watershed resource management	Compile water resource data in SMR watershed for WQO development	1. Bio-assessment 2. Water quality monitoring data 3. Site physical data 4. Hydrological data	Watershed data collected through SWAMP standard procedure and stored in SDIRWM DMS	1. Bioassessment, water quality, physical, and hydrologic data layers 2. Technical study reports
D: Further scientific and technical foundation	Improve technical foundation of water quality management	Develop new approach to establish nutrient WQO	Evaluate surface water nutrient WQOs, and consider seasonal variation of WQOs.	1. Calibrated watershed model 2. Quantified SMR river water quality target	Technical study reports

Attachment 7

Technical Justification of Projects

Attachment 7

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Technical Justification

Attachment 7 consists of the following items:

✓ **Technical Justification.** The body of this attachment provides a regional background of water management and an overview of the physical benefits associated with each individual project in this proposal, as well as technical justification for these benefits.

This attachment contains estimations of the physical benefits of each project contained within this *San Diego IRWM Implementation Grant Proposal – Round 2*. Section 1 provides a summary of the regional water background. Section 2 contains a narrative description of the expected benefits that may be accrued through project implementation. Where possible, each benefit was quantified and presented in physical or economic terms. In cases where quantitative analyses were not feasible, this attachment provides complementary qualitative analyses. In addition, this attachment includes a discussion regarding uncertainties about the future that might affect the level of benefit received.

Regional Water Supply Background

The San Diego region comprises eleven parallel and similar hydrologic units that discharge to coastal bays, estuaries, or lagoons. Due to low and unreliable quantities of precipitation, the region has a limited local water supply and has therefore depended largely on imported water from Northern California rivers, the Bay Delta, and the Colorado River for over sixty years. The adopted San Diego IRWM Plan recognizes that it is important to increase the local water supply, which is reflected in Goal 1 of the IRWM Plan: *optimize local water supply reliability*.

The San Diego County Water Authority (Water Authority) purchases the majority of the region's imported water (sourced from the State Water Project (SWP) and the Colorado River Aqueduct (CRA)) from the Metropolitan Water District of Southern California (MWD), and receives additional imported supplies from the Colorado River through a conservation and transfer agreement with the Imperial Irrigation District (IID). The Water Authority, as the only water wholesaler within the Region, distributes the aforementioned supply to its 24 member agencies, which include all major water agencies in the San Diego region. The amount of water imported into the region varies depending on hydrologic conditions, but in general the region's water supply consists of 70 to 90% imported water. By 2010, the Water Authority had decreased reliance on MWD imports to 59% (331,825 AF), with increased use of IID transfers (13% or 70,000 AF), canal lining transfers (14% or 80,200 AF), and member agency local sources (14% or 76,100 AF).[1] The member agency local sources in the region consist of conservation, recycled water, local surface water, and groundwater. It is anticipated that future water supplies may also consist of desalinated water, although this water sources is not currently available for the region.

One of the most significant issues for the region is the availability and reliability of its imported water supplies. Recent legal decisions to protect the endangered Delta smelt have drastically reduced the amount of Delta pumping that can be conducted, cutting back on the volume of SWP water that can be delivered. This situation, coupled with the recent droughts affecting both the SWP and CRA and further reducing available supplies, serves as a reminder that the region's water supply is vulnerable to events outside the region. Further, imported water is energy intensive and costly to supply. The region faces a critical need for improved local supplies, and local water agencies have identified the need to increase local supplies as a key element in meeting future regional water demands.

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[1] San Diego County Water Authority. 2011. *2010 Urban Water Management Plan.*

Absent increased conservation efforts, as well as cultivation of local surface water, groundwater, desalinated water, and recycled water supplies, the region will continue to be vulnerable to unreliable imported supplies, and will continue to suffer the economic consequences of additional cutbacks in imported supplies. This trend of will continue until the region develops reliable local supplies.

Additionally, the State has set a goal of a 20% reduction in urban water use by 2020 through Senate Bill (SB) X7-7. This mandate is designed to protect water supplies and encourage improved water resources management throughout the state. Though the legislation calls for a reduction in urban water use, recycled water is allowed to contribute towards overall water use reduction, providing an opportunity for water suppliers continue meeting demand while still achieving their goals.

Regional Water Quality Background

The San Diego IRWM region lies entirely within the jurisdiction of the San Diego Regional Water Quality Control Board (RWQCB), which regulates water quality and discharges to surface waters. Municipal stormwater runoff within the region is regulated through a single National Pollutant Elimination System (NPDES) Municipal Separate Storm Sewer System Permit (MS4 Permit), which is issued by the San Diego RWQCB to 21 Copermittees (Order No. R9-2007-0001, NPDES CAS0108758) with the County of San Diego. The County of San Diego is designated as the Principal Copermittee. Each municipal Copermittee is responsible for operating its own stormwater/urban runoff management program within its respective jurisdiction. As Principal Copermittee, the County coordinates the development and implementation of regional stormwater monitoring programs, regional education program, the standard urban stormwater mitigations plan criteria and requirements, and the hydromodification management plan.

The San Diego RWQCB has identified over 40 inland surface water bodies, located in ten of the region's eleven hydrologic units as not attaining applicable water quality objectives. Primary water quality constituents of concern for the region's surface waters include coliform bacteria, sediment, nutrients, salinity, metals, and toxic organic compounds. The RWQCB has completed Total Daily Maximum Loads (TMDLs) for several of these non-complying waters, and has initiated TMDLs for a number of additional impaired waters.

Regional Flood Control Background

The San Diego County Flood Control District (Flood Control District) is the primary flood control agency in the County. The Flood Control District (which is governed by the elected Supervisors of the County) establishes flood policies, maintains flood control facilities, operates a regional flood warning system, and is charged with protection of watercourses, watershed management, and protection of water quality. On a project-by-project basis, the Flood Control District coordinates flood control actions among the County's municipalities, federal and state agencies, watershed management groups, and flood control organizations in Orange and Riverside counties. Each municipality within the region is responsible for designing, constructing, and maintaining necessary flood control structures within its jurisdiction.

Interregional Project

The *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* project included in this funding application is an interregional project being implemented jointly by the San Diego IRWM and Upper Santa Margarita IRWM regions. Although the Upper Santa Margarita IRWM region is a full partner and benefits will accrue across watershed boundaries to both regions, the entire project work plan, budget, and benefits for the project have been included in this funding application in order to simplify project administration and contracting.

The San Diego Funding Area maintains the Tri-County FACC agreement among the three Regional Water Management Groups (RWMGs) to equitably allocate the Funding Area's Proposition 84 funds. Consequently, the Upper Santa Margarita RWMG has committed both grant funds (per the aforementioned agreement) and matching funds to support this interregional project. Please refer to

Appendix 3-1 in Attachment 3 for a letter of support for the interregional project from our San Diego IRWM Program Manager.

Technical Justification

Each project is described, along with the anticipated physical benefits, below. In addition, these benefits and their magnitude are justified using studies, reports, and other documentation, with specific page numbers referenced in each footnote. Copies of all documents are provided in the accompanying CD for reference. Uncertainties related to benefits, potential negative impacts of projects, how projects in this proposal relate to one another, and a description of what could happen without the project is also provided.

A number of studies and documents have been used to support the projects included in this proposal. These studies and documents have been referenced as footnotes in this attachment, including specific references to the page locations and sections of the studies or documents that support the claims made in this attachment. **Please note that in accordance with guidance from DWR found on Page 11 of the *Proposal Solicitation Package*, the documents referenced in this section have been provided in an electronic format only (on the supporting CD), and are not included within the printed hard copies that have been mailed to DWR.**

Project 1: North San Diego County Regional Recycled Water Project – Phase II

Introduction

Project Abstract

NSDCRRWP-Phase II represents a coordinated effort between several North San Diego County water and wastewater agencies to maximize recycled water use within the North San Diego County region. The proposed project includes 10 components designed to regionalize recycled water facilities so that agencies with the ability to generate recycled water in excess of local demand (i.e., within their service area) can provide recycled water to areas where additional supplies are needed. Together, the pipelines, pump stations, storage tanks, and interties constructed in this project will cumulatively produce an estimated 6,790acre-feet per year (AFY) of recycled water and reduce the region's potable water demands.This will directly offset the use of potable supplies imported through the State Water Project (SWP) and the Colorado River Authority (CRA) via the San Diego County Water Authority (Water Authority) and the Metropolitan Water District (MWD).

The water and wastewater agencies participating in this effort include:

- Leucadia Wastewater District (LWD)
- Vallecitos Water District (VWD)
- Vista Irrigation District (VID)
- Rincon del Diablo Municipal Water District (RMWD)
- Olivenhain Municipal Water District (OMWD)
- Santa Fe Irrigation District (SFID)
- Carlsbad Municipal Water District (Carlsbad MWD),
- City of Escondido
- City of Oceanside
- San Elijo Joint Powers Authority (SEJPA)

Table 7-1 provides an overview of the ten project components and the volume of recycled water produced and distributed by each component.

Table 7-1: Recycled Water Distributed Via NSDCRRWP-Phase II Components

NSDCRRWP-Phase II Component	Recycled Water (AFY)
Component 1-1: LWD Regional System Connection	250
Component 1-2: VWD Pump Improvements	300
Component 1-3: VID Golf Course Recycled Water	200
Component 1-4: RMWD Northwest Recycled Water Expansion	16
Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water	350
Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements	50
Component 1-7:Carlsbad MWD Recycled Water Pipeline Expansion	454
Component 1-8: Escondido Recycled Water Easterly Main Extension	4,570
Component 1-9: Oceanside Reclaimed Water Main Extension	600
Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage	*
Total	**6,790**
** Provides 350 AFY storage for Component 1-5*	

Across all projects, primary project activities include the construction of recycled water transmission pipelines, connection to and extension of existing distribution systems, and upgrades to recycled water facilities to promote additional recycled water production (e.g., upgrade of pumps and storage tanks).

Description and Relationship to Other Projects in the Proposal

The *NSDCRRWP– Phase II* integrates infrastructure between its ten North County project partners and contributes towards Plan objectives. It also may relate to other projects in this proposal, such as Project 2: *Turf Replacement and Agricultural Irrigation Efficiency Program*. The infrastructure constructed in the North County project could be used by participants in the Turf Replacement and Agricultural Irrigation Efficiency Program to supply their converted irrigation systems with recycled water. It also complements efforts from all the projects in this proposal to protect and improve the Region's water resources.

Without Project Baseline

This project represents a coordinated effort between several North San Diego County water and wastewater agencies to maximize recycled water use within the North County region. By expanding the use of recycled water within North County, this project will directly offset the use of 6,790 AFY of imported water provided to the participating agencies by the Water Authority.

The availability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and the accompanying increased demands on the SWP system) to drought and earthquakes, to environmental regulations and water rights determinations. Without *NSDCRRWP-Phase II*, 6,790 AFY of potable water will continue to be used for non-potable purposes (e.g., landscape and agricultural irrigation). Reliance on imported water will continue, and water supply reliability will not improve within North County as it would with the project.

The proposed project includes 10 project components designed to regionalize recycled water facilities so that agencies with the ability to generate recycled water in excess of local demand (i.e., within their service area) can provide recycled water to other areas where additional supplies are needed. Without the project, the use of local recycled water resources would not be maximized. The 6,790 AFY of recycled water generated by the project would continue to be discharged to the Pacific Ocean as wastewater effluent and would not be put to beneficial use.

Without the project, the 6,790 AFY of wastewater effluent (treated to secondary standards) would be discharged through various local outfalls, including 3 ocean outfalls (Oceanside, Encina, and SEJPA ocean outfalls) and 1 land outfall (Escondido land outfall, which ultimately connects to the SEJPA ocean outfall). With the project, the effluent will be treated to tertiary standards and used as recycled water.

Costs associated with discharge through the outfalls and expanding the outfalls and/or associated storage tanks to accommodate increased future flows, are therefore avoided as a result of the project.

In addition, increased use of imported water under the "without project" scenario will result in increased energy usage [and associated greenhouse gas (GHG) emissions] involved with pumping and distributing imported water over long distances. The energy requirements would be much lower if locally generated recycled water and captured stormwater and urban runoff were used instead of imported water.

Finally, with the project, agricultural water users in the City of Escondido will receive 4,570 AFY of recycled water through Component 1-8: Escondido Recycled Water Easterly Mains Extension. This water will be used to irrigate up to 870 acres of agricultural land within the Escondido service area. Without the project, these farmers will continue to rely on potable (mostly imported) water, which has significantly increased in cost in recent years. Avocado and other farmers in the region have indicated that further price increases may force them to shut down their operations.[2] Given the high value of avocados and agriculture in general to the San Diego County economy, this could potentially result in substantial economic impacts. The proposed project will avoid these losses by providing a much less expensive and more reliable source of water supply for farmers within the Escondido region.

Potential Adverse Physical Effects of the Project

The project may result in temporary environmental impacts during construction of the pipelines, tanks, and appurtenances required for implementation of the project. Potential impacts include those associated with traffic (road closures), construction noise, potential biological and cultural resources impacts, potential air quality impacts, and impacts associated with hazards and hazardous materials that are routinely used during construction. Additionally, recycled water contains higher levels of nutrients than potable water, and therefore could potentially result in localized water quality impacts. As part of this project, the project sponsor will conduct all necessary environmental compliance documentation in accordance with the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), and will also procure all permits necessary to implement the project. As such, any impacts associated with the project are anticipated to be short-term in nature, and mitigated to less-than-significant levels if necessary. It is not anticipated that any significant, long-term adverse physical effects would result from implementation of this project.

Recent/Historical Conditions

The San Diego County Water Authority (Water Authority) is the water wholesaler to water agencies in San Diego County, and purchases water through the Metropolitan Water District (MWD). Approximately 80% of water used in San Diego County is imported from Colorado River and Bay-Delta supplies.[3] State Water Project (SWP) supplies from the Bay-Delta have been restricted since 2006, due to drought and regulatory restrictions, and additional restrictions on Colorado River water limits its use for supplemental supply. Other sources of imported water for the County are provided through a Water Conservation and Transfer Agreement with IID, an agricultural district in neighboring Imperial County, and a Quantification Settlement Agreement (QSA) on the Colorado River. These provide the Water Authority an annually increasing volume of water from 30,000 AFY in 2005 to 200,000 AFY in 2021 (from IID), and rights to 77,700 AFY of conserved Colorado River water from projects to line the All-American and Coachella Canals.[4]

After experiencing severe shortages from MWD during the 1987–1992 drought, the Water Authority began aggressively pursuing actions to diversify the region's supply sources. Comprehensive supply and facility planning over the last 18 years provided the direction for implementation of these actions.[5]By 2010, the Water Authority had decreased reliance on MWD imports to 59% (331,825 AF), with increased

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[2]Escondido City Council Meeting minutes, December 14, 2011

[3]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.

[4]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.

[5]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.

use of IID transfers (13% or 70,000 AF), canal lining transfers (14% or 80,200 AF), and member agency local sources (14% or 76,100 AF).[6] The local supply goal for 2020 is 36% made up of 13% from conservation, 7% from seawater desalination, 6% from recycled water, 6% from local surface water, and 4% from groundwater.

In 2009, Senate Bill X7-7 was passed, which mandates a 20% reduction in urban water use by 2020.[7]Under this legislation, the use of recycled water in lieu of potable supplies can be counted towards SBX7-7 compliance. The Water Authority's *2010 Urban Water Management Plan* documents that 5% (27,931 AF) of the water used in the county in 2010 was recycled water.[8]

This project aims to implement the recycled water opportunities identified in *NSDCRRWP- Phase I*, which was funded through Proposition 84 Implementation Grant–Round 1. This collaborative effort between ten water and wastewater agencies in the North County region originated as four agencies in 1998 that came together for a USBR Title XVI grant, which funded the construction of various recycled water facilities in the North County region, and expanded the area's recycled water capacity.[9] Most of the ten partner agencies with this project distribute recycled water to customers, though VID and VWD do not. VWD is a recycled water producer and wholesaler, providing recycled water to other partner agencies in the North County region, but does not have a distribution system within its service area. VID owns the now defunct Shadowridge Water Reclamation Plant, whose recycled water distribution system is no longer connected to a recycled water supply.[10]

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

The benefits of this project will be obtained through the completion of all ten project components. Each of these project components builds upon recycled water treatment, storage, and distribution infrastructure already in place. No further facilities, policies, or actions will be necessary to realize the benefits claimed for this project.

Uncertainties in the Physical Benefits

The physical benefit of the amount of recycled water used is expected to remain constant. However, some of the benefits that result from this recycled water use may vary. For example, there is variability between water facilities such as differences in pumping costs and differences in nutrient concentrations in the product water. Other benefits may be difficult to quantify due to lack of data or an inability to determine how much of the benefit may be attributed to this particular project. Benefits which are not quantified are noted in Table 7-2, and explained in more detail under Methods Used to Estimate Physical Benefits.

Potential Physical Benefits of the Project

The physical benefits of this project are a result of a single, measureable, benefit – the increase in recycled water use. This overarching benefit is gained from the infrastructure improvements constructed during this project, including extended pipelines, increased recycled water production, and recycled water connections. Benefits stem from other benefits, as summarized in Table 7-2, and justified below.

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[6]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Derived from multiple tables; recycled water use on page 5-23, Table 5-5.
[7]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 1-4, Section 1.2.
[8]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Derived from multiple tables.
[9]RMC Water and Environment.2012. *North San Diego County Regional Recycled Water Project Facilities Plan*.page 1-1.
[10]RMC Water and Environment.2012. *North San Diego County Regional Recycled Water Project Facilities Plan*.page 3-1.

Table 7-2: Physical Benefits
North San Diego County Regional Recycled Water Project – Phase II

Physical Benefit	Result of Physical Benefit	Quantification of Benefits
Increase recycled water and reduce imported water	A-Avoid Imported Water Supply Purchases	6,790AFY
	B-Avoid Economic Losses Due to Reduced Agricultural Production	Qualitative
	C-Reduce Net Production of Greenhouse Gases	4,447 MT CO_2/year
	D-Benefit Wildlife or Habitat in Bay-Delta Through Reduced Imports	Qualitative
	E-Improve Water Quality Through Reduced Imports	Qualitative
	F-Reduce Demand for Net Diversions from the Bay-Delta	4,700 AFY
Increase in local supply	G-Provide Social Recreation or Access Benefits	Qualitative
	H-Provide a Long-Term Solution in Place of a Short-Term One	Qualitative
	I-Improve Water Supply Reliability Due to Use of Local Sources	Qualitative
Increased access to recycled water	J-Avoid Fertilizer Costs Due to Recycled Water Use	23.6 lbs/AF
	K-Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts	Qualitative
Decreased discharge of recycled water to outfalls	L-Avoided Costs Associated with Upsizing Escondido Land Outfall	Qualitative
	M-Avoid O&M Costs Associated with Ocean Outfall Discharge	Qualitative

Increase Recycled Water and Reduce Imported Water

Amount/Volume and Unit: 6,790 AFY

Technical Justification of Physical Benefit

Table 7-3 shows the sources for how each component's contribution towards *NSDCRRWP-Phase II*'s physical benefit of increased recycled water use was calculated. These calculations were based primarily on the *North San Diego County Regional Recycled Water Project Facilities Plan*, prepared in May 2012, and corroborated with agency-specific plans and studies.

The expected physical benefit of a total 6,790 AFY of recycled water use in the North County region was calculated as a sum of the recycled water use that could be accommodated by each project component. The estimates of the recycled water use of each component was calculated primarily through water demand measures (e.g., water meter records), modeling, and infrastructure capacity increases. It should be noted that in components where maximum demand was measured for the basis of the expected recycled water demand, the actual annual demand was assumed to be 50% of the maximum, a standard assumption for the North County region. Estimates were also adjusted to be conservative within the reasonable range of recycled water use provided through the technical justification sources.

Table 7-3: Justification for Component Contribution to Overall Benefit
North San Diego County Regional Recycled Water Project – Phase II

NSDCRRWP-Phase II Component	Recycled Water (AFY)	Source for Recycled Water Volume
Component 1-1: LWD Regional System Connection	250	LWD Technical Memorandum by Dudek, October 27, 2010: See Page 3, Table 4, for reuse assumption being 50% of capacity.
Component 1-2: VWD Pump Improvements	300	WVD Lift Station No. 1 Upgrades Alternatives Analysis (Spreadsheet): Shows selected alternative will increase flow to plant to 4.78 MGD. Increase in reuse levels is based on the increase in average flow from existing (4.15 MGD) to 4.78 MGD and then assuming about 50% of that can be reused. 50% assumption is based on typical seasonal patterns for reuse in the North County region.
Component 1-3: VID Golf Course Recycled Water	200	Shadowridge Golf Course Recycled Water Supply Analysis, October 9, 2012: See page 2 for AFY water consumption for irrigation.
Component 1-4: RMWD Northwest Recycled Water Expansion	16	Northwest Recycled Water Expansion – Preliminary Design Report, April 7, 2011:See page 5: Average annual recycled water demand for users was based on one-half the maximum monthly demand (typical for area) for each user and total 16 AFY for the project.
Component 1-5: OMWD Conversion of Distribution Facilities to Recycled Water	350	Preliminary Design Report for Northwest Quadrant Recycled Water Project Phase II: Technical Memorandum 3. Shows 350 AFY of demand in Village Park based on a hydraulic analysis of irrigation demands in the study area. See page 3, Table 1. Average annual recycled water demand for users was based on one-half the maximum demand (typical for area). Estimate rounded up to 350 AFY based on Comparison of Recycled Water Supply Options for the Northwest Quadrant Summary Memorandum by DLM (2013), which estimates 370 AFY demand (pg. 1).
Component 1-6: SFID Onsite Recycled Water Irrigation System Improvements	50	2009 Asset Management Master Plan: See Section 9, pages 9-1 to 9-20
Component 1-7:Carlsbad MWD Recycled Water Pipeline Expansion	454	Phase III Recycled Water Project Feasibility Study, June 2012: See Segment 5 project information on pp. 31, 44, 52 and 62
Component 1-8: Escondido Recycled Water Easterly Main Extension	4,570	Escondido's Preliminary Design Report, August 2012: See Page 2-3 (Users are Agriculture –East Block (4,350 AFY) and Oak Hill Memorial Park (220 AFY))
Component 1-9: Oceanside Reclaimed Water Main Extension	600	North San Diego County Regional Recycled Water Project, May 2012.Demands in area grouped under Leisure Village area (600 AFY), see pages 5-2 and 5-3.
Component 1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage	*	Preliminary Design Report for Northwest Quadrant Recycled Water Project Phase II: Technical Memorandum 3.
Total	**6,790**	
* Provides 350 AFY storage for Component 1-5.		

Methods Used to Estimate the Physical Benefits

There are a number of benefits associated with increased recycled water use, each of whose impact can be directly derived from the amount of recycled water use in this project.

A-Avoid Imported Water Supply Purchases

The Water Authority is the water wholesaler to water agencies in San Diego County, and purchases water through the Metropolitan Water District (MWD). MWD obtains its water from two sources: the Colorado River Aqueduct, which it owns and operates, and the SWP, with which MWD has a water supply contract through the state of California. Currently, imported water purchases from MWD account for about 59% (331,825 AF) of Water Authority supplies.[11]State Water Project (SWP) supplies from the Bay-Delta have been restricted since 2006, due to drought and regulatory restrictions, and additional restrictions on Colorado River water limits its use for supplemental supply. Other sources of imported water for the County are provided through a Water Conservation and Transfer Agreement with IID, an agricultural district in neighboring Imperial County, and a Quantification Settlement Agreement (QSA) on the Colorado River. The Water Authority had also acquired short-term dry-year water transfers from agencies in Northern California during the last drought.[12]

Any recycled water from this project will be used to directly offset imported water in a 1:1 ratio. It is assumed that water demands would remain consistent, and that recycled water use would be directly offset by additional imported water from MWD via the Water Authority.Therefore, by expanding the use of recycled water within Northern San Diego County, this project will directly offset the use of 6,790 AFY of imported water (see Table 7-3).

The project will avoid 6,790 AFY at full implementation (i.e., once all subprojects are brought online). Benefits will begin to accrue as soon as May 2014 when the first component is brought online (RMWD Northwest Recycled Water Expansion Project). The last subproject to be completed is the LWD Regional System Connection project, which will begin providing recycled water in November of 2017 (9 months following construction).

Table 7-4: Physical Benefits for A-Avoid Imported Water Supply Purchases
North San Diego County Regional Recycled Water Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2014	Avoid Imported Water Supply Purchases	0	36 AF	36 AF
2015	Avoid Imported Water Supply Purchases	0	912 AF	912 AF
2016	Avoid Imported Water Supply Purchases	0	5,364 AF	5,364 AF
2017	Avoid Imported Water Supply Purchases	0	6,582 AF	6,582 AF
2018-2073	Avoid Imported Water Supply Purchases	0	6,790 AFY*	380,240 AF
2074	Avoid Imported Water Supply Purchases	0	6,754 AF	6,754 AF
2075	Avoid Imported Water Supply Purchases	0	5,878 AF	5,878 AF
2076	Avoid Imported Water Supply Purchases	0	1,426 AF	1,426 AF
2077	Avoid Imported Water Supply Purchases	0	208 AF	208 AF
** Annual avoided imported water supply purchase.*				

[11]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 6-1, Section 6, Metropolitan Water District of Southern California.
[12]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.

B-Avoid Economic Losses Due to Reduced Agricultural Production

This benefit derives from *Component 1-8: Escondido Recycled Water Easterly Main Extension*, which will supply a total of 4,570 AF of recycled water to 870 acres of agricultural land in the Eastern Block.[13] Agricultural demand primarily consists of irrigation water to serve avocado groves and small patches of citrus trees. Growers have indicated that avocado trees require more water than citrus trees and estimates of demand should assume that all agriculture areas could be converted to avocado groves. In the City of Escondido's *Easterly Recycled Water Main Extension Preliminary Design Report,* agricultural irrigation demands were developed using an average annual irrigation demand of 5 AF per acre, which was provided by the avocado growers. This usage estimate applies to overall parcel acreage, and therefore accounts for portions of agriculture parcels that are not plant-able. The acreage of agriculture parcels was estimated using geographic information system (GIS) data for parcels.[14]

Agriculture is a primary component of economic activity in Escondido and San Diego County. Agriculture supports more than $5.1 billion of economic activity in the County[15], with crop value (sales) totaling more than $1.68 billion.[16] The County has the 12th largest farm economy among more than 3,000 farm counties in the United States and is the top producer of avocados and nursery crops in the nation.[17]

Escondido farmers pay between $1,200 and $1,300 per AF of imported water and crops are currently valued at approximately $5,000 per acre.[18]As described above, average annual irrigation demand of 5 AF per acre, which was provided by the avocado growers.[19]At these rates, water costs may exceed crop value and farms may need to cease production. Farmers have expressed that an increase in water prices will lead to farm closures.[20] Loss of the 870 acres of farmland intended for recycled water service in the Eastern Block would result in $4,350,000 in annual lost crop productivity should those farmers fallow or abandon their crops. However, this only represents a possible maximum loss of crop productivity that this project will offset. True estimation of total loss of crop productivity is not possible without a greater understanding of alternate options for water supply that may be employed without this project, willingness and feasibility of farmers to convert to less water-intensive crops, and government assistance to farms.

C-Reduce Net Production of Greenhouse Gases

Imported potable water is more energy intensive than non-potable recycled water. Reduced reliance on imported water will avoid the extensive energy requirements associated with transporting water from Northern California and the Colorado River to San Diego County. This in turn will result in avoided CO2 emissions (a GHG) associated with the production of this energy. The Equinox Center estimates that it requires 2.65 MWh/AF to convey and treat imported water, and 0.8 MWh/AF to convey and treat non-potable recycled water.[21] This results in 1.85 MWh/AF energy savings by converting from imported potable water to non-potable recycled water. Offsetting 6,790 AFY of imported water with recycled water (as justified in Table 7-3 and explained above) will save 12,561.5 MWh/year.

Converting from energy use to CO_2 emissions requires a breakdown of California electricity sources. California generates 70% of its electricity through a combination of hydroelectric, nuclear, coal, oil, natural

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[13]City of Escondido. *2012. Easterly Recycled Water Main Extension Preliminary Design Report*. August 2012. Page 2-1.
[14]City of Escondido. *2012. Easterly Recycled Water Main Extension Preliminary Design Report*. August 2012. Page 2-1.
[15] San Diego County Farm Bureau, website: http://sdfarmbureau.org/SD-Ag/Ag-Facts.php, accessed March 14, 2013.
[16]County of San Diego – Department of Agriculture, Weights and Measures. 2012. *2011 Crop Statistics and Annual Report*. Page 2.
[17] San Diego County Farm Bureau, website: http://sdfarmbureau.org/SD-Ag/Ag-Facts.php, accessed March 14, 2013.
[18]Bender, G. 2012.Avocado Farming with High-Priced Water. Can It Remain Profitable? Tropics in Subtropics – ANR Blogs.
[19]City of Escondido. *2012. Easterly Recycled Water Main Extension Preliminary Design Report*. August 2012. Page 2-1.
[20] Escondido City Council minutes, December 14, 2011.
[21]Equinox Center. 2010. *San Diego's Water Sources: Assessing the Options*, July 2010. pg. 10

gas, geothermal, biomass, wind, solar, and other. 10% of California's electricity is imported from the Pacific Northwest, and the remaining 20% is imported from the Pacific Southwest.[22]

Emission rates associated with electricity production (in lbs of CO_2 per MWh) vary based on the energy sources used to produce electricity in a given region (e.g., hydropower, natural gas, coal-fired power plants). EPA's eGRID data provides average emissions rates associated with electricity production in California (eGRID subregion WECC California), the Pacific Northwest (WECC Northwest), and the Pacific Southwest (WECC Southwest). These regions have a CO_2 emission rate of 658.68, 1191.35, and 819.21 lbs./MWh, respectively.[23] Based on the percentage of total electricity used in California from each region, the weighted average emissions associated with electricity use in California is 780.51 lbs./MWh of CO_2. With 2204.62 lbs. per MT, the standard conversion rate for California is therefore 0.354 MT of CO_2emitted per MWh of electricity produced. Therefore, the total amount of CO_2 emissions expected to be saved by this project is 4,447MT/year (12,561.5 MWh per year in reduced electricity use multiplied by 0.354 MT/MWh). Over the 60-year project life, a total of 266,833 MT of CO2 emissions will be avoided if the project is implemented. Note that some variation may be due to rounding.

Table 7-5: Physical Benefits for C-Reduce Net Production of Greenhouse Gases
North San Diego County Regional Recycled Water Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2014	Reduce Net Production of Greenhouse Gases	0	23.6 MT CO_2	23.6 MT CO_2
2015	Reduce Net Production of Greenhouse Gases	0	597.3 MT CO_2	597.3 MT CO_2
2016	Reduce Net Production of Greenhouse Gases	0	3512.9 MT CO_2	3512.9 MT CO_2
2017	Reduce Net Production of Greenhouse Gases	0	4310.6 MT CO_2	4310.6 MT CO_2
2018-2073	Reduce Net Production of Greenhouse Gases	0	4446.8 MT CO_2*	249019.2 MT CO_2
2074	Reduce Net Production of Greenhouse Gases	0	4423.2 MT CO_2	4423.2 MT CO_2
2075	Reduce Net Production of Greenhouse Gases	0	3849.5 MT CO_2	3849.5 MT CO_2
2076	Reduce Net Production of Greenhouse Gases	0	933.9 MT CO_2	933.9 MT CO_2
2077	Reduce Net Production of Greenhouse Gases	0	136.2 MT CO_2	136.2 MT CO_2
** Annual avoided net production of GHGs.*				

D-Benefit Wildlife or Habitat in Bay-Delta Through Reduced Imports

The Water Authority is the water wholesaler to water agencies in San Diego County, and purchases water through the Metropolitan Water District (MWD). MWD obtains its water from two sources: the Colorado River Aqueduct, which it owns and operates, and the SWP, with which MWD has a water supply contract through the state of California. Currently, imported water purchases from MWD account for about 59% (331,825 AF) of Water Authority supplies.[24]Although the Water Authority and its member agencies use a

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[22] California Energy Commission, *Electricity Generation by Resource Type 1997-2011*. Accessed 13 March 2013, available < http://energyalmanac.ca.gov/electricity/electricity_generation.html>

[23]eGRID Summary Table, pg. 3

[24]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 6-1, Section 6, Metropolitan Water District of Southern California.

mix of imported water and local sources to supply their customers, imported water is more expensive to provide and is the marginal water source. Thus, reduced overall potable water demand due to increased use of recycled water will be used to reduce reliance on imported water supplies exclusively. Consistent with the mix of Water Authority imported supplies, it is assumed that two-thirds of the recycled water (about 4,700 AF) generated by the proposed project will offset SWP supplies. The remaining one-third (2,350 AF) will offset the use of imported water from the CRA.

By reducing the use of imported SWP water, the *NSDCRRWP – Phase II* will augment in-stream flows in the Bay-Delta (which providesthe means by which the SWP delivers water from Northern California tothe south) or will offset other diversions that may otherwise reduce flows. Reduced demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

E-Improve Water Quality Through Reduced Imports

SWP water has a number of water quality constituents that affect its suitability as a drinking water source. SWP water contains relatively high levels of bromide and total organic carbon (TOC), two elements that are of particular concern to drinking water agencies. Bromide and TOC combine with chemicals used in the water treatment process to form disinfection byproducts (DBPs) such as trihalomethanes (THMs) and bromate, which pose risks to human health and are strictly regulated under the federal Safe Drinking Water Act and associated state of California regulations. Currently, there are no standards for bromide or TOC in drinking water. However, current levels of bromide and TOC are significantly higher than target levels identified by an expert panel hired by the California Urban Water Agencies. These levels are 50 parts per billion (ppb) for bromide and 3 parts per million (ppm) for TOC. Average SWP levels are significantly higher: up to 600% above the target level for bromide and 10% above the target level for TOC.[25]

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to their customers. However, poor-quality source water makes it increasingly expensive and difficult to meet such standards. Increased levels of constituents that aid in the formation of THMs, bromate, and other DBPs of public health concern can mean more time spent monitoring finished water in the distribution system, and the need to increase the use of expensive water treatment and disinfection processes. Increased levels of these constituents may also lead to the use of increased proportions of groundwater in the blend of water supplies in order to control THMs. However, reduced imports of SWP water will reduce the need for such preventative measures.

F-Reduce Demand for Net Diversions from the Bay-Delta

As members of the Water Authority, the water supply agencies participating in this project receive imported water supplies. Water Authority purchases this water from MWD, which obtains its water from two sources: the CRA, which it owns and operates, and the SWP, with which MWD has a water supply contract through the state of California. Imported water purchases from MWD account for about 60% of Water Authority supplies. Approximately two-thirds of this water is imported through the SWP, while the remainder comes from the CRA.[26]

As described above, the Water Authority and its member agencies use a mix of imported water and local sources to supply their customers. Reduced overall potable water demand due to increased use of recycled water will be used to reduce reliance on imported water supplies exclusively. Consistent with the mix of Water Authority imported supplies, it is assumed that two-thirds of the recycled water (about 4,527 AFY) generated by the proposed project will offset SWP supplies. This will augment in-stream flows in the Delta or will offset other diversions that may otherwise reduce flows.

[25]Owen, D.M., P.A. Daniel, and R.S. Summers. 1998. Bay-Delta Water Quality Evaluation Draft Final Report. California Urban Water Agencies.D.M. Owen, Malcolm Pirnie, Inc.; P.A. Daniel, Camp, Dresser and McKee; and R.S. Summers, University of Cincinnati (Expert Panel).Prepared by California Urban Water Agencies. June.

[26]Equinox Center. 2010. *San Diego's Water Sources: Assessing the Options*, July 2010. pg. 8.

Table 7-8: Physical Benefits for F-Reduce Demand for Net Diversions from the Bay-Delta
North San Diego County Regional Recycled Water Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2014	Reduced Net Diversions from Bay-Delta	0	24 AF	24 AF
2015	Reduced Net Diversions from Bay-Delta	0	608 AF	608 AF
2016	Reduced Net Diversions from Bay-Delta	0	3,576 AF	3,576 AF
2017	Reduced Net Diversions from Bay-Delta	0	4,388 AF	4,388 AF
2018-2073	Reduced Net Diversions from Bay-Delta	0	4,527 AFY*	253,493 AF
2074	Reduced Net Diversions from Bay-Delta	0	4,503 AF	4,503 AF
2075	Reduced Net Diversions from Bay-Delta	0	3,919 AF	3,919 AF
2076	Reduced Net Diversions from Bay-Delta	0	951 AF	951 AF
2077	Reduced Net Diversions from Bay-Delta	0	139 AF	139 AF
** Annual avoided net diversions from Bay-Delta.*				

Increase in Local Supply

G-Provide Social Recreation or Access Benefits

By switching to recycled water, customers participating in the project will be much less likely to be subject to watering restrictions during times of drought. Thus, open space areas, golf courses, parks, and other recycled water customers that provide recreational or aesthetic services can continue to irrigate their landscape/turf areas regardless of drought conditions (thus remaining green during dry periods). This will improve the aesthetics and enjoyment of these areas and, in extreme cases, may avoid closures that would otherwise be necessary to prevent further turf damage (e.g., on playing fields, parks, and golf courses).

H-Provide a Long-Term Solution in Place of a Short-Term One

The availability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought, changes in snowpack and earthquakes, to environmental regulations, water rights determinations, and associated legal challenges and Court rulings. Local groundwater is also limited in some areas of North San Diego County, highlighting the need for additional reliable sources of water to meet current and future demands under all hydrologic conditions. The proposed project offers a drought-resistant water supply source and long-term solution that will reduce continued reliance on unsustainable water supply sources.

I-Improve Water Supply Reliability Due to Use of Local Sources

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The proposed project will help address reliability issues for Northern San Diego County water supply agencies by offsetting the use of imported water delivered by the Water Authority. As noted above, the reliability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to environmental regulations and water rights determinations.

Though the increase in local water use (equivalent to the total recycled water use from this project, or 6,790 AFY) can be quantified, reliability is more challenging because it is subject to a number of natural and human forces (e.g., drought, earthquakes, population growth, legal agreements). This project contributes towards water supply reliability, but it does not guarantee a reliable water supply. Therefore a number of assumptions must be made to estimate the benefit of this contribution beyond the 6,790 AFY of recycled water use over imported water use, and any results from these calculations can only be used as guidance, and not as a true estimate of the benefit. This project's contribution towards water supply reliability may be estimated as a percentage of imported water that is offset. The Water Authority's *2010 Urban Water Management Plan* reports that total imported water demand in 2010 for the ten agencies in this project was approximately 107,552 AF, which is project to increase to 132,460 AF by 2015 and 132,520 AF by 2020.[27] Therefore, this project will contribute between 5% and 6% to water supply reliability. As stated above, reliability is difficult to quantify, and while it can be discussed as we have done here, true quantification is not possible

Increased Access to Recycled Water

J-Avoid Fertilizer Costs due to Recycled Water Use

Fertilizing compounds commonly present in recycled water (e.g., nitrogen, phosphorus, potassium) are typically not found in potable water at levels of significance. Thus, the use of recycled water for landscape irrigation will reduce fertilizer costs associated with the properties that will be serviced by the project. The nutrient concentration in recycled water varies from plant to plant, seasonally, and from other factors. This makes it difficult to quantify how much fertilizer use may be offset by the use of nutrient-rich recycled water for irrigation purposes. However, all recycled water must meet certain standards to legally be used for various purposes, per the California Code of Regulations.[28] The amount of nutrients (i.e., pounds of fertilizer) per AF of recycled water can be calculated from average (tertiary-treated) effluent values for the City of Escondido's HARRF which will produce a majority of the project supply. The HARRF permit limitation for nitrate ($N0_3$ as N) is 10 mg/L and the reported 12-month average is 8.66 mg/L.[29] Thus, for every AF of recycled water used in lieu of potable water, recycled water customers will avoid the use of a total of 23.6 lbs of fertilizer (8.66 mg/L divide by 453,592 mg/pound times 1,233,481.84 Liter/AF = 23.6 lbs/AF).

Since all of the recycled water for this project will be used for irrigation purposes, we can expect a maximum of 160,244 lbs/year of fertilizer can be offset. However, these estimates present a maximum amount of fertilizer avoided through a combination of maximum allowable nitrogen in recycled water, the use of recycled water exclusively for irrigation, and that irrigators will reduce fertilizer use in a 1:1 ratio with the increased nutrients in the recycled water.

[27]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 2-14.
[28] California Code of Regulations, Title 22, Article 4, Chapter 3, "Water Recycling Criteria," §60320.020(b)(2)(A).
[29]City of Escondido. 2011. *City of Escondido Recycled Water Master Plan*. June. Appendix A, page D-4 and D-6.

Table 7-6: Physical Benefits for J-Avoid Fertilizer Costs due to Recycled Water Use
North San Diego County Regional Recycled Water Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2014	Avoid Fertilizer Costs	0	842 lbs	842 lbs
2015	Avoid Fertilizer Costs	0	21,519 lbs	21,519 lbs
2016	Avoid Fertilizer Costs	0	126,594 lbs	126,594 lbs
2017	Avoid Fertilizer Costs	0	155,327 lbs	155,327 lbs
2018-2073	Avoid Fertilizer Costs	0	160,244 lbs*	8,973,664 lbs
2074	Avoid Fertilizer Costs	0	159,402 lbs	159,402 lbs
2075	Avoid Fertilizer Costs	0	138,725 lbs	138,725 lbs
2076	Avoid Fertilizer Costs	0	33,650 lbs	33,650 lbs
2077	Avoid Fertilizer Costs	0	4,917 lbs	4,917 lbs
** Annual avoided fertilizer costs supply purchase.*				

K-Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts

In 2009, Senate Bill X7-7 was passed, which mandates a 20% reduction in urban water use by 2020.[30] Under this legislation, the use of recycled water in lieu of potable supplies can be counted towards SBX7-7 compliance. The Water Authority's *2010 Urban Water Management Plan* documents that 5% (27,931 AF) of the water used in the county in 2010 was recycled water.[31] With the *NSDCRRWP-Phase II*, an additional 6,790 AFY of recycled water would be used and would contribute to the region's SBx7-7 goal.

This project helps to meet statewide goals to increase use of recycled wastewater by at least 1 million AFY by 2020 and by at least 2 million AFY by 2030.[32]

Decreased Discharge of Recycled Water to Outfalls

L-Avoid Costs Associated with Upsizing Escondido Land Outfall

The City of Escondido owns and operates its own treatment and disposal facility. The City's Hale Avenue Resource Recovery Facility (HARRF) treats influent from Escondido and the City of San Diego's Rancho Bernardo Community. Wastewater effluent from the plant is discharged to the Escondido Land Outfall, which ultimately connects to the SEJPA ocean outfall.[33]

Based on the City's 2009 *Indirect Potable Reuse Feasibility Study*[34], projected wet weather flow through the Escondido Land Outfall is expected to be 49.0 mgd in 2030. Current capacity at the outfall is about 23.7 mgd. Thus, in order to avoid exceeding the Escondido Land Outfall capacity, at least 25.3 mgd of HARRF effluent will need to be diverted to another method of disposal (e.g., recycled water use) during wet weather months (January through March). During dry weather months (April through December), it is estimated that 3.8 mgd will need to be diverted to another method of disposal or used as recycled water in order to avoid expanding the capacity of the outfall. Thus, an average of 9.18 mgd, or 10,277 AFY, will need to be produced throughout the year in order to avoid expanding capacity.

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[30] San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 1-4, Section 1.2.
[31] San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Derived from multiple tables.
[32] State Water Resources Control Board. 2009. Recycled Water Policy. Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/recycledwaterpolicy_approved.pdf. Accessed March 2013
[33] City of Escondido.2011, *2010 Urban Water Management Plan*.
[34] Brown and Caldwell. 2009. *Indirect Potable Reuse Feasibility Study.* July 22, 2009.

The Escondido component (*Component 1-8: Escondido Recycled Water Easterly Main Extension*) will generate 4,570 AFY of recycled water, or about 44% of the total 10,277 AFY needed to avoid expanding the land outfall.[35]

M-Avoid O&M Costs Associated with Ocean Outfall Discharge

Without the project, North San Diego County water and wastewater agencies would continue to discharge 6,790 AFY of wastewater effluent (treated to secondary standards) through various local outfalls, including three ocean outfalls (Oceanside, Encina, and SEJPA ocean outfalls) and 1 land outfall (the Escondido land outfall, which ultimately connects to the SEJPA ocean outfall). With the project, the effluent is treated to tertiary standards and used as recycled water. Discharge through the outfalls, and associated costs, are therefore avoided as a result of the project.

The use of 6,790 AFY of recycled water from this project will directly offset water discharged through outfalls. The O&M costs associated with pumping treated wastewater (if it were not recycled) through the Escondido Land Outfall and/or one of the three ocean outfalls would be avoided with the project. Recycled water customers are generally within close proximity of treatment plants and represent far shorter pumping/transport distances that if discharged through the outfalls. However, these distances and associated pumping requirements have not been accurately quantified.

[35] This analysis assumes that recycled water can be stored during the winter months in order to accommodate daily flows at the outfall.

Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program

Introduction

Project Abstract

The *Turf Replacement and Agricultural Irrigation Efficiency Program* will provide financial incentives, technical assistance, on-site support and guidance, training, and resource lists to encourage and support projects that improve irrigation efficiency and reduce water use in urban landscapes and agricultural lands. There are two components of this program:

1. *Turf Replacement Program*: Turf replacement will provide incentives through cash rebates once projects are completed according to program guidelines. The San Diego Water Authority (Water Authority) will manage the overall grant and administer the incentive program for customers participating throughout its service area, except for those customers located within the City of San Diego's (City's) service area. The City of San Diego Public Utilities Department (Water Conservation Program) will administer the incentive program for customers within its own service area and service areas for which it supplies wholesale water such as Coronado and Imperial Beach, and the City of San Diego Transportation & Storm Water Department (Think Blue/Storm Water Pollution Prevention Program) will provide education and outreach regarding the incentive program with an emphasis on dry weather runoff prevention and water quality protection that are achieved with improvements to irrigation efficiency within the City. This program component has been implemented by the Water Authority and the City for several years, and is ready for continued implementation.

2. *Agricultural Irrigation Efficiency Program*: The Water Authority will also administer a program component that provides incentives for agricultural customers to retrofit on-site potable irrigation systems to recycled water irrigation systems. This program component has been designed, and is ready for implementation.

The financial incentives, training, and education that are the main components of this program will encourage customers to replace turf grass and upgrade irrigation systems in urban landscapes and increase water use efficiency in the agricultural sector. This program is designed to reduce regional water demands, reduce energy consumption via reduced water demands (considering the energy required for water use), reduce green waste production, and improve surface water quality. Reducing outdoor water use and increasing irrigation efficiency in both agricultural and urban sectors also helps to minimize dry weather runoff that flows into storm drains and receiving waters, and reduces pollutants that contribute to the impairment of watersheds.

Description and Relationship to Other Projects in the Proposal

Though not explicitly connected with other projects in this proposal, this program will provide incentives for agricultural users to convert from potable water to recycled water for irrigation purposes. This could increase agricultural demand for non-potable water, and for those users in the North County region, there is potential to be served recycled water by the integrated *North San Diego County Regional Recycled Water Project – Phase II*.

Description and Estimates of Without-Project Conditions

Without this program, residents may not visit the program website and educate themselves about water-wise landscaping and irrigation decisions they can make as residents of the San Diego Region. Additionally, they may not convert their lawns to water-efficient landscaping or convert to recycled water irrigation. The Region would thus continue to use 45 AFY of water that could have been conserved through the Turf Replacement Program component of the program, and 250 AFY of potable water would continue to be used for agricultural irrigation that could have been replaced with recycled water if the Agricultural Irrigation Efficiency Program recommendations had been implemented. Consequently, polluted runoff from inefficient irrigation practices may continue to enter storm drain systems, increasing the amount of pollutants entering the local ecosystem.

Recent/ Historical Conditions

The Water Authority is the water wholesaler to water agencies in San Diego County, and purchases water through the Metropolitan Water District (MWD). Approximately 80% of water used in San Diego County is imported from Colorado River and Bay-Delta supplies.[36] State Water Project (SWP) supplies from the Bay-Delta have been restricted since 2006, due to drought and regulatory restrictions, and additional restrictions on Colorado River water limits its use for additional supplemental supply. Other sources of imported water for the County are provided through a Water Conservation and Transfer Agreement with IID, an agricultural district in neighboring Imperial County, and a Quantification Settlement Agreement (QSA) on the Colorado River. These provide the Water Authority an annually increasing volume of water from 30,000 AFY in 2005 to 200,000 AFY in 2021 (from IID), and rights to 77,700 AFY of conserved Colorado River water from projects to line the All-American and Coachella Canals.[37]

After experiencing severe shortages from MWD during the 1987–1992 drought, the Water Authority began aggressively pursuing actions to diversify the region's supply sources. Comprehensive supply and facility planning over the last 18 years provided the direction for implementation of these actions.[38] By 2010, the Water Authority had decreased reliance on MWD imports to 59% (331,825 AF), with increased use of IID transfers (13% or 70,000 AF), canal lining transfers (14% or 80,200 AF), and member agency local sources (14% or 76,100 AF).[39] The local supply goal for 2020 is 36% made up of 13% from conservation, 7% from seawater desalination, 6% from recycled water, 6% from local surface water, and 4% from groundwater.

In 2009, Senate Bill X7-7 was passed, which mandates a 20% reduction in urban water use by 2020.[40]Under this legislation, the use of recycled water in lieu of potable supplies can be counted towards SBX7-7 compliance. However, aggressive conservation efforts must be implemented by the Region's water purveyors in order to meet this State mandate. Because outdoor irrigation comprises 60% of residential water demand in the Region, there is opportunity to change landscaping norms and behaviors.

The *Turf Replacement and Agricultural Irrigation Efficiency Program* will serve users throughout the San Diego IRWM Region. Residential, commercial, industrial, and institutional sites throughout the Region will be eligible to apply (through the Water Authority and the City of San Diego) for turf replacement rebates. However, only agricultural users are eligible for rebates related to conversion of irrigation hardware from potable to recycled water. Agriculture in the Region is primarily cut flowers, along with avocado and citrus groves. The average water use by fruit groves is 5 AFY per acre, with water demand peaking in late summer and lowest in early spring.[41]While the 1987-1992 drought resulted in water shortages and heightened awareness of reducing dependence on imported water, escalating water prices are significantly affecting agricultural users and provide strong incentives towards decreasing water use.[42]

[36]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.
[37]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.
[38]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.
[39]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Derived from multiple tables; recycled water use on page 5-23, Table 5-5.
[40]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 1-4, Section 1.2.
[41] Escondido. 2012. Recycled Water Easterly Main Extension Preliminary Design Report. Pg. 2-2.
[42]Bender, Gary S. 2012.Avocado Farming with High-Priced Water. Can It Remain Profitable?.Topics in Subtropics – ANR Blogs. April 3, 2012.

Potential Adverse Physical Effects of the Project

There may be temporary environmental impacts during retrofits related to construction. Additionally, recycled water contains higher levels of nutrients than potable water, and it may take some time for growers to adequately adjust fertilizer applications to accommodate this higher level of nutrients. This could lead to the short-term effects of increased nutrients in runoff, reduced fertilizer savings, and reduced energy savings associated with fertilizer use. There is potential for increased runoff as the new landscaping is getting established. Prior to plant establishment, soils may be less stable than with the turf so there is potential for short-term increases in erosion, depending on individual property characteristics, timing of programs, and design choices of landowners. Further, there is potential for short-term increases in water demand during plant establishment, though this is expected to be offset by long-term decrease in water demand for irrigation.

Additionally, recycled water contains higher levels of nutrients than potable water, and therefore could potentially result in localized water quality impacts. However, any impacts associated with the project are anticipated to be short-term in nature, and it is not anticipated that any significant, long-term adverse physical effects would result from implementation of this project.

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

This program funds incentives to convert to water-efficient landscaping and improve agricultural irrigation efficiency and use of recycled water. It does not implement the conversion itself. In order to obtain the benefits described here, participants would have to complete all construction/implementation activities.

Uncertainties in the Physical Benefits

Customers may employ alternative strategies to conserve water, which could reduce water demand even without this program. Further, it is uncertain if all agricultural participants will be able to connect to a recycled water distribution system. Benefits related to the amount of water conserved may vary depending on landscaping choices, as many benefits related to Agricultural Irrigation Efficiency component due to variations in irrigation needs by crops.

Potential Physical Benefits of the Program

Table 7-7 summarizes the expected physical benefits of the *Turf Replacement and Agricultural Irrigation Efficiency Program* by program component. Most of the benefits will be accrued by both components, and so have been combined into program benefits.

Table 7-7: Summary Table of Types of Physical Benefits being Claimed
Turf Replacement and Agricultural Irrigation Efficiency Program

Program Component	Physical Benefit	Quantification of Benefit
Water Conservation via Turf Replacement Program	A. Water Conservation	45 AFY
	B. Avoid Surface Water Treatment	319,673 sq ft of land area producing runoff
	C. Reduce Trash Removal Cost Through a Reduction in Green Waste	9% per household
	D. Provide Education or Technology Benefit	Qualitative
Recycled Water via Agriculture Irrigation Efficiency Program	E. Increase in Recycled Water Use	250 AFY
Overall Benefits of the Entire Program	F. Avoid Imported Water Supply Purchases	295 AFY
	G. Improve Water Supply Reliability	Qualitative
	H. Help Meet an Existing State Mandate	295 AFY
	I. Reduce Net Production of Greenhouse Gases	205.94 MT/year
	J. Reduce Demand for Net Diversions for the Region from the Bay-Delta	195 AFY
	K. Benefit Wildlife or Habitat	Qualitative
	L. Avoid Fertilizer Costs	19,966 lbs/year
	M. Provide a Long-Term Solution in Place of a Short-Term One	Qualitative
	N. Improve Water Quality	Qualitative

Water Conservation via Turf Replacement Program

Amount/Volume and Unit: 45 AFY

Technical Justification of Physical Benefit:

Estimates for the amount of water conversion from turf to water-efficient landscaping were made using a combination of expertise and scientific studies. Tim Schaadt, an Associate Resources Specialist from Metropolitan Water District (MWD), was consulted as an expert, given his experience with a similar rebate program and his experience with water use in Southern California. TimSchaadt estimated that conversion from turf to water-efficient landscaping is expected to save 0.00014 AFY per square foot.[43]He cites two sources to justify this value, an *Evaluation of the Synthetic Turf Pilot Program* by MWD and a *2005 Xeriscape Conversion Study* by Kent Sovocool of the Southern Nevada Water Authority. The MWD study found water savings of 0.00014 AFY per square foot when turf was converted from natural to synthetic.[44] This study only looked at conversion of natural turf to synthetic, not conversion from natural turf to water-efficient landscaping. The Xeriscape study found a savings of 55.8 gallons per square foot when lawns were converted to xeriscape (water-efficient) landscaping in southern Nevada.[45] This is equivalent to 0.00017 AFY per square foot. This represents savings in a more extreme climate, but allows 0.00014 AFY per square foot to remain a reasonable estimate of water savings.

[43] T. Schaadt. 2012. E-mail correspondence. 10 May 2012.
44MWD. 2007. *Evaluation of the Synthetic Turf Pilot Program*. Prepared for U.S. Department of the Interior's Bureau of Reclamation Southern California Area Office.Prepared by Metropolitan Water District of Southern California.August.Pg. 12.
[45]Southern Nevada Water Authority. 2005. *Xeriscape Conversion Study Final Report*. Pg. 60.

Methods Used to Estimate the Physical Benefits

A. Water Conservation

Using water meter records, the MWD study that showed water savings achieved when converting a natural grass field to a synthetic turf of 0.00014 AFY per square foot.[46] This program plans to provide incentives for conversion of approximately 320,000 square feet of turf to water-efficient landscaping. At a savings of 0.00014 AFY per square foot, this would result in water savings of approximately 45 AFY. Note that slight variations in calculations may occur due to rounding.

Note that for the Turf Replacement component, we assumed a "phasing in" of physical benefits based on the budget: 10% in 2013, 50% in 2014 (60% cumulatively for benefits), and 40% in 2015 (100% cumulatively for benefits). This results in a "phasing-out" of benefits as well: 90% in 2033 and 40% in 2034.

Table 7-8: Physical Benefits for A-Water Conservation
Turf Replacement and Agricultural Irrigation Efficiency Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2013	Water Conservation	4.5 AFY	0	4.5 AF
2014	Water Conservation	27 AFY	0	27 AF
2015-2032	Water Conservation	45 AFY	0	810 AF
2033	Water Conservation	40.5 AFY	0	40.5 AF
2034	Water Conservation	18 AFY	0	18 AF
* *Annual volume of water conserved*				

B. Avoid Surface Water Treatment

Water conservation directly inhibits watershed pollution by reducing urban runoff. Urban irrigation runoff can include pollutants such as chemicals and bacteria, which can flow from urban landscapes into existing water bodies. The San Diego RWQCB, in collaboration with the U.S. Environmental Protection Agency (USEPA), identified the San Diego Region water bodies on the 2010 California 303(d) List of Water Quality Limited Segments.[47] The 303(d) list includes approximately 440 water bodies within the San Diego RWQCB (Region 9) jurisdiction. The *Water Quality Control Plan for the San Diego Basin* (Basin Plan) notes that highways, agricultural fields and orchards, residential and urban areas, and septic tank disposal systems contribute non-point source pollution, including nutrients, as a result of storm water runoff, irrigation return flows, and ground water contributions.[48]

Conversion of turf to water-efficient landscaping will conserve 45 AFY of water, and reduce associated non-point source pollution that carries nutrients, fertilizers, and pesticides into local water bodies. The *Sun Valley Watershed Management Plan Environmental Impact Report* provides project lifetime costs of four alternatives to treat pollutants from runoff.[49] Two of the four alternatives are of interest in the context of this project: Alternative 2 (Water Conservation) and Alternative 4 (Full Conveyance with Regional BMPs). These alternatives represent our with-project and without-project scenarios, respectively. Over a 50-year project lifetime, Alternative 2 (our with-project scenario) costs $171.58 million for a 4.4 square

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[46]MWD. 2007. *Evaluation of the Synthetic Turf Pilot Program*. Prepared for U.S. Department of the Interior's Bureau of Reclamation Southern California Area Office.Prepared by Metropolitan Water District of Southern California.August.Pg. 12.

[47] California EPA, State Water Resources Control Board (SWRCB). *2010 Integrated Report*. Available http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml?wbid=CAR30981177200 20319112226 (Accessed 14 March 2013).

[48]RWQCB. 2011. *Water Quality Control Plan for the San Diego Basin*. Chapter 7, TMDLs, page 7-16.

[49]County of Los Angeles Department of Public Works. 2004. *Environmental Impact Report for the Sun Valley Watershed Management Plan*. Available http://www.sunvalleywatershed.org/ceqa_docs/plan.asp. Pg. 4-16.

mile area. Alternative 4 (our without-project scenario), would cost $206.61 million for a 4.4 square mile area. Therefore, the costs per square mile would be $39 million and $46.96 million, respectively, in 2002 dollars. Please see Attachment 8 for a detailed explanation of the avoided cost calculations.

Avoided surface water treatment can only be quantified for the Turf Replacement program. This program will directly conserve water and prevent associated irrigation return flows through conversion of turf to water efficient landscape. The Turf Replacement Program is anticipated to convert approximately 320,000 square feet or 7.3 acres to water-wise landscaping. If this land is not converted to water-wise landscaping, it will likely continue to produce urban runoff that will need to be treated prior to being discharged from the municipal separate stormwater system (MS4) to local water bodies. Table 7-9 provides an estimate of the square footage of land area wherein runoff will be reduced, and therefore the area of physical benefit.

Note that for the Turf Replacement component, we assumed a “phasing in” of physical benefits based on the budget: 10% in 2013, 50% in 2014 (60% cumulatively for benefits), and 40% in 2015 (100% cumulatively for benefits). This results in a “phasing-out” of benefits as well: 90% in 2033 and 40% in 2034.

Table 7-9: Physical Benefits for B-Avoid Surface Water Treatment
Turf Replacement and Agricultural Irrigation Efficiency Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2013	Avoid Surface Water Treatment	38,361 sq ft	0	38,361 sq ft
2014	Avoid Surface Water Treatment	191,804 sq ft	0	191,804 sq ft
2015-2032	Avoid Surface Water Treatment	319,673 sq ft	0	319,673 sq ft
2033	Avoid Surface Water Treatment	281,312 sq ft	0	281,312 sq ft
2034	Avoid Surface Water Treatment	127,869 sq ft	0	127,869 sq ft
** Converted area of turf that would lead to reduced wastewater treatment*				

C. Reduced Trash Removal Cost Through Reduction in Green Waste

Turf removal provides more benefits than just reduced water demand. It also reduces the amount of green waste produced from landscaping care. The Sustainable Site Initiative’s *The Case for Sustainable Landscapes* profiles a series of case studies that document the benefit of conversion to sustainable landscaping.[50]The Santa Monica Garden case profiles the cost and care differences between a traditional lawn and a native plant garden. The sites were designed to be directly comparable – they were located on the same size lots, immediately adjacent to one another, and both sites were cleared completely and in the same manner prior to lawn/garden installation. This case documented a 66% reduction in green waste between the lawn and the native plant garden.[51]

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[50]The Sustainable Sites Initiative. 2009. The Case for Sustainable Landscapes. Available http://www.sustainablesites.org/report/The%20Case%20for%20Sustainable%20Landscapes_2009.pdf.Pp. 36-37.

[51]The Sustainable Sites Initiative. 2009. The Case for Sustainable Landscapes. Available http://www.sustainablesites.org/report/The%20Case%20for%20Sustainable%20Landscapes_2009.pdf.Pg. 37.

According to Katie Orr, KPBS Metro Reporter, the incorporated areas in the County (excluding the City of San Diego) pay between $14 and $23 per month for trash collection.[52] For residents of the unincorporated areas of San Diego County, green waste collection costs between $13 and $16, according to Waste Management, the local waste collection company.[53]Historically, residents of San Diego City have not paid for residential trash collection. As of 2009, it was estimated that free trash collection cost the city between $54 and $65 million.[54] The USEPA reports that approximately 13.7% of total municipal solid waste is yard trimmings.[55]

The Santa Monica Garden case study provided a side-by-side comparison of yards in adjacent lots.[56] One was landscaped in the traditional manner typical of residential properties in the area. The neighboring yard was landscaped using native plants, similar to those found in the local Santa Monica Mountains. The City tracked costs, plant data, waste production, and water use associated with each garden over four years following construction. Controls were put in place to enable direct comparison between sites. Through the data collection, the difference in annual water use, green waste, and labor costs were calculated between the two gardens. The difference in green waste production was 428.5 pounds per year, or 66%. For the City of San Diego, this could result in significant annual savings since 13.7% of trash collection costs can be assumed to be due to green waste, per the USEPA's estimates.[57] Therefore, green waste costs the city approximately $8,151,500 per year. A 66% reduction in green waste would result in a savings of $5,379,990 if all City of San Diego residents converted from turf to water efficient landscaping.

The *Turf Replacement and Agricultural Irrigation Efficiency Program* will convert 320,000 square feet to water efficient landscaping, and we can calculate the reduction in total waste produced by a residence after conversion to water-efficient landscaping. Green waste is 13.7% of total waste, and is reduced by 66% after turf conversion. Therefore, turf conversion reduces total waste by 9% (0.137 * 0.66 = .09) per household. With an average waste collection cost of $18.50 to $14.50 per residence (for incorporated and unincorporated areas, respectively), it can be assumed that turf conversion will reduce waste collection costs to approximately $15.01 per residence on average (from $16.50), or an average saving of $1.49 per residence per month by conversion to water-efficient landscaping.[58]

Table 7-10: Physical Benefits for C-Reduced Trash Removal through Reduction In Green Waste
Turf Replacement and Agricultural Irrigation Efficiency Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2013-2034	Reduced Trash Removal	9%	0	9% per household

[52]*Free Trash Collection Could End for San Diego City Residents,"* http://www.kpbs.org/videos/2009/jul/31/4492/: An interview by Gloria Penner with Katie Orr
[53]Waste Management. 2013. Phone Call with Waste Management on 8 February 2013. 714-558-7761.
[54]*Free Trash Collection Could End for San Diego City Residents,"* http://www.kpbs.org/videos/2009/jul/31/4492/: An interview by Gloria Penner with Katie Orr
[55]U.S. EPA. 2009. Municipal Solid Waste Generation, Recycled, and Disposal in the United States: Facts and Figures for 2009.
[56]The Sustainable Sites Initiative. 2009. The Case for Sustainable Landscapes. Available http://www.sustainablesites.org/report/The%20Case%20for%20Sustainable%20Landscapes_2009.pdf.Pp. 36-37.
[57]U.S. EPA. 2009. Municipal Solid Waste Generation, Recycled, and Disposal in the United States: Facts and Figures for 2009.
[58] These values were calculated using: Average collection costs – (13.7% x Average collection costs x 66%). 13.7% is the amount of total waste that is green waste, 66% represents the reduction in green waste from conversion to water-efficient landscaping.

D. Provides Educational or Technology Benefit

City of San Diego Transportation & Storm Water Department (Think Blue/Storm Water Pollution Prevention Program) will provide education and outreach regarding the *Turf Replacement and Agricultural Irrigation Efficiency Program* with an emphasis on dry weather runoff prevention and water quality protection that are achieved with improvements to irrigation efficiency within the City. There is an additional online turf replacement study guide for those who wish to view the information, regardless of whether or not they are participating in these rebate programs. Both elements of the program require the customers to understand the relative use of water at their site - in urban landscapes and in production agriculture.

This information is available through the San Diego County Water Authority's WaterSmart Turf Replacement Program website (turfreplacement.watersmartsd.org). By making changes to their site and working through the program requirements, customers will enhance their knowledge of water-wise plant materials, efficient irrigation systems, and use of recycled water on production crops, thereby promoting an awareness and stewardship for water as a precious resource in San Diego.

Recycled Water via Agricultural Irrigation Efficiency Program

Amount/Volume and Unit: 250 AFY

Technical Justification of Physical Benefit

The *Agricultural Irrigation Efficiency* component anticipates converting 50 acres of agricultural land on a minimum of two sites to recycled water irrigation. The City of Escondido's *Easter Recycled Water Main Extension Preliminary Design Report* estimates the average water use for avocado irrigation in the North County region is 5 AFY per acre.[59] Because San Diego County is the top producer of avocados and nursery crops in the nation,[60] this assessment assumes that average annual irrigation demand of County growers is 5 AF per acre.

Methods Used to Estimate the Physical Benefits

E. Increase in Recycled Water Use

Information from the City of Escondido's *Eastern Recycled Water Main Extension Preliminary Design Report* shows that 5 AFY per acre is a reasonable assumption for agricultural water use. Assuming that the program would retrofit 50 acres of agricultural land to recycled water (vs. potable water), the program would result in 250 AFY of recycled water use.

Note that for the Agricultural Irrigation Efficiency component, we are phasing in benefits by assuming one site will be finished by 2015 and one in 2016 (with a similar phasing out).

Table 7-11: Physical Benefits for E-Increase in Recycled Water Use
Turf Replacement and Agricultural Irrigation Efficiency Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2015	Increase in Recycled Water Use	125 AFY	0	125 AF
2016-2064	Increase in Recycled Water Use	250 AFY	0	12,000 AF
2065	Increase in Recycled Water Use	125 AFY	0	125 AF
***** *Annual recycled water use*				

[59] City of Escondido. 2012. Easterly Recycled Water Main Extension Preliminary Design Report. Pg. 2-1.
[60] San Diego County Farm Bureau, website: http://sdfarmbureau.org/SD-Ag/Ag-Facts.php, accessed March 14, 2013.

Overall Benefits of the Entire Program

Amount/Volume and Unit: 295 AFY (conservation and recycled water)

Technical Justification of Physical Benefit

As justified above (see A-Water Conservation and E-Increase Recycled Water Use), this program will conserve 45 AFY of water through the Turf Replacement Program component and use 250 AFY of recycled water through the Agricultural Irrigation Efficiency Program component. This water will directly offset the purchase of imported water by San Diego County Water Authority.

Methods Used to Estimate the Physical Benefits

F. Avoid Imported Water Supply Purchases

The Water Authority is the water wholesaler to water agencies in San Diego County, and purchases water through the Metropolitan Water District (MWD). MWD obtains its water from two sources: the Colorado River Aqueduct, which it owns and operates, and the SWP, with which MWD has a water supply contract through the state of California. Currently, imported water purchases from MWD account for about 59% (331,825 AF) of Water Authority supplies.[61]State Water Project (SWP) supplies from the Bay-Delta have been restricted since 2006, due to drought and regulatory restrictions, and additional restrictions on Colorado River water limits its use for additional supplemental supply. Other sources of imported water for the County are provided through a Water Conservation and Transfer Agreement with IID, an agricultural district in neighboring Imperial County, and a Quantification Settlement Agreement (QSA) on the Colorado River. The Water Authority had also acquired short-term dry-year water transfers from agencies in Northern California during the last drought.[62]

Although the Water Authority uses a mix of imported water and local sources to supply their customers, imported water is the most expensive source to provide and it is not considered to be a very reliable source of supply. For this analysis, imported water is therefore considered to be the marginal water source for the Water Authority's service area. Thus, reduced overall water demand due to increased use of recycled water and increased water use efficiency will reduce reliance on MWD water supplies.

Any conservation or recycled water supplies from this project will be used to directly offset imported water in a 1:1 ratio. It is assumed that water demands would remain consistent, and that conservation or recycled water use would be directly offset by additional imported water from MWD via the Water Authority. This program will avoid 45 AFY in imported water purchases through the Turf Replacement Program for the 20-year timeframe of that component and 250 AFY in imported water purchases through the Agricultural Irrigation Efficiency Program for the 50-year timeframe of that component.

As explained above, Turf Replacement assumes a "phasing in" of physical benefits at 10% in 2013, 50% in 2014 (60% cumulatively for benefits), and 40% in 2015 (100% cumulatively for benefits) and a "phasing out" of benefits at 90% in 2033 and 40% in 2034. Agricultural Irrigation Efficiency assumes a "phasing in" of 50% in 2015 and 50% in 2016 (with a similar phasing out).

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[61]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 6-1, Section 6, Metropolitan Water District of Southern California.

[62]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.

Table 7-12: Physical Benefits for F-Avoid Imported Water Supply Purchases
Turf Replacement and Agricultural Irrigation Efficiency Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2013	Avoid Imported Water Supply Purchases	4.5 AFY	0	4.5 AF
2014	Avoid Imported Water Supply Purchases	27 AFY	0	27 AF
2015	Avoid Imported Water Supply Purchases	170 AFY	0	170 AF
2016-2032	Avoid Imported Water Supply Purchases	295 AFY	0	5,015 AF
2033	Avoid Imported Water Supply Purchases	290.5 AFY	0	290.5 AF
2034	Avoid Imported Water Supply Purchases	268 AFY	0	268 AF
2035-2064	Avoid Imported Water Supply Purchases	250 AFY	0	7,500 AF
2065	Avoid Imported Water Supply Purchases	125 AFY	0	125 AFY
**Annual avoided imported water supply purchases*				

G. Improve Water Supply Reliability

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The *Turf Replacement and Agricultural Irrigation Efficiency Program* will help address reliability issues for the Water Authority by offsetting the use of imported water delivered by MWD. As noted above, the reliability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to environmental regulations, Court rulings, and water rights determinations.

The challenge in trying to determine a value of increased reliability is that the *Turf Replacement and Agricultural Irrigation Efficiency Program* only enhances overall reliability and does not guarantee 100% reliability. Due to the uncertainty involved, no benefit estimate is included in the monetized benefits tables in Attachment 8. However, we provide a description here to give an idea of the potential magnitude of this benefit.

Though the decrease in imported water demand (295 AFY) can be quantified, reliability is more challenging because it is subject to a number of natural and human forces (e.g., drought, earthquakes, population growth, legal agreements). This project contributes towards water supply reliability, but it does not guarantee a reliable water supply. Therefore a number of assumptions must be made to estimate the benefit of this contribution beyond the 295 AFY of reduced imported water demand, and any results from these calculations can only be used as guidance, and not as a true estimate of the benefit. This project's contribution towards water supply reliability may be estimated as a percentage of imported water that is offset. Currently, imported water purchases from MWD account for about 59% (331,825 AF) of Water Authority supplies.[63] Therefore, this program will offset 0.09% of current imported water demand, and contribute 0.09% towards water supply reliability. As stated above, reliability is difficult to quantify, and while it can be discussed as we have done here, true quantification is not possible

[63]San Diego County Water Authority. 2011. *2010 Urban Water Management Plan*. Page 6-1, Section 6, Metropolitan Water District of Southern California.

H. Help Meet an Existing State Mandate

Both program components help the Water Authority to achieve potable water demand reduction goals set out in SBX7-7, which calls for a 20% reduction in per capita water consumption by 2020. Water conservation and recycled water use directly helps that goal, in addition to a goal of 10% reduction by 2015. The Water Authority's 2010 *Urban Water Management Plan* determines that its member agencies must reduce potable water demands by -15,386 AF by 2015 and -76,705 AF by 2020.[64] The *Turf Replacement and Agricultural Irrigation Efficiency Program* savings comprise 1.92% of the 2015 target and 0.38% of the 2020 target.

As a whole, the *Turf Replacement and Agricultural Irrigation Efficiency Program* is anticipated to reduce potable water demand by 295 AFY. Water conserved through the program directly offsets imported water supplied by MWD from SWP and CRA sources. While reliance on MWD supplies has been replaced by IID and canal lining transfers, as well as local sources, MWD imports still comprise over half of all water supply and are the marginal source of water for the Water Authority's service area. Since both the SWP and CRA water sources (the Bay-Delta and Colorado River, respectively) are major sources of many water-related activities in addition to water supply, offsetting imports from them will help to decrease regional water-demand stress on scarce water resources.

As explained above, Turf Replacement assumes a "phasing in" of physical benefits at 10% in 2013, 50% in 2014 (60% cumulatively for benefits), and 40% in 2015 (100% cumulatively for benefits) and a "phasing out" of benefits at 90% in 2033 and 40% in 2034. Agricultural Irrigation Efficiency assumes a "phasing in" of 50% in 2015 and 50% in 2016 (with a similar phasing out).

Table 7-13: Physical Benefits for H-Help Meet an Existing State Mandate
Turf Replacement and Agricultural Irrigation Efficiency Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2013	Help Meet Existing State Mandate	4.5 AFY	0	4.5 AF
2014	Help Meet Existing State Mandate	27 AFY	0	27 AF
2015	Help Meet Existing State Mandate	170 AFY	0	170 AF
2016-2032	Help Meet Existing State Mandate	295 AFY	0	5,015 AF
2033	Help Meet Existing State Mandate	290.5 AFY	0	290.5 AF
2034	Help Meet Existing State Mandate	268 AFY	0	268 AF
2035-2064	Help Meet Existing State Mandate	250 AFY	0	7,500 AF
2065	Help Meet Existing State Mandate	125 AFY	0	125 AF
**Annual avoided imported water supply purchases that contribute to meeting an existing state mandate*				

[64] San Diego County Water Authority. 2011. *2010 Urban Water Management Plan*. Table 2-3: Member Agency Water Use Efficiency Targets (AF), Page 2-8.

I. Reduce Net Production of Greenhouse Gases

There are two ways greenhouse gas production will be reduced through the *Turf Replacement and Agricultural Irrigation Efficiency Program*, energy savings from reduced imported water demand, and energy savings from reduced landscape maintenance. Though we are able to characterize the reduction of greenhouse gas production from reduced landscape maintenance, we are only able to quantify (and monetize) the reduction in greenhouse gas (GHG) production due to reduced imported water demand. The energy requirements for turf maintenance are mainly due to mowing. The U.S. EPA's *Sustainable Landscaping* presentation states that one hour of operating a gas-powered mower produces emissions equivalent to driving a car 20 miles. It goes on to state that 5% of ozone-forming VOCs are produced through lawn mowing activities.[65] Without a better understanding of current lawn care patterns by potential program participants, it is not possible to quantify the GHG production from landscape maintenance further.

Energy costs to import water, on the other hand, are easier to calculate. As described above, 295 AFY of imported water is anticipated to be offset by this program. Imported potable water is more energy intensive than non-potable recycled water. Reduced reliance on imported water will avoid the extensive energy requirements associated with transporting water from Northern California and the Colorado River to San Diego County. This in turn will result in avoided CO2 emissions (a GHG) associated with the production of this energy. The Equinox Center estimates that it requires 2.65 MWh/AF to convey and treat imported water, and 0.8 MWh/AF to convey and treat non-potable recycled water.[66] This results in 1.85 MWh/AF energy savings by converting from imported potable water to non-potable recycled water. Offsetting 45 AFY of imported water through conservation (Turf Replacement component) will save 119 MWh/year for 20 years, while offsetting 250 AFY of imported water with recycled water (Agricultural Irrigation Efficiency component) will save 463MWh/year for 50 years.

Converting from energy use to CO_2 emissions requires a breakdown of California electricity sources. California generates 70% of its electricity through a combination of hydroelectric, nuclear, coal, oil, natural gas, geothermal, biomass, wind, solar, and other. 10% of California's electricity is imported from the Pacific Northwest, and the remaining 20% imported from the Pacific Southwest.[67]Emission rates in lbs. of CO_2 per MWh will vary based on the energy source, but can be estimated across regions, per the EPA's eGRID. California production was eGRID subregion WECC California, the Pacific Northwest is WECC Northwest, and the Pacific Southwest is WECC Southwest. Each of these regions has a CO_2 emission rate of 658.68, 1191.35, and 819.21 lbs/MWh, respectively.[68] Taking a weighted emissions rate (using the percentage of electricity produced in each region), the average emissions for electricity in California is 780.51 lbs/MWh of CO_2. With 2204.62 lbs. per MT, a standard conversion rate for California can be calculated as 0.354 MT of CO_2 per MWh of electricity. Therefore, the total amount of CO_2 emissions expected to be saved by this project is 206 MT/year for the first 20 years of project implementation, and 164 MT/year for the 30 years after that.

As explained above, Turf Replacement assumes a "phasing in" of physical benefits at 10% in 2013, 50% in 2014 (60% cumulatively for benefits), and 40% in 2015 (100% cumulatively for benefits) and a "phasing out" of benefits at 90% in 2033 and 40% in 2034. Agricultural Irrigation Efficiency assumes a "phasing in" of 50% in 2015 and 50% in 2016 (with a similar phasing out).

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[65]US EPA*. 2003. Sustainable Landscaping.* Available http://www.epa.gov/glnpo/greenacres/smithsonian.pdf. Pg. 4

[66]Equinox Center. 2010. *San Diego's Water Sources: Assessing the Options*, July 2010. pg. 10

[67] California Energy Commission, *Electricity Generation by Resource Type 1997-2011*. Accessed 13 March 2013, available < http://energyalmanac.ca.gov/electricity/electricity_generation.html>

[68]U.S. EPA.eGRID Summary Table, pg. 4 eGRID2012 Version 1.0 Year 2009 Summary Tables. Available: http://www.epa.gov/cleanenergy/documents/e.g.ridzips/eGRID2012V1_0_year09_SummaryTables.pdf. Accessed March 2013.

Table 7-14: Physical Benefits for I-Reduce Net Production of Greenhouse Gases
Turf Replacement and Agricultural Irrigation Efficiency Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2013	Reduce Net Production of Greenhouse Gases	4.22 MT/year	0	4.22 MT
2014	Reduce Net Production of Greenhouse Gases	25.33 MT/year	0	25.33 MT
2015	Reduce Net Production of Greenhouse Gases	124.08 MY/year	0	124.08 MT
2016-2032	Reduce Net Production of Greenhouse Gases	205.94 MT/year	0	3,500.97 MT
2033	Reduce Net Production of Greenhouse Gases	201.72 MT/year	0	201.72 MT
2034	Reduce Net Production of Greenhouse Gases	180.61 MT/year	0	180.61 MT
2035-2064	Reduce Net Production of Greenhouse Gases	163.73 MT/year	0	4,911.75 MT
2065	Reduce Net Production of Greenhouse Gases	81.86 MT/year	0	81.86 MT

**Annual avoided imported water supply purchases that contribute to meeting an existing state mandate*

J. Reduce Demand for Net Diversions for the Region from the Delta

Consistent with the mix of Water Authority imported water sources, approximately two-thirds of any offset imported water can be expected to be offset from the SWP and thus from the Bay-Delta. As justified above (F-Avoid Imported Water Supply Purchases), 295 AFY of imported water is expected to be offset by this program. Of this, 195 AFY (at peak performance following implementation of both the Turf Replacement and the Agricultural Irrigation Efficiency components) would have been from the SWP. Therefore, we can expect a 195 AFY reduction in net diversion from the Delta because of the *Turf Replacement and Agricultural Irrigation Efficiency Program*.

As explained above, Turf Replacement assumes a “phasing in” of physical benefits at 10% in 2013, 50% in 2014 (60% cumulatively for benefits), and 40% in 2015 (100% cumulatively for benefits) and a “phasing out” of benefits at 90% in 2033 and 40% in 2034. Agricultural Irrigation Efficiency assumes a “phasing in” of 50% in 2015 and 50% in 2016 (with a similar phasing out).

Table 7-15: Physical Benefits for J-Reduce Demand for Net Diversions from the Bay-Delta
Turf Replacement and Agricultural Irrigation Efficiency Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2013	Reduced Demand for Net Diversions from Bay	3 AFY	0	3 AF
2014	Reduced Demand for Net Diversions from Bay	18 AFY	0	18 AF
2015	Reduced Demand for Net Diversions from Bay	114 AFY	0	114 AF
2016-2032	Reduced Demand for Net Diversions from Bay	198 AFY	0	3,360 AF
2033	Reduced Demand for Net Diversions from Bay	195 AFY	0	195 AF
2034	Reduced Demand for Net Diversions from Bay	180 AFY	0	180 AF
2035-2064	Reduced Demand for Net Diversions from Bay	168 AFY	0	5,025 AF
2065	Reduced Demand for Net Diversions from Bay	84 AFY	0	84 AF
**Annual avoided imported water supply purchases*				

K. Benefit Wildlife Protection or Habitat

Estuarial and other aquatic habitat may be protected by decreasing the irrigation water that brings pesticides, organic waste and other elements into the waterways via the storm drain system. By decreasing the amount of irrigation water that enters the storm drain system (bringing with it pesticides, organic waste and other elements into our waterways) a reduction in harmful chemicals emitted into waterbodies is anticipated. The USEPA has found that 40-60% of nitrogen from fertilizers end up in surface waters and that homeowners use 10x more [fertilizer] per acre than farmers.[69]Reducing the need for fertilizers through native landscaping, and reducing runoff through more efficient irrigation systems and reduced irrigation demand will reduce the amount of fertilizers and pesticides entering the local environment.

This project will provide additional habitat benefits by promoting native species. By replacing turf in urban areas, customers are removing a non-native species and planting water-wise varieties that are native to the area and the climate.

The SWP relies on diversions from the Bay-Delta to provide water to numerous agricultural, residential, and commercial customers, including those served by the Water Authority. By reducing the use of imported SWP water, the *Turf Replacement and Agricultural Irrigation Efficiency Program* will augment in-stream flows in the Delta (which provides the means by which the SWP delivers water from Northern California to the south) or will offset other diversions that may otherwise reduce flows. Reduced demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat. Consistent with the mix of Water Authority imported supplies, it is assumed that two-thirds of the offset imported water (about 198 AFY) generated by the proposed project will offset SWP supplies.

L. Avoid Fertilizer Costs

Fertilizing compounds commonly present in recycled water (e.g., nitrogen, phosphorus, potassium) are typically not found in potable water at levels of significance. Thus, the use of recycled water for landscape irrigation will reduce fertilizer costs associated with the properties that will be serviced by the project. The

[69]US EPA. 2003. Sustainable Landscaping. Available http://www.epa.gov/glnpo/greenacres/smithsonian.pdf. Pp. 6-7.

nutrient concentration in recycled water varies from plant to plant, seasonally, and from other factors. This makes it difficult to quantify how much fertilizer use may be offset by the use of nutrient-rich recycled water for irrigation purposes. However, all recycled water must meet certain standards to legally be used for various purposes, per the California Code of Regulations. Assuming that all recycled water will be treated to the same standard, the maximum amount of nitrogen in recycled water is 10 mg/L.[70] The amount of nutrients (i.e., pounds of fertilizer) per AF of recycled water can be calculated from average (tertiary-treated) effluent values for the City of Escondido's HARRF which will produce a majority of the project supply. The HARRF permit limitation for nitrate ($N0_3$ as N) is 10 mg/L and the reported 12-month average is 8.66 mg/L.[71] Thus, for every AF of recycled water used in lieu of potable water, recycled water customers will avoid the use of a total of 23.6 lbs of fertilizer (8.66 mg/L divide by 453,592 mg/pound times 1,233,481.84 Liter/AF = 23.6 lbs/AF).

Since all of the recycled water for this project (250 AFY) will be used for agricultural irrigation, most likely in North County areas (which may be served by HARRF), we can expect a maximum of 5,900 lbs/year of fertilizer can be offset. However, these estimates present a maximum amount of fertilizer avoided through a combination of maximum allowable nitrogen in recycled water, the use of recycled water exclusively for irrigation, and that irrigators will reduce fertilizer use in a 1:1 ratio with the increased nutrients in the recycled water.

Additional fertilizer savings can be realized through the turf conversion program. The USEPA says homeowners use 10 times more fertilizer per acre than farmers.[72] Conversion to native plants and those better suited to local conditions, will reduce the need for fertilizers in residential areas. Avocado growers with a typical tree density of 109 trees per acre require 190.75 lbs of nitrogen per acre per year using an average of 1.75 lbs of nitrogen per tree per year.[73] Therefore, homeowners typically use 1907.5 lbs of nitrogen per acre per year, or 0.044 lbs/square foot. This project anticipates converting 319,673 square feet of turf. Assuming that the use of native plants would eliminate the need for fertilizer, this would result in a saving of 14,066 lbs. of nitrogen per year.

As explained above, Agricultural Irrigation Efficiency assumes a "phasing in" of 50% in 2015 and 50% in 2016 (with a similar phasing out).

Table 7-16: Physical Benefits for L-Avoided Fertilizer Costs
Turf Replacement and Agricultural Irrigation Efficiency Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2013	Avoided Fertilizer Costs	1,688 lbs/year	0	1,688 lbs
2014	Avoided Fertilizer Costs	8,439 lbs/year	0	8,439 lbs
2015	Avoided Fertilizer Costs	17,016 lbs/year	0	17,016 lbs
2016-2032	Avoided Fertilizer Costs	19,966 lbs/year	0	339,415 lbs
2033	Avoided Fertilizer Costs	18,278 lbs/year	0	18,278 lbs
2034	Avoided Fertilizer Costs	11,526 lbs/year	0	11,526 lbs
2035-2064	Avoided Fertilizer Costs	5,900 lbs/year	0	177,000 lbs
2065	Avoided Fertilizer Costs	2,950 lbs/year	0	2,950 lbs
**Annual avoided imported water supply purchases*				

[70] California Code of Regulations, Title 22, Article 4, Chapter 3, "Water Recycling Criteria," §60320.020(b)(2)(A).
[71] City of Escondido. 2011. *City of Escondido Recycled Water Master Plan*. June. Appendix A, page D-4 and D-6.
[72] US EPA. 2003. Sustainable Landscaping. Available http://www.epa.gov/glnpo/greenacres/smithsonian.pdf. Pp. 6-7.
[73] Bender, Gary.*Avocado Production in California*.Book 1.Chapter 6. Pg. 69, and Book 2. Chapter 2.Pg.28. Available http://ucanr.edu/sites/alternativefruits/Avocados/Literature/.

M. Provide a Long-Term Solution in Place of a Short-Term One

Long-term water management solutions require reduced dependence on imported water. This program contributes 295 AFY in reduced imported water demand (see F-Avoided Imported Water Supply). Additionally, this program will serve to influence public opinion on native plant and water efficient landscaping. Similar programs in other cities have seen participation in turf conversion programs as a result of conversations with existing participants, leading to shifts in customer attitudes and behaviors.[74] This shift can lead to long-term changes in water use behavior, which in turn leads to long-term water conservation benefits. The program is intended to promote changes in norms and behaviors toward the use of water in urban landscapes and agriculture over the long-term, resulting in increased water use efficiency, less dependence on imported water, an enhanced awareness and sense of responsibility toward the stewardship of our limited water supplies and ecological health of our waterways.

N. Improve Water Quality

Water conservation directly inhibits watershed pollution by reducing urban runoff. Urban irrigation runoff can include pollutants such as chemicals and bacteria, which can flow from urban landscapes into existing water bodies. The San Diego Regional Water Quality Control Board (RWQCB), in collaboration with the U.S. Environmental Protection Agency (USEPA), identified the San Diego Region water bodies on the 2010 California 303(d) List of Water Quality Limited Segments.[75] The 303(d) list includes approximately 440 water bodies within the San Diego RWQCB (Region 9) jurisdiction. The *Water Quality Control Plan for the San Diego Basin* (Basin Plan) notes that highways, agricultural fields and orchards, residential and urban areas, and septic tank disposal systems contribute non-point source pollution, including nutrients, as a result of storm water runoff, irrigation return flows, and ground water contributions.[76]

Estuarial and other aquatic habitat may be protected by decreasing the irrigation water that brings pesticides, organic waste and other elements into the waterways via the storm drain system. By decreasing the amount of irrigation water that enters the storm drain system (bringing with it pesticides, organic waste and other elements into our waterways), the Region's surface water quality will be improved.

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[74] Grenoble, Penelope B. 2012. Thinking Long-Term: Water resource management and public outreach help water utilities deal with climate variability and water scarcity.*Water Efficiency*. 22 October 2012.

[75] California EPA, State Water Resources Control Board (SWRCB). *2010 Integrated Report*. Available http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml?wbid=CAR3098117720020319112226 (Accessed 14 March 2013).

[76]RWQCB. 2011. *Water Quality Control Plan for the San Diego Basin*. Chapter 7, TMDLs, page 7-16.

Project 3: Rural Disadvantaged Community (DAC) Partnership Program

Introduction

Project Abstract

The *Rural DAC Partnership Program*, administered by the Rural Community Assistance Corporation (RCAC), will fund critical water supply and water quality projects in rural DACs in San Diego County. Rural DACs lack the technical expertise and financial resources necessary to assemble the information needed to complete a complex grant application. Water supply infrastructure deficiencies will be identified and prioritized by the Rural DAC Stakeholder Committee and then funding will be provided via grant reimbursements to resolve those deficiencies. This program helps meet the critical DAC need for safe, healthy, potable, supplies of water that are adequate to meet basic household and fire protection demands, while at the same time recognizing and responding to DACs' needs for technical and managerial support to even request funding for these basic water needs.

RCAC will manage the *Rural DAC Partnership Program* to address inadequate water supply and water quality in rural DACs, including tribal communities, with populations less than 10,000. DACs will be selected using 2010 Census data.

Projects will be selected based on need and priorities established by the Rural DAC Stakeholder Committee with an emphasis on critical water supply and water quality issues. The Rural DAC Stakeholder Committee designated the following criteria for DAC selection:

Primary Criteria

- Disadvantaged community per 2010 Census data
- Construction project
- Addresses public health issue
- Critical water projects (quantity/quality/reliability)
- Adequate TMF capacity (likely to be successful)
- Shovel ready or ability to complete within project time frame

Secondary Criteria

- Project ability to leverage other funding
- Capital cost per connection
- Multiple benefits
- Green technology
- Environmental justice concerns.

Opportunities to merge related projects will be evaluated. Projects will be selected from both tribal and non-tribal rural DACs. In every case, RCAC will look at other available funding resources to leverage Prop 84 grant dollars.

All projects will address inadequate, unsafe, or unreliable water supply and water quality in rural DACs based on priorities already identified by the Rural DAC Stakeholder Committee. The proposed *Rural DAC Partnership Program* will select and implement four or more projects similar to the example projects described below. Three example projects described below have been identified for inclusion in this program by the Rural DAC Stakeholder Committee.

Example 3-1: Phoenix House School –The Phoenix House Foundation owns and operates a small PWS serving 75 students and staff in Descanso, CA. The only well that serves this system is located adjacent to a creek, approximately 25 feet from a sewer line that crosses the creek and about 100 feet down gradient from the septic leach field. Due to the location of this well, it is susceptible to exposure from fecal coliform, and has a history of bacteriological failures at the wellhead.[77]The proposed project is construction of a replacement well and two new 10,000 gallon storage tanks. The project will protect the drinking water source from bacteriological contamination and provide sufficient storage to provide the

[77]Phoenix House Foundation. 2006. *Preliminary Engineering Report* (System #3701478). Page 1.

community with water in the event of power outages or routine maintenance procedures on the well pump and motor.[78]

Example 3-2: Rancho Estates MWC –The Rancho Estates Mutual Water Company (MWC) serves an agricultural community of approximately 180 residents in Pauma Valley, CA. The water system is served by 7 active wells and two shallow open cut reservoirs that are approximately 3 million gallons and 1.5 million gallons. Since the community is agricultural, the bulk of the water demands (average of 680 gpm) are used for irrigation of crops. Because the reservoirs are subject to contamination, the County of San Diego has issued Compliance Orders to cover and/or replace them.[79] The water system is also plagued with nitrate and bacterial problems which are violations of the Title 22 California Code of Regulations for drinking water.[80] The water system currently blends water from YMWD through the distribution system as a control measure for nitrates which has kept them under the nitrate MCL.[81] The proposed project would improve the connection with YMWD, construct a covered finished water storage tank, and replace the existing distribution system piping. This would protect public health by eliminating potential contamination due to the environmental exposure and provide the Rancho Estates community with adequate storage capacity. Figure 7-1 shows the current and proposed distribution systems, respectively.

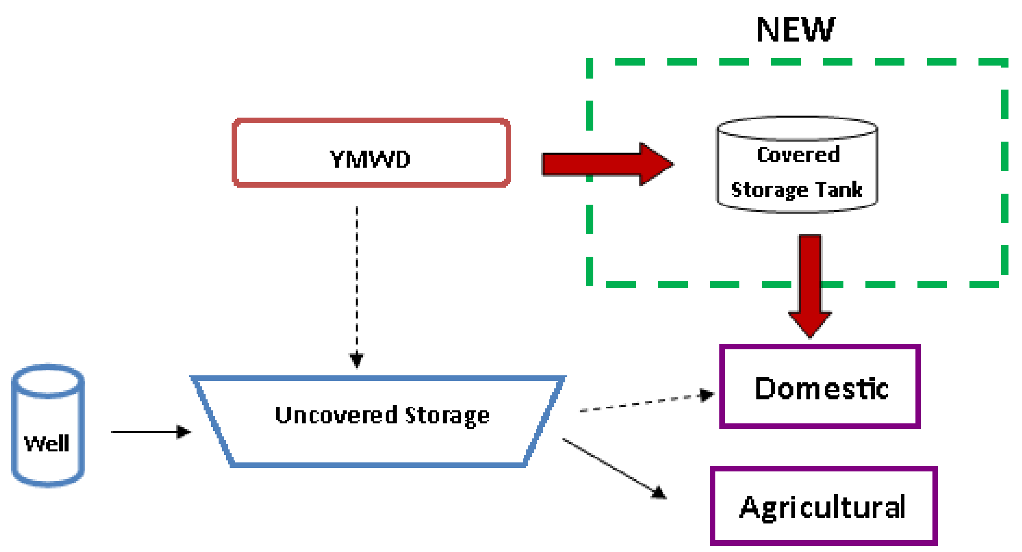

Figure 7-1: Rancho Estates MWC Water Supply Distribution System
Note that the dashed arrows indicate current connections that will be disconnected once project is implemented.

Example 3-3: San Pasqual District B Water System – San Pasqual District B (Western) is a community PWS located near Valley Center, CA, on the San Pasqual Reservation. The water system has 90 residential connections and 12 transient connections. The PWS consists of a consecutive connection to Valley Center Municipal Water District (VCMWD), a booster pump station, a storage tank, and a distribution system.[82] The primary existing tank was constructed in 1992 and has a storage capacity of 100,000

[78]Phoenix House Foundation. 2006. *Preliminary Engineering Report* (System #3701478). Page 2.
[79]County of San Diego. 2010. *Compliance Order, Rancho Estates Mutual Water Company*.
County of San Diego. 2007. *Compliance Order, Rancho Estates Mutual Water Company*.
[80]Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 1-6.
[81]Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 2-6.
[82]USEPA. 2012. Sanitary Survey of San Pasqual District B (Western) (PWSID #0605080). Prepared by Sleeping Giants Environmental Consultants, LLC.Page 1.

gallons. A small 38,000 gallon corrugated steel tank also exists at the same site. Both USEPA[83] and IHS[84] have concluded that the tank exterior is showing oxidation and significant corrosion, as well as leaking in the base and joints. In addition, the system does not have an adequate amount of storage capacity to meet the County regulation requiring 2 days of storage for fire protection.[85] Due to the age and leaking of the tank and the need for additional storage, replacement of the tank was deemed the most reasonable option for addressing these issues. The proposed project will abandon the aging and leaking 100,000 gallon tank in place, and replace an adjacent 38,000 gallon tank with a new 250,000 gallon welded steel tank to provide greater water storage to the entire distribution system.[86] This would protect public health by eliminating potential contamination due to the leakage, eliminate wasted water supplies, and provide the District B community with adequate storage capacity.

Description and Relationship to Other Projects in the Proposal

The Rural DAC Partnership Program is not explicitly connected with other projects in this proposal. However, it does work to complement the other projects by addressing needs not yet addressed by other projects, and contributing to overall IRWM Plan goals and objectives.

Description and Estimates of Without-Project Conditions

Without the *Rural DAC Partnership Program*, efforts to improve water systems in small (populations less than 10,000), rural, disadvantaged areas will be more difficult to implement. This could result in not meeting the critical water and wastewater needs of these communities. If these needs are not met, water quality will continue to be at risk, human and environmental health will remain at risk, and anticipated physical benefits will not be obtained.

The example deficiencies below present critical system defects, critical operational defects, or potential health hazards. Without the *Rural DACs Partnership Program*, these critical defects would not be addressed and the PWS would continue to be at risk for health hazards.

Example 3-1: Phoenix House School

The Phoenix House Foundation[87] has found two critical issues with its system:

1. **Nitrate and Bacteria Contamination.** Due to improper location of the well, it is susceptible to exposure from fecal coliform, and has a history of bacteriological failures at the wellhead.[88]
2. **Tank Storage Volume.** The County of San Diego has determined that the existing system lacks sufficient storage capacity.[89]

Example 3-2: Rancho Estates MWC

Rancho Estates MWC[90] and the County of San Diego[91] note the following system deficiencies:

1. **Open Reservoirs**. Two reservoirs are subject to contamination because they are uncovered. Algae and sediment line the shallow perimeter of the reservoirs, which results from stagnation.[92]

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[83]USEPA. 2012. Sanitary Survey of San Pasqual District B (Western) (PWSID #0605080). Prepared by Sleeping Giants Environmental Consultants, LLC.Page 5.
[84]IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 2.
[85]IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 2.
[86]IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 1.
[87]Phoenix House Foundation. 2006. *Preliminary Engineering Report*.
Phoenix House Foundation. 2006. *Department of Health Services, Safe Drinking Water State Revolving Fund, Application for Construction Funds 2006/2007*.
[88]Phoenix House Foundation. 2006. *Department of Health Services, Safe Drinking Water State Revolving Fund, Application for Construction Funds 2006/2007*. Page 4.
[89]Phoenix House Foundation. 2006. *Preliminary Engineering Report*.
Phoenix House Foundation. 2006. *Department of Health Services, Safe Drinking Water State Revolving Fund, Application for Construction Funds 2006/2007*.
[90]Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 2-6.
[91]County of San Diego. 2010. *Compliance Order, Rancho Estates Mutual Water Company*.
County of San Diego. 2007. *Compliance Order, Rancho Estates Mutual Water Company*.
[92]County of San Diego. 2007. *Compliance Order, Rancho Estates Mutual Water Company*. Page 2.

Additionally, algae mats contain high total organic carbon (TOC), which can combine with chlorine to create disinfection byproducts such as trihalomethanes (THMs) and haloacetic acids.[93]

2. **Nitrate and Bacteria Contamination**. The water system is also plagued with nitrate and bacterial problems which are violations of the Title 22 California Code of Regulations for drinking water.[94]The water system wells are also subject to nitrate contamination from use of fertilizers in the agricultural community. The water system currently blends water from YMWD through the distribution system as a control measure for nitrates which has kept them under the nitrate MCL.[95]There are multiple violations of the Total Coliform Rule for presence of bacteria which is an acute health risk to the community.[96]
3. **Leakage**. The water system is old and water losses are estimated at 1.16 million gallons in 2005 which is likely 10% of the water used for domestic and irrigation needs.[97]

Example 3-3: San Pasqual District B Water System

USEPA[98] and IHS[99]have found two high priority health risks in the San Pasqual District B storage tank:

1. **Tank Corrosion and Leaking.** The tank interior is showing some signs of corrosion. The exterior is showing oxidation and significant corrosion. Some of the tank seams are leaking. The leaks have the potential to introduce bacteria into the tank.

2. **Tank Storage Volume.** The current 100,000 gallon tank only supplies less than 1 day worth of storage. While the tribe has not experienced a water shortage, a significant power outage could create problems for the community.

Recent/ Historical Conditions

As defined in the 2012 Guidelines, and described in Attachment 10, a DAC is a community with a Median Household Income (MHI) of less than 80% of Statewide MHI, or $48,706.[100] These communities often lack the technical and financial resources to adequately design, construct, or maintain their water infrastructure. Because of this, the sustainability of their water systems is often at risk. The USEPA has identified three significant problems which may impact the sustainability of a small (serving less than 10,000 people) DAC's water system:[101]

- Contamination of source water from wastewater systems or contaminant spills
- Seasonal weather impacts, such as flooding or drought
- Aging or deteriorating infrastructure

The *Rural DAC Partnership Program* seeks to address these problems by providing funding to implement effective solutions to critical water supply and water quality issues for rural DACs. Additionally, the project selection process as described in Attachment 3 involves stakeholder and community input to identify needs and potential projects, empowering DAC stakeholders.[102]

Each of the projects selected by the Rural DAC Stakeholder Committee for inclusion in the program will have its own set of recent and historical conditions that provide context for their needs and show the value of the proposed project (see Without Project Conditions above). Some of the conditions may be common to most projects, while others may be more project or site specific.

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[93]County of San Diego. 2007. *Compliance Order, Rancho Estates Mutual Water Company*. Page 2.
[94]Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 1-6.
[95]Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 2-6.
[96]Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 2-6.
[97]Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 2-6.
[98]USEPA. 2012. Sanitary Survey of San Pasqual District B (Western) (PWSID #0605080). Prepared by Sleeping Giants Environmental Consultants, LLC.Page 5.
[99]IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 2.
[100]DWR. 2012. Guidelines: Integrated Regional Water Management, Proposition 84 and 1E. Appendix G, pg. 85. For description of DACs in San Diego IRWM Region, refer to Attachment 10 of this application.
[101]U.S. EPA 2007.*Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110.Pg. 4-4.
[102] See Work Plan in Attachment 3.

Potential Adverse Physical Effects of the Project

The program may result in temporary environmental impacts during construction of the selected projects. Potential impacts include those associated with traffic (road closures), construction noise, potential biological and cultural resources impacts, potential air quality impacts, and impacts associated with hazards and hazardous materials that are routinely used during construction. As part of this project, the project sponsor will ensure that all necessary environmental compliance documentation is completed in accordance with CEQA and NEPA, and will also ensure that all permits necessary to implement the project are procured. As such, any impacts associated with the selected projects are anticipated to be short-term in nature, and mitigated to less-than-significant levels if necessary. It is not anticipated that any significant, long-term adverse physical effects would result from implementation of this program.

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

Most of the physical benefits from this program are a result of implementation of selected projects. In order to obtain these benefits, projects will need to be constructed or implemented. This program will obtain the benefit of increased public involvement with water management before the projects are implemented.

Uncertainties in the Physical Benefits

This program will fund projects that will address critical water supply or water quality needs of rural DACs. Because the projects have not yet been selected, exact physical benefits are uncertain. Benefits presented here are from example projects similar to those that may be selected by the *Rural DAC Partnership Program*.

Summary of Physical Benefits

Because this DAC program will fund a variety of projects that will be selected by the RCAC Steering Committee, it is not possible to develop a complete analysis of the physical benefits that will occur due to this program. Instead, an example of the kinds of likely physical benefits, using examples of probable projects, has been developed. This section provides an example of the types of physical benefits that may occur using likely DAC projects. Additional physical benefits are likely to occur as these examples represent only a subset of projects that will be completed as part of this program.

Table 7-17: Physical Benefits
Rural DAC Partnership Program

Physical Benefit	Result of Physical Benefit*	Quantification of Benefit**
Increase Stakeholder Involvement in Water Management	A. Increase Stakeholder Involvement and Stewardship	Qualitative
Benefit Disadvantaged Communities	B. Benefit DACs by Addressing Critical Water Supply or Water Quality Needs	Qualitative
Address Critical Water Supply Needs	C. Long-term Solutions for Water Quality and Water Supply Needs of DACs†	Qualitative
	D. Increase Water Available for Fire Protection	Qualitative
	E. Improve Water Supply Reliability	Qualitative
Reduce Need for Imported Water	F. Avoid Imported Water Supply Purchases	782 AFY
	G. Reduce Net Production of Greenhouse Gases	36,675 MT CO_2
	H. Benefit Wildlife or Habitat in Bay-Delta Through Reduced Imports	Qualitative
	I. Reduce Demand for Net Diversions from the Bay-Delta	782 AFY
Address Critical Water Quality Need	J. Provide Safe Drinking Water	Qualitative
	K. Avoid Bottled Drinking Water Purchases	52,560 gallons per year
	L. Improve Water Quality	Qualitative

** These are examples of common benefits expected from the types of projects that will be funded through this program, based on the program's selection criteria.*
*** Quantifications of benefits are from an example project that may be funded through this program. Degree or level of benefit will vary project-to-project. Benefits which cannot be quantified are described qualitatively.*
† This benefit is both a water supply and a water quality benefit

Increase Public Involvement with Water Management

A. Increase Stakeholder Involvement and Stewardship

Maximizing stakeholder/community involvement is one of the primary objectives of the *Rural DAC Partnership Program*. Selection of DAC projects for funding will be decided by a Rural DAC Stakeholder Committee with representatives from RCAC, the California Department of Public Health (CDPH), County DEH, Indian Health Service (IHS), and the Regional Water Management Group (RWMG). Additionally, project solicitation outreach meetings will be conducted to inform citizens of the importance of environmental stewardship, emphasizing conservation, regulatory (drinking water quality) compliance, and utility efficiency.[103]

The *Rural DAC Partnership Program* also supports the following State, federal programs to address critical water supply and water quality issues in PWS:

- USEPA Region 9 primary regulatory responsibilities for Indian Tribes.
- CDPH State Revolving Fund Priority Project List and primary regulatory responsibilities.
- SWRCB's Small Community Wastewater Strategy which promotes strategies to assist small and/or disadvantaged communities with wastewater needs.
- USDA Rural Development and Health and Human Services' targeted low income projects.
- IHS support for Indian Tribes and public health goals.
- County DEH list of Community Water Systems' compliance orders.

[103] Work Plan, Attachment 3 (Contribution to IRWM Plan Objectives)

RCAC partners with these agencies to help them achieve their goals of assisting rural DACs with infrastructure improvements and protection of public health.[104]

Benefit Disadvantaged Communities

This benefit is expected to be obtained by the Rural DAC Partnership Program no matter which projects are selected for program inclusion. As described in Attachment 3, all projects will be implemented in rural DACs not included in the Water Authority's service area.

B. Benefit DACs by Addressing Critical Water Supply or Water Quality Needs

Rural communities within the San Diego IRWM Region unincorporated areas that are not served directly by the Water Authority's member agencies have water quantity and quality issues exacerbated by climate change, poor economies, and lack of community expertise. Inadequate water supply to support existing communities poses a public health risk. The majority of drinking water maximum containment level (MCL) violations occur with small public water systems.[105] Further, inadequate wastewater treatment results in unplanned discharge events that pose risks to human health and the environment.

The infrastructure needs of rural DACs are so extensive that currently, there is not enough available funding to meet the needs of rural DACs throughout the Region. The California Department of Public Health (CDPH) has 41 small (less than 10,000 population) systems located in San Diego County on its 2013 State Revolving Fund (SRF) Priority Project List (PPL)[106], with many listed more than once. The Rancho Estates MWC project, identified as an example project by the Rural DAC Stakeholder Committee, is listed in the CDPH PPL with a funding target of $500,000. The State Water Resources Control Board (SWRCB) has a similarly lengthy list of communities requesting funding from the Clean Water SRF for wastewater improvements.

This series of small DAC projects is designed to provide safe, reliable water that is adequate to meet community needs and regulatory standards in areas that have neither the technical nor the funding capability to provide safe drinking water. In every one of these projects, the primary objective is to ensure the community has access to reliable water supplies that meet water quality standards in sufficient quantities to meet basic community and fire protection needs.

This benefit to DACs will be obtained by implementing the *Rural DAC Partnership Program*, and is not affected by which projects are selected. Per the work plan in Attachment 3, all projects considered as part of the program will meet the definition of a DAC project as defined in the 2012 Guidelines and described in Attachment 10.[107]

As described in Attachment 3, this program will service rural DACs of 10,000 people or fewer. It is anticipated that four individual infrastructure projects that are listed in the will be selected as part of this program.[108]

Address Critical Water Supply Needs

This benefit is expected to be obtained by the *Rural DAC Partnership Program* no matter which projects are selected for program inclusion. As described in Attachment 3, critical water supply projects are one of the primary criteria for project selection. To more easily describe and justify quantifications of benefits of addressed critical water supply need, example projects are provided, which are typical of the types of projects the program anticipates funding. These example projects are provided above in the Project Abstract.

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[104] Work Plan, Attachment 3 (Project Integration)

[105] U.S. EPA. 2007. *Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110. Pp. 2-5 to 2-6, and Figure 2-10.

[106] Sean Sterchi, CDPH. 2013. *State Revolving Fund Priority Project List*. Email dated March 5, 2013.

[107] DWR. 2012. Guidelines: Integrated Regional Water Management, Proposition 84 and 1E. Appendix G, pg. 85. For description of DACs in San Diego IRWM Region, refer to Attachment 8 of this application. Work Plan is available in Attachment 3 of this application.

[108] Work Plan, Attachment 3

C. Long-Term Solutions for Water Quality and Water Supply Needs of DACs

The USEPA[109] has identified three main obstacles to the sustainability of small water systems:

- Contamination of drinking water source water from wastewater intrusion, agricultural influences, and/or contaminant spills from industrial activities;
- Seasonal weather changes resulting in floods or droughts, which require design options to bypass treatment during rain and storm events and identification of alternative water supplies (including water reuse sources) to increase capacity during droughts; and
- Deteriorating collection and distribution systems that compromise source water quality and increase the cost of water treatment.[110]

Further, it also notes that water systems must also have technical, managerial, and financial (TMF) capacity.

The *Rural DAC Partnership Program* will address both the infrastructure and expertise issues that affect critical water quality and water supply needs of DACs. As explained in Attachment 3, the program will provide appropriate training and technical assistance to increase the sustainability of the physical improvements.[111] This training will enable communities to better care for their systems, prolonging the life of the projects and the associated benefits. It will also help to reduce safety risk to operators by providing adequate training. A well-maintained system run by experienced, well-trained operators will reduce risks of contamination, prolong the life of the equipment, and provide a system that is likely better able to withstand weather impacts. This will serve to provide long-term solutions to critical water supply and water quality needs of DACs.

E. Improved Water Supply Reliability

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The proposed *Rural DAC Partnership Program* will help address reliability issues by ensuring the PWS operator in rural, disadvantaged areas are able to maintain the reliability of their systems.

The reliability of local groundwater is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to water rights determinations. The *Rural DAC Partnership Program* will increase supply reliability by increasing access to groundwater supplies, decreasing leaks and water loss, increasing storage facilities, and decreasing O&M constraints (for example, pumping and distribution deficiencies).

D. Increased Water Available for Fire Protection

Fire protection is a major issue for the tribes and surrounding communities, and increased water storage improves water supplies for firefighting and other emergency conditions. The San Diego backcountry is prone to 'Santa Ana' winds and associated wildfires. CalFire documented 55 incidents of wildfires in San Diego County between 2003 and 2012.[112]

Public safety will be improved throughout the San Diego backcountry by providing adequate storage necessary for fire-fighting and emergency conditions. The increased water storage from the projects implemented by the *Rural DAC Partnership Program* will help ensure adequate water supplies for

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[109] U.S. EPA 2007.*Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110.Pg. 4-4.

[110] Work Plan, Attachment 3 (Project Need); and U.S. EPA 2007.*Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110.Pg. 4-4.

[111] Work Plan, Attachment 3

[112] CalFire.Incident Information. Available http://cdfdata.fire.ca.gov/incidents/incidents_search_results?search=Search&search=San+Diego (Accessed 15 March 2013).

firefighting efforts on these rural and tribal lands. An example of the type of fire protection benefits that will occur due to this project is presented below.

In ***Example 3-1: Phoenix House School***, the County of San Diego determined that the existing system lacks sufficient storage capacity.[113] The proposed project will involve construction of two new 10,000 gallon storage tanks to provide sufficient storage in the event of power outages or routine maintenance procedures on the well pump and motor.[114]

In ***Example 3-3: San Pasqual Water District B Water System***, IHS determined that the current tank has enough storage for less than one day's demand.[115] Although the community had not yet experienced them, IHS expressed concern that a significant power outage could lead to problems with water supplies. Without storage sufficient for even one day's worth of water demands, the system cannot support the additional demands required by firefighting efforts in the event of a fire. Additionally, power outages related to fires could further exacerbate the issue. By increasing the tank size to 250,000 gallons, as described in Attachment 3, two days of water storage would be available for the community.[116] This would also increase the amount of water potentially available for firefighting purposes, especially if power remains intact and water can continue to be pumped into the tank.

Reduce Need for Imported Water

Amount/Volume and Unit: 782 AFY

Technical Justification of Physical Benefit

For rural PWS that have interconnections with Water Authority member agencies to purchase imported water supplies on an as-needed basis, the improved storage infrastructure that will be constructed through the *Rural DAC Partnership Program* will allow the rural PWS to operate their water systems to balance supply availability with demand.

In ***Example 3-2: Rancho Estates MWC***, improvements to its water supply infrastructure will include construction of covered storage and a separate distribution system for domestic use. The existing system would remain in place for agricultural irrigation use, while the domestic system would be supplied solely by Yuima Municipal Water District (YMWD). The existing Rancho Estates MWC system is estimated to have lost 1.16 million gallons to leakage in 2005. Rancho Estates MWC also supplements its water with water purchased from Yuima Municipal Water District (YMWD), a Water Authority member agency, in order to dilute nitrate concentrations to meet water quality standards.[117] Under the *Rural DAC Partnership Program*, these leakage and nitrate issues would be addressed through covered storage and separate distribution systems for agricultural use and domestic use. Therefore, the volume of imported water supply they must purchase through YMWD could be substantially reduced.

It is important that the *Rural DAC Partnership Program* help address these critical water supply and water quality issues in the Region's rural DACs because they support the ongoing viability of the local agricultural industry.

Methods Used to Estimate the Physical Benefits

F. Avoid Imported Water Supply Purchases

The Rancho Estates MWC *Engineering Report* estimates a 200 gallon per person per day domestic demand. This equals 40 AFY for domestic demand. Domestic demand averages 25 gallons per minute, while total system demand (agricultural and domestic) is estimated at an average of 680 gallons per

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[113]Phoenix House Foundation. 2006. *Preliminary Engineering Report*.
Phoenix House Foundation. 2006. *Department of Health Services, Safe Drinking Water State Revolving Fund, Application for Construction Funds 2006/2007*.
[114]Phoenix House Foundation. 2006. *Preliminary Engineering Report* (System #3701478). Page 2.
[115]IHS. 2012. Technical Memorandum No. 2, San Pasqual Water District B. Pg. 2.
[116]IHS. 2012. Technical Memorandum No. 2, San Pasqual Water District B. Pg. 2
[117]Rancho Estates MWC. 2008. *Engineering Report Executive Summary*. Pg. 2-6.

minute.[118] Thus agricultural irrigation demands are estimated as an average of 655 gallons per minute, or 1056.5 AFY. Rancho Estates MWC sources its water from wells and supplements it with YMWD water. This supplementation is necessary to reduce nitrate levels to meet water quality standards. The wells average 39 mg/L concentration of nitrate, and there is no system in place to remove nitrates from Rancho Estates MWC water prior to delivery to customers.[119] Therefore, any reduction in nitrate concentration is due solely to YMWD inputs. Assuming that YMWD water contains negligible amounts of nutrients, YMWD would be blended with Rancho Estates MWC water in a 3:1 ratio.

Currently, both domestic and agricultural water is on a shared system. This project will separate the two distribution systems, and provide YMWD water for domestic use, and Rancho Estates MWC well water for agricultural irrigation use. With a blending ratio of 3:1 YMWD to well water, agricultural irrigation uses approximately 792 AFY of YMWD water under the current system. Because Rancho Estates is using a single distribution system for both agriculture and domestic demand, 75% of water used to meet domestic demand is also YMWD water, for a total domestic demand for YMWD water of 30 AFY.

This project would eliminate agricultural use of YMWD water, and meet all domestic demands with YMWD supplies. Therefore, this project would lead to a 792 AFY decreased in YMWD water demand for agriculture uses, and increase domestic demand for YWMD water by 10 AFY. The new system installed for domestic water supply would prevent loss of water through leakage, estimated at 10% of use.[120]Though it is expected that the new system would reduce leakage, it cannot be eliminated entirely, so water savings from reduced leakage are not included in this analysis.Net reduction in YMWD water demand by Rancho Estates MWC would be 782 AFY (-792 AFY from agriculture + 10 AFY from domestic).

YMWD is a Water Authority member agency. The Water Authority uses a blend of imported and local water sources, but any reduced demand for Water Authority supplies will be used to directly offset imported water, both because the imported water is an expensive supply, and because the Water Authority has a goal to reduce dependence on imported water. Therefore, all 782 AFY of reduced YMWD water demand from this project will directly offset imported water supplies.

Table 7-18: Physical Quantification of F-Avoid Imported Water Supply Purchases

Rural DAC Partnership Program

(a) Year	(b) Type of Benefit	(c) Without Project*	(d) With Project*	(e) Change Resulting from Project
2015-2064	Avoid Imported Water Supply Purchases	822 AFY	40 AFY	39,100 AF (or 782 AFY)
** Annual avoided imported water purchases.*				

G. Reduce Net Production of Greenhouse Gases

Reducing overall purchases of imported water has commiserate reductions in greenhouse gas production associated with pumping SWP and CRA supplies to San Diego County. This benefit can by quantified to MT CO_2 per acre-foot of water saved for projects that reduce imported water.

In ***Example 3-2: Rancho Estates MWC***, the Rancho Estates project would replace uncovered reservoirs with covered storage and construct a separate distribution system for domestic water. Domestic water will be provided by Yuima Municipal Water District, while the existing well system will be used to distribute untreated water for agricultural irrigation. As justified above, because of its reliance on YMWD water to meet water demands and water quality standards, reduced imported water purchases in the Rancho Estates MWC system would total approximately 782 AFY.

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[118]Rancho Estates MWC. 2008. *Engineering Report Executive Summary*. Pg. 1-6
[119]Rancho Estates MWC. 2008. *Engineering Report Executive Summary*. Pg. 2-6.
[120]Rancho Estates MWC. 2008. *Engineering Report Executive Summary*. Pg. 2-6.

Imported water is energy intensive and reducing the amount of water that is imported will avoid the extensive energy requirements associated with transporting water from Northern California and the Colorado River to San Diego County. This in turn will result in avoided CO2 emissions (a GHG) associated with the production of this energy. A 2010 report by the Equinox Center estimates that based on the blend of Colorado River and SWP water purchased by Metropolitan and sold to Water Authority for use by its member agencies, 2.65 MWh/AF is required to convey and treat imported water.[121]

Converting from energy use to CO_2 emissions requires a breakdown of California electricity sources. California generates 70% of its electricity through a combination of hydroelectric, nuclear, coal, oil, natural gas, geothermal, biomass, wind, solar, and other. 10% of California's electricity is imported from the Pacific Northwest, and the remaining 20% imported from the Pacific Southwest.[122] Emission rates in lbs. of CO_2 per MWh will vary based on the energy source, but can be estimated across regions, per the EPA's eGRID. California production was eGRID subregion WECC California, the Pacific Northwest is WECC Northwest, and the Pacific Southwest is WECC Southwest. Each of these regions has a CO_2 emission rate of 658.68, 1191.35, and 819.21 lbs/MWh, respectively.[123] Taking a weighted emissions rate (using the percentage of electricity produced in each region), the average emissions for electricity in California is 780.51 lbs/MWh of CO_2. With 2204.62 lbs per MT, a standard conversion rate for California can be calculated as 0.354 MT of CO_2 per MWh of electricity

To estimate the reduced net production of greenhouse gases in a reasonable unit for water management, we can calculate the MT of CO_2 per AF of water, using the values justified above. With emissions rate of 0.354 MT CO_2/MWh, and an energy input of 2.65 MWh/AF of imported water, we get an emissions rate of 0.938 MT CO_2/AF of imported water. Therefore, for every acre-foot of water that is not imported because of this project, greenhouse gas emissions will be reduced by 0.938 metric tons of CO_2 (2,068 pounds). In the Rancho Estates MWC example, greenhouse gas emissions are expected to be reduced by 733.516 metric tons of CO_2 per year.

Table 7-19: Physical Quantification of G-Reduce Net Production of Greenhouse Gases
Rural DAC Partnership Program

(a) Year	(b) Type of Benefit	(c) Without Project*	(d) With Project	(e) Change Resulting from Project
2015-2064	Reduce Net Production of Greenhouse Gases	733.5 MT CO_2 per year	0	36,675 MT CO_2
** Annual avoided net production of GHGs.*				

H. Benefit Wildlife or Habitat in Bay-Delta Through Reduced Imports

The Water Authority is the water wholesaler to water agencies in San Diego County, and purchases water through the Metropolitan Water District (MWD). MWD obtains its water from two sources: the Colorado River Aqueduct (CRA), which it owns and operates, and the SWP, with which MWD has a water supply contract through the state of California. Currently, imported water purchases from MWD account for about 59% (331,825 AF) of Water Authority supplies.[124] Although the Water Authority and its member agencies use a mix of imported water and local sources to supply their customers, imported water is more expensive to provide and is the marginal water source. Thus, reduced overall potable water demand will be used to reduce reliance on imported water supplies exclusively.

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[121] Equinox Center. 2010. *San Diego's Water Sources: Assessing the Options*, July 2010. pg. 10

[122] California Energy Commission, *Electricity Generation by Resource Type 1997-2011*. Accessed 13 March 2013, available < http://energyalmanac.ca.gov/electricity/electricity_generation.html>

[123] U.S. EPA.eGRID Summary Table, pg. 4 eGRID2012 Version 1.0 Year 2009 Summary Tables. Available: http://www.epa.gov/cleanenergy/documents/e.g.ridzips/eGRID2012V1_0_year09_SummaryTables.pdf. Accessed March 2013.

[124] San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 6-1, Section 6, Metropolitan Water District of Southern California.

In ***Example 3-2: Rancho Estates MWC***, the Rancho Estates MWC project will reduce the amount of imported water purchased from YMWD. As justified above, because of its reliance on YMWD water to meet water demands and water quality standards, reduced imported water purchases in the Rancho Estates MWC system would total approximately 782 AFY. Consistent with the mix of Water Authority imported supplies, it is assumed that two-thirds of the avoided imported water (about 521 AF) generated by the proposed project will offset SWP supplies. The remaining one-third (261 AF) will offset the use of imported water from the CRA. This will augment in-stream flows in the Bay-Delta (which provides the means by which the SWP delivers water from Northern California to the south) or will offset other diversions that may otherwise reduce flows. Reduced demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

I. Reduced Demand for Net Diversions from the Bay-Delta

As described above, the Water Authority and its member agencies supply imported water to their customers. Reduced overall potable water demand will reduce overall imported water demand and reduce net diversions from the Bay-Delta.

In ***Example 3-2: Rancho Estates MWC***, the Rancho Estates MWC project will reduce the amount of imported water purchased from YMWD. As justified above, because of its reliance on YMWD water to meet water demands and water quality standards, reduced imported water purchases in the Rancho Estates MWC system would total approximately 782 AFY. Consistent with the mix of Water Authority imported supplies, as described above, 521 AFY of this avoided imported water would come from the SWP. This will augment in-stream flows in the Delta or will offset other diversions that may otherwise reduce flows.

Table 7-20: Physical Quantification of I-Reduced Demand for Net Diversions from the Bay-Delta
Rural DAC Partnership Program

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2015-2064	Reduce Net Diversion from Bay-Delta	782 AFY	0	39,100 AF
** Annual offset demand for Bay-Delta imports.*				

Address Critical Water Quality Need

This benefit is expected to be obtained by the *Rural DAC Partnership Program* no matter which projects are selected for program inclusion. As described in Attachment 3, critical water quality projects are one of the primary criteria for project selection.[125] To more easily describe and justify quantifications of benefits of addressed critical water supply need, example projects are provided, which are typical of the types of projects the program anticipates funding. These example projects are provided above in the Project Abstract.

J. Provide Safe Drinking Water

The objective of the *Rural DAC Partnership Program* is to provide both funding and technical support for implementing projects that will solve critical water or wastewater system issues in the Region's rural DACs, including tribal communities. As stated in Attachment 3, an emphasis will be given to systems lacking safe and reliable delivery of drinking water, and support for solutions that address public health will be provided.[126]

Rural communities within the San Diego IRWM Region unincorporated areas that are not served directly by the Water Authority's member agencies have water quantity and quality issues exacerbated by climate change, poor economies, and lack of community expertise. Inadequate water supply to support existing communities poses a public health risk. The majority of drinking water maximum containment level (MCL)

[125] Work Plan, Attachment 3 (Abstract).
[126] Work Plan, Attachment 3 (Project Objectives)

violations occur with small public water systems.[127] Further, inadequate wastewater treatment results in unplanned discharge events that pose risks to human health and the environment.

Three major problems that impede the safety of DACs served by small community water systems, and which will be addressed by this program, include:

- Contamination of drinking water source water from wastewater intrusion, agricultural influences, and/or contaminant spills from industrial activities;
- Seasonal weather changes resulting in floods or droughts, which require design options to bypass treatment during rain and storm events and identification of alternative water supplies (including water reuse sources) to increase capacity during droughts; and
- Deteriorating collection and distribution systems that compromise source water quality and increase the cost of water treatment.[128]

The California Department of Public Health (CDPH) has 41 small (less than 10,000 population) systems located in San Diego County on its 2013 State Revolving Fund (SRF) Priority Project List (PPL)[129], with many listed more than once. The Rancho Estates MWC project, identified as an example project by the Rural DAC Stakeholder Committee, is listed in the CDPH PPL with a funding target of $500,000. The State Water Resources Control Board (SWRCB) has a similarly lengthy list of communities requesting funding from the Clean Water SRF for wastewater improvements.

Rural DACs in the San Diego IRWM Region are faced with water supply systems that are inadequate to support existing connections. It is costly to provide supplemental treatment processes to improve the water quality of contaminated drinking water sources.[130] It is difficult for small DAC drinking water and wastewater systems to afford improvements because they have fewer ratepayers to share the costs. Further, rural DACs lack technical expertise and financial stability to access and comprehend funding programs.

All of the example projects identified by the Rural DAC Stakeholder Committee for priority implementation will provide safe drinking water to economically disadvantaged communities in the backcountry, and will be offered TMF support from RCAC to operate the PWS safely. ***Example 3-1: Phoenix House School*** will construct a replacement well and two new 10,000 gallon storage tanks. The project will protect the drinking water source from bacteriological contamination and provide sufficient storage to provide the community with water in the event of power outages or routine maintenance procedures on the well pump and motor.[131]***Example 3-2: Rancho Estates MWC*** will construct a covered finished water storage tank and a separate domestic supply distribution system connected to YMWD. This would protect public health by eliminating potential contamination due to the environmental exposure, address leakage issues, and provide drinking water with significantly lower concentrations of nitrogen. ***Example 3-3: San Pasqual District B Water System*** will abandon the aging and leaking 100,000 gallon tank in place, and replace an adjacent 38,000 gallon tank with a new 250,000 gallon welded steel tank to provide greater water storage to the entire distribution system.[132] This would protect public health by eliminating potential contamination due to the leakage, eliminate wasted water supplies, and provide the District B community with adequate storage capacity.

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[127]U.S. EPA. 2007. *Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110. Pp. 2-5 to 2-6, and Figure 2-10.
[128]Work Plan, Attachment 3, pg. 3-X. (Project Need); and U.S. EPA 2007.*Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110.Pg. 4-4.
[129] Sean Sterchi, CDPH. 2013. *State Revolving Fund Priority Project List*. Email dated March 5, 2013.
[130]U.S. EPA. 2007. *Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110.Pg. 3-6 and 4-3.
[131]Phoenix House Foundation. 2006. *Preliminary Engineering Report* (System #3701478). Page 2.
[132]IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 1.

K. Avoid Bottled Drinking Water Purchases

The objective of the *Rural DAC Partnership Program* is to provide both funding and technical support for implementing projects that will solve critical water or wastewater system issues in the Region's rural DACs. Although RCAC is working closely with USEPA, SDPH, County DEH, and other regulatory agencies to address these critical issues, the persistence of water quality concerns in backcountry areas has resulted in widespread bottled water purchases.

In ***Example 3-2: Rancho Estates MWC***, the Rancho Estates project would replace uncovered reservoirs with covered storage, reduce the amount of water leakage in its system, and construct a separate domestic water distribution systems that is connected to YMWD supplies. This will improve the water quality of supplies distributed by the system. The *Engineering Report* states that residents served by Rancho Estates MWC currently purchase bottled water for their drinking needs.[133]This project would reduce the need for residents to purchase bottled water.

In ***Example 3-2: Rancho Estates MWC***, the proposed project would address infrastructure deficiencies that currently allow for nitrate contamination in drinking water supplies. Assuming that each person requires one gallon of drinking water per day, and that 80% of the Rancho Estates MWD's 180 residents currently purchase bottled water, this results in 52,560 gallons of bottled water purchased each year. With project implementation, this would lead to a savings of 52,560 gallons per year of bottled water purchases. This estimate is conservative because some residents may also choose to use bottled water for other cooking and washing activities, in addition to drinking.

Table 7-21: Physical Quantification of K-Avoided Bottled Drinking Water Purchases
Rural DAC Partnership Program

(a) Year	(b) Type of Benefit	(c) Without Project	(d) With Project	(e) Change Resulting from Project
2015-2064	Avoided Bottled Water Purchases	52,560 gallons per year*	0	2,628,000 gallons
** Annual avoided bottled water purchases.*				

L. Improve Water Quality

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to their customers. However, poor-quality source water and/or contamination during storage makes it increasingly expensive and difficult to meet such standards. Increased levels of constituents, including fecal coliform, bacteria, nitrate, and TOCs that aid in the formation of THMs and other public health concerns can mean more time spent monitoring finished water in the distribution system, and the need to increase the use of expensive water treatment and disinfection processes. Increased levels of these constituents may also lead to the use of increased proportions of groundwater in the blend of water supplies in order to control them.

The objective of the *Rural DAC Partnership Program* is to provide both funding and technical support for implementing projects that will solve critical water or wastewater system issues in the Region's rural DACs. The program will improve drinking water quality through some of the projects that may be selected.

Example 3-1: Phoenix House School will remove the public health hazards associated with exposure from fecal coliform and a history of bacteriological failures at the wellhead[134] due to improper well siting. Improvements to the Phoenix House School system will ensure that all groundwater quality is protected from contamination.

Example 3-2: Rancho Estates MWC will also lead to improved water quality by reducing nutrient or pollutant concentrations from domestic water prior to distribution to users. The County of San Diego has

[133] Engineering Report, Pg. 2-6
[134] Phoenix House Foundation. 2006. *Preliminary Engineering Report* (System #3701478). Page 1.

issued multiple Compliance Orders noting that algae and sediment line the shallow perimeter of the reservoirs, which can contain high TOC and result in formation of disinfection byproducts such as THMs and haloacetic acids.[135] Improvements to the Rancho Estates MWC system will ensure that all domestic water supplies are covered and protected from contamination.

Finally, ***Example 3-3: San Pasqual District B Water System*** will improve drinking water quality by eliminating potential contamination due to the leakage at the existing tank site.

[135]County of San Diego. 2007. *Compliance Order, Rancho Estates Mutual Water Company*. Page 2.

Project 4: Failsafe Potable Reuse at the Advanced Water Purification Facility

Introduction

Project Abstract

The *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project will provide comprehensive testing, evaluation, and demonstration of sequential failsafe treatment steps (treatment trains) for potable reuse without an environmental buffer. To accomplish this, the project will draw upon active potable reuse research projects in the United States, Singapore, South Africa, and Australia in addition to worldwide potable reuse applications and practices used and researched in these same countries. Highlighted by a workshop on hazard analysis, critical control points, and redundancy requirements, this project will convene national and international health, treatment, and water quality experts to establish an appropriate framework for demonstration of failsafe potable reuse at the City of San Diego's existing advanced water purification demonstration facility (demonstration facility).

This project consists of four distinct phases as described below:

Phase 1 – Develop expert panel guidelines on hazard analysis, redundancy, reliability, and monitoring requirements for potable reuse without an environmental buffer: This task will identify an expert panel to participate in an international workshop that will develop the necessary guidelines to address hazard analysis, redundancy requirements, and appropriate water quality monitoring techniques for implementing potable reuse without an environmental buffer. A two-day workshop will be held in San Diego with the California Department of Public Health (CDPH) and municipalities pursuing potable reuse invited to attend. The expert panel will produce failsafe guidelines that will provide needed guidance for the potable reuse demonstration testing that will be performed as a part of this project.

Phase 2 - Develop a comprehensive test plan for a failsafe potable reuse system that incorporates failsafe guidelines from previous WRRF studies: This task will devise a test plan that incorporates the failsafe guidelines developed by the expert panel in this project along with the potable reuse treatment guidelines (developed in WRRF 11-02) and any other salient guidance from on-line monitoring (WRRF 11-01) and/or engineered storage buffer (WRRF 12-06). The test plan will be comprehensive and will include bench-scale work to better develop surrogate and indicator concepts, pilot-scale testing to demonstrate alternative disinfection and oxidation technology performance, as well as demonstration-scale testing to provide proof of failsafe system concept.

Phase 3 – Perform bench-scale, pilot-scale and demonstration-scale testing at the City of San Diego's water purification demonstration plant: This task will operate the City's demonstration facility for 52 weeks to develop long-term information that will evaluate the failsafe concepts developed in the test plan. The demonstration testing will involve microbial challenges, evaluations of intentional system failures, demonstration of on-line monitoring equipment's response, and redundancy treatment response. In addition to the demonstration testing, pilot-scale testing of alternative disinfection and oxidation processes will also be routinely operated and challenge tested. The combination of demonstration and pilot-scale testing will cover a wide range of treatment alternatives, monitoring, system response, and system reliability concepts.

Phase 4 – Prepare Final report on complete strategy for failsafe potable reuse: A final report will be compiled to provide a comprehensive pathway to failsafe potable reuse. The report will summarize expert panel guidelines and all the data gathered for on-line monitoring applications, redundancy and reliability performance, and relevant surrogate and indicators for various treatment processes. The report will be provided along with a workshop to develop a common understanding of project outcomes prior to finalizing the report with any specific comments.

The WateReuse Research Foundation is actively funding nearly $3 million in research to better develop potable reuse as a supplemental water supply. This project leverages the expertise from those investments and combines them to demonstrate failsafe potable reuse at the City of San Diego's demonstration facility.

Description and Relationship to Other Projects in the Proposal

This project will contribute to the IRWM concept of integrated management, utilizing a collaborative, stakeholder-driven process to further the scientific and technical foundation of water supply diversification – specifically pushing innovation of failsafe potable reuse of local recycled water supplies. It will also complement the efforts of other projects in this proposal to improve water management in the San Diego IRWM Region.

Description and Estimates of Without-Project Conditions

The *Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility* project will provide comprehensive testing, evaluation, and demonstration of failsafe treatment trains for potable reuse without environmental buffers (i.e., failsafe potable reuse). In California and elsewhere, failsafe potable reuse can offer a number of benefits compared to potable reuse that requires an environmental buffer (i.e., indirect potable reuse (IPR)) or nonpotable reuse. This is due to a number of factors, including water rights issues, lack of usable buffers near the locations where reclaimed water is produced, potential for contamination of the reclaimed water when it is released into the environmental buffer, and costs associated with maintenance, operation, and monitoring of environmental buffers. In addition, failsafe potable reuse will typically avoid or minimize the need for expensive pipelines, pump stations, and other infrastructure, and associated greenhouse gas emissions (GHGs), that is required to transport recycled water to IPR environmental buffer locations (e.g., reservoirs, aquifer recharge sites) or to nonpotable customers using purple pipe networks.

This project seeks to ultimately support wider implementation of failsafe potable reuse by increasing industry understanding and easing the burden on regulators to address the complex issues associated with the variations of possible potable reuse scenarios, including direct potable reuse. Without this project, failsafe potable reuse may be delayed (or not implemented at all) in many areas due to the infeasibility of incorporating an environmental buffer into the process.

In California, failsafe potable reuse is not yet allowed by state regulatory agencies, although it is under development in Texas and has been successfully implemented in Singapore and (for many decades) Namibia. This project has the potential to provide important input into regulations and policy currently being developed in this area. Senate Bill 918 (SB 918) requires the California Department of Public Health (CDPH) to report on the feasibility of direct potable reuse, and the proposed project will provide guidelines and scientific assessment to help CDPH to make a more informed decision on this topic. Without the project, this decision may be delayed (or misinformed) due to lack of scientific information.

The benefits of being able to implement failsafe potable reuse are exemplified by the City of San Diego. Due to increasing concerns over the reliability of imported water in Southern California, San Diego has developed extensive plans for expanding potable reuse within its service area. Currently, the City is evaluating the potential for an indirect potable reuse/reservoir augmentation (IPR/RA) program that would ultimately recycle up to 100,000 AFY[136] of wastewater using advanced treatment technologies. Following treatment, this water would be pumped to the San Vicente Reservoir (which effectively serves as the environmental buffer), blended with water from other sources, and ultimately treated again at the potable water treatment plant. The pipeline from the City's Advanced Water Purification Facility (AWPF) to San Vicente Reservoir would be 22 miles long. Without the project, this IPR/RA program would continue to be implemented.

Although IPR/RA (i.e., using the San Vicente Reservoir as an environmental buffer) would provide important benefits to the City, failsafe potable reuse without the use of an environmental buffer has the potential to save the City significant amounts of money (see Attachment 8). With this option, recycled water would also be developed at the City's AWPF but would be delivered directly to San Diego County Water Authority (Water Authority) regional raw aqueduct system (which serves the City of San Diego and other local communities). Similar to the IPR/RA program, this water would be treated again at a potable water treatment plant prior to distribution to customers. The pipeline from the City's AWPF to the raw aqueduct system would be 10 miles long.

[136] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-15.

Without the project, the City of San Diego would proceed with IPR/RA due to uncertainties associated with the feasibility of failsafe potable reuse. This will increase costs significantly for the City. In addition, construction of the additional length of pipe required to pump water from the AWPF to San Vicente Reservoir would significantly increase the carbon footprint associated with IPR/RA (compared to failsafe potable reuse).

This project also has important implications that extend far beyond the San Diego illustration, as it would provide benefits throughout the State of California. While the proposed project will not, in itself, result in immediate monetizable benefits, the true value of this project is that it will help to facilitate future implementation of failsafe potable reuse. This could potentially result in significant financial, environmental, and social benefits for water supply agencies (and their customers) throughout the state. Through comprehensive testing, evaluation, and demonstration of failsafe treatment trains, this project will expand scientific, regulatory, and industry knowledge related to the implementation of failsafe potable reuse.

Recent / Historical Conditions

Environmental buffers (i.e., intermediate water storage structures such as reservoirs or aquifers that allow treated reuse water to blend with water from other sources) have been important features of potable water reuse projects constructed in the United States for the last five decades. Over this time period, treatment technologies have improved significantly and their costs have decreased. As utilities have become more confident in their ability to meet potable water standards and guidelines, potable reuse projects have been proposed, designed, and in some cases built in the United States without environmental buffers.[137] The increasing interest of utilities in operating potable reuse projects without environmental buffers (i.e., failsafe potable reuse) is driven by a number of factors, including water rights, lack of usable buffers near the locations where reclaimed water is produced, potential for contamination of the reclaimed water when it is released into the environmental buffer, and costs associated with maintenance, operation, and monitoring of environmental buffers.[138] In California, potable reuse without environmental buffers is not yet allowed by state regulatory agencies.

Senate Bill 918 (SB 918) requires the California Department of Public Health (CDPH) to finalize regulations for indirect potable reuse through groundwater recharge and reservoir augmentation by the end of 2013 and 2016, respectively. CDPH must also report on the feasibility of direct potable reuse (potable reuse), which would not require an environmental buffer (failsafe potable reuse) and could potentially increase the viability of potable reuse for water agencies throughout the State. One challenge in establishing regulations for all types of potable reuse projects is a lack of industry knowledge regarding specific treatment objectives required to protect public health, the myriad of alternative treatment processes available to enhance water quality, redundancy requirements for the sequential treatment system (treatment train), treatment system reliability requirements, and real-time water quality monitoring techniques.

The United States science and engineering community has struggled with this lack of industry knowledge for some time, dating back to a workshop held in Boulder, Colorado in 1975 by the United States Environmental Protection Agency, the American Water Works Association, the Water Pollution Control Federation, and the University of Colorado. Industry knowledge continues to be an issue, as the scientific community continued to discuss the potential for failsafe potable reuse at the WateReuse Foundation California Conference held in 2012 in Sacramento, California. Similarly, the National Research Council (NRC) wrestled with the issue in its 1982 Report, *Quality Criteria for Water Reuse*, in its 1984 review of the Potomac Estuary Experimental Water Treatment Plant, and in its 1998 report, *Issues in Potable Reuse*. The NRC has targeted this issue once again in its new 2011 report, *Water Reuse: Potential for Expanding the Nation's Water Supply Through Reuse of Municipal Wastewater*. Internationally, Australia

[137] National Research Council. 2012. *Water Reuse: Potential for Expanding the Nation's Water Supply Through Reuse of Municipal Wastewater.* Washington, DC. Available: http://www8.nationalacademies.org/onpinews/newsitem.aspx?recordid=13303

[138] National Research Council. 2012. *Water Reuse: Potential for Expanding the Nation's Water Supply Through Reuse of Municipal Wastewater.* Washington, DC. Available: http://www8.nationalacademies.org/onpinews/newsitem.aspx?recordid=13303

recently issued a set of guidelines for potable reuse. All these existing guidelines must be assimilated and supplemented with project-specific criteria for local applicability in California.

The *San Diego Recycled Water Study* notes that when blended with imported water, water produced at the AWPF has the potential to reduce salinity in reservoirs by up to 50% due to its purity.[139] Imported water entering San Vicente Reservoir averages 500mg/L of total dissolved solids (TDS), while water from Orange County's Groundwater Replenishment System – an operating advanced water treatment plant – averages 35-50 mg/L.[140] On land, the reservoirs that receive the advanced purified water, the residents that use the water, and the soil that is irrigated with the water would all benefit from having water with up to half the current salinity levels.

This project seeks to fill known knowledge and data gaps and ultimately support wider implementation of potable reuse by increasing industry understanding and easing the burden on regulatory agencies to address the complex issues associated with the variations of possible potable reuse scenarios. The City of San Diego's *Recycled Water Study* (completed in 2012) estimated that augmenting reservoir supplies with advanced-treated purified water (indirect potable reuse via reservoir augmentation) could create up to 100,000 AFY of new local water supply for southern San Diego County by 2035.[141] In addition, potable reuse projects allow agencies to further the reuse of water, which reduces the volume of water ultimately wasted by discharging to the ocean. Application of the lessons learned from this WRRF study could substantially increase potable reuse throughout the State and nation.

Potential Adverse Physical Effects of the Project

This project is comprised of workshops, demonstration testing, and analysis designed to establish the feasibility of failsafe potable reuse. No adverse physical effects are anticipated as a result of this project. Prior to adoption of any recommendations that would allow implementation of failsafe potable reuse (such as a CDPH recommendations per SB 918), the appropriate lead agency will conduct all necessary environmental compliance documentation in accordance with CEQA and NEPA and procure any permits necessary to implement the project. It is not anticipated that any significant, long-term adverse physical effects would result from implementation of this project.

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

The report produced by *Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility* will provide a comprehensive pathway to failsafe potable reuse. The report will summarize expert panel guidelines and all the data gathered for on-line monitoring applications, redundancy and reliability performance, and relevant surrogate and indicators for various treatment processes. The report will be provided along with a workshop to develop a common understanding of project outcomes prior to finalizing the report with any specific comments. Some of the benefits will be obtained through the process of developing this report, while other benefits will only be obtained if the recommendations are accepted as the basis for new water quality standards and approved by CDPH.

Uncertainties in the Physical Benefits

Though there is an expectation that failsafe potable reuse is achievable, it is not possible to predetermine what the science will say, so there is a risk that adequate failsafe assurances cannot be provided. This could affect the benefit associated with avoiding construction of the IPR/RA alternative by the City of San Diego. Additionally, the regulatory community is still developing its potable reuse policies, which may affect the degree of influence this project has on failsafe potable reuse applications throughout the State.

Summary of Physical Benefits

This project is anticipated to contribute to enabling implementation of failsafe potable reuse. Enabling implementation of failsafe potable reuse is expected to result in ten benefits as shown in Table 7-22 below. The justification for each benefit, along with a description of how they can be measured, is provided following the table.

[139] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-1.
[140] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Section 6.1, page 6-1.
[141] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-1.

Table 7-22: Physical Benefits
Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility

Physical Benefit	Result of Physical Benefit	Amount/ Volume and Unit
Avoid Construction of IPR/RA Facilities	A-Avoid Construction of Pipeline to San Vicente Reservoir	12 Additional Miles of Pipeline Construction
	B-Reduce Net Generation of Greenhouse Gases	53,280 MT of CO_2
Water Supply Produced via Failsafe Potable Reuse	G-Additional Statewide Water Supply Derived From Potable Reuse	0.9 million AFY
	D-Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts	Qualitative
	F-Leverage Existing Research Efforts	Qualitative
	C-Expand Scientific and Technical Foundation for Potable Reuse	Qualitative
	H-Improve Water Supply Reliability	Qualitative
	I-Reduce Ocean Discharges	0.9 million AFY

Avoid Construction of IPR/RA Facilities

Amount/Volume and Unit: 12 Additional Miles of Pipeline Construction

Technical Justification of Physical Benefit

The San Diego County Water Authority (Water Authority) is the water wholesaler to water agencies in San Diego County, and purchases water through the Metropolitan Water District (MWD). MWD obtains its water from two sources: the Colorado River Aqueduct and the State Water Project (SWP). Other sources of imported water for the County are provided through a transfer with Imperial Irrigation District (IID)and the Quantification Settlement Agreement (QSA) on the Colorado River. SWP supplies from the Bay-Delta have been restricted since 2006 due to drought and regulatory restrictions, and additional restrictions on Colorado River water limits its use for additional supplemental supply.[142] With the region's population projected to reach 3.9 million people by 2030, demands will increase and strain these limited water supplies. Water reuse has been proven as a safe, reliable, locally controlled and sustainable option for the region.[143]

The *Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility* project will provide comprehensive testing, evaluation, and demonstration of failsafe potable reuse, so that it can be used in the future as a locally-produced water supply. This project also has important implications that extend far beyond the San Diego illustration, and would provide supply development benefits throughout the State of California.

Currently, the City is evaluating the potential for an indirect potable reuse/reservoir augmentation (IPR/RA) program that would ultimately recycle up to 100,000 AFY of wastewater using advanced treatment technologies.[144] Following treatment, this water would be pumped to the San Vicente Reservoir (which effectively serves as the environmental buffer), blended with water from other sources, and ultimately treated again at the potable water treatment plant. The pipeline from the City's AWPF to San Vicente Reservoir would be 22 miles long. This is the recommended approach from the City's 2005 Water *Reuse Study*. The approach uses the region's largest reservoir to increase retention time and provide the ability to distribute water throughout the region and to the largest water treatment plants.[145]

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[142]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 4-1, Section 4, San Diego County Water Authority Supplies.
[143]City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-1.
[144]City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-15.
[145]City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-15.

Although IPR/RA (i.e., using the San Vicente Reservoir as an environmental buffer) would provide important benefits to the City, failsafe potable reuse without the use of an environmental buffer has the potential to save the City significant amounts of money. With this option, recycled water would also be developed at the City's AWPF but would be delivered directly to the Water Authority regional raw aqueduct system (which serves the City of San Diego and other local communities). Similar to the IPR/RA program, this water would be treated again at a potable water treatment plant prior to distribution to customers. The pipeline from the City's AWPF to the raw aqueduct system would be 10 miles long.

Methods Used to Estimate the Physical Benefits

A- Avoid Construction of Pipeline to San Vicente Reservoir

The 2012 *Recycled Water Study* was produced through a series of technical evaluations and stakeholder meetings. Eight technical memoranda were produced, each of which was presented to stakeholders who provided input and feedback.[146] The technical memoranda covered recycled water market assessment, regional recycled water demand, framework planning, wastewater supply and treatment, recycled water demand and delivery, final solutions and steps needed to move forward, and a financial analysis of recycled water project alternatives.[147] The *Recycled Water Study* Chapter 8 provides a description of the integrated reuse alternatives and Appendix F provides conceptual cost estimates for the integrated reuse alternatives, including the IPR/RA concept.

Selection of the pipeline from the AWPF to San Vicente Reservoir is a critical consideration. The Recycled Water Study notes that the IPR/RA pipeline must be sized depending on factors including future potable reuse opportunities and the City's ability to maximize cost savings.[148]

Due to the much shorter pipeline and the less difficult terrain that the pipeline would traverse, failsafe potable reuse would result in significant cost savings for the City compared to the IPR/RA alternative. Attachment 8 presents the estimated capital costs associated with construction of direct and indirect potable reuse facilities in San Diego. Note that this analysis assumes that without the project, construction of the pipeline to San Vicente Reservoir will occur in 2025 – 2027.

Table 7-23: Physical Benefit of A-Avoid Construction of Pipeline to San Vicente Reservoir
Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2025-2027	Avoid Construction of Pipeline to San Vicente Reservoir	12 miles	0	12 miles

B- Reduce Net Generation of Greenhouse Gases

Failsafe potable reuse is a sustainable water practice since it maximizes the use of an underutilized resource at a local level. The practice reduces the energy use and impacts caused by importing water long distances. Recent research has revealed that there is a considerable carbon footprint associated with water system and other pipelines.[149] These investigations have estimated and accounted for

[146] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-5.
[147] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page 1-4.
[148] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page 8-27.
[149] Chlana, L. 2011. Carbon Footprint Analysis of a Large Diameter Water Transmission Pipeline Installation MS Thesis, Civil Engineering Department, U of TX Arlington, May 2011. Full text: http://dspace.uta.edu/bitstream/handle/10106/5844/Chilana_uta_2502M_11082.pdf?sequence=1. Accessed on March 5, 2013; Du, F., G Woods, D Kang, K. Lansey, R. Arnold. 2012. Life Cycle Analysis for Water and Wastewater Pipe Materials. Journal of Environmental Engineering.Posted August 18; Qi,C. and N-B. Chang, J. 2012. Integrated carbon footprint and cost evaluation of a drinking water infrastructure system for screening expansion alternatives. Journal of Cleaner Production. Volume 27, May 2012, Pages 51–63. http://www.sciencedirect.com/science/article/pii/S0959652612000121. Accessed on March 5, 2013.

greenhouse gas (GHG) emissions associated with the pipe manufacturing process, as well as emissions arising from transport to the installation site, plus installation activities themselves.

The majority of a pipeline-associated carbon footprint is associated with the production phase, with manufacturing the pipe accounting for between 70% to 99% of the total carbon footprint.[150] The range in production-associated emissions reflects a combination of factors. Much of the variation appears to be associated with the pipe material (e.g., cement, PVC, steel), as well as pipe diameter (which impacts the amount of surface area and pipe-wall thickness). The balance of pipeline-associated carbon footprints are attributed to the transport of the pipe to the installation site, and actual installation activities. The carbon footprint will vary considerably based the location of the installation site relative to the pipe manufacturing location. It also is impacted by the pipe material and diameter, which in turn impacts the weight to be transported and/or the pipe lengths manufactured and, thus, impacts how many truck trips are required to haul the pipe to the site.

For the San Diego illustration, the pipe is anticipated to be cement mortar-lined steel and 36 inches in diameter, for either the 22-mile IPR/RA or the 10-mile failsafe pipelines. Therefore, the failsafe potable reuse alternative reduces the amount of pipeline by 12 miles compared to the IPR/RA option.

Production of cement-mortared large-diameter (84”) steel pipe requires 1241 kWh of electricity per foot of pipe manufactured[151], and based on power sources used in manufacturing sites, this translates to 1554 pounds of carbon emissions per linear foot of pipe. This is equivalent to 3,730 MT of CO2e emissions per mile of pipe. Adjusting this downward proportionally for the 36“ diameter pipe applicable to the San Diego illustration, and extending to the 12 miles of pipeline avoided, an estimate is derived of 53,280 MT of carbon emissions saved from the production process alone.

This is a conservative estimate of total emissions avoided, because it does not account for the GHG emissions associated with pipe transport and installation (which could easily account for another 3.3%, or 1760 MT, based on the field application developed by Chilana[152]). It also does not account for energy use and related emissions associated with pumping, nor does it reflect the additional emissions associated with the fact that the IPR/RA alternative requires extensive tunneling for the pipeline installation (whereas no tunneling is required for the DPR pipeline configuration). Note that this analysis assumes that without the project, construction of the pipeline to San Vicente Reservoir will occur in 2025 – 2027.

[150] Chlana, L. 2011. Carbon Footprint Analysis of a Large Diameter Water Transmission Pipeline Installation MS Thesis, Civil Engineering Department, U of TX Arlington, May 2011. Full text: http://dspace.uta.edu/bitstream/handle/10106/5844/Chilana_uta_2502M_11082.pdf?sequence=1. Accessed on March 5, 2013; Du, F., G Woods, D Kang, K. Lansey, R. Arnold. 2012. Life Cycle Analysis for Water and Wastewater Pipe Materials. Journal of Environmental Engineering. Posted August 18; NACAP. 2010. Presentation: Carbon Footprint of Pipeline. Presentation at 44th Annual Int’l Pipe Line & Offshore Contractors Assoc Convention, Venice. September 27. http://www.iploca.com/platform/content/element/7551/NacapPresentationCarbon-FootprintofPipelineProjects.pdf. Accessed on March 5, 2013.

[151] Chlana, L. 2011. Carbon Footprint Analysis of a Large Diameter Water Transmission Pipeline Installation MS Thesis, Civil Engineering Department, University of Texas Arlington, May 2011. Full text: http://dspace.uta.edu/bitstream/handle/10106/5844/Chilana_uta_2502M_11082.pdf?sequence=1. Accessed on March 5, 2013.

[152] Chlana, L. 2011. Carbon Footprint Analysis of a Large Diameter Water Transmission Pipeline Installation MS Thesis, Civil Engineering Department, U of TX Arlington, May 2011. Full text: http://dspace.uta.edu/bitstream/handle/10106/5844/Chilana_uta_2502M_11082.pdf?sequence=1. Accessed on March 5, 2013.

Table 7-24: Physical Benefit of B-Reduced Net Greenhouse Gas Production
Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2025-2027	Reduced Net Greenhouse Gas Production	53,280 MT CO_2	0	53,280 MT CO_2

Water Supply Produced via Failsafe Potable Reuse

Amount/Volume and Unit: 0.9 million AFY

Technical Justification of Physical Benefit

Failsafe potable reuse provides high quality water that is of equal or better quality than untreated imported water. Therefore, this water has virtually unlimited reuse opportunities. It is a locally developed sustainable water supply that is uninterruptible and is not affected by outside influences such as drought, water rights, and other supply interruptions.

Although the most important benefit of the *Failsafe Potable Reuse at the Advanced Water Purification Facility* project is to demonstrate the feasibility of failsafe treatment trains, the development of potable reuse in general (whether it involves an environmental buffer or not) will provide important benefits for the City of San Diego, as well as throughout the State of California. For San Diego, a key benefit of increased potable reuse includes the development of a local, drought-resistant source of high-quality drinking water that will reduce reliance on other water supply sources.

In Southern California many water supply agencies receive imported water supplies from MWD. The availability of imported water (from both the Colorado River and the SWP) is subject to a number of natural and human forces, including increased population growth (and accompanying increased demands),drought, changes in snowpack and earthquakes, environmental regulatory constraints, water rights determinations, and associated legal challenges and Court rulings. As noted in the *California Water Plan Update 2009*, replacing dependence on imported water supplies with potable reuse will have broad implications including increased reliability, availability, and cost-savings.[153]

Local groundwater is also limited in many areas, highlighting the need for additional reliable sources of water to meet current and future demands under all hydrologic conditions. The *California Water Plan Update 2009* continues to document groundwater overdraft at between 1 and 2 million AFY.[154]

In addition, by reducing the need for imported SWP water, wide-scale implementation of potable reuse will augment in-stream flows in Sacramento-San Joaquin River Delta (which provides the means by which the SWP delivers water from Northern California to the south) or will offset other diversions that may otherwise reduce flows. Reduced demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

Further, if failsafe approaches to potable reuse without an environmental buffer can be demonstrated to be safe and reliable – as this proposed project is intended to help demonstrate – then there will be many additional opportunities to expand reuse throughout the State. In most communities this would also likely provide significant financial cost savings and environmental benefits (e.g., from reduced piping and pumping in most locations) compared to the alternatives of more limited and often more costly forms of potable and non-potable reuse.

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[153] DWR. 2010. *California Water Plan Update 2009*. Volume 2 Resource Management Strategies, Chapter 11 Recycled Municipal Water. Page 11-10.
[154] DWR. 2010. *California Water Plan Update 2009*. Volume 2 Resource Management Strategies, Chapter 11 Recycled Municipal Water. Page 11-10

Methods Used to Estimate the Physical Benefits

G-Additional Statewide Water Supply Derived from Potable Reuse

As described below (see D- Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts), the State's annual reuse goal is 2.5 million AFY. In 2009, water recycling accounted for only about 0.7million AF of California's 43 million AFY water use. Approximately 3.5 million AFY of fresh water is discharged to the ocean as wastewater and much of this could be available for reuse to meet the urban water demand as it grows beyond the current level of 9 million AFY.[155]

In order to estimate the magnitude of potential Statewide benefit that could accrue from failsafe potable reuse, we used two different methods and averaged them (see Table 7-25 below). In Method 1, we note that approximately 1.8 million AFY of wastewater should be available for beneficial reuse once the State achieves its annual reuse goal. Assuming that approximately 30% of this annual wastewater flow could be used for failsafe potable reuse, approximately 0.54 million AFY of purified water could be produced via failsafe potable reuse. In Method 2, we assume that approximately 67% of the current 3.5 million AFY of wastewater discharged to the ocean can be recycled, and 50% of that recycled water could be used for failsafe potable reuse. In this calculation, approximately 1.17 million AFY of purified water could be produced via failsafe potable reuse. The average of the results of Methods 1 and 2 equates to 0.9 million AFY of purified water produced through failsafe potable reuse.

Table 7-25: Water Supply Volume Calculation

Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility

Estimated Statewide DPR Volume Method 1		
2.5	MAFY	State's annual reuse goal
0.7	MAFY	current recycled water use (from SWRCB 2009 survey)
1.8	MAFY	Incremental annual use that is assumed to come from the 3.5 MAFY wastewater currently discharged to the ocean and not being used for any beneficial purpose (by difference)
0.3		Assumed fraction of incremental use that could be DPR and could not otherwise be reused due to lack of geology/reservoirs for IPR and logistically feasible non-potable demand
0.54	MAFY	New water available annually due to DPR
Estimated Statewide DPR Volume Method 2		
3.5	MAFY	available recycled water being discharged to ocean and therefore not currently being beneficially reused
0.67		Assumed fraction that can be recycled
0.5		Assumed fraction of recycled water that could be used via DPR
1.17	MAFY	new water for DPR
0.9	**MAFY**	**Average of Result from Methods 1 and 2**

Note that the calculation presented herein is considered a first approximation of the benefit. No comprehensive study of statewide failsafe potable reuse opportunities has been conducted.

[155] WateReuse California. 2009. Potable Reuse Program Position Statement. Available: http://www.watereuse.org/sites/default/files/u8/PR%20position%20statement%20v3a.pdf
SWRCB.2009 Municipal Wastewater Recycling Survey. Available: http://www.waterboards.ca.gov/water_issues/programs/grants_loans/water_recycling/munirec.shtml

Table 7-26: Physical benefit of G-Additional Statewide Water Supply Derived from Potable Reuse
Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2015-2074	Additional Statewide Water Supply	0.9 million AFY	0	54 million AF
***** *Annual additional state water supply derived from potable reuse*				

C-Expand Scientific and Technical Foundation for Potable Reuse

Through comprehensive testing, evaluation, and demonstration of failsafe treatment trains, the *Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility* project will expand industry knowledge related to the implementation of potable reuse without environmental buffers.

As described in Attachment 7, a challenge in establishing regulations for all types of potable reuse is a lack of industry knowledge regarding specific treatment objectives required to protect public health, the myriad of alternative treatment processes available to enhance water quality, treatment train redundancy requirements, system reliability requirements and real-time water quality monitoring techniques. This project seeks to fill this gap and ultimately support wider implementation of potable reuse by increasing industry understanding and easing the burden on regulators to address the complex issues associated with the variations of possible potable reuse scenarios.

In addition, the City's Advanced Water Purification Demonstration Facility will continue to be open for public tours throughout implementation of the demonstration project. This will provide for additional public education regarding San Diego's water supply challenges and the role that full advanced water treatment technology and potable reuse can have in addressing those challenges.

D-Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts

Senate Bill 918 (SB 918) requires the California Department of Public Health (CDPH) to finalize regulations for indirect potable reuse through groundwater recharge and reservoir augmentation by the end of 2013 and 2016, respectively. CDPH must also report on the feasibility of direct potable reuse, which would not require an environmental buffer and could increase the viability of potable reuse for water agencies throughout the State. The proposed demonstration project will provide guidelines and scientific assessment that will help CDPH to make a determination regarding direct potable reuse for the State of California.

Senate Bill X7-7 mandates a 20% reduction in per capita urban water use by December 31, 2020(and by at least 10% by December 31, 2015).[156]Under this legislation, the use of recycled water in lieu of potable supplies can be counted towards SBX7-7 compliance. The *Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility* project could help to facilitate up to 100,000 AFY of failsafe potable reuse in the San Diego region. Implementation of direct potable reuse will help to meet requirements set forth in Senate Bill X7-7.

This project also helps to meet statewide goals established through the State Water Resources Control Board (SWRCB) Recycled Water Policy to increase use of recycled wastewater by at least 1 million AFY by 2020 and by at least 2 million AFY by 2030.[157]In 2009, water recycling accounted for only about 0.7million AF of California's 43 million AFY water use. Approximately 3.5 million AF of fresh water is

[156]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 1-4, Section 1.2.
[157]State Water Resources Control Board. 2009. Recycled Water Policy. Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/recycledwaterpolicy_approved.pdf. Accessed March 2013

discharged to the ocean as wastewater and much of this could be available for reuse to meet the urban water demand as it grows beyond the current level of 9 million AF.[158]

H-Improve Water Supply Reliability

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The *Failsafe Potable Reuse at the Advanced Water Purification Facility* project will help address reliability issues for the City of San Diego by providing a drought proof-supply. As noted above, the reliability of imported water – which is the region's primary current supply – is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to environmental regulations and water rights determinations.

Though the increase in local water supply (equivalent to the total purified water produced by the AWPF, or 100,000 AFY) can be quantified, reliability is more challenging because it is subject to a number of natural and human forces (e.g., drought, earthquakes, population growth, legal agreements). This project contributes towards water supply reliability, but it does not guarantee a reliable water supply. However, failsafe potable reuse provides high quality water that is of equal or better quality than untreated imported water. It is a locally developed sustainable water supply that is uninterruptible and is not affected by outside influences, and as such would increase water supply reliability if implemented at full scale in the region.

I-Reduce Ocean Discharges

In 2010, the U.S. Environmental Protection Agency (USEPA) allowed the City of San Diego to continue to operate the Point Loma Wastewater Treatment Plant (PLWWTP) as a chemically enhanced primary treatment facility under a modification to its National Pollutant Discharge Elimination System (NPDES) Permit.[159] During the 2008-2010 permit modification process, two environmental organizations entered into a Cooperative Agreement with the City to conduct the *Recycled Water Study* which sought to identify alternatives to large-scale wastewater system upgrades, including a water reuse program. Water reuse programs provide valuable water supplies by using resources that otherwise are sent to the ocean.[160]

The supply of purified water that would be reused by the City of San Diego AWPF totals 100,000 AFY.[161] The calculated supply for failsafe potable reuse Statewide (0.9 MAF) includes wastewater that would be otherwise discharged to the ocean. This reduction in ocean discharges would have a substantial impact on coastal ecosystems directly adjacent to ocean outfalls.

Table 7-29: Physical Benefit of I-Reduce Ocean Discharges

Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2015-2074	Reduced Ocean Discharges	0.9 million AFY*	0	54 million AF
***** *Annual ocean discharges that are avoided by this project*				

[158] WateReuse California. 2009. Potable Reuse Program Position Statement. Available: http://www.watereuse.org/sites/default/files/u8/PR%20position%20statement%20v3a.pdf
[159] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-1.
[160] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-1.
[161] City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-6.

F-Leverage Existing Research Efforts

This project will build upon research developed as part of the WRRF's Potable Reuse Development Program. This program has funded close to $3 million in research efforts to investigate on-line monitoring technologies for evaluating system performance (WRRF 11-01), as well as alternative potable reuse treatment trains and public health criteria for direct potable reuse (WRRF 11-02). WateReuse California's Potable Reuse Program position statement can be found here: http://www.watereuse.org/sites/default/files/u8/PR%20position%20statement%20v3a.pdf.

Failsafe Potable Reuse at the Advanced Water Purification Facility will demonstrate the treatment and monitoring methods developed in these WRRF projects, which is necessary for regulatory approval of the failsafe potable reuse concept.

Project 5: Sustaining Healthy Tributaries to the Upper San Diego River

Introduction

Project Abstract

The Upper San Diego River Watershed contains water bodies that provide source water for the City of San Diego's El Capitan Reservoir, the largest local water supply source in San Diego County, which is impaired by water quality concerns and is on the 303(d) list of impaired water bodies. The streams and creeks that drain into El Capitan Reservoir are relatively healthy, but are under continued threat of degradation from both natural and man-made sources. This project seeks to develop a means of engaging local community members in assessing and monitoring the health of this important watershed and using the information collected to identify emerging threats and changing conditions.

This project will restore and maintain a portion of Boulder Creek, an important tributary to the El Capitan Reservoir in the San Diego River Watershed that captures rain, snow melt, and spring water and drains into El Capitan Reservoir. Areas of the Boulder Creek catchment, including Cuyamaca Peak, average more than 40 inches of rain a year. Boulder Creek is of unique significance because it is used to transfer water between Helix Water District's Lake Cuyamaca and the City of San Diego's El Capitan Reservoir where water is stored until treated for potable use. As part of this project, the community will be engaged in restoring approximately 4.4 acres of degraded riparian and associated buffer habitat on Boulder Creek. The project will also include monitoring of Boulder Creek and surrounding creeks to increase knowledge of the creeks and provide baseline information that will allow for early actions to be taken in the event that the creek begins to degrade. With a relatively small investment now, the creek and watershed can remain healthy, improving the health of the environment, maintaining carrying capacity in the reservoir, and reducing potential water treatment costs.

Boulder Creek is one of two known creeks in the San Diego River Watershed that supports wild rainbow trout. The presence of trout indicates a high quality stream with cold water. These unique conditions offer an exciting potential to use Boulder Creek and nearby creeks as baselines for monitoring the overall health of the 440 square mile San Diego River Watershed. Identifying a suitable creek to use as a baseline for "healthy" conditions and creating a robust monitoring program is a primary goal of the overall watershed water quality monitoring program for the San Diego River Watershed.

Preliminary studies have shown that Boulder Creek is threatened by rural development, legacy mines, erosion and sedimentation from wildfires, and invasive plants and animals. Some hydromodifications have occurred on Boulder Creek, most of which is in public ownership. Recently, the San Diego River Park Foundation (SDRPF) purchased a privately owned 3,000-foot section of the Creek. This project will also include work to restore this section, which has been damaged by private development and wildfire.

Through integration with partners and to bring a more holistic approach to assessing baseline conditions for Boulder Creek, this project includes field surveys of other creeks that drain into the El Capitan Reservoir. Monitoring will include real-time monitoring stations, biological assessments, and invasive animal and plant surveys. Education elements will provide information to private land owners in the area on how to reduce pollutant loading and activities that result in erosion and sedimentation. Another important component is outreach to three Native American Tribes in the area to provide training to empower their members to survey their tribal lands.

Description and Relationship to Other Projects in the Proposal

This project is not directly related to other projects in the proposal, but will contribute towards overall IRWM Program goals and objectives. Similar to Project 7: *Implementing Nutrient Management in the Santa Margarita River Watershed*, this project will collect data for use in future watershed management. Efforts to restore Boulder Creek will enhance recreation opportunities in the Region, provide educational benefits, and build relationships with area Tribes. Each of these contributes to IRWM Program objectives and contributes towards protecting local water resources and providing for integrated water management.

Description and Estimates of Without-Project Conditions

This project is predicated on the idea that a small investment to provide protection now will prevent large remediation costs in the future. Boulder Creek is a relatively healthy cold-water stream. Other, similar, creeks are degraded, and Boulder Creek is being degraded. It suffers from increased sedimentation related to recent wildfires and invasive species. These factors have also reduced shading, leading to increased stream temperatures, and an increase in pollutant loading in the stream. Without this project the area would continue to be degraded and erosion would continue. This will eventually lead to sedimentation in the El Capitan Reservoir, and over time may reduce reservoir capacity or contribute to dredging costs. Further, wild rainbow trout has been documented in the stream. Further degradation may make this stream uninhabitable for these fish.

Data collected as part of this project will be shared with land managers and the public, and used to inform future water management decisions in these and similar creeks. Without this project, managers will not have as much information on these ecosystems, and may not be able to make as scientifically-sound decisions.

Without the restoration activities of this project, the area would continue to suffer the impacts of invasive species, which can include decreased species diversity, increased sedimentation, and a lower water table. Further, because the area was recently burned in a wildfire, invasive species may find opportunities to increase their range without restoration work in the burned areas. Restored areas, and other property owned by SDRPF will be opened to recreation as part of this project. Without this project, there will be limited public access, and with it limited benefits associated with public access to wild spaces.

Recent/ Historical Conditions

Tributaries of the Upper San Diego River are generally in good health; however, disturbance (fire) and activities on privately owned lands are a potential threat to this condition. Boulder Creek is used as a natural conveyance of water from Lake Cuyamaca to El Capitan Reservoir, the region's largest local water supply reservoir. By protecting Boulder Creek and other tributaries of the San Diego River that drain into El Capitan Reservoir, the water quality in the reservoir itself is protected. As the El Capitan Reservoir is listed an impaired (303d-listed) water body, activities that can be taken to improve the water quality of this water reservoir could potentially avoid the need for water treatment.

Boulder Creek has many important natural features and supports several beneficial uses. Specifically, Boulder Creek supports wild Rainbow Trout. Despite these important features of Boulder Creek, there is a lack of data regarding this water body. Specifically, there is no baseline against which to evaluate stream health to ensure that the beneficial uses are protected and maintained in the future.

The *Water Quality Control Plan for the San Diego Basin* (Basin Plan) was developed by the San Diego RWQCB in September 1994 and amended on or before April 2011.[162] The Basin Plan established water quality objectives for all watersheds in the San Diego Basin, including the San Diego River watershed. The impact of pollutant loading within the watershed can vary greatly due to site-specific factors such as hydrology, shading, and temperature. Data collected as part of this project will provide a scientifically sound baseline that can be used when making and assessing future water management decisions in Boulder Creek and similar streams.

In 2003, the Cedar Fire burned 280,278 acres and destroyed more than 2,800 buildings.[163] The project area was burned in the Cedar Fire and has not yet recovered. The loss of vegetation has resulted in increased sedimentation and evaporative loss of water flow. This threatens the future of wild Rainbow Trout in the stream, as well as degrades habitat and water quality. Other threats to water and habitat quality include invasive species, such as tamarisk and palms, and feral pigs, all of which have been documented either in the project area or nearby.

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[162] RWQCB. 2011. *Water Quality Control Plan for the San Diego Basin*.
[163] CalFire. 2003. Cedar Fire Incident Information. Available http://www.fire.ca.gov/cdf/incidents/Cedar%20Fire_120/incident_info.html

The project area lies on private property within the Cleveland National Forest. Because of its location, beauty, and relatively healthy status, this area is popular with nearby residents and visitors to the Forest, and is known as a freshwater fishing stream. Improvements incorporated into the project will enhance visitor enjoyment and improve visitor access while reducing visitor impacts on native habitat.

Potential Adverse Physical Effects of the Project

The project may result in temporary environmental impacts during restoration activities required for implementation of the project. Potential impacts include those associated with traffic (road closures), construction noise, potential biological and cultural resources impacts, and potential air quality impacts. As part of this project, the project sponsor will conduct all necessary environmental compliance documentation in accordance with CEQA and/or NEPA, and will also procure all permits necessary to implement the project. As such, any impacts associated with the project are anticipated to be short-term in nature, and mitigated to less-than-significant levels if necessary. It is not anticipated that any significant, long-term adverse physical effects would result from implementation of this project.

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

All expected benefits from this project will be obtained through the completion of this project. No other facilities, policies or actions are necessary to obtain the benefits described in this attachment.

Uncertainties in the Physical Benefits

Though the described physical benefits are expected to be obtained through this project, there are some uncertainties. Restoration efforts will only occur over a small portion of Boulder Creek (approximately 3,000 linear feet of stream). Therefore, erosion control will only occur over this reach, and not the entire tributary. While erosion and sedimentation will be improved as part of this project, the amount of control in the creek as a whole is uncertain. Although restoration activities will remove invasives and plant native species, not all plants will take and there is a risk that invasive species will be able to re-establish themselves.

The data collected from this project are expected to contribute to future management of the watershed. However, there is no guarantee that these data will be accepted by regulatory agencies. Agencies may choose not to use these data due to data reliability/use constraints or resource constraints at the agencies.

Potential Physical Benefits of the Project

Table 7-30 summarizes the expected physical benefits of *Sustaining Healthy Tributaries to the Upper San Diego River*. Each of these benefits is described below.

Table 7-30: Physical Benefits
Sustaining Healthy Tributaries to the Upper San Diego River

Physical Benefit	Type of Physical Benefit	Quantification of Benefit
Restore Habitat in Upper San Diego River	A. Restore Native Habitat and Benefits to Wildlife	4.4 Acres
	B. Reduce Net Greenhouse Gas Emissions via Habitat Restoration	230 MT of CO_2
	C. Prevent Water Quality Degradation	Qualitative
	D. Improve Water Supply reliability	Qualitative
	E. Source Water Protection in El Capitan Reservoir	Qualitative
	F. Scientific and Technical Foundation of Water Management	Qualitative
	G. Community and Tribal Engagement	Qualitative
	H. Provide Education or Technology Benefits	Qualitative
	I. Provide Access to Restored Land	13.35 Acres

Restore Habitat in Upper San Diego River

Amount/Volume and Unit: 4.4 Acres

Technical Justification of Physical Benefit

One the primary goals of *Sustaining Healthy Tributaries to the Upper San Diego River* is to restore 4.4 acres of riparian habitat along Boulder Creek.[164] The *San Diego River Watershed Management Plan* notes that the El Capitan Watershed Management Area (including Boulder Creek) contains a diverse array of vegetation communities and threatened and endangered species, including San Diego Ambrosia (*Ambrosia pumila*), San Diego Thorn-mint (*Acanthominthailicifolia*), Arroyo Toad (*Bufocalifornicus*), Southwestern Willow Flycatcher (*Empidonaxtrailiiextimus*), Least Bell's Vireo (*Vireo belliipusillus*), California Gnatcatcher (*Polioptilacalifornicacalifornica*), and Bald Eagle (*Haliaeetusleucocephalus*).[165] The El Capitan Management Area is unique in the watershed in that it includes both cold and warm water fish habitats. Indicators of cold water conditions include high elevation, dense overhead tree canopy, and spring-fed stream reaches.

Methods Used to Estimate the Physical Benefits

A. Restore Native Habitat and Benefits to Wildlife

Sustaining Healthy Tributaries to the Upper San Diego River will include invasive species removal (e.g., tamarisk, palms) and planting of native species. In addition to enhancing and protecting native plant ecosystems, this will increase available habitat for native species by removing invasive plants and planting in burned areas that have not recovered. Tamarisk invasion is correlated with a decrease in native animal species diversity, so tamarisk removal is expected to help with native animal species diversity.[166] Water quality improvements related to riparian restoration – reduced sedimentation, reduced pollutant concentration, decreased stream temperatures, and reduced water loss from increased shading – will provide a high quality cold water stream for wild rainbow trout and other cold-water species.

The real-time monitoring component of this project will include water quality monitoring and monitoring species of interest. These species may include important native species such as wild rainbow trout, and non-native species of concern – those with a history of invasion or destructive impact on the native ecosystem (e.g., quagga mussels, feral pigs). One of the invasive species of greatest concern is the feral pig. Feral pigs are known to cause significant damage to a wide variety of habitats.[167] Pigs are heavily dependent on water sources to help regulate body temperature, and pose greatest threats to sensitive riparian habitats.[168]Feral pigs can be disastrous for important native plant species – the Nature Conservancy and the National Park Service spent $5 million to eradicate wild pigs from Santa Cruz Island, CA in 2007 – and there is worry that feral pigs may also serve as a disease vector.[169]

Pig eradication can be difficult and is often extremely expensive. Feral pigs are not common in San Diego County, but a known population of feral pigs resides near Capitan Grande reservation, near the project area.[170] This puts the project area at high risk to damage from feral pigs, so to minimize this risk, the SDRPF will partner with local Native American tribes to monitor for and control feral pig populations.

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[164] Work Plan. Attachment 3 (Project Objectives)
[165] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 2.6 Biological Resources, page 23.
[166]Department of Ecology, State of Washington.Non-native Invasive Freshwater Plants – Salt Cedar (*Tamarix*).Available http://www.ecy.wa.gov/programs/wq/plants/weeds/aqua013.html (Accessed 19 March 2013).
[167] Conservation Biology Institute. 2009. An Assessment of the Known and Potential Impacts of Feral Pigs (*Susscrofa*) in and near San Diego County with Management Recommendations. Pp. 2-3.
[168] Conservation Biology Institute. 2009. An Assessment of the Known and Potential Impacts of Feral Pigs (*Susscrofa*) in and near San Diego County with Management Recommendations. Pg. 4.
[169]Kreith, M. 2007. *Wild Pigs in California: The Issues*. University of California – Agricultural Issues Center. December 2007. Available: http://aic.ucdavis.edu/pub/briefs/brief33_v3.pdf
[170] Conservation Biology Institute. 2009. An Assessment of the Known and Potential Impacts of Feral Pigs (*Susscrofa*) in and near San Diego County with Management Recommendations. Pg. 9.

Monitoring for feral pigs will enable implementation of control measures early, which will reduce feral pig control costs, and help protect the newly restored habitat before it is damaged.

Table 7-31: Quantification of Benefit A-Restoration of Native Habitat
Sustaining Healthy Tributaries to the Upper San Diego River

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2017-2066	Restore Native Habitat and Benefits to Wildlife	0	4.4 acres	4.4 acres

B. Reduce Net Greenhouse Gas Emissions

The *Sustaining Healthy Tributaries to the Upper San Diego River* project will restore 4.4 acres of riparian habitat along Boulder Creek. This land was previously burned in the Cedar fire, and the land has not yet recovered. Restoration activities would involve replanting the area with native riparian species, which will act as a carbon sink, because it will replace either currently unvegetated land or will replace non-native grassland, which is essentially carbon-neutral.[171] Native ecosystems in the area are oak woodlands and cottonwood/willow riparian zones.[172]

The California Energy Commission developed a report called *Regional Characterization for the State of Arizona: Potential of Riparian Areas for Carbon Sequestration* in 2009 that calculated the potential for carbon accumulation by restoring riparian areas with different riparian ecosystems. They were unable to develop different estimates for carbon sequestration between the different dominant woody species (conifer/oak, cottonwood/willow, mesquite, and mixed broadleaf), but their estimate is within the range for oak woodlands presented by the *Economic Analysis of the Benefits of Habitat Conservation in California Rangelands*.[173] This also increases our confidence that sequestration rates in California will be comparable to those in Arizona. Estimates for carbon dioxide sequestration are provided as cumulative over 20, 40 and 80 years, to reflect the different uptake rates over the lifetime of the plant. Riparian habitats will sequester 46, 57, and 60 tons of CO_2 per acre at 20, 40 and 80 years old, respectively.[174] Note that the *Economic Analysis* report uses grams of carbon per square meter per year as its metric, while *Potential of Riparian Areas* uses tons of carbon dioxide per acre. One gram of carbon per square meter per year is equivalent to 0.016 tons of carbon dioxide per acre. Also note that these are tons, and not metric tonnes.

Assuming a 50 year project life time, we can calculate the total amount of carbon dioxide the 4.4 acres of restored habitat will sequester. Using yearly CO_2 sequestration rates calculated from the totals presented in *Potential of Riparian Areas*[175] of 2.3 tons per acre for years 1-20, 0.55 tons per acre for years 21-40, and 0.075 tons per acre for years 41-80, we can calculate a total sequestration of 230 MT of $CO_2$for this project. Table 7-32 shows how this was calculated.

[171] Defenders of Wildlife. 2010. *An Economic Analysis of the Benefits of Habitat Conservation on California Rangelands*. Pg. 28.
[172] San Diego Wildfires Education Project. 2004. *San Diego Habitats*.Available http://interwork.sdsu.edu/fire/resources/san-diego-habitats.htm (Accessed 19 March 2013).
[173] California Energy Commission. 2010. *Regional Characterization for the State of Arizona: Potential of Riparian Areas for Carbon Sequestration*. Pg. 11.
Defenders of Wildlife. 2010. *An Economic Analysis of the Benefits of Habitat Conservation on California Rangelands*. Pg. 28.
[174] California Energy Commission. 2010. *Regional Characterization for the State of Arizona: Potential of Riparian Areas for Carbon Sequestration*. Pg. 11
[175] California Energy Commission. 2010. *Regional Characterization for the State of Arizona: Potential of Riparian Areas for Carbon Sequestration*. Pg. 11.

Table 7-32: Carbon Sequestration Breakdown by Time Period (MT of CO_2 per acre)
Sustaining Healthy Tributaries to the Upper San Diego River

Years	Total Sequestration rate (tons of CO_2 per acre)*	Annual Sequestration rate (tons of CO_2 per acre per year)	Annual sequestration for project - 4.4 acres (tons of CO_2 per year)	Project life (years)	Total project Sequestration (tons of CO_2)	Total project Sequestration (MT of CO_2)
0-20	46	2.3	10.12	0-20	202.4	183.6
21-40	57	0.55	2.42	21-40	48.4	43.9
41-80	60	0.075	0.33	41-50	3.3	3.0
				Total	**254**	**230**

Source: California Energy Commission. 2010. *Regional Characterization for the State of Arizona: Potential of Riparian Areas for Carbon Sequestration*. Pg. 11

Table 7-33: Physical Quantification of B. Reduce Net Greenhouse Gas Emissions
Sustaining Healthy Tributaries to the Upper San Diego River

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2017 - 2036	Reduce Net Greenhouse Gas Emissions	2.3 tons of CO2 per acre	0	183.6 MT of CO_2
2037 – 2056	Reduce Net Greenhouse Gas Emissions	0.55 tons of CO2 per acre	0	43.9 MT of CO_2
2057 - 2066	Reduce Net Greenhouse Gas Emissions	0.075 tons of CO2 per acre	0	3.0 MT of CO_2
** Annual sequestration of CO2 based on Table 7-32 above.*				

C. Prevent Water Quality Degradation

The *San Diego River Watershed Management Plan* notes that the water quality in the undeveloped upper watershed is much higher than that found in the lower watershed.[176] The Plan notes that source water and reservoir monitoring in the El Capitan Watershed management Area showed the primary constituents of concern to water quality are excessive nutrients, total organic carbon (TOC), and total dissolved solids (TDS).[177]Nonpoint sources of constituents of concern within the developed portions of the upper watershed include streets, residential and commercial areas, and irrigated lands, while nonpoint sources in undeveloped areas include geology, wildlife, and soil composition.

As described in Attachment 3, this project will restore 4.4 acres along Boulder Creek.[178]A portion of this restoration involves replanting an area along the creek that was damaged by fire, which will reduce loadings of sediment and other nonpoint source pollutants from these fire-damaged areas.

In addition, a portion of the project involves two hydromodification removal studies, which will involve analyzing the costs, benefits and feasibility of removing two separate creek modifications. If these modifications do end up being removed it will likely be because of benefits associated with lowered flow velocities, mainly a reduction in erosion and sedimentation.[179]

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[176] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 2.3 Surface Water Quality, page 15.
[177] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 3.2 Surface Water Quality, page 40.
[178]Work Plan, Attachment 3
[179] Work Plan, Attachment 3

D. Improve Water Supply Reliability

The *San Diego River Watershed Management Plan* notes that surface water from the El Capitan Watershed Management Area (including Boulder Creek) is an important source of water supply. El Capitan Reservoir is owned and operated by the City of San Diego and provides source water for the City's Alvarado Water Filtration Plant.[180] A portion of the project involves canopy restoration along the bank of the upper San Diego River. A 2009 paper by Stormont et al. found that canopy shade can reduce evaporative water loss by more than 50%.[181] Invasives removal, including tamarisk, will also yield some water supply enhancements. Tamarisk in particular is a water-intensive plant, and has been shown to use up to 200 gallons of water per day, leading to potentially high water loss from an ecosystem and lowering the groundwater table.[182]

These activities will provide some additional (but unquantifiable) water supply yields and, because this is a local resource, will contribute to water supply reliability (by enabling a small offset of less reliable import water).

E. Source Water Protection in El Capitan Reservoir

The *San Diego River Watershed Management Plan* notes that surface water from the El Capitan Watershed Management Area (including Boulder Creek) is an important source of water supply. El Capitan Reservoir is owned and operated by the City of San Diego and provides source water for the City's Alvarado Water Filtration Plant.[183] From the perspective of drinking source water, the City of San Diego prepared an updated sanitary survey of the tributary area of El Capitan Reservoir, and concluded that diffuse nonpoint source pollution from residential and commercial developments are the most significant sources of constituents of concern in the management area.[184] However, the 2003 Cedar Fire burned this entire management area, and the *San Diego River Watershed Management Plan* concludes that water quality issues associated with sediment loading and nutrient cycling will persist for many years. This will require additional effort and expense by the City of San Diego and they will incur additional near-term water treatment costs due to post-fire inputs of sediment, ash, and nutrients.[185]

Boulder Creek directly flows into the El Capitan Reservoir, and any water quality benefits in the Creek will also benefit the Reservoir. It is anticipated that the greatest water quality benefits that the reservoir will experience are reduced sediment loads (which settle in the reservoir and eventually reduce capacity) and reduced nutrient loading from runoff.

F. Scientific and Technical Foundation of Water Management

The *Sustaining Healthy Tributaries to the Upper San Diego River* project will collect real-time monitoring data, field assessments of three tributaries to the Upper San Diego River, and implement a field monitoring program. The data collected from these efforts will be made publicly available, and used to create a baseline for assessing stream health in similar creeks. This will provide a scientifically sound baseline that can be used when making and assessing future water management decisions in Boulder Creek and similar streams.

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[180] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 2.5 Water Supply, page 19.

[181] Stormont, J., Farfan, E., and Coonrod, J. (2009). "Total Soil Water Evaporation in a Riparian Environment: Model Development and Application." *J. Hydrol. Eng.*, 14(9), 904–912. Available: http://ascelibrary.org/doi/abs/10.1061/%28ASCE%29HE.1943-5584.0000069

[182] Department of Ecology, State of Washington.Non-native Invasive Freshwater Plants – Salt Cedar (*Tamarix*).Available http://www.ecy.wa.gov/programs/wq/plants/weeds/aqua013.html (Accessed 19 March 2013).

[183] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 2.5 Water Supply, page 19.

[184] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 3.2 Surface Water Quality, page 40.

[185] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 3.2 Surface Water Quality, page 40.

Knowledge of invasives and additional hydromodifications (there are at least two known modifications) are helpful in planning and prioritizing future removal efforts. In addition, an initial, comprehensive assessment also gives researchers an idea of the effectiveness of the project by allowing them to gauge how habitat quality changes as the project progresses. This will help guide future research efforts, both in the Upper San Diego River Watershed and elsewhere.

G. Community and Tribal Engagement

The *Sustaining Healthy Tributaries to the Upper San Diego River* project relies heavily on the contribution of volunteers. Volunteers will collect data and participate in restoration activities.[186] Through this process, volunteers will receive training on native species, monitoring techniques, and the importance of healthy ecosystems. Educational materials will be installed along trails in the 13.35 acres of this project, which will further engage the community when they arrive to recreate.

In addition to the volunteer outreach and the interpretive signage, this project has a component directly focused on Tribal outreach. There are 18 federally recognized Native American tribes in San Diego County, and the San Diego River and its adjacent lands are the ancestral home of the Barona and Viejas tribes. These tribes have a unique and important history with the watershed, and all project staff working on the initial multi-creek assessment are trained to recognize culturally significant objects, including arrowheads, pounding stones, clay potsherds etc.

The SDRPF recognizes these tribes continue to play an important role in protecting the watershed today. This project involves a concerted effort to work with these local tribes. The Foundation has partnered with the Kumeyaay Digueno Land Conservancy, which is affiliated with several tribes, and on-site workshops are planned for the Viejas, Barona, and Inaja Reservations.[187] The Viejas and Barona tribes jointly administer Capitan Grande, which is another reservation also located in the watershed, and home to the only known population of feral pigs in San Diego County.[188]

H. Provide Education or Technology Benefits

The *Sustaining Healthy Tributaries to the Upper San Diego River* project relies heavily on volunteers for monitoring and restoration activities. As described in G-Community and Tribal Engagement, this will engage many community members, and educate them on native ecosystems, the benefits of native ecosystems, the importance of Boulder Creek, and the role riparian ecosystems play in river health. This project also involves informing and updating the public about the progress of the project, as well as educating landowners about actions they can take to improve water quality by reducing nutrient and sediment loads. The focus on involvement is expected to result in a more active and educated community, as well as real improvements in environmental quality. Further, this project will open 13.35 acres to the public for recreation, and install educational signage along trails.

In addition to the educational efforts at the site itself, this project will engage with local Tribes to conduct ecosystem monitoring. In particular, trainings will be held with Tribe members on water quality assessments and invasive species monitoring – especially feral pigs.[189]

Aside from the educational benefits accrued by people directly involved with this project, data will be collected along Boulder Creek for use as a baseline for similar creeks. It involves a partnership between the SDRPF and San Diego State University, and the data will be made public and shared with land managers. Data will be collected through a monitoring station in the Creek. The station is customizable, and researchers will be able to swap out various sensors and parts to get the inputs they need in real-time. Data on Boulder Creek is especially valuable because it is a relatively healthy cold water stream, which allows it to serve as a baseline (or attainable goal) for other, more impaired creeks. This should make it easier for researchers and water managers to evaluate and improve water bodies throughout the watershed.

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[186] Work Plan, Attachment 3 (Task 9.2 and 9.6).
[187] Work Pan, Attachment 3 (Task 9.3).
[188] Conservation Biology Institute. 2009. An Assessment of the Known and Potential Impacts of Feral Pigs (*Susscrofa*) in and near San Diego County with Management Recommendations. Pg. 9.
[189] Work Plan, Attachment 3 (Subtask 9.3).

I. Provide Access to Restored Land

A major goal of the SDRPF is to provide public access to the San Diego River, and where appropriate, responsible recreational use will be encouraged.[190] The Cleveland National Forest received an average of 501,000 visits in FY 2009,[191] so there are significant potential recreational users for the newly-accessible Boulder Creek areas. This project involves providing access to 13.35 acres of SDRPF land along Boulder Creek through signage, fencing and a public information web portal. As one of two known creeks in the watershed supporting wild rainbow trout, public access to Boulder creek is very valuable to anglers. The SDRPF is collaborating with San Diego Fly Fishers to develop a monitoring program that will ensure recreation benefits for years to come.[192] The area is also used by hikers and birders, and provides scenic views. Value is enhanced through the restoration component, where 4.4 acres will be newly restored and cleared of invasives.

Table 7-36: Quantification of Benefit I-Provide Access to Restored Land
Sustaining Healthy Tributaries to the Upper San Diego River

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2017-2066	Provide Access to Restored Land	0	13.35 acres	13.35 acres

[190] San Diego River Park Foundation. 2002. Conceptual Plan, Vision and Goals. Pg. 2.
[191] Annual Visitation Use Estimate, Selected Forest: Cleveland NF (FY 2009). Accessed February 22, 2013.
[192] San Diego River Park Foundation.2012. Boulder Creek.Available http://sandiegoriver.org/boulder_creek.php (Accessed 19 March 2013).

Project 6: Chollas Creek Integration Project – Phase II

Introduction

Project Abstract

The *Chollas Creek Integration Project - Phase II* aims to improve water and habitat quality in a Chollas Creek segment at Northwest Village, and engage members of the surrounding DAC in water quality monitoring along Chollas Creek. The project will reduce flood damage and improve water quality at Northwest Village Chollas Creek through creek realignment, headwall installation, and drop structures; improve habitat through invasives removal and native riparian revegetation; and conduct pre/post water quality monitoring.

A. Northwest Village Creek Restoration: Construction will accomplish flood damage reduction and water quality improvement through 1) creek re-alignment 2) construction of inlets 3) drop structure installation and,4) non-native removal/restoration.. Specifically, two 3-foot drop structures (rip-rap) will be developed along the northwest and southwest segments of this creek section to slow the creek flow at these points. Plants removed during construction will be replaced with native riparian species to restore habitat disturbed during this phase.

B. Habitat Improvement Through Invasive Removal: Invasives removal and restoration will improve water quality through erosion control and pollution uptake, and will contribute to improved habitat values for wildlife. Recreational and public access benefits will also be achieved. This Phase II project will support a comprehensive invasives removal effort at Northwest Village Creek (Euclid Avenue and Market Street), as well as 47th Street and Castana. Building upon *Chollas Creek Integration Project - Phase I*, biological site assessment data (delineation of vegetation communities/wetland resources and identification of sensitive plant and animal species) will inform the Phase II invasives removal efforts, reflecting community removal priorities where the greatest water quality, recreation, wildlife conservation, and stakeholder benefits can be achieved. The project design is 90% complete with CEQA compliance approval pending in mid-2013.

C. Water Pollution Source Tracking, Citizen Monitoring, Pollution/Conservation Education, and Community Engagement: Phase II will build upon *Chollas Creek Integration Project - Phase I*'s engagement of institutional stakeholders in the determination of water quality, natural resource, and environmental justice opportunities/constraints. Phase II will expand stakeholder outreach to include residents in water quality monitoring, and conduct targeted educational messaging. Thirty (30) area youth will be trained and employed as water quality monitors. Water quality monitoring will utilize existing City of San Diego Stormwater data for pollution source tracking, and will expand upon the San Diego Coastkeeper's Citizen Science Monitoring and Pollution/Conservation Education programs. The project will also partner with Groundwork's Green Team Community Service Project for engagement of student volunteers, and a coalition of institutional stakeholders in the determination of water quality, natural resource, and environmental justice opportunities/constraints.

Description and Relationship to Other Projects in the Proposal

The *Chollas Creek Integration Project – Phase* II is not directly related to any of the other projects in this proposal. However, it is a continuation of a project funded through the San Diego IRWM Region's Proposition 84-Round 1 Implementation Grant (*Chollas Creek Integration Project – Phase I*). This builds upon work that is already being implemented as part of the IRWM Program. The project will contribute towards meeting IRWM Program goals (see Attachment 3), and will complement other efforts in the Region working towards addressing water quality, public health, and water resources management needs.

Description and Estimates of Without-Project Conditions

Without this project, the Chollas Creek riparian zone will not be restored and the creek channel will not be improved to reduced flooding. This leaves the project area vulnerable to flooding, and will hinder the planned development in the neighborhood that is vital to neighborhood revitalization. Impervious surfaces in the area would remain, so runoff will remain high and contain an excess of pollutants. This runoff would continue to contribute to degradation of Chollas Creek's water quality.

Because this project will remove stands of Arundo and clean up homeless encampments, homeless encampments will still exist in the area without this project. This further contributes to poor water quality and public health concerns. Restoration efforts will also serve to improve habitat quality and lead to an increase in species diversity. Without this project, invasion by Arundo and other species will continue unabated, and native species populations will continue to decline or otherwise suffer from low quality habitat these invasive make.

Without this project, community involvement in the neighborhood would be reduced, and there would be a decrease in opportunities for public outreach. The 30 student water quality monitors that would be employed by this project would not have this opportunity to develop important environmental stewardship and work ethic values without this project. These activities do more than just monitoring the water quality of Chollas Creek – they encourage and inspire local DAC residents to feel a sense of stewardship and ownership over their local waterways. This benefit is invaluable.

Recent/ Historical Conditions

The Jacobs Center for Neighborhood Innovation (JCNI) is working to create a trails system along Chollas Creek. Phase I of this project was funded through a Propostion 84 – Round 1 Implementation Grant, and is currently using a stakeholder-driven water management process to develop implementation strategies for the updated Chollas Creek Enhancement Program. Data collected through Phase I has been, and will continue to be, used to inform decisions for Phase II such as site selection and creek modification choices. Phase I is also restoring a section of Chollas Creek, which will be connected to the restored section from this phase of the project.

This segment of Chollas Creek is in a disadvantaged neighborhood, and suffers from poor water quality stemming from pollutants in runoff, homeless encampments along the banks, invasive species, and trash. Chollas Creek is currently 303(d) listed for numerous pollutants, such as diazinon, nutrients, metals, and trash.[193]

Given Chollas Creek's location in a disadvantaged community, this project seeks to provide the guidance and funding necessary to improve the health and safety of the community. The Jacobs Center for Neighborhood Innovation is helping to revitalize the community through engagement with the community and building the capacity of individuals and their communities. This is reflected in the planned Village at Market Creek development, which is a community-driven effort to create a cultural destination and convert 60 acres of blighted land to productive use.[194]

Potential Adverse Physical Effects of the Project

The project may result in temporary environmental impacts during creek improvement efforts and restoration work along Chollas Creek. Potential impacts include those associated with construction noise, potential biological and cultural resources impacts, potential air quality impacts, and impacts associated with hazards and hazardous materials that are routinely used during construction. Additionally, care will be needed when removing homeless encampments and invasive species to reduce health and injury risks. As part of this project, the project sponsor will conduct all necessary environmental compliance documentation in accordance with the California Environmental Quality Act and will also procure all permits necessary to implement the project. As such, any impacts associated with the project are anticipated to be short-term in nature, and mitigated to less-than-significant levels if necessary. It is not anticipated that any significant, long-term adverse physical effects would result from implementation of this project.

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[193] State Water Resources Control Board. 2010. Integrated Report. Available http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml (Accessed 19 March 2013).

[194] The Village at Market Creek. 2011. Vision and Map. Available http://thevillageatmarketcreek.com/plan_map.htm (Accessed 18 March 2013).

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

Expected project benefits will be attained through the completion of this project. Some of the benefits may require successful establishment of restored native vegetation. Recreation benefits will be obtained as part of this project, but will be enhanced by work being currently conducted as part of Phase I, and further enhanced by work in a planned third phase of this project.

Uncertainties in the Physical Benefits

Long-term benefits from habitat restoration and invasive species removal are dependent on the successful establishment of native species, and the ability to resist invasive species. Arundo commonly spreads downstream as water breaks off pieces of the plant, which are then able to sprout if it washes onto land.[195] Water quality benefits may not be sufficient to reduce pollutants to below TMDLs, as this project will not affect upstream pollution.

Potential Physical Benefits of the Project

The expected physical benefits of the *Chollas Creek Integration Project – Phase II* are summarized in Table 7-38, and justified below.

Table 7-38: Physical Benefits
Chollas Creek Integration Project – Phase II

Project Component	Result of Physical Benefit	Quantification of Benefit
Improve Drainage and Provide Flood Protection	A. Avoid Flood Damage	1,704 ft^2 of medium-value commercial property
	B. Reduce Stormwater Runoff	0.12 AFY
	C. Improve Water Quality and Avoid More Costly BMPs	52% reduction in onsite runoff
Habitat Restoration and Invasives Removal	E. Benefits to Wildlife and Habitat	6.3 acres of restored habitat
	D. Reduce Public Health Hazards	Qualitative
	F. Provide Recreation Opportunities	6.3 acres of open space
Water Pollution Source Tracking and Citizen Monitoring	G. Provide Education or Technology Benefits	Qualitative
	H. Stakeholder and Community Involvement, Including DACs	Qualitative
	I. Increase Scientific Knowledge of Creek	300 water quality samples

Improve Drainage and Provide Flood Protection

Amount/Volume and Unit: 1,704 square feet of medium-value property

Technical Justification of Physical Benefit

According to the *Water Quality Technical Report for Northwest Village Creek*, runoff from properties near Chollas Creek currently sheet flows towards the creek from surrounding paved surfaces and is discharged over the creek bank.[196] Other properties discharge storm water runoff onto Market Street via surface flow or via public catch basins the collect runoff via private grated inlets and discharge into the public 42”-RCP storm drain pipe in Market Street. The public 42”-RCP storm drain pipe discharges into Chollas Creek at the Market Street culvert.

The *Chollas Creek Integration Project – Phase II* proposes to regrade, realign, recontour and revegetate the Chollas Creek channel. These efforts will serve to control flows and erosion in the channel and to embody the provisions of the *Chollas Creek Enhancement Program* by providing better quality riparian

[195] California Invasive Plant Council. 2011. *Arundo donax* Distribution and impact Report. Pg. 25.
[196] Rick Engineering. 2011. *Water Quality Technical Report for Northwest Village Creek*. January 2011 (with revisions through June 2012). Page 3.

habitat, controlling human access and interaction with the creek, and improving public safety.[197] The *Drainage Report for Northwest Village Creek* provides an assessment of the peak discharge rates in the pre- and post-project condition.[198] This report estimates that 100-year storm flows would be reduced by 0.1% (from 1,925 cfs to 1,923 cfs) in Chollas Creek at Market Street as a result of construction activities associated with the larger Northwest Village Creek project.

Methods Used to Estimate the Physical Benefits

A. Avoid Flood Damage

Rick Engineering prepared the Phase II design plans and conducted flood analyses based on the drainage, geotechnical, and water quality reports (see Completed Works in Attachment 3). These flood analyses resulted in Figure 7-1 showing floodplains for the 50-year, 100-year, 200-year, and 500-year floods. Currently, flooding will occur for each of these flood events, with the majority of flooding occurring to the east of the creek. Much of the floodplain consists of paved and unpaved vacant lots, and neither the 50-year nor the 100-year flood is expected to cause damage to area structures. At the 200-year flood, however, two medium value properties would experience flooding, while the 500-year flood would expose three medium value properties to damage by flooding.[199] The 500-year flood is also expected to damage 0.03 miles of minor roads. According to Rick Engineering, all 200-year floods and lower would be contained within the channel if the *Chollas Creek Integration Project - Phase II* were implemented.[200]

A HEC-RAS analysis of the existing terrain within the project area upstream of Market Street was prepared modeling the 25-year, 50-year, 100-year, 200-year, and 500-year discharge rates for Chollas Creek. A second HEC-RAS analysis of the proposed restoration project and grading for this same area was prepared for the same five storm events. Preliminary floodplain limits and elevations for each event were compared with the surrounding terrain to determine the limits of flooding, and the potential damages to property.[201]

Without-project flood damage was calculated using engineering reports and the Flood Rapid Assessment Model (FRAM). Per the HEC-RAS analysis, all floods at the 200-year level and below would be contained within the stream banks and all damage that would have occurred at these levels (i.e. the two medium value properties and parking lots) will be avoided by project implementation. The two buildings that benefit from this project are 282 square feet and 1,422 square feet, for a total of 1,704 square feet of medium value property protected from flood damage.[202]

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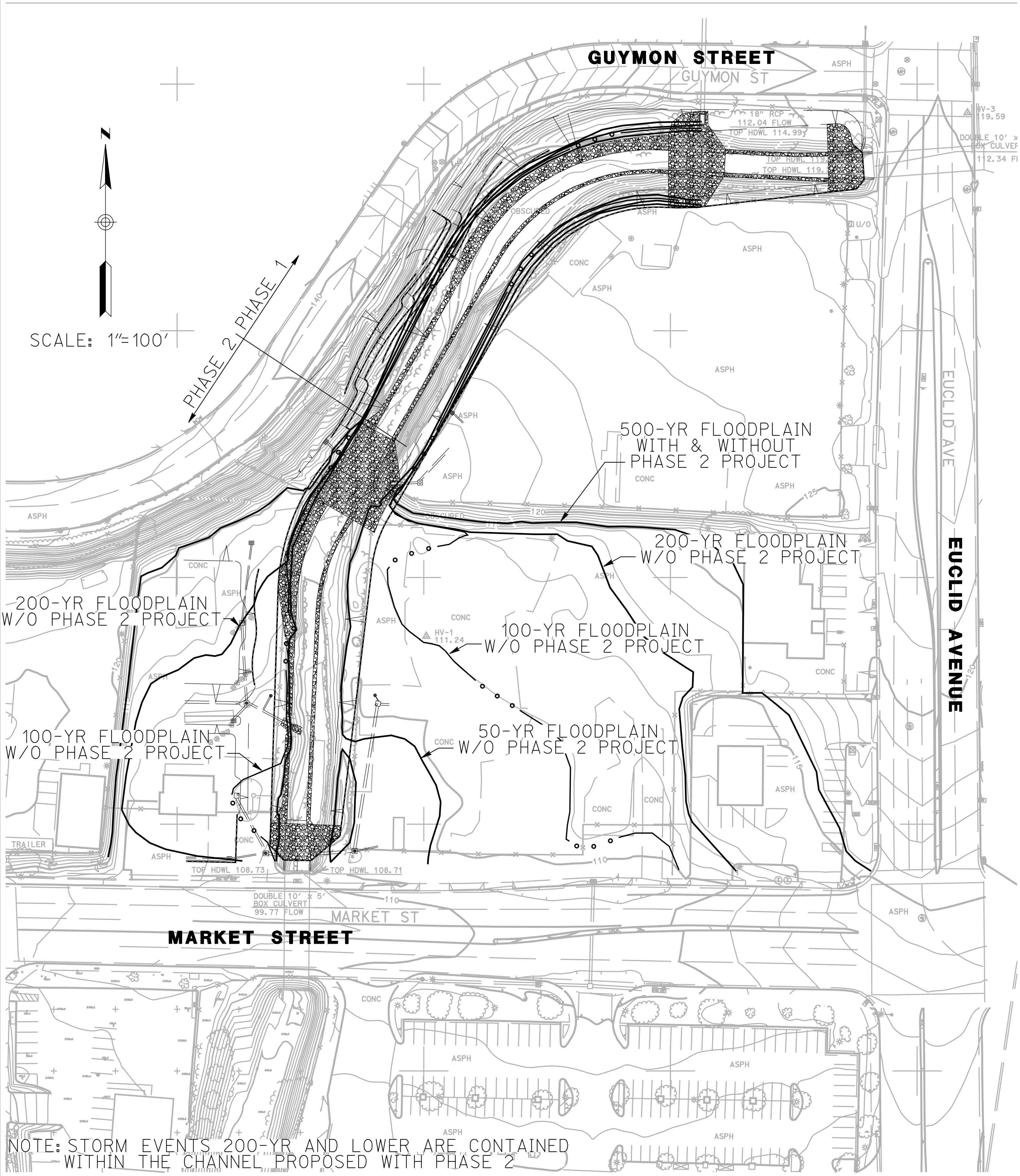
[197] City of San Diego.2002. *Chollas Creek Enhancement Program*.
[198] Rick Engineering. 2011. *Drainage Report for Northwest Village Creek*. January 2011 (with revisions through June 2012).Page 13.
[199] Rick Engineering. 2013. Northwest Village Creek Phase 2 Floodplain Exhibit.
[200] Rick Engineering. 2013. Northwest Village Creek Phase 2 Floodplain Exhibit.
[201] Rick Engineering. 2013. Personal Communication with Joe Hammond. 19 March 2013.
[202] Rick Engineering. 2013. Personal Communication with Joe Hammond. 19 March 2013.



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PHASE 2 FLOODPLAIN EXHIBIT

In addition to the avoided flood damage to existing properties, this project will provide flood protection for planned development in the area. The Village at Market Creek development is a community-driven effort that will convert 60 acres of blighted land into productive properties including recreational, commercial, and residential properties.[203] The areas of this development that would benefit from the reduced flood risk from this project includes planned commercial development to the east of the creek, and planned residential development to the west of the creek.[204] In total, the *Chollas Creek Integration Project - Phase II* will protect 1.7 million square feet of future development at the Village at Market Creek.

Table 7-39: Quantification of Benefit A-Avoid Flood Damage
Chollas Creek Integration Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2017-2066	Avoided Flood Damage	1,704 ft^2 of medium-value property	0	1,704 ft^2 of medium-value property

B. Reduce Stormwater Runoff

As described above, runoff from properties near Chollas Creek currently sheet flows towards the creek from surrounding paved surfaces and is discharged over creek bank. Other properties discharge storm water runoff onto Market Street via surface flow or via public catch basins that collect runoff via private grated inlets and discharge into the public 42"-RCP storm drain pipe in Market Street. The public 42"-RCP storm drain pipe discharges into Chollas Creek at the Market Street culvert.[205]

The *Water Quality Technical Report for Northwest Village Creek* includes permanent stormwater best management practices (BMPs) and low impact development (LID) design guidance. Hydromodification management requirements are addressed to ensure that the creek's hydrologic regime does not impact downstream channels and habitat integrity.[206]

Consultation with Rick Engineering about the Phase II project led to an estimated reduction in runoff as described herein. Runoff reduction benefits for the restoration project were calculated by comparing the % rainfall runoff (runoff coefficient) before the restoration project (0.95) and after the restoration project (0.45). Based on this comparison, there is approximately a 52% decrease in the anticipated runoff volume from the Phase II restoration site, which includes 2.3 acres of construction/restoration within the channel and installation of stormwater BMPs for an additional 2.9-acre catchment area.[207] This equates to a 0.12 acre-ft per year reduction in runoff based on an average annual rainfall of 9.8 inches over the 5.2 acre site.[208]

Table 7-40: Quantification of Benefit B-Reduce Stormwater Runoff
Chollas Creek Integration Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2017-2066	Reduce Stormwater Runoff	0.12 AFY	0	6 AF
**Annual avoided runoff*				

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[203]The Village at Market Creek. Available: http://thevillageatmarketcreek.com/index.html (Accessed 18 March 2013).
[204]The Village at Market Creek. 2011. Vision and Map. Available http://thevillageatmarketcreek.com/plan_map.htm (Accessed 18 March 2013).
[205]Rick Engineering. 2011. *Water Quality Technical Report for Northwest Village Creek*. January 2011 (with revisions through June 2012).Page 3.
[206]Rick Engineering. 2011. *Water Quality Technical Report for Northwest Village Creek*. January 2011 (with revisions through June 2012).Page 24.
[207] Rick Engineering. 2013. Personal Communication with Joe Hammond. 21 March 2013.
[208] Rick Engineering. 2013. Personal Communication with Joe Hammond. 19 March 2013.

C. Improve Water Quality and Avoid More Costly BMPs

According to the State Water Resources Control Board (SWRCB) *2010 Integrated Report*,[209] Chollas Creek is listed as impaired by copper, diazinon, indicator bacteria, lead, phosphorus, total nitrogen as N, trash, and zinc. The San Diego Regional Water Quality Control Board (RWQCB) has adopted total maximum daily loads (TMDLs), which mandate load reductions or control actions needed to restore and protect receiving waters, for diazinon (adopted 2002), copper, lead, and zinc (adopted 2007), and indicator bacteria (Revised Project I adopted 2010).[210]

The *Water Quality Technical Report for Northwest Village Creek* includes permanent stormwater best management practices (BMPs) and low impact development (LID) design guidance. Hydromodification management requirements are addressed to ensure that the creek's hydrologic regime does not impact downstream channels and habitat integrity.[211]

The *Chollas Creek Integration Project – Phase II* will restore four acres of land to native habitat, and remove invasive species along a reach of Chollas Creek. Restored native habitat will act as a filter for runoff, reducing the amount of pollutants entering the creek following a storm event or through other sources of runoff. The creek realignment, culvert widening, and installation of drop structures and headwalls will reduce erosion and sedimentation within the channel, while removal of invasives can also improve water quality. Invasive species, namely Arundo and tamarisk, are associated with water quality indicators such as low dissolved oxygen and associated eutrophication. Invasives can also lead to their own erosion and sedimentation issues.[212]

As described in C- Reduce Stormwater Runoff, this project anticipated a 0.12 AFY reduction in runoff due to Phase II restoration activities. This represents a 52% reduction in stormwater runoff and associated nonpoint source pollutant loading to the creek. Although stormwater runoff discharging to Chollas Creek from the Northwest Village properties will comply with the City of San Diego's Storm Water Standards[213], this site-specific reduction in runoff will help ensure that the City does not have to implement costly treatment BMPs in the future to address TMDL mandates.

Reduced runoff will result in a reduction of pollutants entering the creek. Native plants in the restored riparian habitat will be able to act as filters for pollutants carried by runoff, further reducing the amount of pollutants entering and transported by the creek. However, it is not possible to quantify the amount of pollutant reduction that will be attained by this component of the project.

Table 7-41: Quantification of Benefit C-Improve Water Quality and Avoid More Costly BMPs
Chollas Creek Integration Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2017-2066	Improve Water Quality and Avoid More Costly BMPs	52% reduction in runoff	0	52% reduction in runoff

[209] California EPA, State Water Resources Control Board (SWRCB). 2010. Integrated Report. Available http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml?wbid=CAR3098117720020319112226 (Accessed 21 March 2013).
[210] San Diego RWQCB. San Diego Region – Total Maximum Daily Loads (TMDLs). Website: http://www.waterboards.ca.gov/rwqcb9/water_issues/programs/tmdls/index.shtml.
[211] Rick Engineering. 2011. *Water Quality Technical Report for Northwest Village Creek*. January 2011 (with revisions through June 2012).Page 24.
[212] Ventura County Resource Conservation District. 2006. Upper Santa Clara River Watershed Arundo/Tamarisk Removal Plan Environmental Impact Report.
[213] Rick Engineering. 2012. Water Quality Technical Report. Pg 1.

Habitat Restoration and Invasives Removal

Amount/Volume and Unit: 6.3 acres of restored habitat

Technical Justification of Physical Benefit

One the primary goals of the *Chollas Creek Integration Project – Phase II* are to restore 4 acres of riparian habitat along Chollas Creek.[214] The *Northwest Village Creek Biological Technical Letter Report* notes that biological resources at the Northwest Village site include riparian scrub, coastal sage scrub, and disturbed/developed land.[215] The riparian scrub and coastal sage scrub are considered sensitive by the City of San Diego and would be subject to the Environmentally Sensitive Lands (ESL) regulations. The proposed project implements the *Chollas Creek Enhancement Program* by preserving and restoring native riparian habitats.[216]

Per the work plan, the *Chollas Creek Integration Project – Phase II* will restore the section of Chollas Creek adjacent to Northwest Village to native riparian habitat. This will involve removal of invasives, channel improvements, and native plant revegetation.[217] Total restored area for the proposed project will include the channel and banks restored during the Northwest Village Creek Restoration (Component A, 2.3 acres) or as part of the Habitat Improvement Through Invasives Removal (Component B, 4 acres). Following re-grading of the creek channel for hydrologic purposes in the Northwest Village Creek Restoration, an open water area will be created in the earthen bottom of the channel and riparian habitat will be revegetated onsite within native planting areas and rip rap areas.[218] Additionally, an open space easement will encompass the creek, revegetation areas, and the existing coastal sage scrub habitat that is being left in place.[219] Phase I of this project is in the process of conducting a biological site assessment, which will be used to inform the Habitat Improvement Through Invasives Removal in Phase II in a way that reflects community priorities where the greatest stakeholder benefits can be achieved.[220]

Methods Used to Estimate the Physical Benefits

E. Benefits to Wildlife and Habitat

Restoration efforts will improve water quality through erosion control and pollution uptake. This will improve river habitat for aquatic species. Further, invasive plants are associated with reduced species diversity, increased water issues, and can decrease native animal populations. Invasive colonies threaten native riparian habitats by monopolizing water resources, altering flood regimes, and reducing habitat quality. Arundo, an invasive species abundant in the project area, has been shown to use significant amounts of water, and cannot be used as a food sources by insects, which decreases available food supplies for birds and other insectivores.[221] The *Chollas Creek Integration Project – Phase II* will improve riparian and aquatic habitats that serve as nesting and foraging grounds for native wildlife.

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[214] Work Plan. Attachment 3 (Project Objectives)
[215] REC Consultants.2012. *Northwest Village Creek Biological Technical Letter Report*. May 2012. Page 1.
[216] City of San Diego.2002. *Chollas Creek Enhancement Program*.Page 15.
[217] Work Plan. Attachment 3 (Project Abstract and Task 9).
[218] City of San Diego. 2012. Draft Mitigated Negative Declaration, Project No. 230777. November 2012. Page 16.
[219] City of San Diego. 2012. Draft Mitigated Negative Declaration, Project No. 230777. November 2012. Page 16.
[220] Work Plan. Attachment 3. (Project Abstract).
[221] Bell, G. 1997. Ecology and Management of *Arundodonax*, and Approaches to Riparian Habitat Restoration in Southern California. In Brock, J. H., Wade, M., Pysek, P., and Green, D. (Eds.): *Plant Invasions: Studies from North America and Europe*. Blackhuys Publishers, Leiden, The Netherlands, pp. 103-113; and California Invasive Plant Council. 2011. *Arundodonax* Distribution and Impact Report. Pp. 47-48.

Table 7-42: Quantification of Benefit E-Benefits to Wildlife or Habitat
Chollas Creek Integration Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2017-2066	Benefits to Wildlife or Habitat BMPs	6.3 Acres	0	6.3 Acres

F. Provide Recreation Opportunities

The *City of San Diego General Plan* recommends a minimum of 2.8 useable acres of parkland per 1,000 residents.[222] The Encanto neighborhood, where this project is located, has a population of 48,161 and should therefore have approximately 135 acres of parkland. However, it only has 58 acres of parkland, and thus has a significant parkland deficit of approximately 77 acres.[223] This means that for every 1000 residents in the neighborhood, there are currently only 1.2 acres of parkland, well short of the recommended 2.8 acres.

The *Chollas Creek Integration Project – Phase II* helps remedy that by restoring an additional 6.3 acres of riparian habitat, and opening this area up to public access.[224]Following re-grading of the creek channel for hydrologic purposes in the Northwest Village Creek Restoration, an open water area will be created in the earthen bottom of the channel and riparian habitat will be revegetated onsite within native planting areas and rip rap areas.[225]Additionally, an open space easement will encompass the creek, revegetation areas, and the existing coastal sage scrub habitat that is being left in place.[226]

Table 7-43: Quantification of Benefit F-Provide Recreation Opportunities
Chollas Creek Integration Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2017-2066	Provide Recreation Opportunities	6.3 Acres	0	6.3 Acres

D. Reduce Public Health Hazards

The *Chollas Creek Integration Project – Phase II* promotes social health and safety through invasive removal and native habitat restoration. The proposed project will embody the provisions of the *Chollas Creek Enhancement Program* by providing better quality riparian habitat, controlling human access and interaction with the creek, and improving public safety.[227]Thick colonies of giant reed (*Arundo donax*) at the site are associated with homeless populations. Giant reed grows in large, dense clumps that homeless people have found may provide some measure of privacy and safety. This behavior has been documented by project partners, and is evidenced by the presence of such things as mattresses.[228]

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[222]City of San Diego. 2008. General Plan. Pg. RE-17.
[223]City of San Diego. 2007. Draft General Plan Final PEIR. Pg. 2-12.
[224] Work Plan. Attachment 3 (Project Abstract).
[225]City of San Diego. 2012. Draft Mitigated Negative Declaration, Project No. 230777. November 2012. Page 16.
[226]City of San Diego. 2012. Draft Mitigated Negative Declaration, Project No. 230777. November 2012. Page 16.
[227]City of San Diego.2002. *Chollas Creek Enhancement Program*.
[228]JCNI. 2012. Personal communication. Photo of homeless encampment.

Evidence of homeless encampments in Chollas Creek. (Source: JCNI)

This creates critical pollution problems due to the lack of sanitary facilities. Invasive species like Arundo also make residents extremely vulnerable to both flood and fire dangers. While riparian areas serve as natural firebreaks under normal conditions, invasives enable wildfires to spread more rapidly. Arundo, in particular, is highly flammable and burns more intensely than native riparian vegetation, even when green.[229] Further, dense stands of Arundo can trap debris and impede the channel, increasing the impact of flood events.[230]

The *Chollas Creek Integration Project – Phase II* will support a comprehensive invasives removal effort at Northwest Village Creek (Euclid Avenue and Market Street), as well as 47th Street and Castana. As documented in Figure 7-2, which resulted from the Opportunities Assessment in Phase I, there are higher concentrations of crime occurrences at streets and intersections that provide transient access to the creek.[231] Note the cluster of crime occurrences along 47th Street (Segment 4) and Euclid Street (Segment 2) where invasives removal activities are proposed.

[229] Ventura County Resource Conservation District. 2006. Upper Santa Clara River Watershed Arundo/Tamarisk Removal Plan Environmental Impact Report. Pg. 1-4; and Bell, G. 1997. Ecology and Management of *Arundo donax*, and Approaches to Riparian Habitat Restoration in Southern California. In Brock, J. H., Wade, M., Pysek, P., and Green, D. (Eds.): *Plant Invasions: Studies from North America and Europe*. Blackhuys Publishers, Leiden, The Netherlands, pp. 103-113

[230] Ventura County Resource Conservation District. 2013. *Arundo Donax* Handout.

[231] Groundworks San Diego-Chollas Creek. Map from Leslie Reynolds via email, February 26, 2013.

Chollas Creek Crime: Segments 1 - 4

*This map displays crimes from 10/10/2012 - 2/10/2013 within 1/8 mile of Chollas Creek

Data Sources: SanGIS, bing(TM), Groundwork San Diego

Water Pollution Source Tracking and Citizen Monitoring

G. Provide Education or Technology Benefits

This qualitative benefit of the *Chollas Creek Integration Project – Phase II* results from the community-based water quality sampling program that will be implemented by Coastkeeper and Groundworks. Sampling will be conducted by 30 student volunteers who will receive training as water quality monitors. This training will educate them on water issues in the area and what affects factors affect water quality. This project then goes further to incorporate the results of the water quality sampling effort into the City of San Diego's stormwater data, Coastkeeper's Citizen Science Monitoring data, and Groundwork's watershed assessment data, as well as the City's Think Blue outreach materials for the community. This outreach effort aims to reduce pollution and conserve water.[232]

H. Stakeholder and Community Involvement, Including DACs

The work plan for the *Chollas Creek Integration Project – Phase II* calls for a high level of community engagement in all three components of the project. This project will continue the community involvement efforts of Phase I by implementing a restoration and invasives control plan that reflects community priorities, as established by stakeholders. This project will utilize citizen scientists for water quality monitoring through Coastkeeper's Citizen Science Monitoring and Pollution/Conservation Education programs and Groundwork's Green Team Community Service Project. Groundworks will also continue facilitating a coalition of watershed stakeholders to determine water quality natural resource, and environmental justice opportunities and constraints.[233] Community involvement is a high priority for JCNI, the project sponsor, and is reflected in their vision and all of the work they do.[234]

Without this project, community involvement in the neighborhood would be reduced, and there would be a decrease in opportunities for public outreach. The 30 student water quality monitors that would be employed by this project would not have this opportunity to develop important environmental stewardship and work ethic values without this project. These activities do more than just monitoring the water quality of Chollas Creek – they encourage and inspire local DAC residents to feel a sense of stewardship and ownership over their local waterways. This benefit is invaluable.

I. Increase Scientific Knowledge of Creek

The USEPA has identified increased scientific knowledge as a key component to motivating environmental stewardship in its 2005 *Everyday Choices: Opportunities for Environmental Stewardship*.[235] This project seeks to improve its scientific understanding of Chollas Creek, its nonpoint pollutant sources, and the effectiveness of creek restoration in pollution update and erosion control through collection of 300 pre- and post-project water quality samples.[236] These water quality samples will be analyzed and results shared with other agencies, such as the City of San Diego, which allows for the discussion of restoration successes to be broadcast throughout the region.

Table 7-44: Quantification of Benefit I-Increase Scientific Knowledge of Creek
Chollas Creek Integration Project – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2014-2015	Increase Scientific Knowledge of Creek	300 WQ Samples	0	300 WQ Samples

[232] Work Plan. Attachment 3. (Project Abstract)
[233] Work Plan, Attachment 3. (Project Abstract).
[234] Jacobs Center for Neighborhood Innovation.Community Vision and Voice.Available http://www.jacobscenter.org/whatwedo_civic.htm (Accessed 19 March 2013).
[235] U.S. EPA. 2005. *Everyday Choices: Opportunities for Environmental Stewardship*, EPA Innovation Action Council. Pg. 2
[236] Work Plan. Attachment 3. (Task 4 and Task 9.3)

Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Introduction

Project Abstract

Nitrogen and phosphorous loading from the Santa Margarita River (SMR) Watershed can result in low dissolved oxygen (DO) and increased algal blooms in the estuary and stream segments, several of which have been 303(d)-listed for nitrogen, phosphorus, or eutrophication. Total Maximum Daily Loads (TMDLs) are not currently in place in most of the SMR Watershed segments which are listed for nutrient impairment. However, TMDLs are likely to be instituted in the near future. As there is little scientific knowledge about the appropriate level of nutrients that the SMR can sustainably assimilate, the TMDLs would be based on a generalized approach if no actions are taken.

This project aims to establish the science and seek stakeholder consensus to develop nutrient water quality goals that are protective of beneficial uses and could be employed in the development of alternative nutrient water quality objectives (WQOs) for the SMR Watershed in response to the *Water Quality Control Plan for the San Diego Basin* (Basin Plan) Triennial Update. This is the second phase of work, which consists of continued stakeholder facilitation and continued monitoring, modeling, and data analyses to determine nutrient water quality goals. The project leverages an investment of over $2 million in data collection and other resources contributed by watershed stakeholders and partners. The project aims to:

(1) Maximize community involvement in the SMR watershed through ongoing stakeholder group facilitation (established in Phase I)
(2) Continue work with the group to obtain feedback and critical review of technical work products to achieve consensus on the nutrient water quality goals
(3) Continue core monitoring and special studies to address data gaps required to develop the nutrient water quality goals for the river
(4) Further refine proposed nutrient water quality goals developed as part of Phase I for the SMR Estuary, if deemed necessary by the Stakeholder Group
(5) Develop nutrient water quality goals for the SMR River as needed based on the Nutrient Numeric Endpoints (NNE) approach and local data that are protective of beneficial uses

The project benefits the SMR watershed and the region by providing scientifically–based nutrient water quality goals that will ultimately conserve water and control eutrophication. Stakeholders believe that since the estuary through which the SMR flows is open to the ocean during the winter (the wet season), nutrients in the river only have a short residence time before they enter the ocean.

This effort will counteract hydromodifications and lead to improved protection and restoration of habitat and open space, optimize water-based recreational opportunities, and enhance the maintenance of water resources. Within the region, the project will further the technical foundation of water management by demonstrating a science-based approach to establishing nutrient water quality goals that can be developed jointly with the regulatory agencies. If warranted by the results, the scientific studies will provide the underpinnings necessary to support Nutrient Site-Specific Objectives (SSOs) that require a Basin Plan amendment. This effort will serve as a template for similar efforts within the region.

This analysis is the second phase of a three phase project. Phases I and III are not directly connected to this phase, and so are not included in the analysis.

Description and Relationship to Other Projects in the Proposal

This project will contribute to the IRWM concept of integrated management, utilizing a collaborative, stakeholder-driven process to address water concerns across a multi-jurisdictional area. It will also complement the efforts of other projects in this proposal to improve water quality and water management in the San Diego IRWM Region. It may experience some impact from the extension of recycled water use through *Project 1: North San Diego County Regional Recycled Water Project – Phase II*, particularly

Component 1-8: Escondido Recycled Water Easterly Main Extension, which will extend recycled water pipelines to the Oak Grove area, in the southeastern area of the SMR watershed.[237]

Description and Estimates of Without-Project Conditions

As described above, nitrogen and phosphorous loading from the SMR Watershed can result in low DO and increased algal blooms in the estuary and stream segments, several of which have been 303(d)-listed for nitrogen, phosphorus, or eutrophication. TMDLs are not currently in place in most of the SMR Watershed segments which are listed for nutrient impairment. However, TMDLs are likely to be instituted in the near future. As there is little scientific knowledge about the appropriate level of nutrients that the SMR can sustainably assimilate, the TMDLs would be based on a generalized approach if no actions are taken. TMDLs based on a generalized approach would be neither site-specific nor season-specific.

The County of San Diego believes that TMDLs that are based on a generalized approach would be sufficiently stringent that the County may need to build one or more municipal stormwater treatment facilities in order to treat stormwater that is discharged from the municipal separate storm sewer system (MS4) into the SMR. Even with the municipal stormwater treatment facility, however, the County could still face fines from regulators and/or litigation from third parties for violating the TMDLs that are instituted without the project.

In addition, without the project, there will not be regular SMR meetings for stakeholders to coordinate their activities and share information. These meetings are important because they are where the interested parties gather to plan how best to maximize the beneficial uses of the SMR. Finally, without the project, studies would not be conducted on the river, preventing scientific information from reaching the stakeholder group, the public at large, and the San Diego Regional Water Quality Control Board (RWQCB) who ultimately dictates water quality regulations in the watershed.

Recent/ Historical Conditions

The SMR Watershed spans across the northern section of the San Diego IRWM Region and the southwestern portion of the Upper Santa Margarita IRWM Region. The lower portion of the watershed is largely undeveloped, while parts of the upper section of the watershed are in rapidly developing sections of Riverside County.[238] Due to the jurisdictional complexity of its location, management of the watershed is challenging. Many of the waterbodies in the watershed are 303(d) listed for nutrients. Of the waterbodies in the SMR Watershed that are on the EPA-approved 2010 California 303(d) List of Water Quality Limited Segments, most are in Category 5. Category 5 contains waterbodies that require, but do not yet have, TMDLs, and are in violation of water quality standards.[239]

The *Water Quality Control Plan for the San Diego Basin* (Basin Plan) was developed by the San Diego RWQCB in September 1994 and amended on or before April 2011.[240] The Basin Plan established water quality objectives for all watersheds in the San Diego Basin, including the SMR watershed. It does not set TMDLs for the waterbodies, and its standards are not site-specific. The impact of nutrient loading within the watershed can vary greatly due to site-specific factors such as hydrology, shading, and temperature. Therefore, the standards as established in the Basin Plan may not be appropriate for all locations within a given water body. This is acknowledged in the Basin Plan Table 3-2, endnote a, which states that the limits for Nitrogen and Phosphorus may not be exceeded unless there are studies which "clearly show that the water quality objective changes are permissible".[241]

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[237] Refer to Work Plan in Attachment 3

[238] Project Clean Water.Santa Margarita River Watershed Overview.Available http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=52&Itemid=27 (Accessed 14 March 2013).

[239] California EPA, State Water Resources Control Board (SWRCB). 2010. Integrated Report. Available http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml?wbid=CAR3098117720020319112226 (Accessed 14 March 2013).

[240] RWQCB. 2011. *Water Quality Control Plan for the San Diego Basin*.

[241] RWQCB. 2011. *Water Quality Control Plan for the San Diego Basin*. Page 3-5 to 3-16.

The *Santa Margarita River Hydrological and Biological Support Report* reports that nitrogen levels in many of the river's tributaries exceed current standards.[242] However, the report notes that sections of the streams appeared to have assimilated the excess nitrogen without impacting their beneficial uses.[243] This report also states that in the lower reaches of the watershed, nitrogen is the limiting factor in algal growth, while phosphorus is the limiting factor in upper reaches of the watershed.[244] These indicate that the watershed is likely able to assimilate higher levels of some nutrient in some stretches at different times of year and under different conditions than current standards allow.

Phase I of this project was funded through a Proposition 84-Round 1 Implementation Grant. This phase is currently underway, and is working to establish nutrient water quality goals for the SMR Estuary. A group of diverse stakeholders was established in 2009 to help guide the project and provide input and technical review. It is generally believed that the watershed may be able to assimilate higher concentrations of nutrients than allowed by current standards under certain conditions. However, more data will need to be collected and analyzed as part of this project before any changes to standards can be recommended.

Due to lack of scientific consensus on target thresholds that result in impairment, a Numeric Nutrient Endpoint (NNE) framework was developed to guide the adoption of narrative criteria for assessing nutrient impacts on beneficial uses.[245] The NNE framework is advocated by the State Water Resources Control Board (SWRCB) and U.S. Environmental Protection Agency (USEPA), and is currently under development.[246]

Potential Adverse Physical Effects of the Project

This project is comprised of studies and data analysis designed to establish safe levels of nutrient loading in the watershed. As such, no adverse physical effects are anticipated as a result of this project. Prior to adoption of any recommendations that would impact nutrient loading in the watershed (such as a Basin Plan amendment), the appropriate lead agency will conduct all necessary environmental compliance documentation in accordance with CEQA and NEPA and procure any permits necessary to implement the project. It is not anticipated that any significant, long-term adverse physical effects would result from implementation of this project.

New Facilities, Policies, and Actions Required to Obtain Physical Benefits

The report produced by *Implementing Nutrient Management in the Santa Margarita River Watershed–Phase II* will contain recommendations for science-based nutrient standards specific to the SMR watershed. Some of the benefits will be obtained through the process of developing this report, while other benefits will only be obtained if the recommendations are accepted as the basis for new water quality standards in the watershed and approved by the RWQCB and the USEPA.

Uncertainties in the Physical Benefits

Though there is an expectation that some of the current nutrient standards are too stringent, it is not possible to predetermine what the science will say, so there is a risk that more stringent nutrient goals may be appropriate in areas of the watershed. This could affect the benefit associated with avoiding installation of a treatment facility. Additionally, the regulatory community is still developing its implementation policy, which may affect the degree of influence this project has on the water quality standards set for the SMR watershed.

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[242] U.S. Bureau of Reclamation (USBR). 2010. *Hydrological and Biological Support to Lower Santa Margarita River Watershed Monitoring Program Water Years 2008-2009.*

[243] U.S. Bureau of Reclamation (USBR). 2010. *Hydrological and Biological Support to Lower Santa Margarita River Watershed Monitoring Program Water Years 2008-2009*. Pg. xviii

[244] U.S. Bureau of Reclamation (USBR). 2010. *Hydrological and Biological Support to Lower Santa Margarita River Watershed Monitoring Program Water Years 2008-2009*. Pp. 4-9 to 4-10.

[245] Southern California Coastal Water Research Project (SCCWRP). 2011. Background - Nutrient Numeric Endpoints. Available: http://www.sccwrp.org/ResearchAreas/Nutrients/NutrientCriteriaSupportStudies/BackgroundNutrientNumericEndpoints.aspx (Accessed 14 March 2013).

[246] SWRCB. 2011. Proposed Policy for Nutrients for Inland Surface Waters of the State of California. Available: http://www.waterboards.ca.gov/plans_policies/nutrients.shtml (Accessed 14 March 2013).

Other benefit uncertainties relate to the benefit associated with avoiding third-party litigation. Though it is anticipated that a collaborative, stakeholder-driven process will reduce (potential) litigation related to nutrient loading standards, the possibility of litigation cannot be entirely eliminated, particularly from groups that are not, or choose not to be, part of the stakeholder group. Further, though it is expected that the stakeholder group will reach agreement on recommendations based on the science, it is not certain that this will occur, because the results of the studies are as yet unknown. Conflict over recommendations may also lead to third-party litigation.

Summary of Physical Benefits

This project is anticipated to produce two overarching physical benefits: 1) engaging the Santa Margarita River watershed stakeholders, and 2) expanding the scientific and technical foundation of water management. These benefits are expected to result in a total of four measurable benefits, as shown in Table 7-45 below. The justification for each benefit, along with a description of how they can be measured, is provided following the table.

Table 7-45: Physical benefits
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Physical Benefit	Impact of Physical Benefit	Quantification of Physical Benefit
Engage Santa Margarita River watershed stakeholders	A. Stakeholder Involvement in Nutrient Assessment	15 Stakeholder Advisory Group Meetings
Expand the scientific and technical foundation of water management	B. Improve Scientific Knowledge of SMR Watershed	Qualitative
	C. Avoid Municipal Stormwater Treatment Facility	245,000 lbs nitrogen and 25,000 lbs Total P reduction
	D. Avoid Third Party Litigation Related to TMDL Compliance	Qualitative
	E. Improve Water Quality and Reduce Eutrophication Due to Nutrient Management	Qualitative

Engage Santa Margarita River Watershed Stakeholders

Amount/Volume and Unit: 15 Stakeholder Advisory Group Meetings

Technical Justification of Physical Benefit

As described in Attachment 3, *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* will utilize the Stakeholder Advisory Group formed in Phase I to develop current understanding of water quality in the watershed and identify the data gaps this project will need to address. The Stakeholder Advisory Group will be the driving force for guiding the project, completing the necessary studies, analyzing data, and developing nutrient management guidelines for the Santa Margarita River Watershed. Through this process, stakeholders will be actively engaged in nutrient management in the watershed.

The work plan for *Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II*, calls for continued facilitation of the Stakeholder Advisory Group (Subtask 4A) established during Phase I. The work plan anticipates holding 15 meetings of the stakeholder group or subgroups over the Phase II timeframe. The purpose of these meetings will be to get feedback from stakeholders on technical and policy elements of the projects. The Stakeholder Advisory Group will guide project activities and reviews, identify data gaps, and provide input on modeling efforts. The purpose of these meetings will be to take input from the stakeholders regarding the project and provide updates, grant reports, and other information to stakeholders (see Attachment 3, Subtask 4A). After data are collected, models run, and results interpreted, the stakeholder group will determine the appropriate nutrient water quality goals for the SMR. Maximizing stakeholder involvement in all aspects of the project would foster a sense of stewardship and consensus to further watershed management goals.

The USEPA defines environmental stewardship "as the responsibility for environmental quality shared by all those whose actions affect the environment. This sense of responsibility is a value that can be reflected through the choices of individuals, companies, communities, and government organizations, and shaped by unique environmental, social, and economic interests."[247] The EPA's *Opportunities for Environmental Stewardship* report summarizes motivations for stewardship behaviors that were identified by a panel of stakeholders and experts. The first motivation for stewardship behavior is increased scientific understanding of natural resources, which is a key objective for this project.[248]

This project has a website hosted by Project Clean Water (www.projectcleanwater.org), which lists the 31 members of the stakeholder group, and provides information on the project, stakeholder meetings, how to get involved, and how to contact the stakeholder group.[249] Stakeholders involved in the project include representatives from water and public utility districts, counties, state and federal agencies, military installations, and non-profits that have an interest or authority related to water management in the SMR watershed. A review of the meeting summaries[250] shows that on average, 17 stakeholders attend each meeting. With 24 organizations represented by the stakeholders (see Table 7-46 below), approximately 70% of the watersheds interests are participating in each meeting. This high rate of involvement shows the value of collaborative planning to solve watershed-scale problems.

Table 7-46: SMR Watershed Nutrient Initiative – Stakeholder Group Members
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

	Organization		Organization
1	Riverside County Flood Control & Conservation District, Chair	13	South Coast Water District and Trout Unlimited
2	County of Riverside	14	Sierra Club and Elsinore-Murrieta-Anza RCD
3	U.S. Marine Corps (USMC) Camp Pendleton	15	TetraTech
4	Rancho California Water District	16	County of San Diego
5	U.S. Bureau of Reclamation	17	Mission Resource Conservation District
6	Fallbrook Public Utilities District	18	Stetson Engineers
7	Eastern Municipal Water District	19	Michael R. Welch, Ph.D., P.E. Consulting Engineer
8	Caltrans	20	Southern California Coastal Water Research Project
9	CalTrout	21	Larry Walker & Associates
10	U.S. Navy Space and Naval Warfare Systems Center Pacific	22	San Diego Regional Water Quality Control Board
11	San Diego County Farm Bureau	23	National Marine Fisheries Services
12	Upper Santa Margarita Irrigated Lands	24	United States Geological Survey

[247]USEPA. 2005. *Everyday Choices: Opportunities for Environmental Stewardship*, EPA Innovation Action Council. Pg. 2

[248]USEPA. 2005. *Everyday Choices: Opportunities for Environmental Stewardship*, EPA Innovation Action Council. Pg. 5.

[249]Project Clean Water.2013. Santa Margarita Watershed Nutrient Initiative – Stakeholder Group. Available: http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=196&Itemid=192 (Accessed 14 March 2013).

[250]Project Clean Water. 2013. Santa Margarita Watershed Nutrient Initiative – Stakeholder Group, Meeting Summaries from February 16, 2011 through January 10, 2013. Available: http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=196&Itemid=192 (Accessed 14 March 2013).

A. Stakeholder Involvement in Nutrient Assessment

The work plan for *Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II*, calls for continued facilitation of the Stakeholder Advisory Group (Subtask 4A) established during Phase I. Subtask 4A, the "Facilitate Stakeholder Advisory Group", calls for 15 meetings to take place over the four years of the project. It is anticipated that meetings will initially be held bimonthly and then be held as needed. Meetings will be more frequently in the early stages of this project, when more input from stakeholders will be necessary to properly guide project direction and identify the data gaps this project seeks to fill. After data are collected, models run, and results interpreted, the Stakeholder Advisory Group will determine the appropriate nutrient water quality goals for the SMR. Maximizing stakeholder involvement in all aspects of the project would foster a sense of stewardship and consensus to further watershed management goals.

Stakeholder involvement is an important objective of the San Diego IRWM Plan, and maximizing stewardship through stakeholder and community involvement has been a key component of the IRWM Program. Stakeholder involvement increases community ownership of problems and their solutions.[251]

The stakeholder group, as listed on the project website, currently consists of 31 members representing 24 organizations. These organizations include water and public utility districts, counties, state and federal agencies, military installations, and non-profits.[252] Of the eleven meetings where meeting minutes with a list of attendees is available, meeting attendance ranged between 15 and 24 stakeholders, with an average of approximately 17 stakeholders present.[253] It is important to remember that though these meetings average only 17 stakeholders, each attendee is a liaison to his or her respective stakeholder organization, and as a whole the stakeholder group represents the interests of, and reaches out to, thousands of stakeholders. A wide variety of interests as reflected in each organization's mission, membership numbers, and service areas. However, due to the overlap of members in different stakeholder organizations, and the uncertainty in the level of investment of stakeholders in their representative organizations, it is difficult to quantify the actual number of stakeholders reached through this project.

Table 7-47: Quantification of Benefit A-Stakeholder Involvement in Nutrient Assessment
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project**	**With Project**	**Change Resulting from Project**
2013-2017	Stakeholder Involvement	15 meetings	0	15 meetings

Expand the Scientific and Technical Foundation of Water Management

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II will identify and fill data gaps in water quality and watershed management for the SMR watershed. Through the studies conducted as part of this project, and the assessment of data throughout the watershed, a scientifically-sound basis for nutrient loading objectives can be established. By doing this in a collaborative, stakeholder-driven process, multiple benefits may be realized.

The U.S. EPA has identified increased scientific knowledge as a key component to motivating environmental stewardship in its 2005 *Everyday Choices: Opportunities for Environmental*

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[251] San Diego Regional Water Management Group. 2007. *San Diego Integrated Regional Water Management Plan*. Pg. C-3.

[252] Project Clean Water.2013. Santa Margarita Watershed Nutrient Initiative – Stakeholder Group. Available: http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=196&Itemid=192 (Accessed 14 March 2013).

[253] Project Clean Water. 2013. Santa Margarita Watershed Nutrient Initiative – Stakeholder Group, Meeting Summaries from February 16, 2011 through January 10, 2013. Available http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=196&Itemid=192 (Accessed 14 March 2013)

Stewardship.[254] This project seeks to improve its scientific understanding of the SMR watershed's ability to assimilate nutrients on a site-specific level without impacting beneficial uses. The stakeholder group will identify data gaps, conduct studies to fill these gaps, and complete technical studies for the watershed.

The *Santa Margarita River Hydrological and Biological Support Report* reports that nitrogen levels in many of the river's tributaries exceed current standards.[255] However, the report notes that sections of the streams appeared to have assimilated the excess nitrogen without impacting their beneficial uses.[256] This report also states that in the lower reaches of the watershed, nitrogen is the limiting factor in algal growth, while phosphorus is the limiting factor in upper reaches of the watershed.[257] These indicate that the watershed is likely able to assimilate higher levels of some nutrient in some stretches at different times of year and under different conditions than current standards allow.

Completion of Phases I and II is necessary in order to provide the SDRWQCB with the information that may be required to successfully persuade them to develop and apply seasonally adjusted, site-relevant water quality standards. However, no changes to the Basin Plan standards for the SMR will be implemented until and if there is adequate science to defend them.

Since the SMR Estuary is open to the ocean during the winter, stormwater runoff and discharges from MS4 facilities has a short residence time in the river. Modeling conducted during Phase I is expected to demonstrate this limited effect of wet weather inputs (due to coarse sediments) on the eutrophic conditions of the lagoon in early fall. The Stakeholder Advisory Group anticipates finding a similar issue in the river during Phase II. The purpose of *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* is to confirm those theories with strong scientific evidence that will support the SDRWQCB in making appropriate Basin Plan updates.

B. Improve Scientific Knowledge of Santa Margarita River Watershed

Increased knowledge is nearly impossible to quantify. However, it is possible to consider the number of studies that are produced as a result of this project as an increase in scientific knowledge relating to the SMR watershed. This project aims to establish the science and seek stakeholder consensus to develop nutrient water quality goals that are protective of beneficial uses and could be employed in the development of alternative nutrient WQOs for the SMR Watershed in response to the Basin Plan Triennial Update.

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II will conduct field and special studies during task 4B of this project, from which they will develop nutrient water quality goals for the SMR in Task 4C. The field and special studies of Task 4B will include analyses on algal bioassessment, water quality, and site-specific and season-specific physical and hydrological data, among other items. Task 4B will conclude with *The Monitoring and Special Studies Report*. Task 4C will use data from Task 4B to develop riverine models, which will help determine appropriate nutrient water quality goals. Results will be reported in *The Technical Studies Supporting Proposed Nutrient Water Quality Goals for Santa Margarita River Report*. In addition to the reports, the knowledge gained in Tasks 4B and 4C will be shared during the Stakeholder Advisory Group meetings that constitute Task 4A.[258]

Within the region, the project will further the technical foundation of water management by demonstrating a science-based approach to establishing nutrient water quality goals that can be developed jointly with the regulatory agencies. If warranted by the results, the scientific studies will provide the underpinnings

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[254] U.S. EPA. 2005. *Everyday Choices: Opportunities for Environmental Stewardship*, EPA Innovation Action Council. Pg. 2

[255] U.S. Bureau of Reclamation (USBR). 2010. *Hydrological and Biological Support to Lower Santa Margarita River Watershed Monitoring Program Water Years 2008-2009.*

[256] U.S. Bureau of Reclamation (USBR). 2010. *Hydrological and Biological Support to Lower Santa Margarita River Watershed Monitoring Program Water Years 2008-2009*. Pg. xviii

[257] U.S. Bureau of Reclamation (USBR). 2010. *Hydrological and Biological Support to Lower Santa Margarita River Watershed Monitoring Program Water Years 2008-2009*. Pp. 4-9 to 4-10.

[258] See Work Plan, Attachment 3.

necessary to support Nutrient Site-Specific Objectives (SSOs) that require a Basin Plan amendment. This effort will serve as a template for similar efforts within the region.

C. Avoid Municipal Stormwater Treatment Facility

Nitrogen and phosphorous loading from the SMR Watershed can result in low DO and increased algal blooms in the estuary and stream segments, several of which have been 303(d)-listed for nitrogen, phosphorus, or eutrophication.[259] Project proponents think that nutrient loading to the SMR Watershed could be managed to achieve maximum benefit. Nutrient loading may be adjusted for seasonality by those sources that have flexible operations. By adjusting nutrient loading for seasonality, dry weather nutrient concentrations may be reduced thereby leading to de-listing of the SMR Estuary and stream segments from the 303(d) list and/or establishment of watershed management strategies in lieu of a formal TMDL.

TMDLs are not currently in place in most of the SMR Watershed segments which are listed for nutrient impairment. However, TMDLs are likely to be instituted in the near future. As there is little scientific knowledge about the appropriate level of nutrients that the SMR can sustainably assimilate, the TMDLs would be based on a generalized approach if no actions are taken. TMDLs based on a generalized approach would be neither site-specific nor season-specific.

The County of San Diego believes that TMDLs that are based on a generalized approach would be sufficiently stringent that the County may need to build one or more municipal stormwater treatment facilities in order to treat stormwater that is discharged from the municipal separate storm sewer system (MS4) into the SMR, particularly after storm events.

Loading of Total Nitrogen and Total Phosphorus for the watershed is reported in the *Comprehensive Load Reduction Plan* which lists NPDES monitoring at Mass Loading SMR-MLS-2 which is located and the boundary of the County of San Diego and Camp Pendleton.[260] Based on the data shown in Table 7-48, the County of San Diego has determined the percentage of nitrogen and phosphorus reductions (75% and 50%, respectively) expected to be set for the SMR under the generalized TMDLs (that is, if the project does not occur).

Table 7-48: Nutrient Loading Data for SMR Mass Loading Station SMR-MLS-2
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

	Nitrate (mg/L)	Total Phosphorus (mg/L)
Flow Weighted EMC	4.0	0.2
WQO Target EMC	1.0	0.1
% Reduction Needed to Meet Current WQO	**75%**	**50%**
Annual Loading Based on the Flow Weighted EMC	993,112	49,099
Total Load Reduction Needed to Meet Current WQO (lbs/year)	744,834	24,550

Using these percentage reductions with the current annual loading of these nutrients in the SMR, the County of San Diego has determined that the municipal stormwater treatment facility(ies)would need to remove about 745,000 pounds of nitrogen per year and about 25,000 pounds of phosphorous per year. The capital and operations and maintenance costs associated with the facility(ies) needed has also been determined from costs of other treatment facilities that are in operation for nutrient loadings in the San Luis Rey River Watershed, located just south of the SMR.

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[259] California EPA, State Water Resources Control Board (SWRCB). 2010. Integrated Report. Available http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml?wbid=CAR3098117720020319112226 (Accessed 14 March 2013)

[260] County of San Diego, Department of Public Works. 2012. Comprehensive Load Reduction Plan. Appendix B.

Note that it is uncertain at what nutrient concentrations the TMDLs will be set at if the project does not occur. If they are set at a more (or less) stringent level than mentioned above, the size of the municipal stormwater treatment facility(ies) would need to be larger (or smaller). In addition, there is annual and seasonal variation in the amount of nitrogen and phosphorous loading into the SMR. Some years there will be more nutrient loading, while in others there will be less than what the analysis is based on.

Table 7-49: Physical Benefits for C-Avoid Municipal Stormwater Treatment Facility
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

(a)	(b)	(c)	(d)	(e)
Year	**Type of Benefit**	**Without Project***	**With Project**	**Change Resulting from Project**
2018-2032	Avoid Municipal Stormwater Treatment Facility	245,000 lb nitrogen and 25,000 lb Total P	0	3.675 million lb nitrogen and 675,000 lb Total P
*** *Annual nutrient loading that would have been treated but is avoided***				

D. Avoid Third Party Litigation Related to TMDL Compliance

In the absence of the project, TMDLs that are neither site-specific nor season-specific are likely to be set for the SMR in the near future. If the County of San Diego does not meet the TMDL targets, the County may face pressure from third parties demanding that the TMDLs be met. If the third parties are not satisfied with the County's response, they could bring litigation, resulting in additional costs to the county.[261]

Without having set non-site specific nutrient standards for the SMR watershed and gathering data on the resulting lawsuits, it is difficult to quantify the benefit of reduced third-party litigation that would result from this project. Strict thresholds for nutrient impact on a beneficial use of a waterbody are often contentious, because biological activity is dependent on multiple factors, such as light, temperature, and community structure.[262] Litigation may occur over a number of issues related to water quality standards, such as violating current standards or the current standards violating beneficial uses. A scientifically-sound site-specific set of nutrient standards is likely to reduce litigation over violations of beneficial uses. Additionally, if stakeholders are involved in developing the recommendations for new standards, there will be increased understanding by all stakeholders (including dischargers) on how their activities impact the watershed, increased knowledge over the source of potential violations, increased dialogue between stakeholders, and an understanding of how best to address water quality concerns. All of these activities are likely to reduce potential litigation and instead promote a collaborative solution, though without knowing what the recommended standards and management practices may be, it is not possible to quantify this benefit.

E. Improve Water Quality and Reduce Eutrophication Due to Nutrient Management

The County of San Diego's *Watershed Urban Runoff Management Program: Santa Margarita River Watershed* (WURMP) identifies five core management questions related to water quality in the watershed.[263] The WURMP also specifies a strategy to identify data gaps related to answering these core management questions, including identifying and analyzing data as receiving water conditions versus urban runoff inputs, as well as considering seasonality of data.[264] As described in Attachment 3, this project seeks to fill data gaps related to nutrient loading and related water quality issues.[265] Filling data gaps will help answer the core management questions in a complete and scientifically-sound manner.

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[261] In the 1990s, the Natural Resources Defense Council brought litigation against the County of San Diego for violating a Consent Decree.
[262] US EPA. 2006. Technical Approach to Develop Nutrient Numeric Endpoints for California. Pg. 1-2.
[263] County of San Diego. 2008. Watershed Urban Runoff Management Program: Santa Margarita River Watershed. Pg. 3-2
[264] County of San Diego. 2008. Watershed Urban Runoff Management Program: Santa Margarita River Watershed. Pg. 3-2
[265] See Work Plan in Attachment 3.

Using an NNE approach, rather than a numerical approach for establishing water quality standards, may allow for variable nutrient loading based on seasonality, wet/dry weather, and other conditions which may affect nutrient assimilation in the watershed. The NNE approach allows for this flexibility because it is designed to reduce the risk of impairment, regardless of actual measured levels of contaminants.[266] As such, nutrient loading may be heavier during wet weather when the assimilative capacity of the watershed is great and lower during dry weather when the potential for eutrophication is greatest. By adjusting nutrient loading for seasonality, dry weather nutrient concentrations may be reduced and eutrophication controlled.

Without the project, should stringent TMDLs and a treatment facility be constructed to address stream water quality, nutrient loading and algal blooms may still persist. Establishing the NNE and new WQOs/SSOs with stakeholder support will make it more likely that those stakeholders implement changes that would reduce loading during the dry season consistent with watershed management goals.

Quantifying the anticipated benefit to water quality and decreased eutrophication without knowing the science-based water quality objectives that will result from this project is difficult. Once the recommendations are finalized and if they are accepted by regulatory agencies, this benefit may be quantified by number of streams removed from the 303(d) list for nutrient impairment.

[266] USBR. 2010. Hydrological and Biological Support to Lower Santa margarita River Watershed Monitoring Program Water Years 2008-2009. Pg. 5-9.

Attachment 8

Benefits and Cost Analysis

Attachment 8

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Benefits and Cost Analysis

Attachment 8 consists of the following items:

- ✓ **Project Costs and Benefits.** The body of this attachment provides an overview of the costs and benefits of this proposed funding package, as well as the benefits associated with each individual project.
- ✓ **Appendix 8-1.** Appendix 8-1 provides a detailed discussion of the estimated avoided future imported water costs from developing local supplies in the San Diego region.
- ✓ **Appendix 8-2.** Appendix 8-2 of this attachment contains detailed information and background regarding the qualitative and quantitative costs and benefits of each individual project contained within this proposal.

This attachment contains estimations of thecosts and benefits of each project contained within this *San Diego IRWM Round 2 Implementation Grant Proposal – Round 2*. A narrative description of the expected benefits and costs that may be incurred to implement and operate each project is provided for each project. Where possible, each benefit was quantified and presented in physical or economic terms. In cases where quantitative analyses were not feasible, this attachment provides complementary qualitative analyses. In addition, this attachment provides a description of economic factors that may affect or qualify the amount of economic benefits to be realized..

Proposal Benefits and Costs Summary

Because several projects are being proposed with multiple benefits, Table 8-1 below contains a summary of the costs and benefits for all projects. This summary shows the benefit-cost ratio of the overall Proposal is 10.3, and that as a whole, the benefits well exceed the costs.

Table 8-1: Proposal Benefits and Costs Summary (PSP Table 20)

Proposal: San Diego IRWM Implementation Grant, Round 2						
Agency: San Diego County Water Authority						
Project	Project Proponent	Total Present Value Project Costs (1)	Total Present Value Project Benefits			Section D2 – Briefly Describe the Main Non-monetized Benefits*
			Section D3 Monetized (2)	Section D4 Flood Damage Reduction (3)	Total	
(a)	(b)	I	(d)	(e)	(f) = (d) + (e)	(h)
1. North San Diego County Regional Recycled Water Project – Phase II	Olivenhain Municipal Water District	$22,603,039	$178,127,244	--	$178,127,244	*B. Avoided loss of agricultural production* – recycled water is cheaper for users than the potable imported water currently used for irrigation. Water costs are the greatest single expense for farmers, and current rates are likely to force farm closures. *E. Improve water quality* – imported water is high in TDS and may require additional groundwater pumping for dilution. Reducing imported water will reduce TDS imported to the Region. *F-Reduce net diversions from Bay-Delta* and *D-Benefit Wildlife or Habitat* – because imported supplies are from the Delta, reducing imported water purchases will improve aquatic habitat conditions in the Delta *H. Long-term solution*and *I. Improve water supply reliability* – maximizing recycled water use helps diversify the area's water portfolio and reduce water waste. This improves reliability in the face of drought or water restrictions. *L. Avoid costs of discharge or upgrading outfalls* – excess treated waste water are contributing to meeting outfall capacity. Maximizing recycled water use in North County will reduce the pressures on outfall capacity and associated costs with upgrades and O&M
2. Turf Replacement and Agricultural Irrigation Efficiency Program	San Diego County Water Authority	$1,385,598	$7,348,499	--	$7,348,499	*A. Water conservation*– 45 AFY of water will be conserved through turf replacement with water-wise landscaping *C. Reduced green waste* – 66% reduction in green waste is expected for every lawn replaced with water-wise landscaping. This benefit is associated with reduced trash removal costs *E. Increased recycled water use* – 250 AFY of recycled water use is anticipated through the Agricultural Irrigation Program component, which will reduce imported water demand and the associated energy use and TDS imports *D. Educational benefits*– program participants take online tutorials about water use and water-wise landscaping. Additional educational materials are available on project websites.

Proposal: San Diego IRWM Implementation Grant, Round 2						
Agency: San Diego County Water Authority						
Project	Project Proponent	Total Present Value Project Costs (1)	Total Present Value Project Benefits			Section D2 – Briefly Describe the Main Non-monetized Benefits*
			Section D3 Monetized (2)	Section D4 Flood Damage Reduction (3)	Total	
(a)	(b)	I	(d)	(e)	(f) = (d) + (e)	(h)
						N. Improve water quality – lawn care is often accompanied by high use of fertilizers and pesticides, and require frequent watering. Conversion to water-wise landscaping will reduce increased runoff, which carried nutrients and pesticides into local water systems. *M. Long-term solution* – conservation and use of recycled water reduce potable water demand and help contribute to water independence. Additionally, turf conversion and conversion to recycled water for irrigation provide benefits over the long-run.
3. Rural DAC Partnership Program	Rural Community Assistance Corporation	$4,631,384	$21,832,082	-	$21,832,082	*B. Address critical water quality and water supply needs of DACs* – this program will fund projects that address critical water supply or water quality needs for rural DACs. These communities lack the funds and expertise necessary to implement water projects. *D. Increase water availability for fire protection* – fire is a common concern in the Region, and many of the rural DACs lack sufficient water supplies to meet domestic demand, much less provide surplus water to assist in firefighting efforts. A history of fires in the Region makes this a critical concern. *C. Long-term solutions* – the project partner will assist in providing training for water resources employees to empower communities to provide for their water needs in the future *E. Improve water supply reliability* – many of the rural DACs that could be helped by this program suffer from inadequate or unreliable water supplies marked by a lack of storage and frequent water outages. This program will fund projects to address these problems through infrastructure improvements.
4. Failsafe Potable Reuse at the Advanced Water Purification Facility	WateReuse Research Foundation	$2,697,016	$5,692,561	-	$5,692,561	*C. Expand scientific foundation for potable reuse* – failsafe potable reuse represents a significant opportunity for water recycling and meeting potable demand. As a newer technology, additional information is necessary in order to assess the benefits, risks, and overall feasibility of a full-scale system. *F. Leverage existing research efforts* – this project builds on existing research efforts at the Advanced Water Purification Facility, and utilizes these data to guide design of failsafe treatment trains. It also

Proposal: San Diego IRWM Implementation Grant, Round 2						
Agency: San Diego County Water Authority						
Project	Project Proponent	Total Present Value Project Costs (1)	Total Present Value Project Benefits			Section D2 – Briefly Describe the Main Non-monetized Benefits*
			Section D3 Monetized (2)	Section D4 Flood Damage Reduction (3)	Total	
(a)	(b)	I	(d)	(e)	(f) = (d) + (e)	(h)
						takes advantage of the educational program at the Facility to conduct community outreach and gain community support. *G. Additional statewide water supply* – data from this project will be used to inform State agencies on the safety and feasibility of direct potable reuse. This technology has the potential to address water supply demand throughout the state, and increase water independence throughout the state.
5. Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Resources	San Diego River Park Foundation	$597,340	$2,875	-	$2,875	*A. Restoration of native habitat* – 4.4 acres will be restored to native habitat following degradation from fire and invasive species. This restoration is expected to provide water quality and habitat benefits in the stream and riparian zone. *F. Scientific knowledge* – data collected through this project can be used to create a baseline for stream health in the watershed, and to assess water quality objectives relevant to similar streams. *G. Community and tribal engagement* – tribes are important local land managers in the project area, and will be worked with closely to monitor water quality and invasive species. Many of the data collection and restoration activities will be conducted by trained volunteers.
6. Chollas Creek Integration Project – Phase II	Jacobs Center for Neighborhood Innovation	$591,454	$38,864	7,953	$46,817	*B. Reduced stormwater runoff* – restoration activities will convert impermeable surfaces to permeable surfaces, reducing runoff through increased infiltration. This leads to a host of benefits including reduced pollutant loading and improved habitat. *H. Community involvement* – This project implements restoration activity identified as meeting community needs and priorities. The design of this project has been community driven, and implementation will further increase community involvement through outreach, education, and volunteer opportunities. *D. Protection of public health* – Arundo removal and homeless encampment clean-ups will reduce risks to public health from sanitation problems, flood, and fire. These activities will also contribute to a safer environment by lowering risks of crime associated with transient access to the creek.

Proposal: San Diego IRWM Implementation Grant, Round 2						
Agency: San Diego County Water Authority						
Project	Project Proponent	Total Present Value Project Costs (1)	Total Present Value Project Benefits			Section D2 – Briefly Describe the Main Non-monetized Benefits*
			Section D3 Monetized (2)	Section D4 Flood Damage Reduction (3)	Total	
(a)	(b)	I	(d)	(e)	(f) = (d) + (e)	(h)
						F. Recreation opportunities – the areas restored through this project will be connected with previously restored areas to create public parkland along the creek. Trails will allow the public to safely experience the creek and its native habitat and provide open space in a disadvantaged neighborhood sorely lacking parkland.
7. Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II	County of San Diego	$1,408,396	$135,008,438	-	$135,008,438	*B. Improved scientific knowledge of the SMR watershed* – data gaps exist to adequately determine appropriate site-specific water quality objectives for the SMR watershed. This project will fill these gaps and provide a complete analysis of water quality and beneficial uses in the watershed, furthering our scientific understanding. *E. Improved water quality and nutrient management* – there is potential that recommended water quality objectives that result from this project will provide for alternate management strategies for nutrient loading management. Improved nutrient management will reduce eutrophication in the water bodies and improve water quality.
Totals		**$33,914,227**	**$348,050,563**	**$7,953**	**$348,058,516**	
Benefit: Cost Ratio					**10.3:1**	
These are only a selection of the non-monetized benefits. For a full description of all benefits, see each project's benefits in the following section						

Benefit and Cost Analysis

For each project, a project abstract and project benefit-cost summary table are followed by sections outlined in the PSP: Non-Monetized Benefits Analysis (Section D2), Monetized Benefit Analysis (Section D3), Flood Damage Reduction Benefits Analysis (Section D4) (where applicable), and Project Benefits and Costs Summary (Section D5).

A number of studies and documents have been used to support the projects included in this proposal. These studies and documents have been referenced as footnotes in this attachment, including specific references to the page locations and sections of the studies or documents that support the claims made in this attachment. **Please note that in accordance with guidance from DWR found on Page 11 of the *Proposal Solicitation Package*, the documents referenced in this section have been provided in an electronic format only (on the supporting CD), and are not included within the printed hard copies that have been mailed to DWR.**

Project 1: North San Diego County Regional Recycled Water Project – Phase II

Project Abstract

NSDCRRWP-Phase II represents a coordinated effort between several North San Diego County water and wastewater agencies to maximize recycled water use within the North San Diego County region. The proposed project includes 10 components designed to regionalize recycled water facilities so that agencies with the ability to generate recycled water in excess of local demand (i.e., within their service area) can provide recycled water to areas where additional supplies are needed. Together, the pipelines, pump stations, storage tanks, and interties constructed in this project will produce an estimated 6,790acre-feet per year (AFY) of recycled water. This will directly offset the use of potable supplies imported through the State Water Project (SWP) and the Colorado River Authority (CRA) via the San Diego County Water Authority (Water Authority) and the Metropolitan Water District (MWD).

The water and wastewater agencies participating in this effort include:

- Leucadia Wastewater District (LWD)
- Vallecitos Water District (VWD)
- Vista Irrigation District (VID)
- Rincon del Diablo Municipal Water District (RMWD)
- Olivenhain Municipal Water District (OMWD)
- Santa Fe Irrigation District (SFID)
- Carlsbad Municipal Water District (Carlsbad MWD),
- City of Escondido
- City of Oceanside
- San Elijo Joint Powers Authority (SEJPA)

Table 8-1 provides a summary of the ten project components incorporated into this grant application. For each component, the table shows the primary project proponent and partner agencies, a brief summary of project activities, and the acre-feet per year (AFY) of recycled water that the project will provide. Across all components, primary activities include construction of recycled water transmission pipelines, connection to and extension of existing distribution systems, and upgrades to recycled water facilities to promote additional recycled water production (e.g., upgrade of pumps and storage tanks).

Table 8-2: Summary of NSDCRRWP-Phase II Project Components
North San Diego County Regional Recycled Water Project – Phase II

Project Component	Project Proponents and Partner Agencies[a]	Project Description	AFY
1-1: LWD Regional System Connection	• LWD • OMWD, Carlsbad MWD (will receive recycled water from LWD)	• Construction of 1,200 feet of recycled water pipeline that will connect to existing OMWD pipeline. Installation of a new high pressure pump station at the existing LWD Gafner WRP to facilitate additional recycled water production	250
1-2: VWD Lift Station No. 1 Pump Improvements	• VWD	• Installation of new wastewater pump at VWD Lift Station No. 1 to increase wastewater flows to VWD's Meadowlark Water Reclamation Facility for treatment to tertiary standards • Overhaul of the lift station's electrical package and discharge pipeline to meet increased flow.	300
1-3: VIDGolf Course Recycled Water Project	• VID • Carlsbad MWD (wholesale provider of recycled water)	• Metered connection from a Carlsbad MWD recycled water main to VID's Shadowridge Water Reclamation Facility (SWRF) failsafe pipeline. • Installation of approximately 400 ft of pipeline from the terminus of the failsafe pipe at the SWRF to an existing VID pipeline. • Installation of a 4-inch potable water meter at golf course irrigation pond for supplemental water and blending.	200
1-4: RMWD Northwest Recycled Water Expansion	• RMWD • City of Escondido (source of recycled water).	• Construction of 3,500 feet of recycled water pipeline to serve customers in the northern portion of the District's service area, and open space areas located westerly near Escondido Country Club. • Installation of 1400 feet of recycled water pipeline to connect to a future filling station for construction water use near the Rockhoff Pump Station	16
1-5: OMWD Conversion of Distribution Facilities to Recycled Water	• OMWD • SEJPA, Carlsbad MWD, and LWD (potential sources of recycled water supply).	Construction of up to 26.500 feet of pipeline and a pump station to facilitate conversion of HOA common areas and schools in the Village Park community of Encinitas (in OMWD's Northwest Quadrant recycled water service area) to recycled water.	350
1-6: SFID Onsite Recycled Water Irrigation System Improvements	• SFID • SEJPA (wholesale recycled water supplier).	Final design and construction of onsite recycled water irrigation improvements (retrofits and/or new systems) to connect SFID customers to SEJPA's existing recycled water distribution system.	50

Project Component	Project Proponents and Partner Agencies[a]	Project Description	AFY
1-7: Carlsbad MWD Recycled Water Pipeline Expansion	• Carlsbad MWD • City of Oceanside (will receive recycled water and retrofit conversion of El Camino Country Club golf course and any location within their boundary)	Extend Carlsbad MWD's existing recycled water system north to the El Camino Country Club located in the City of Oceanside. Construction includes 43,300 feet of pipeline. Water would be used for irrigation of two HOAs, two City parks, the Plaza Camino Real, an elementary school, a private golf course driving range, median landscaping, and El Camino Country Club.	454
1-8: Escondido Recycled Water Easterly Main Extension	• City of Escondido	Construction of approximately 5.1 miles of recycled water transmission main to connect agricultural connections to the existing recycled water system.	4,570
1-9: Oceanside Reclaimed Water Main Extension	• City of Oceanside • VID • Carlsbad MWD (provider of recycled water)	Construction of 14,440 ft. of pipeline to extend existing recycled water distribution system. This includes pipeline extension from Faraday (in Carlsbad MWD service area) to Melrose (in VID service area) to serve the Shadowridge Golf Course and two schools, and an extension to the west to serve the Ocean Hills golf course and greenbelt areas in Oceanside service area.	600
1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage	• SEJPA • OMWD, SDWD (partnering agencies in conversion of the 3MG tank)	Evaluation of two tanks for conversion to recycled water storage, with ultimate conversion of one tank. The first is a 3 MG potable water tank owned by OMWD and San Dieguito Water District. SEJPA provides both districts recycled water and has existing distribution pipelines near the tank. Conversion of this tank would allow expansion of recycled water use to the eastern portions of the City of Encinitas. The second tank is a 1 MG wastewater equalization tank located at the San Elijo Water Reclamation Facility, and would provide recycled water storage for SEJPA's four water purveyors.	*
a. Primary project proponent is listed as the first partner agency			
** Storage for component 1-5*			

Summary Project Benefits and Costs

A summary of all benefits and costs of the project are provided in Table 8-3. A description of the monetized benefits and non-monetized benefits are presented in the following sections, while physically quantified (but not monetized) benefits are described in Attachment 7.

As shown in Table 8-3, the present value (PV) of monetized benefits outweighs the PV costs by a considerable margin. Benefits are lettered for cross-reference with Attachment 7, and are therefore not represented in order in the following sections.

Table 8-3. Benefit-Cost Analysis Overview

North San Diego County Regional Recycled Water Project – Phase II

	Present Value
Costs – Total Capital and O&M	**$22,603,039**
Monetizable Benefits	
A-Avoid Imported Water Supply Purchases	$174,893,215
J-Avoid Fertilizer Costs due to Recycled Water Use	$995,100
C-Reduce Net Production of Greenhouse Gases	$2,238,929
Total Monetizable Benefits	**$178,127,244**
Physically Quantified Benefits	**Project Life Total**
F-Reduce Demand for Net Diversions from the Bay-Delta	407,400 AF
Qualitative Benefit or Cost	**Qualitative Indicator***
B-Avoid Economic Losses Due to Reduced Agricultural Production	+
G-Provide Social Recreation or Access Benefits	+
K-Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts	+
D-Benefit Wildlife or Habitat in Bay-Delta Through Reduced Imports	+
E-Improve Water Quality Through Reduced Imports	+
H-Provide a Long-Term Solution in Place of a Short-Term One	+
I-Improve Water Supply Reliability Due to Use of Local Sources	++
M-Avoid O&M Costs Associated with Ocean Outfall Discharge	**+**
L-Avoid Costs Associated with Upsizing Escondido Land Outfall	**+**

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Non-Monetized Benefits Analysis (Section D2)

Narrative descriptions of the benefit categories marked “Yes” in DWR’s *Proposal Solicitation Package* Table 12 are provided below.

G-Provide Social Recreation or Access Benefits

By switching to recycled water, customers participating in the project will be much less likely to be subject to watering restrictions during times of drought. Thus, open space areas, golf courses, parks, and other recycled water customers that provide recreational or aesthetic services can continue to irrigate their landscape/turf areas regardless of drought conditions (thus remaining green during dry periods). This will improve the aesthetics and enjoyment of these areas and, in extreme cases, may avoid closures that would otherwise be necessary to prevent further turf damage (e.g., on playing fields, parks, and golf courses).

K-Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts

This project helps to meet requirements set forth in California Senate Bill X7-7 (2009), which sets an overall goal for urban water suppliers of reducing per capita water use by 20% by December 31, 2020 (and by at least 10% by December 31, 2015). Under this legislation, the use of recycled water in lieu of potable supplies can be counted as a reduction in per capita use. With the *NSDCRRWP-Phase II*, an additional 6,790 AFY of recycled water will be made available, contributing to the Region's SBx7-7 goal.

This project also helps to meet statewide goals to increase use of recycled wastewater by at least 1 million AFY by 2020 and by at least 2 million AFY by 2030.[1]

B-Avoided Economic Losses Due to Reduced Agricultural Production

C*omponent 1-8: Escondido Recycled Water Easterly Main Extension* will supply a total of 4,570 AF of recycled water to farmers in San Diego County. This water will be used to irrigate up to 870 acres of agricultural land within the Escondido service area (no other components involve the use of recycled water for agricultural irrigation).[2]

Agriculture is a primary component of economic activity in Escondido and San Diego County. Agriculture supports more than $5.1 billion of economic activity in the County[3], with crop value (sales) totaling more than $1.68 billion.[4] The County has the 12th largest farm economy among more than 3000 farm counties in the United States and is the top producer of avocados and nursery crops in the nation.[5]

Within the Escondido component area (870 acres), avocado is the primary crop grown, along with small patches of citrus. In recent years, farmers in the area have been subject to water rate increases on imported water. In 2012, the City of Escondido raised agricultural water rates by 12% in order to cover rising MWD rates and fixed costs associated with their water infrastructure and delivery system. As described in Attachment 7, avocado growers provided figures on average annual irrigation demands for avocados, amounting to 5 AF per acre.[6]

In Escondido, farmers currently pay between $1,200 and $1,300 per acre foot for imported water supplies (their primary source of water).[7] Based on the current cost of imported water and a demand of 5 AF per acre, water costs for avocados can range from $6,000 to $6,500/acre per year.[8] Given an average production of 5,000 lbs of avocados per acre (the average yield in CA for the last 5 years), and a price of $1 per pound, avocado crops are currently valued at approximately $5,000 per acre.[9] Thus, farmers can barely cover their water costs, much less costs associated with labor, supplies, and other inputs.[10] Avocado and other farmers in the region have indicated that further price increases may force them to shut down their operations.[11]

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[1] State Water Resources Control Board. 2009. Recycled Water Policy. Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/recycledwaterpolicy_approved.pdf. Accessed March 2013

[2] City of Escondido. *2012. Easterly Recycled Water Main Extension Preliminary Design Report*. August 2012. Page 2-1.

[3] San Diego County Farm Bureau, website: http://sdfarmbureau.org/SD-Ag/Ag-Facts.php, accessed March 14, 2013.

[4] Department of Agriculture, Weights and Measures, County of San Diego. 2012. *2011 Crop Statistics and Annual Report*. Pg. 1.

[5] San Diego County Farm Bureau, website: http://sdfarmbureau.org/SD-Ag/Ag-Facts.php, accessed March 14, 2013.

[6] City of Escondido. *2012. Easterly Recycled Water Main Extension Preliminary Design Report*. August 2012. Page 2-1.

[7] Bender, G. 2012.Avocado Farming with High-Priced Water. Can It Remain Profitable? Tropics in Subtropics – ANR Blogs.

[8] Bender, G. 2012.Avocado Farming with High-Priced Water. Can It Remain Profitable? Tropics in Subtropics – ANR Blogs.

[9] Bender, G. 2012.Avocado Farming with High-Priced Water. Can It Remain Profitable? Tropics in Subtropics – ANR Blogs.

[10] Bender, G. 2012.Avocado Farming with High-Priced Water. Can It Remain Profitable? Tropics in Subtropics – ANR Blogs.

[11] Escondido City Council Meeting minutes, December 14, 2011

Given the high value of avocado and agriculture in general to the San Diego County economy, this would potentially result in substantial economic impacts. Loss of the 870 acres of farmland intended for recycled water service in the Eastern Block would result in $4,350,000 in annual lost crop productivity should those farmers fallow or abandon their crops. The proposed project will help to avoid these losses by providing a much less expensive and more reliable source of water supply for farmers within the Escondido region.

Although this is a substantial benefit for the region, it is not included in benefit cost tables because it is not known how many farmers would go out of business if they do not receive recycled water. It is also not clear how market forces willaffect profitability (i.e., as some farmers leave the market, supply will decrease, and prices may increase for the remaining farmers).

D-Benefit Wildlife or Habitat in Bay-Delta Through Reduced Imports

As members of the Water Authority, the water supply agencies participating in this project receive imported water supplies. Although the Water Authority and its member agencies use a mix of imported water and local sources to supply their customers, imported water is more expensive to provide and is the marginal water source. Thus, reduced overall potable water demand due to increased use of recycled water will be used to reduce reliance on imported water supplies exclusively. Consistent with the mix of Water Authority imported supplies, it is assumed that two-thirds of the recycled water (about 4,700 AF) generated by the proposed project will offset SWP supplies. The remaining one-third (2,350 AF) will offset the use of imported water from the CRA.

By reducing the use of imported SWP water, the *NSDCRRWP – Phase II* will augment in-stream flows in Sacramento-San Joaquin River Delta (which provides the means by which the SWP delivers water from Northern California tothe south) or will offset other diversions that may otherwise reduce flows. Reduced demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

E-Improve Water Quality Through Reduced Imports

SWP water has a number of water quality constituents that affect its suitability as a drinking water source. SWP water contains relatively high levels of bromide and total organic carbon (TOC), two elements that are of particular concern to drinking water agencies. Bromide and TOC combine with chemicals used in the water treatment process to form disinfection byproducts (DBPs) such as trihalomethanes (THMs) and bromate. Currently, there are no standards for bromide or TOC in drinking water. However, current levels of bromide and TOC are significantly higher than target levels identified by an expert panel hired by the California Urban Water Agencies. These levels are 50 parts per billion (ppb) for bromide and 3 parts per million (ppm) for TOC. Average SWP levels are significantly higher: up to 600% above the target level for bromide and 10% above the target level for TOC.[12]

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to their customers. However, poor-quality source water makes it increasingly expensive and difficult to meet such standards. Increased levels of constituents that aid in the formation of THMs, bromate, and other DBPs of public health concern can mean more time spent monitoring finished water in the distribution system, and the need to increase the use of expensive water treatment and disinfection processes. Increased levels of these constituents may also lead to the use of increased proportions of groundwater in the blend of water supplies in order to control THMs. However, reduced imports of SWP water will reduce the need for such preventative measures.

F-Reduce Demand for Net Diversions from the Bay-Delta

As members of the Water Authority, the water supply agencies participating in this project receive imported water supplies. SDCWA purchases this water from MWD, which obtains its water from two sources: the CRA, which it owns and operates, and the SWP, with which MWD has a water supply

[12] Owen, D.M., P.A. Daniel, and R.S. Summers. 1998. Bay-Delta Water Quality Evaluation Draft Final Report. California Urban Water Agencies.D.M. Owen, Malcolm Pirnie, Inc.; P.A. Daniel, Camp, Dresser and McKee; and R.S. Summers, University of Cincinnati (Expert Panel).Prepared by California Urban Water Agencies. June.

contract through the state of California. Imported water purchases from MWD account for about 80% of SDCWA supplies. About two-thirds of this water is imported through the SWP, while the remainder comes from the CRA.[13]

The Water Authority and its member agencies use a mix of imported water and local sources to supply their customers. Reduced overall potable water demand due to increased use of recycled water will be used to reduce reliance on imported water supplies. Consistent with the mix of Water Authority imported supplies, it is assumed that two-thirds of the recycled water (about 4,700 AFY) generated by the proposed project will offset SWP supplies. This will augment in-stream flows in the Delta or will offset other diversions that may otherwise reduce flows.

H-Provide a Long-Term Solution in Place of a Short-Term One

The availability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought, changes in snowpack and earthquakes, to environmental regulations, water rights determinations, and associated legal challenges and Court rulings. Local groundwater is also limited in some areas of North San Diego County, highlighting the need for additional reliable sources of water to meet current and future demands under all hydrologic conditions. The proposed project offers a drought-resistant water supply source and long-term solution that will reduce continued reliance on unsustainable water supply sources.

I-Improve Water Supply Reliability Due to Use of Local Sources

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The proposed project will help address reliability issues for Northern San Diego County water supply agencies by offsetting the use of imported water delivered by the Water Authority. As noted above, the reliability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to environmental regulations and water rights determinations.

Although interest in water supply reliability is increasing (e.g., due to increasing water demands and concerns over climate-related events), only a few studies have directly attempted to quantify its value (i.e., through nonmarket valuation studies). The results from these studies indicate that residential and industrial (i.e., urban) customers seem to value supply reliability quite highly. Stated preference studies find that water customers are willing to pay $100 to more than $500 per household per year for total reliability (i.e., a 0% probability of their water supply being interrupted in times of drought).

The challenge in applying these values to determine a value of increased reliability as a result of *NSDCRRWP-Phase II* is recognizing how to reasonably interpret these survey-based household monetary values. The values noted above reflect a willingness to pay per household to ensure complete reliability (zero drought-related use restrictions in the future), whereas *NSDCRRWP-Phase II* only enhances overall reliability and does not guarantee 100% reliability. Thus, if applied directly to the number of households within the Water Authority service area, the dollar values from the studies would overstate the reliability value provided by the project.

A simple way to roughly adjust for this “whole versus part” problem is to attribute a portion of the total value of reliability to the portion of the problem that is solved by the project. To adjust for the partial improvement in reliability from *NSDCRRWP-Phase II*, it is assumed that household willingness to pay for improved reliability is directly proportional to the amount of recycled water that will offset imported water, as a percentage of the total potable water supply. This represents the percentage of total supply that has been improved in terms of overall reliability (i.e., by offsetting imported water demand with local sources).

For example, the project will offset more than 6,790 AFY of imported water. The Water Authority’s *2010 Urban Water Management Plan* reports that total imported water demand in 2010 for the ten agencies in this project was approximately 107,552 AF, which is projected to increase to 132,520 AF by 2020.[14]

[13] Equinox Report. 2010.*San Diego’s Water Sources: Assessing the Options*, July 2010.

[14] San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 2-14.

Therefore, in 2020, about 5.1% of total imported water demand will be met by recycled water made available by this project. To obtain a lower bound estimate for the value of improved reliability associated with this water, it is assumed that households within the collective service areas are willing to pay about $5.10 per year for improved reliability of supplies ($100 multiplied by 5.1%). Applying this per household dollar value to the approximately 280,457 households within the collective service areas in 2020[15] would result in $1,430,330 of benefits. Taking into account increasing population and changing demands, this calculation could be completed for each year of the project's useful life.

Due to the uncertainty involved in applying these numbers to this situation, this benefit estimate is not included in the tables. However, it is provided here to give an idea of the potential magnitude of this benefit.

L-Avoid Costs Associated with Upsizing Escondido Land Outfall

The City of Escondido owns and operates its own treatment and disposal facility. The City's Hale Avenue Resource Recovery Facility (HARRF) treats influent from Escondido and the City of San Diego's Rancho Bernardo Community. Wastewater effluent from the plant is discharged to the Escondido Land Outfall, which ultimately connects to the San Elijo JPA ocean outfall.[16]

Based on the City's 2009 *Indirect Potable Reuse Feasibility Study*[17], projected wet weather flow through the Escondido Land Outfall is expected to be 49.0 mgd in 2030. Current capacity at the outfall is about 23.7 mgd. Thus, in order to avoid exceeding the Escondido Land Outfall capacity, at least 25.3 mgd of HARRF effluent will need to be diverted to another method of disposal (e.g., recycled water use) during wet weather months (January through March). During dry weather months (April through December), it is estimated that 3.8 mgd will need to be diverted to another method of disposal or used as recycled water in order to avoid expanding the capacity of the outfall. Thus, an average of 9.18 mgd, or 10,277 AFY, will need to be produced throughout the year in order to avoid expanding capacity.

The Escondido component (*Component 1-8: Escondido Recycled Water Easterly Main Extension*) will generate 4,570 AFY of recycled water, or about 44% of the total 10,277 AFY needed to avoid expanding the land outfall[18]. The City estimates that expanding the outfall will cost about $400 million. Attributing 44% of this cost to the Escondido component would result in total avoided costs associated with the project of about $178 million.

This benefit is included as a non-monetized benefit because the $400 million estimate is a rough estimate that was calculated for the purposes of a grant application for indirect potable reuse. No specific source for this estimate can be found. In addition, it is not known exactly when the outfall would need to be built. Therefore, the present value of this benefit was not calculated.

M-Avoid O&M Costs Associated with Ocean Outfall Discharge

Without the project, North San Diego County water and wastewater agencies would continue to discharge 6,790 AFY of wastewater effluent (treated to secondary standards) through various local outfalls, including three ocean outfalls (Oceanside, Encina, and SEJPA ocean outfalls) and 1 land outfall (the Escondido land outfall, which ultimately connects to the SEJPA ocean outfall). With the project, the effluent is treated to tertiary standards and used as recycled water. Discharge of 6,790 AFY through the outfalls, and associated costs, are therefore avoided as a result of the project.

The O&M costs associated with pumping treated wastewater (if it were not recycled) through the Escondido Land Outfall and/or one of the three ocean outfalls would be avoided with the project. Recycled water customers are generally within close proximity of treatment plants. Pumping costs associated with recycled water are therefore typically lower than pumping costs associated with

[15] Estimate calculated based on the projected 2020 population documented in the 2010 UWMP for each agency. Population was divided by 2.79 persons per household (based on Census data for San Diego County) to obtain household estimate.

[16] City of Escondido.2011, *2010 Urban Water Management Plan*.

[17] Brown and Caldwell. 2009. *Indirect Potable Reuse Feasibility Study.* July 22, 2009.

[18] This analysis assumes that recycled water can be stored during the winter months in order to accommodate daily flows at the outfall.

discharging to the ocean outfalls due to far shorter pumping/transport distances. However, these distances and associated pumping requirements have not been accurately quantified. This benefit is therefore included as a non-monetized benefit for this analysis.

Monetized Benefit Analysis (Section D3)

A-Avoid Imported Water Supply Purchases

By expanding the use of recycled water within Northern San Diego County, this project will directly offset the use of 6,790 AFY of imported water provided to the participating agenciesby Water Authority. The Water Authority is the water wholesaler to water agencies in San Diego County, and purchases water through the Metropolitan Water District (MWD). MWD obtains its water from two sources: the Colorado River Aqueduct, which it owns and operates, and the SWP, with which MWD has a water supply contract through the state of California. Currently, imported water purchases from MWD account for about 59% (331,825 AF) of Water Authority supplies.[19]

Although SDCWA and its member agencies use a mix of imported water and local sources to supply their customers, imported water is more expensive to provide than most sources, and it is not considered to be a very reliable source of supply (see I-Improve Water Supply Reliability Due to Use of Local Sources). For this analysis, imported water is therefore considered the marginal water source for North San Diego County water supply agencies. Thus, reduced overall water demand due to increased use of recycled water will be used to reduce reliance on imported water supplies exclusively.

To calculate the avoided costs of imported water over time, the amount of imported water avoided each year is multiplied by the projected cost of imported water. For this analysis, it is assumed that the project will avoid Tier 1 treated MWD water supplies because this is the primary source of water obtained by the participating agencies and the extent of Tier 2 versus Tier 1 future usage is unknown. In 2012 and 2013, the cost of Tier 1 treated water for SDCWA retail customers amounted to $1,148 and $1,259 per AF of water delivered, respectively.

In recent years, annual MWD rate increases have averaged about 6% in nominal terms (i.e., including inflation). For this analysis, we assume that the cost of imported supplies will continue to increase at this rate through 2020 based on MWD's current and planned financial commitments. After adjusting for annual inflation of about 2.5%[20], the cost of imported water is therefore expected to increase annually by 3.5% in real terms over this time period. Beginning in 2021, a 1.5% annual real increase in water rates is assumed through the end of the project life. Appendix X provides additional documentation on the avoided imported water costs and escalation rates assumed for this analysis.

Given the construction schedule for the ten components incorporated into *NSDCRRWP-Phase II*, the overall project will avoid a total of 407,400 AF of imported water over the expected 60-year project life. Based on the assumptions described above and applying a discount rate of 6% (per DWR's PSP Guidelines), total present value benefits associated with the avoided purchase of this water amounts to $174,893,215 a 60-year project life.

J-Avoid Fertilizer Costs Due to Recycled Water Use

Fertilizing compounds commonly present in recycled water (e.g., nitrogen, phosphorus, potassium) are typically not found in potable water at levels of significance. Thus, the use of recycled water for landscape irrigation will reduce fertilizer costs associated with the properties that will be serviced by the project.

The exact offset of fertilizer use from using recycled water is difficult to predict due to daily and seasonal nutrient variations in the recycled water. However, the amount of nutrients (i.e., pounds of fertilizer) per AF of recycled water can be calculated from average (tertiary-treated) effluent values for the City of Escondido's HARRF which will produce a majority of the project supply. The HARRF permit limitation for

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[19] San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 6-1, Section 6, Metropolitan Water District of Southern California.

[20] Based on long-range Consumer Price Index (CPI) projections from the Federal Reserve Bank of Philadelphia of 2.3% per year, for 2013 through 2022.

nitrate ($N0_3$ as N) is 10 mg/L and the reported 12-month average is 8.66 mg/L.[21] Thus, for every AF of recycled water used in lieu of potable water, recycled water customers will avoid the use of a total of 23.6 lbs of fertilizer (8.66 mg/L divide by 453,592 mg/pound times 1,233,481.84 Liter/AF = 23.6 lbs/AF). The weighted average commercial value of this fertilizer is $0.46/lb.[22]

For the 6,790 AF of recycled water applied each year in lieu of imported water, recycled water customers serviced by the project will avoid the use of 160,244 lbs/year of fertilizer. This will result in avoided costs of $73,712 annually (undiscounted)[23]. Over the 60-year lifetime of the project, total present value avoided fertilizer costs will amount to $995,100. Additional benefits would be expected for avoided fertilizer costs due to increased levels of phosphorus and potassium in recycled water compared to potable supplies.

C-Reduce Net Production of Greenhouse Gases

As described in Attachment 7, reduced reliance on imported water will avoid the extensive energy requirements associated with transporting water from Northern California and the Colorado River to San Diego County. This in turn will result in avoided CO2 emissions (a GHG) associated with the production of this energy.

To calculate avoided CO2 emissions with the project, we multiplied the amount of energy required to treat and convey 6,790 AF of water (2.65 MWh/AF[24]) by the average carbon emissions rate associated with energy production in California (0.354 MT/MWh). We performed the same calculation for recycled water (using an average energy use of 0.800 MWh/AF[25]). This provided us with the annual net reduction in CO2 emissions resulting from the project. By avoiding 6,790 AFY of imported water (at full implementation), the project will result in a net reduction in CO2 emissions of 4,447 MT per year. Given the schedule for project construction (with some benefits beginning to accrue in 2014), total net CO2 emissions reductions amount to 266,833 MT over the 60-year project life.

To monetize this benefit, we applied the dollar value assigned to greenhouse gas (GHG) emissions, measured in carbon dioxide equivalent (CO2e). The social cost of carbon is estimated as the aggregate net economic value of damages from climate change across the globe, and is expressed in terms of future net benefits and costs that are discounted to the present.[26] In February 2010, the U.S. Government's Interagency Working Group on Social Cost of Carbon issued guidance[27] on recommend values for the social cost of carbon for use in regulatory benefit-cost analysis. The recommended mean estimate of the social cost of reducing one metric ton (MT) of CO2 in 2012 is $22.53/MT(updated from 2010 values using CPI), with a range of values from $4.95 to $68.33 per MT. The recommended mean estimate of the social cost of carbon reflects the worldwide net benefits of reducing CO2 emissions. Estimates of the portions of the net benefits occurring in the United States range from 7% to 23% of the worldwide social cost of carbon.

For this analysis, the average value of $22.53/MT was used when calculating social benefits and costs, which produces conservative estimates for the benefits and costs associated with GHG emissions. To determine total costs over the 60-year project period, we escalate the social cost of carbon by 2.4% per

[21] City of Escondido. 2011. *City of Escondido Recycled Water Master Plan*. June. Appendix A, page D-4 and D-6.

[22] This represents the average weighted cost of nitrogen and phosphorus. Source: Asano, 1981, updated to 2006 using the national fertilizer price index. Updated from 2006 to 2012 based on the Consumer Price Index (CPI).

[23] Numbers do not add exactly due to rounding.

[24] Equinox Center. 2010. *San Diego's Water Sources: Assessing the Options*, July 2010. pg. 10

[25] Equinox Center. 2010. *San Diego's Water Sources: Assessing the Options*, July 2010. pg. 10

[26] IPCC. 2007. Summary for policymakers. In *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson (eds.). Cambridge University Press, Cambridge, UK. pp. 7–22.

[27] Interagency Working Group. 2010. Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866. Interagency Working Group on Social Cost of Carbon, United States Government.February. Available: www.epa.gov/oms/climate/regulations/scc-tsd.pdf. Accessed 7/13/2011.

year, which is above the general rate of inflation. The social cost of carbon will increase in future years because CO2 will produce larger incremental damages as physical and economic systems become more stressed in responding to greater climate change.

Over the 60-year project life, total present value benefits associated with avoided social costs of carbon amount to $2,238,929.

Summary of Monetized Benefits

Table 8-4 summarizes the annual benefits from the project, including: avoided imported water supply costs, avoided fertilizer costs, and reduced social costs associated with CO_2 emissions.

Table 8-4: Annual Benefits (PSP Table 15)
North San Diego County Regional Recycled Water Project – Phase II

Annual Benefit (All benefits should be in 2012 dollars)									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
2014	Imported water supply	AF	36	0	36	$1,303	$46,911	0.890	**$41,750**
	Fertilizer use	lbs	842	0	842	$0.46	$387	0.890	**$345**
	Reduction in GHG production	MT	23	0	23	$23.62	$553	0.890	**$492**
2015	Imported water supply	AF	912	0	912	$1,349	$1,229,994	0.840	**$1,032,727**
	Fertilizer use	lbs	21,519	0	21,519	$0.46	$9,899	0.840	**$8,311**
	Reduction in GHG production	MT	597	0	597	$24.19	$14,447	0.840	**$ 12,130**
2016	Imported water supply	AF	5,364	0	5,364	$1,396	$7,487,507	0.792	**$5,930,806**
	Fertilizer use	lbs	126,594	0	126,594	$0.46	$58,233	0.792	**$46,126**
	Reduction in GHG production	MT	3,513	0	3,513	$24.77	$87,031	0.792	**$68,937**
2017	Imported water supply	AF	6,582	0	6,582	$1,445	$9,509,259	0.747	**$7,105,871**
	Fertilizer use	lbs	155,327	0	155,327	$0.46	$71,450	0.747	**$53,392**
	Reduction in GHG production	MT	4,311	0	4,311	$25.37	$109,350	0.747	**$81,713**
2018 - 2073	Imported water supply	AF	6,790	0	6,790	Variable	Variable	Variable	**$159,442,478**
	Fertilizer use	lbs	160,244	0	160,244	$0.46	$73,712	Variable	**$882,900**
	Reduction in GHG production	MT	4,447	0	4,447	Variable	Variable	Variable	**$2,051,490**
2074	Imported water supply	AF	6754	0	6,754	$3,579	$24,173,369	0.027	**$652,189**
	Fertilizer use	lbs	159402	0	159,402	$0.46	$73,325	0.027	**$1,978**
	Reduction in GHG production	MT	4423.85	0	4,424	$98.03	$433,670	0.027	**$11,700**
2075	Imported water supply	AF	5878	0	5,878	$3,633	$21,353,632	0.025	**$543,503**
	Fertilizer use	lbs	138725	0	138,725	$0.46	$63,814	0.025	**$1,624**
	Reduction in GHG production	MT	3849.99	0	3,850	$100.38	$386,472	0.025	**$9,837**
2076	Imported water supply	AF	1426	0	1,426	$3,687	$5,258,087	0.024	**$126,256**

Annual Benefit (All benefits should be in 2012 dollars)									
(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (1) (f) x (g)	(i) Discount Factor (1)	(j) Discounted Benefits (1) (h) x (i)
	Fertilizer use	lbs	33650	0	33,650	$0.46	$15,479	0.024	**$372**
	Reduction in GHG production	MT	933.87	0	934	$102.79	$95,994	0.024	**$2,305**
2077	Imported water supply	AF	208	0	208	$3,743	$778,462.31	0.023	**$17,634**
	Fertilizer use	lbs	4917	0	4,917	$0.46	$2,262	0.023	**$51**
	Reduction in GHG production	MT	136.45	0	136	$105.26	$14,363	0.023	**$325**
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$178,127,244**

Project Benefits and Costs Summary (Section D5)

Project Economic Costs

Total capital costs for the project amount to $19,150,228. Direct construction and implementation costs account for $18,849,668 (about 98%) of total project costs. Project administration, planning, design, environmental documentation and compliance, and mitigation costs account for the remainder of the capital budget. In addition to the project capital costs borne by the project proponents, agricultural customers receiving recycled water from the Escondido subproject will pay to connect to the recycled water system. The project proponent estimates that these costs will amount to $2,160,000 based on assumed pipe size of 8-inch (main lines from tank) and 4-inch (lines to extent of agricultural properties). This is included as an additional project cost for the purposes of this analysis and assumes the agricultural connections are constructed immediately after completion of the recycled water main extension to take advantage of lower recycled water rates.

O&M costs associated with the various subprojects will total about $281,758 per year. Based on the planning criteria included in the *North San Diego County Regional Recycled Water Project Facilities Plan*, annual O&M costs for pipeline and pressure reducing stations are assumed to equal 1% of capital costs and O&M costs for pump stations are assumed to equal 5% of capital costs.[28] O&M would include staff costs for operation (e.g., exercising valves) and maintenance, including both staff costs and purchase of materials (e.g., grease or oils for motors, floats for PRVs). In addition, the VWD and OMWD components will both require periodic replacement costs associated with the pumps being installed as part of these projects. These costs will amount to $451,023 and $748,500, respectively, and will be incurred every 15 years.

Table 8-5 shows the capital and O&M costs associated with each component of the overall *NSDCRRWP-Phase II* project.

[28] RMC Water & Environment.2012. *North San Diego County Regional Recycled Water Project Facilities Plan*.May.Appendix B.

Table 8-5: Total Costs for NSDCRRWP-Phase II
North San Diego County Regional Recycled Water Project – Phase II

Component	Facility	Total Capital Cost	Total O&M (annual)	Replacement Costs (every 15 yrs)
1-1: LWD Regional System Connection	Pipe	2,000,000	20,000	-
1-2: VWD Lift Station No. 1 Pump Improvements	Pump	451,023	22,551	451,023
1-3: VID Golf Course Recycled Water Project	Pipe	799,000	7,990	-
1-4: RMWD Northwest Recycled Water Expansion	Pipe	572,806	5,728	-
1-5: OMWD Conversion of Distribution Facilities to Recycled Water	Pipe	3,569,300	35,693	-
	Pump	748,500	37,425	748,500
1-6: SFID Onsite Recycled Water Irrigation System Improvements	Pipe	347,500	3,475	-
1-7: Carlsbad MWD Recycled Water Pipeline Expansion	Pipe	3,283,871	32,839	-
1-8: Escondido Recycled Water Easterly Main Extension	Pipe	4,489,200	44,892	
1-9: Oceanside Reclaimed Water Main Extension	Pipe	2,116,527	21,165	-
1-10: SEJPA Conversion of Existing Tanks to Recycled Water Storage	Tank	471,941	50,000	-
Subtotal		**18,849,668**	**281,758**	**1,199,523**
Design and Administration		**300,560**		
Total Project Costs		**19,150,228**		

In total, the present value capital and O&M costs associated with the project amount to $22,603,039 over the 60-year project life. Table 8-6 summarizes the economic project costs for the project

Table 8-6: Total Project Cost Schedule
North San Diego County Regional Recycled Water Project – Phase II

Year	NSDCRRWP-Phase I	NSDCRRWP-Phase II (this work plan)	Agricultural Connections
2011	$500,000		
2012	$500,000		
2013	$500,000	$766,009	
2014	$500,000	$5,745,068	
2015		$8,617,603	
2016		$3,830,046	
2017		$191,502	
2018			$1,080,000
2019			$1,080,000
Total	**$2,000,000**	**$19,150,228**	**$2,160,000**

Table 8-7: Annual Costs (PSP Table 19)

North San Diego County Regional Recycled Water Project – Phase II

Table 19 – Annual Costs of Project										
(All costs should be in 2012 Dollars)										
	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost(1)	Annual Costs (2)						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2013	$766,009			$1,909				$767,918	0.943	$724,451.28
2014	$5,745,068			$33,458				$5,778,526	0.890	$5,142,867.38
2015	$8,617,603	$1,440,000		$152,870				$10,210,473	0.840	$8,572,910.41
2016	$3,830,046	$720,000		$263,038				$4,813,084	0.792	$3,812,413.50
2017	$191,502			$279,705				$471,207	0.747	$352,113.18
2018-2030				$283,038				$283,038	Variable	$1,872,366
2031				$283,038		$451,023		$734,061	0.331	$242,616.78
2032				$283,038		$748,500		$1,031,538	0.312	$321,638.49
2033-2046				$283,038				$283,038	Variable	$820,307
2047				$283,038		$451,023		$734,061	0.130	$95,505.19
2048				$283,038		$748,500		$1,031,538	0.123	$126,611.80
2049-2062				$283,038				$283,038	Variable	$322,911
2063				$283,038		$451,023		$734,061	0.051	$37,595.26
2064				$283,038		$748,500		$1,031,538	0.048	$49,840.26
2065-2073				$283,038				$283,038	Variable	$93,016
2074				$279,697				$279,697	0.027	$7,546.12
2075				$236,654				$236,654	0.025	$6,023.43
2076				$78,767				$78,767	0.024	$1,891.33
2077				$18,333				$18,333	0.023	$415.30
Total Present Value of Discounted Costs (Sum of Column (j)) Transfer to Table 17, column (c), Proposal Benefits and Costs Summaries										**$22,603,039**

Benefits and Costs Summary

As shown in Table 8-4 above, the total present value benefits associated with the *NSDCRRWP – Phase II* amount to $178,127,244 over the expected 60-year lives of the various project components. The total present value cost of the project (including capital and O&M costs) is $22,603,039. The proposed project will therefore result in total present value net benefits of $155,524,205.

Total monetized benefits include avoided imported water supply costs, avoided fertilizer costs, and reduced social costs associated with CO2 emissions. In addition to monetized benefits and costs, the proposed project will also result in the non-monetized benefits associated with avoided economic losses due to agricultural production, social recreation/access benefits due to recycled water customers being able to irrigate during times of drought, helping to meet state mandates associated with water recycling, reduce demand for net diversions and associated benefits to wildlife or habitat by reducing stress on the Bay-Delta ecosystem, avoided costs associated with upsizing Escondido Land Outfall, and avoided O&M costs associated with ocean outfall discharge.

Omissions, Biases, and Uncertainties

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biasesassociated with monetizing these benefits. In this analysis, the main uncertainties are associated with avoided imported water supply purchases, avoided fertilizer costs, and reduced social costs associated with CO2 emissions. These issues are listed in Table 8-8

Table 8-8. Omissions, Biases, and Uncertainties, and Their Effect on the Project
North San Diego County Regional Recycled Water Project – Phase II

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
A-Avoid Imported Water Supply Purchases	-	Benefits associated with avoided imported water are dependent on full use of the 6,790 AF made available by the project. If less recycled water is used, benefits will decrease proportionately.
A-Avoid Imported Water Supply Purchases	U	The calculation of avoided imported water costs assumes that MWD water rates will increase annually (in real terms) by 3.5% through 2020. Beyond 2020, a 1.5% real increase in water rates is assumed. These projections are based on existing and planned MWD financial commitments and recent increases in MWD rates. It is uncertain whether actual future rate increases will be above or below these assumed rate increases.
C-Avoid Fertilizer Costs due to Recycled Water Use	-	This benefit is dependent on the knowledge and behavior of the landscape manager, as well as the use of the recycled water provided by this project exclusively for irrigation. If the landscape manager does not reduce fertilizer use on a 1:1 ratio with the increased nutrients in the recycled water, then this benefit will be reduced. In addition, if less recycled water is used for irrigation than the full 6,790, then less fertilizer use will be avoided.
Avoided Social Costs of CO2 Emissions	U	The estimate used to calculate the value of reduced carbon emissions represents the mid-point of estimates from the literature. The true social cost of carbon may be higher or lower than the estimate used here.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease benefits.
— = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program

Project Abstract

The *Turf Replacement and Agricultural Irrigation Efficiency Program* will provide financial incentives, technical assistance, on-site support and guidance, training, and resource lists to encourage and support projects that improve irrigation efficiency and reduce water use in urban landscapes and agricultural lands. There are two components of this program:

1. *Turf Replacement Program*: Turf replacement s will be incentivized through cash rebates once projects are completed according to program guidelines. The San Diego County Water Authority (Water Authority) will manage the overall grant and administer the incentive program for customers participating throughout its service area, except for those customers located within the City of San Diego's (City's) service area. The City of San Diego Public Utilities Department (Water Conservation Program) will administer the incentive program for customers within its own service area and service areas for which it supplies wholesale water such as Coronado and Imperial Beach, and the City of San Diego Transportation & Storm Water Department (Think Blue/Storm Water Pollution Prevention Program) will provide education and outreach regarding the incentive program with an emphasis on dry weather runoff prevention and water quality protection that are achieved with improvements to irrigation efficiency within the City. This program component has been implemented by the Water Authority and the City for several years, and is ready for continued implementation.

2. *Agricultural Irrigation Efficiency Program*: The Water Authority will also administer a program component that provides incentives for agricultural customers to retrofit on-site potable irrigation systems to increase water use efficiency. This program will provide incentives to retrofit potable water irrigation systems to recycled water irrigation systems. This program component has been designed, and is ready for implementation.

The financial incentives, training, and education that are the main components of this program will encourage customers to replace turf grass and upgrade irrigation systems in urban landscapes and increase water use efficiency in the agricultural sector. This program is designed to reduce regional water demands, reduce energy consumption via reduced water demands (considering the energy required for water use), reduce green waste production, and improve surface water quality. Reducing outdoor water use and increasing irrigation efficiency in both agricultural and urban sectors also helps to minimize dry weather runoff that flows into storm drains and receiving waters, and reduces pollutants that contribute to the impairment of watersheds.

Summary Project Benefits and Costs

A summary of all benefits and costs of the project are provided in Table 8-19. Monetized benefits and non-monetized benefits are presented in this attachment, while physically quantified (but not monetized) benefits are described in Attachment 7.Benefits are lettered for cross-reference with Attachment 7. Benefits are lettered for cross-reference with Attachment 7, and are therefore not represented in order in the following sections.

Table 8-9. Benefit-Cost Analysis Overview
Turf Replacement and Agricultural Irrigation Efficiency Program

	Present Value
Costs – Total Capital and O&M	**$1,385,598**
Monetizable Benefits	
F. Avoid Imported Water Supply Purchases	$7,076,469
B. Avoid Surface Water Treatment	$57,783
I. Reduce Net Production of Greenhouse Gases	$89,901
L. Avoid Fertilizer Costs	$105,385
Total Monetizable Benefits	**$7,348,499**
Physically Quantified Benefit or Cost	**Project Life Total**
A. Water Conservation	900 Acre-Feet
C. Reduced Trash Removal Cost Through Reduction in Green Waste	9% reduction in solid waste
J. Reduce Net Diversions from the Bay-Delta	8,978 Acre-Feet
E. Increase Recycled Water Use	12,500 Acre-Feet
H. Helps Meet Existing State Mandates	295 AFY
Qualitative Benefit or Cost	**Qualitative Indicator***
D. Provides Education or Technology Benefits	+
K. Benefits Wildlife and Habitat	+
N. Improve Water Quality	++
M. Provide a Long-Term Solution in Place of a Short-Term One	+
G. Improved Water Supply Reliability	

* Direction and magnitude of effect on net benefits:
\+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Non-Monetized Benefits Analysis (Section D2)

Narrative descriptions of the benefit categories marked “Yes” in DWR’s *Proposal Solicitation Package* Table 12 are provided below.

D. Provides Education or Technology Benefits

City of San Diego Transportation & Storm Water Department (Think Blue/Storm Water Pollution Prevention Program) will provide education and outreach regarding the *Turf Replacement and Agricultural Irrigation Efficiency Program* with an emphasis on dry weather runoff prevention and water quality protection that are achieved with improvements to irrigation efficiency within the City. There is an additional online turf replacement study guide for those who wish to view the information, regardless of whether or not they are participating in these rebate programs. In addition to providing water savings quantified in Attachment 7, this educational outreach program can educate water customers on a variety of water use efficiency measures and lead them to other water conservation initiatives.

H. Helps Meet Existing State Mandate

Both program components help the Water Authority to achieve potable water demand reduction goals set out in SBX7-7. Numerous factors causing water scarcity in the region have forced water resource planners to set a target of a 20% reduction in potable water consumption by 2020. Water conservation stemming from these programs directly helps that goal, in addition to a goal of 10% reduction by 2015. The Water Authority’s 2010 *Urban Water Management Plan* determines that its member agencies must reduce potable water demands by -15,386 AF by 2015 and -76,705 AF by 2020.[29] The *Turf Replacement and Agricultural Irrigation Efficiency Program*savings comprise 1.92% of the 2015 target and 0.38% of the 2020 target.

Water conserved through the *Turf Replacement and Agricultural Irrigation Efficiency Program* directly offsets imported water supplied by MWD from SWP and CRA sources. While reliance on MWD supplies has been replaced by IIDand canal lining transfers, as well as local sources, MWD imports still comprise over half of all water supply and are the marginal source of water for the Water Authority's service area. Since both the SWP and CRA water sources (the Bay-Delta and Colorado River, respectively) are major sources of many water-related activities in addition to water supply, offsetting imports from them will help to decrease regional water-demand stress on scarce water resources.

K. Benefits Wildlife or Habitat

Reductions in over-irrigation have additional habitat benefits due to reduced pollution. Estuarial and other aquatic habitat may be protected by decreasing the irrigation water that brings pesticides, organic waste and other elements into the waterways via the storm drain system. By decreasing the amount of irrigation water that enters the storm drain system (bringing with it pesticides, organic waste and other elements into our waterways) a reduction in harmful chemicals emitted into waterbodies is anticipated. Since the Water Authority's service area is highly populated with residential units, especially within the City of San Diego itself, local bodies of water and the plants and animals that depend upon them are especially vulnerable to fertilizers and other highly-used chemicals. By replacing turf and upgrading urban irrigation systems, there will be reduced levels of applied fertilizers and pesticides, and less use of water required to irrigate and then produce runoff from these areas.

This project will provide additional habitat benefits by promoting native species. By replacing turf in urban areas, customers are removing a non-native species and planting water-wise varieties that are native to the area and the climate.

The SWP relies on diversions from the Bay-Delta to provide water to numerous agricultural, residential, and commercial customers, including those served by the Water Authority. By reducing the use of imported SWP water, the *Turf Replacement and Agricultural Irrigation Efficiency Program* will augment in-stream flows in the Delta (which provides the means by which the SWP delivers water from Northern California tothe south) or will offset other diversions that may otherwise reduce flows. Reduced demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

N. Improves Water Quality

Water conservation directly inhibits watershed pollution by reducing urban runoff. Urban irrigation runoff can include pollutants such as chemicals and bacteria, which can flow from urban landscapes into existing water bodies. The San Diego Regional Water Quality Control Board (RWQCB), in collaboration with the U.S. Environmental Protection Agency (USEPA), identified the San Diego Region water bodies on the 2010 California 303(d) List of Water Quality Limited Segments.[30] The 303(d) list includes approximately 440 water bodies within the San Diego RWQCB (Region 9) jurisdiction. The *Water Quality Control Plan for the San Diego Basin* (Basin Plan) notes that highways, agricultural fields and orchards, residential and urban areas, and septic tank disposal systems contribute non-point source pollution, including nutrients, as a result of storm water runoff, irrigation return flows, and ground water contributions.[31]Estuarial and other aquatic habitat may be protected by decreasing the irrigation water that brings pesticides, organic waste and other elements into the waterways via the storm drain system. By decreasing the amount of irrigation water that enters the storm drain system (bringing with it pesticides, organic waste and other elements into our waterways), the Region's surface water quality will be improved.

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[29]San Diego County Water Authority. 2011. *2010 Urban Water Management Plan*. Table 2-3: Member Agency Water Use Efficiency Targets (AF), Page 2-8.

[30] California EPA, State Water Resources Control Board (SWRCB). *2010 Integrated Report*. Available http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml?wbid=CAR3098117720020319112226 (Accessed 14 March 2013).

[31]RWQCB. 2011. *Water Quality Control Plan for the San Diego Basin*. Chapter 7, TMDLs, page 7-16.

M. Provides a Long-Term Solution in Place of a Short-Term One

Both turf replacement and conversion to recycled water have extended benefits lifetimes. While we quantify water savings benefits from the programs to be 20 and 50 years, respectively, it is possible that benefits can accrue over an even longer period of time, or lead customers to upgrade their irrigation systems and landscapes in the future. Similar programs in other cities have seen participation in turf conversion programs as a result of conversations with existing participants, leading to shifts in customer attitudes and behaviors.[32] This shift can lead to long-term changes in water use behavior. The benefits lifetimes of the individual programs also allow customers to plan water use over a long period of time. The availability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought, changes in snowpack and earthquakes, to environmental regulations, water rights determinations, and associated legal challenges and Court rulings. This project offers a drought-resistant water supply source and long-term solution that will reduce continued reliance on unsustainable water supply sources.

G. Improve Water Supply Reliability

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The *Turf Replacement and Agricultural Irrigation Efficiency Program* will help address reliability issues for the Water Authority by offsetting the use of imported water delivered by MWD. As noted above, the reliability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to environmental regulations, Court rulings, and water rights determinations.

Although interest in water supply reliability is increasing (e.g., due to increasing water demands and concerns over climate-related events), only a few studies have directly attempted to quantify its value (i.e., through nonmarket valuation studies).[33] The results from these studies indicate that residential and industrial (i.e., urban) customers seem to value supply reliability quite highly. Stated preference studies find that water customers are willing to pay approximately $100 to more than $500 per household per year in 2012 dollars for total reliability (i.e., a 0% probability of their water supply being interrupted in times of drought).

The challenge in applying these values to determine a value of increased reliability as a result of the Turf Replacement and Agricultural Irrigation Efficiency Project is recognizing how to reasonably interpret these survey-based household monetary values. The values noted above reflect a willingness to pay per household to ensure complete reliability (zero drought-related use restrictions in the future), whereas the Turf Replacement and Agricultural Irrigation Efficiency Project only enhances overall reliability and does not guarantee 100% reliability. Thus, if applied directly to the number of households within the SDCWA service area, the dollar values from the studies would overstate the reliability value provided by the project.

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[32] Grenoble, Penelope B. 2012. Thinking Long-Term: Water resource management and public outreach help water utilities deal with climate variability and water scarcity.*Water Efficiency*. 22 October 2012.

[33]Carson, R.T.; Mitchell, R.C. *Economic Value of Reliable Water Supplies for Residential Water Users in the State Water Project Service Area*; SWC Exhibit Number 54; the Metropolitan Water District of Southern California, Los Angeles, 1987.

CUWA.*The Value of Water Supply Reliability: Results of a Contingent Valuation Survey of Residential Customers*, California Urban Water Agencies, Sacramento, CA. [Online] **1994**, http://www.cuwa.org/library/TheValueofWaterSupplyReliabilityAug94.pdf (accessed October 1, 2009).

Griffin, R.C.; Mjelde, J.W. Valuing Water Supply Reliability.*American Journal of Agricultural Economics* **2000**, *82*, 414–426

Howe, C.W.; Smith, M.G.The Value of Water Supply Reliability in Urban Water Systems.*Journal of Environmental Economics and Management* **1994**,*26*, 19–30.

Raucher, R., J. Clements, and others. 2013. *The Value of Water Supply Reliability in the Residential Sector.* WateReuse Research Foundation. Project WRF-08-09.

Due to the uncertainty involved in applying these numbers to this situation, no benefit estimate is included in the monetized benefits tables. However, we provide a description here to give an idea of the potential magnitude of this benefit.

J. Reduce Demand for Net Diversions from the Bay-Delta

As described above, the Water Authority and its member agencies use a mix of imported water and local sources to supply their customers. Reduced overall potable water demand due to water conservation and increased use of recycled water will be used to reduce reliance on imported water supplies exclusively. Consistent with the mix of Water Authority imported supplies, it is assumed that two-thirds of the offset imported water (about 168 AFY for 50 years from the Agricultural Irrigation Efficiency Program, and 30 AFY for 20 years from the Turf Replacement Program) generated by the proposed project will offset SWP supplies. This will augment in-stream flows in the Delta or will offset other diversions that may otherwise reduce flows.

A. Water Conservation

Estimates for the amount of water conversion from turf to water-efficient landscaping were made using a combination of expertise and scientific studies. Using water meter records, the MWD*Evaluation of the Synthetic Turf Pilot Program*that showed water savings achieved when converting a natural grass field to a synthetic turf of 0.00014 AFY per square foot.[34]This program plans to provide incentives for conversion of approximately 320,000 square feet of turf to water-efficient landscaping. At a savings of 0.00014 AFY per square foot, this would result in water savings of approximately 45 AFY.

C. Reduced Trash Removal Cost Through a Reduction in Green Waste

Turf removal provides more benefits than just reduced water demand. It also reduces the amount of green waste produced from landscaping care. The Sustainable Site Initiative's *The Case for Sustainable Landscapes* profiles a series of case studies that document the benefit of conversion to sustainable landscaping. The Santa Monica Garden case documented a 66% reduction in green waste between the lawn and the native plant garden.[35]

Green waste is currently collected by local solid waste companies, and who collect all municipal solid waste for a fee. Reducing the amount of green waste generated by water-wise landscapes will reduce the amount that must be collected, saving costs for municipalities and potentially for customers. Given that the USEPA reports that approximately 13.7% of total municipal solid waste is yard trimmings[36], turf conversion can result in a 9% reduction of municipal solid waste.With an average waste collection cost of $18.50 to $14.50 per residence (for incorporated and unincorporated areas, respectively), it can be assumed that turf conversion will reduce waste collection costs to approximately $15.01 per residence on average (from $16.50), or an average saving of $1.49 per residence per month by conversion to water-efficient landscaping.[37]

This benefit was not monetized further because the potential number of residences and business that could participate in the Turf Replacement program is unknown. The Turf Replacement program is designed on a square-foot basis, rather than a number of lots. There is a wide range of lot sizes and set-backs across the county, depending on location and age of neighborhoods. Because these costs can only be monetized at the residence level, and the number of potential residences is unknown, we were unable to monetize this benefit.

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[35]The Sustainable Sites Initiative. 2009. The Case for Sustainable Landscapes. Available http://www.sustainablesites.org/report/The%20Case%20for%20Sustainable%20Landscapes_2009.pdf.Pg. 37.

[36]U.S. EPA. 2009. Municipal Solid Waste Generation, Recycled, and Disposal in the United States: Facts and Figures for 2009.

[37] These values were calculated using: Average collection costs – (13.7% x Average collection costs x 66%). 13.7% is the amount of total waste that is green waste, 66% represents the reduction in green waste from conversion to water-efficient landscaping.

E. Increase in Recycled Water Use

The Agricultural Irrigation Efficiency Component is expected to convert 50 acres of agricultural land on a minimum of two sites to recycled water with efficient irrigation systems. With irrigation demand estimated at 5 AFY per acre, per the City of Escondido's *Easter Recycled Water Main Extension Preliminary Design Report,*this result in 250 AFY in recycled water use. This recycled water use will offset potable water, which is currently used to irrigate avocado and citrus crops.

Monetized Benefit Analysis (Section D3)

Several monetized benefits are expected to accrue over the expected 52 year life of the project. Those include avoided cost of imported water, avoided wastewater treatment costs, and reduced net greenhouse gas production associated with the energy used in importing water.

F. Avoid Imported Water Supply Purchases

Although the Water Authorityuses a mix of imported water and local sources to supply their customers, imported water is the most expensive source to provide and it is not considered to be a very reliable source of supply (see G-Improve Water Supply Reliability discussion above). For this analysis, imported water is therefore considered to be the marginal water source for the Water Authority's service area. Thus, reduced overall water demand due to increased use of recycled water and increased water use efficiency will reduce reliance on MWD water supplies.

The *Turf Replacement and Agricultural Irrigation Efficiency Program* will directly offset 295 AFY of imported water provided by MWD. Approximately 45 AFY will be offset by turf replacement over approximately 320,000 square feet of residential and commercial turf. Approximately 250 AFY will be offset by converting 50 acres of agricultural land to a recycled water irrigation system. Any conservation or recycled water supplies from this project will be used to directly offset imported water in a 1:1 ratio.

Since turf replacement benefits are only estimated over a 20-year benefit lifetime, total benefits are conservative since water conservation will likely continue beyond this 20-year span. Furthermore, imports offset by recycled water conversion are considered over a 50-year span, while farmers will likely continue to use recycled water for irrigation well beyond that. Approximately 900 AF of imported water will be avoided over the 20-year lifespan of the turf conversions, and approximately 12,500 AF of imported water will be avoided over the 50-year lifespan of the agricultural conversions, which totals 13,400 AF over the entire program.

To calculate the present value of offset imports, we multiply the amount of avoided imported water by the total cost of Water Authority melded "all in" Tier 1 water in each year. MWD supplies imported water to the Water Authority, who in turn supplies water to 24 member agencies including the City of San Diego. MWD provides water using two major sources: SWP water from the Sacramento-San Joaquin Delta and Colorado River water pumped through MWD's Colorado River Aqueduct. For the purposes of this analysis we consider the marginal supply of water to be the Water Authority melded M&I Tier 1 (including fixed charges) (see Appendix 8-1).

Based on Water Authority charges as of February, 2013, Tier 1 Full Treated water cost of $1,259 in 2013, we estimate that offsetting 295 AF/year of imported water will provide an estimated benefit of $411,783 in 2016, the first year in which full project benefits are realized. Accounting for the price escalation of imported water and a standard discount rate of 6%, we estimate the present value of future avoided water imports to amount to $7,076,469 over the 50-year project life.

B. Avoid Surface Water Treatment

Water conservation directly inhibits watershed pollution by reducing urban runoff. Urban irrigation runoff can include pollutants such as chemicals and bacteria, which can flow from urban landscapes into existing water bodies. Given that San Diego County and the City of San Diego in particular are densely populated areas with high usage of chemicals such as fertilizers and pesticides for residential and commercial landscaping, these substances can easily infiltrate local water bodies, as well as protected areas adjacent to the Pacific Ocean. The *Water Quality Control Plan for the San Diego Basin* (Basin Plan) notes that highways, agricultural fields and orchards, residential and urban areas, and septic tank disposal systems contribute non-point source pollution, including nutrients, as a result of storm water runoff, irrigation return flows, and ground water contributions.[38]

In this benefit, we are assuming that the conservation activities achieved through residential and commercial turf replacement and micro irrigation improvements will reduce non-point source runoff, and therefore the amount of storm water entering municipal systems and requiring wastewater treatment. Since this benefit is exclusive to turf replacement (and acknowledging that residential landscapes can change following property sales), benefits are assumed to last for 20 years and not the full lifetime of the project (50 years).

To calculate avoided surface water treatment costs, we multiply the amount of turf that will be replaced each year by the annual cost per acre of wastewater treatment. Based on estimates in the *Sun Valley Watershed Management Plan Environmental Impact Report* for project alternatives to treat pollutants from runoff, the cost to collect and treat urban runoff is estimated at $46.96 million per square mile over the 50-year timeframe, while the cost to conserve water is estimated at $39 million per square mile.[39] The difference between the two is $7.96 million per square mile (discounted 4% over a 50 year period), or $12,440 per acre ($7.96 million per square mile x 1 square mile per 640 acres) in 2002 dollars. Converting this to 2012 dollars gets a 50-year project life savings of $15,876.74 per acre to conserve water versus full conveyance with BMPs. Converting this to annual costs for a 20-year project provides an annual per acre savings of $739.07 (present value of 50 year total per acre/present value of $1 in 50 years with a 4% discount rate). This results in approximately $0.0169 per square foot of land area wherein runoff will be reduced. Over the 20-year span of benefits from the conversion of approximately 320,000 ft^2 (or 7.3 acres) of turf to water-wise landscaping, avoided surface water treatment from reduced urban irrigation runoff will yield a present value benefit of $57,783.

I. Reduce Net Production of Greenhouse Gases

As described in Attachment 7, reduced reliance on imported water will avoid the extensive energy requirements associated with transporting water from Northern California and the Colorado River to San Diego County. This in turn will result in avoided CO2 emissions (a greenhouse gas (GHG)) associated with the production of this energy.

To calculate avoided CO2 emissions with the project, we multiplied the amount of energy required to treat and convey 295 AFY of water (2.65 MWh/AF for imported water and 0.8 MWh/year for recycled water[40]) by the average carbon emissions rate associated with energy production in California (0.354 MT/MWh[41]). Approximately 45 AFY of water will be directly conserved by this project, and 250 AFY of recycled water will be used in lieu of imported water. This provided us with the annual net reduction in CO2 emissions of approximately 206 MT/year for the first 20 years of project implementation, and approximately 164 MT/year for the 30 years after that. Given the schedule for project construction (with some benefits beginning to accrue in 2016), total net CO2 emissions reductions amount to 9,030 MT over the 50-year project life.

To monetize this benefit, we applied the dollar value assigned to GHG emissions, measured in carbon dioxide equivalent (CO2e). The social cost of carbon is estimated as the aggregate net economic value of damages from climate change across the globe, and is expressed in terms of future net benefits and costs that are discounted to the present.[42] In February 2010, the U.S. Government's Interagency Working

[38]RWQCB. 2011. *Water Quality Control Plan for the San Diego Basin*. Chapter 7, TMDLs, page 7-16.
[39]County of Los Angeles Department of Public Works. 2004. *Environmental Impact Report for the Sun Valley Watershed Management Plan*. Available http://www.sunvalleywatershed.org/ceqa_docs/plan.asp. Pg. 4-6.
[40]Equinox Center. 2010. *San Diego's Water Sources: Assessing the Options*, July 2010. pg. 10
[41]U.S. EPA. 2009. Emissions & Generation Resource Integrated Database. eGRID Summary Table, pg. 3 eGRID2012 Version 1.0 Year 2009 Summary Tables. Available: http://www.epa.gov/cleanenergy/documents/e.g.ridzips/eGRID2012V1_0_year09_SummaryTables.pdf. Accessed March 2013.
[42]IPCC, 2007.Summary for policymakers. In *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on*

Group on Social Cost of Carbon issued guidance on recommend values for the social cost of carbon for use in regulatory benefit-cost analysis.[43] The recommended mean estimate of the social cost of reducing one metric ton (MT) of CO2 in 2012 is $22.53/MT (updated from 2010 values using CPI), with a range of values from $4.95 to $68.33 per MT. The recommended mean estimate of the social cost of carbon reflects the worldwide net benefits of reducing CO2 emissions. Estimates of the portions of the net benefits occurring in the United States range from 7% to 23% of the worldwide social cost of carbon.

For this analysis, the average value of $22.53/MT was used when calculating social benefits and costs, which produces conservative estimates for the benefits and costs associated with GHG emissions. To determine total costs over the 50-year project period, we escalate the social cost of carbon by 2.4% per year, which is above the general rate of inflation. The social cost of carbon will increase in future years because CO2 will produce larger incremental damages as physical and economic systems become more stressed in responding to greater climate change.

Over the 50-year project life, total present value benefits associated with avoided social costs of carbon amount to $89,901.

L. Avoided Fertilizer Costs

Fertilizing compounds commonly present in recycled water are typically not found in potable water (e.g., nitrogen, phosphorus, potassium). Thus, the use of recycled water for landscape irrigation will reduce fertilizer costs associated with the properties that will be serviced by the project.

The exact offset of fertilizer use from using recycled water is difficult to predict due to daily and seasonal nutrient variations in the recycled water. However, the amount of nutrients (i.e., pounds of fertilizer) per AF of recycled water can be calculated from average (tertiary-treated) effluent values for the City of Escondido's Hale Avenue Resource Recovery Facility (HARRF). The recycled water fromHARRF contains 8.66 mg/L of nitrogen.[44]Thus, for every AF of recycled water used in lieu of potable water, therecycled water customers will avoid the use of a total of 23.6 lbs. ofnitrogen. The weighted average commercial value of this fertilizer is $0.46/lb.[45].

For the 250 AF of recycled water applied each year in lieu of imported water, recycled water customers serviced by the project will avoid the use of 5,900 lbs/year of fertilizer. This will result in avoided costs of $2,714 annually (undiscounted)[46]. Over the lifetime of the project, total present value avoided fertilizer costs will amount to $36,994. Additional benefits would be expected for avoided fertilizer costs due to increased levels of potassium in recycled water compared to potable supplies.

Additional fertilizer savings can be realized through the turf conversion program. The USEPA says homeowners use 10 times more fertilizer per acre than farmers.[47] Conversion to native plants and those better suited to local conditions will reduce the need for fertilizers in residential areas. Assuming homeowners typically use 0.044 lbs/square foot and this project converts approximately 320,000 square feet of turf, this would result in a saving of 14,066lbs of nitrogen per year. The results in $6,470 annually (undiscounted) of avoided fertilizer costs. The present value of all future avoided fertilizer costs through turf replacement is $68,931. Over the 50-year project lifetime, fertilizer costs avoided through conversion to recycled water irrigation systems and urban turf replacement has a present value of $105,925.

Table 8-10 summarizes the annual benefits from the project.

Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson (eds.). Cambridge University Press, Cambridge, UK. pp. 7–22.

[43]Interagency Working Group, 2010. Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866. Interagency Working Group on Social Cost of Carbon, United States Government.February. Available: www.epa.gov/oms/climate/regulations/scc-tsd.pdf

[44]City of Escondido. 2011. *City of Escondido Recycled Water Master Plan*. June. Appendix A, page D-4 and D-6.

[45] This represents the average weighted cost of nitrogen and phosphorus. Source: Asano, 1981, updated to 2006 using the national fertilizer price index. Updated from 2006 to 2012 based on the Consumer Price Index (CPI).

[46] Numbers do not add exactly due to rounding.

[47]US EPA. 2003. Sustainable Landscaping. Available http://www.epa.gov/glnpo/greenacres/smithsonian.pdf. Pp. 6-7.

Table 8-10: Annual Benefits (PSP Table 15)

Turf Replacement and Agricultural Irrigation Efficiency Program

Annual Benefit (All benefits should be in 2012 dollars)									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	**Type of Benefit**	**Measure of Benefit (Units)**	**Without Project**	**With Project**	**Change Resulting from Project (e) – (d)**	**Unit $ Value (1)**	**Annual $ Value (1) (f) x (g)**	**Discount Factor (1)**	**Discounted Benefits (1) (h) x (i)**
2013	Avoided Imported Water Supply Purchases	Acre-Feet	0	5	5	$1,259	$5,666	0.943	**$5,345**
	Avoided Surface Water Treatment Costs	Square Feet	0	38,361	38,361	$0.02	$651	0.943	**$614**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	4	4	$22.53	$95	0.943	**$90**
	Avoided Fertilizer Costs	Lbs.	0	1,688	1,688	$0.54	$911	0.943	**$860**
2014	Avoided Imported Water Supply Purchases	Acre-Feet	0	27	27	$1,303	$35,183	0.890	**$31,313**
	Avoided Surface Water Treatment Costs	Square Feet	0	191,804	191,804	$0.02	$3,254	0.890	**$2,896**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	25	25	$23.07	$584	0.890	**$520**
	Avoided Fertilizer Costs	Lbs.	0	8,439	8,439	$0.54	$4,557	0.890	**$4,056**
2015	Avoided Imported Water Supply Purchases	Acre-Feet	0	170	170	$1,349	$229,274	0.840	**$192,503**
	Avoided Surface Water Treatment Costs	Square Feet	0	319,673	319,673	$0.02	$5,424	0.840	**$4,554**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	124	124	$23.62	$2,931	0.840	**$2,461**
	Avoided Fertilizer Costs	Lbs.	0	17,016	17,016	$0.54	$9,188	0.840	**$7,715**
2016-2032	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$1,396	$411,783	Variable	**$4,269,436**
	Avoided Surface Water Treatment Costs	Square Feet	0	319,673	319,673	$0.02	$5,424	Variable	**$47,712**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$24.19	$4,982	Variable	**$51,616**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$0.54	$10,781	Variable	**$94,843**
2033	Avoided Imported Water Supply Purchases	Acre-Feet	0	291	291	$1,944	$564,694	0.294	**$166,108**
	Avoided Surface Water Treatment Costs	Square Feet	0	281,312	281,312	$0.02	$4,773	0.294	**$1,404**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	202	202	$36.20	$7,303	0.294	**$2,148**
	Avoided Fertilizer Costs	Lbs.	0	18,278	18,278	$0.54	$9,870	0.294	**$2,903**
2034	Avoided Imported Water Supply Purchases	Acre-Feet	0	268	268	$1,973	$528,771	0.278	**$146,737**
	Avoided Surface Water Treatment Costs	Square Feet	0	127,869	127,869	$0.02	$2,170	0.278	**$602**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	181	181	$37.07	$6,696	0.278	**$1,858**
	Avoided Fertilizer Costs	Lbs.	0	11,526	11,526	$0.54	$6,224	0.278	**$1,727**
2035 - 2064	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$2,003	$500,655	Variable	**$2,247,193**
	Avoided Surface Water Treatment Costs	Square Feet	0	-	-	$0.02	$-	Variable	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$37.96	$6,215	Variable	**$30.919**

Annual Benefit (All benefits should be in 2012 dollars)									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$0.54	$3,186	Variable	**$12,170**
2065	Avoided Imported Water Supply Purchases	Acre-Feet	0	125	125	$3,130	$391,282	0.046	**$17,835**
	Avoided Surface Water Treatment Costs	Square Feet	0	-	-	$0.02	$-	0.046	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	82	82	$77.33	$6,331	0.046	**$289**
	Avoided Fertilizer Costs	Lbs.	0	2,950	2,950	$0.54	$1,593	0.046	**$73**
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$7,348,499**

Project Benefits and Costs Summary (Section D5)

Project Economic Costs

Table 8-4 summarizes the cost schedule for the *Turf Replacement and Agricultural Irrigation Efficiency Program* and Table 8-5 summarizes the economic project costs for the project.

Administration costs of the project total $15,347 and are made up entirely of Water Authority grant administration labor costs. The remainder of the project costs borne by project proponents is comprised of construction and implementation costs totaling $751,979, and a grant administration cost of $17,265.

In addition to the $784,591 outlined in Attachment 4, there are costs borne by end-users in order to complete turf replacement and agricultural irrigation retrofits. Residential and Commercial customers will pay an average of $2.18/ft^2 to complete turf replacement, for a total end-user cost of $696,887 for the Turf Replacement Program. Agricultural customers will pay approximately $25,000 per site to convert their irrigation system from potable water to recycled water, for a total agricultural end-user cost of $50,000 over two sites.

The Water Authority's website, which will provide education and public outreach for the Turf Replacement Program, will incur operation and maintenance costs for the first five years after project implementation begins. This includes $125/year for software licensing and $80/year for technical support, for a total of $605 of O&M costs per year over a five year period (2013 – 2017).

The present value of administration, construction and implementation, end-user, and O&M costs for the Turf Replacement and Agricultural Irrigation Efficiency Project is $1,385,598.

Table 8-11: Total Project Cost Schedule
Turf Replacement and Agricultural Irrigation Efficiency Program

Year	Program Implementation (this work plan)	Residential and Commercial Property-Owner Contributions	Agricultural Property-Owner Contributions	Microsite O&M
2013	78,459	69,689		605
2014	392,296	348,444	50,000	605
2015	313,836	278,755	50,000	605
2016	-			605
2017	-			605
Total	**784,591**	**696,887**	**100,000**	**3,025**

Table 8-12: Annual costs (PSP Table 19)

Turf Replacement and Agricultural Irrigation Efficiency Program

Project Annual Costs (2012 Dollars)										
			Annual Costs						Discounting Calculations	
	Initial Costs Grand Total Cost from Table 6 (row (i), column (d))	Adjusted Grand Total Cost	Admin	Operation	Maintenance	Replace-ment	Other	Total Costs (a) +…+ (g)	Discount Factor (Capital) Present Value Coeff (O&M)	Discounted Project Costs (h) x (i)
Year			(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012										
2013	78,459	69,689		$605				$148,753	0.943	$140,333
2014	392,296	398,444		$605				$791,345	0.890	$704,294
2015	313,836	328,755		$605				$643,196	0.840	$540,040
2016				$605				$605	0.792	$479
2017				$605				$605	0.747	$452
Total Present Value of Discounted Costs (Sum of Column (j)) Transfer to Table 17, column (c), Proposal Benefits and Costs Summaries										**$1,385,598**

Benefits and Costs Summary

The present value of avoided imported water costs, avoided wastewater treatment costs, reduced GHG emissions, and avoided fertilizer costs totals $7,348,499.

Water savings achieved through the project will prevent 8,978 AF of water from being diverted from the Sacramento-San Joaquin Delta. Replacing residential and commercial turf will conserve 45 AFY, and retrofitting potable irrigation systems to use recycled water at agricultural sites will allow for new distribution of 250 AFY of recycled water. This project also will provide education benefits, will reduce water resource conflicts, benefit native habitat, improve water quality through reduced runoff, provide a local long-term water planning solution, and improve water supply reliability.

The present value of all project costs, including end-user and O&M expenditure, equals $1,385,598. With a present value of project benefits totaling $7,348,499, the present value of monetized *net* benefits is approximately $5,962,901.

Omissions, Biases, and Uncertainties

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with avoided imported water supply costs. These issues are listed in Table 8-13.

Table 8-13. Omissions, Biases, and Uncertainties, and Their Effect on the Project
Turf Replacement and Agricultural Irrigation Efficiency Program

Benefit or Cost Category	Likely Impact on Net Benefits*	*Comment*
Avoid Imported Water Supply Purchases	+	Benefits associated with turf replacement and conversion to recycled water irrigation systems are based on 20- and 50-year lifetimes, respectively. Since water savings, and therefore avoided imported water costs, will likely continue beyond the assumed lifetimes for both project components, actual benefits will likely be higher than the estimate provided here.
Avoid Imported Water Supply Purchases	U	The calculation of avoided imported water costs assumes that MWD water rates will increase annually (in real terms) by 3.5% through 2020. Beyond 2020, a 1.5% real increase in water rates is assumed. These projections are based on existing and planned MWD financial commitments and recent increases in MWD rates. It is uncertain whether actual future rate increases will be above or below these assumed rate increases.
Reduce Net GHG Emissions	U	The estimate used to calculate the value of reduced carbon emissions represents the mid-point of estimates from the literature. The true social cost of carbon may be higher or lower than the estimate used here.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease benefits.
— = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Project 3: Rural Disadvantaged Community (DAC) Partnership Program

Project Abstract

The *Rural DAC Partnership Program*, administered by the Rural Community Assistance Corporation (RCAC), will fund critical water supply and water quality projects in rural DACs in San Diego County. Water supply infrastructure deficiencies will be identified and prioritized by the Rural DAC Stakeholder Committee and then funding will be provided via grant reimbursements to resolve those deficiencies. This program helps meet the critical DAC need for safe, healthy, potable, supplies of water that are adequate to meet basic household and fire protection demands, while at the same time recognizing and responding to DACs' needs for technical and managerial support to even request funding for these basic water needs.

RCAC will manage the *Rural DAC Partnership Program* to address inadequate water supply and water quality in rural DACs, including tribal communities, with populations less than 10,000. DACs will be selected using 2010 Census data.

Projects will be selected based on need and priorities established by the Rural DAC Stakeholder Committee with an emphasis on critical water supply and water quality issues. The Rural DAC Stakeholder Committee designated the following criteria for DAC selection:

Primary Criteria

- Disadvantaged community per 2010 Census data
- Construction project
- Addresses public health issue
- Critical water projects (quantity/quality/reliability)
- Adequate TMF capacity (likely to be successful)
- Shovel ready or ability to complete within project time frame

Secondary Criteria

- Project ability to leverage other funding
- Capital cost per connection
- Multiple benefits
- Green technology
- Environmental justice concerns

Opportunities to merge related projects will be evaluated. Projects will be selected from both tribal and non-tribal rural DACs. In every case, RCAC will look at other available funding resources to leverage Prop 84 grant dollars.

All projects will address inadequate, unsafe, or unreliable water supply and water quality in rural DACs based on priorities already identified by the Rural DAC Stakeholder Committee. The proposed *Rural DAC Partnership Program* will select and implement four or more projects similar to the example projects described below. Three example projects described below have been identified as likely to be, or similar to projects likely to be selected for inclusion in this program by the Rural DAC Stakeholder Committee.

Example 3-1: Phoenix House School – The Phoenix House Foundation owns and operates a small PWS serving 75 students and staff in Descanso, CA. The only well that serves this system is located adjacent to a creek, approximately 25 feet from a sewer line that crosses the creek and about 100 feet down gradient from the septic leach field. Due to the location of this well, it is susceptible to exposure from fecal coliform, and has a history of bacteriological failures at the wellhead.[48] The proposed project is construction of a replacement well and two new 10,000 gallon storage tanks. The project will protect the drinking water source from bacteriological contamination and provide sufficient storage to provide the

[48]Phoenix House Foundation. 2006. *Preliminary Engineering Report* (System #3701478). Page 1.

community with water in the event of power outages or routine maintenance procedures on the well pump and motor.[49]

Example 3-2: Rancho Estates MWC – The Rancho Estates Mutual Water Company (MWC) serves an agricultural community of approximately 180 residents in Pauma Valley, CA. The water system is served by 7 active wells and two shallow open cut reservoirs that are approximately 3 million gallons and 1.5 million gallons. Since the community is agricultural, the bulk of the water demands (average of 680 gpm) are used for irrigation of crops. Because the reservoirs are subject to contamination, the County of San Diego has issued Compliance Orders to cover and/or replace them.[50] The water system is also plagued with nitrate and bacterial problems which are violations of the Title 22 California Code of Regulations for drinking water.[51]The water system currently blends water from YMWD through the distribution system as a control measure for nitrates which has kept them under the nitrate MCL.[52]The proposed project would improve the connection with YMWD, construct a covered finished water storage tank, and replace the existing distribution system piping. This project will separate the distribution system into one for domestic supply (supplied exclusively by YMWD water) and one for agricultural irrigation supply (supplied by existing Rancho Estates well system). This would protect public health by eliminating potential contamination due to the environmental exposure and provide the Rancho Estates community with adequate storage capacity.

Example 3-3: San Pasqual District B Water System – San Pasqual District B (Western) is a community PWS located near Valley Center, CA, on the San Pasqual Reservation. The water system has 90 residential connections and 12 transient connections. The PWS consists of a consecutive connection to Valley Center Municipal Water District (VCMWD), a booster pump station, a storage tank, and a distribution system.[53] The primary existing tank was constructed in 1992 and has a storage capacity of 100,000 gallons. A small 38,000 gallon corrugated steel tank also exists at the same site. Both USEPA[54] and IHS[55]have concluded that the tank exterior is showing oxidation and significant corrosion, as well as leaking in the base and joints. In addition, the system does not have an adequate amount of storage capacity to meet the County regulation requiring 2 days of storage for fire protection.[56] Due to the age and leaking of the tank and the need for additional storage, replacement of the tank was deemed the most reasonable option for addressing these issues. The proposed project will abandon the aging and leaking 100,000 gallon tank in place, and replace an adjacent 38,000 gallon tank with a new 250,000 gallon welded steel tank to provide greater water storage to the entire distribution system.[57] This would protect public health by eliminating potential contamination due to the leakage, eliminate wasted water supplies, and provide the District B community with adequate storage capacity.

Summary Project Benefits and Costs

A summary of the benefits and costs for the program described above are provided in Table 8-14. Monetized benefits and non-monetized benefits are presented in this attachment, while physically quantified (but not monetized) benefits are described in Attachment 7. Note that it is not possible to develop a complete analysis for the monetized and physically quantified benefits for this Program as the individual projects have yet to be selected. However, example projects that have been identified as priorities by the Rural DAC Stakeholder Committee are provided although they only represent the

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[49]Phoenix House Foundation. 2006. *Preliminary Engineering Report* (System #3701478). Page 2.
[50]County of San Diego. 2010. *Compliance Order, Rancho Estates Mutual Water Company*.
County of San Diego. 2007. *Compliance Order, Rancho Estates Mutual Water Company*.
[51]Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 1-6.
[52]Rancho Estates MWC. 2009. *Engineering Report Executive Summary*. Page 2-6.
[53]USEPA. 2012. Sanitary Survey of San Pasqual District B (Western) (PWSID #0605080). Prepared by Sleeping Giants Environmental Consultants, LLC.Page 1.
[54]USEPA. 2012. Sanitary Survey of San Pasqual District B (Western) (PWSID #0605080). Prepared by Sleeping Giants Environmental Consultants, LLC.Page 5.
[55]IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 2.
[56]IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 2.
[57]IHS. 2012. *Technical Memorandum No. 2, San Pasqual District B Tank Replacement*. Page 1.

monetized and physically quantifiable benefits attributable to one likely project. The Program will fund a minimum of four projects – making the example of physically quantifiable and monetized benefits significantly smaller than expected. Benefits are lettered for cross-reference with Attachment 7, and are therefore not represented in order in the following sections.

Table 8-14. Benefit-Cost Analysis Overview
Rural DAC Partnership Program

	Present Value
Costs – Total Capital and O&M	**$4,631,384**
Monetizable Benefits	
K. Avoid Bottled Drinking Water Supply Purchases	$1,372,157
F. Avoid Imported Water Supply Purchases	$20,107,667
G. Reduce Net Production of Greenhouse Gases	$352,268
Total Monetized Benefits	**$21,832,082**
Qualitative Benefit or Cost	**Qualitative Indicator***
J. Provide Safe Drinking Water	++
B. Benefit DACs by Addressing Critical Water Supply or Water Quality Needs	++
A. Increase Stakeholder Involvement and Stewardship	+
D. Increase Water Available for Fire Protection	+
H. Benefit Wildlife or Habitat in Bay-Delta Through Reduced Imports	+
L. Improve Water Quality	+
C. Long-Term Solutions to Critical Water Quality or Water Supply Needs of DACs	+
I. Reduce Demand for Net Diversions from the Bay-Delta	+
E. Improve Water Supply Reliability	+

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Non-Monetized Benefits Analysis (Section D2)

Narrative descriptions of the benefit categories marked "Yes" in DWR's *Proposal Solicitation Package* Table 12 are provided below.

A. Increase Stakeholder Involvement and Stewardship

Maximizing stakeholder/community involvement is one of the primary objectives of this Program. Selection of DAC projects for funding will be decided by a Rural DAC Stakeholder Committee with representatives from RCAC, the California Department of Public Health (CDPH), County DEH, Indian Health Service (IHS), and the Regional Water Management Group (RWMG). Additionally, project solicitation outreach meetings will be conducted to inform citizens of the importance of environmental stewardship, emphasizing conservation, regulatory (drinking water quality) compliance, and utility efficiency.

The *Rural DAC Partnership Program* also supports the following State, federal programs to address critical water supply and water quality issues in PWS:

- USEPA Region 9 primary regulatory responsibilities for Indian Tribes.
- CDPH State Revolving Fund Priority Project List and primary regulatory responsibilities.
- SWRCB's Small Community Wastewater Strategy which promotes strategies to assist small and/or disadvantaged communities with wastewater needs.

- USDA Rural Development and Health and Human Services' targeted low income projects.
- IHS support for Indian Tribes and public health goals.
- County DEH list of Community Water Systems' compliance orders.

RCAC partners with these agencies to help them achieve their goals of assisting rural DACs with infrastructure improvements and protection of public health.

J. Provide Safe Drinking Water

The goal of the *Rural DAC Partnership Program* is to provide funding and technical support to address inadequate water supply and water quality affecting rural DACs, including tribal communities. The program will help rural water systems to provide a safe water quality source that is not contaminated with nitrates, bacteria, or other contaminants. The program reduces potential for high public health risks in water and/or wastewater systems through infrastructure improvements and helps small water systems to provide sufficient quantities of safe drinking water to the residents served by their systems.[58]

Rural communities within the San Diego IRWM Region unincorporated areas that are not served directly by the Water Authority's member agencies have water supply and quality issues exacerbated by climate change, poor economies, and lack of community expertise. Inadequate water supply to support existing communities poses a public health risk. The majority of drinking water maximum containment level (MCL) violations occur with small public water systems.[59] Further, inadequate wastewater treatment results in unplanned discharge events that pose risks to human health and the environment.

Drinking water systems that serve disadvantaged communities often lack both access to much needed infrastructure financing and the resources to adequately operate and maintain existing system facilities. As a result, these systems face significant challenges in complying with long standing and new drinking water rules. All of the example projects identified by the Rural DAC Stakeholder Committee for priority implementation will address a current water supply or storage system that either has been, is currently, or has significant potential to be the source of a waterborne disease outbreak.

Three major problems that impede the safety of DACs served by small community water systems, and which will be addressed by this program, include:

- Contamination of drinking water source water from wastewater intrusion, agricultural influences, and/or contaminant spills from industrial activities;
- Seasonal weather changes resulting in floods or droughts, which require design options to bypass treatment during rain and storm events and identification of alternative water supplies (including water reuse sources) to increase capacity during droughts; and
- Deteriorating collection and distribution systems that compromise source water quality and increase the cost of water treatment.[60]

The California Department of Public Health (CDPH) has 41 small (less than 10,000 population) systems located in San Diego County on its 2013 State Revolving Fund (SRF) Priority Project List (PPL)[61], with many listed more than once. The Rancho Estates MWC project, identified as an example project by the Rural DAC Stakeholder Committee, is listed in the CDPH PPL with a funding target of $500,000. The State Water Resources Control Board (SWRCB) has a similarly lengthy list of communities requesting funding from the Clean Water SRF for wastewater improvements.

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[58] Work Plan, Attachment 3, Project purpose

[59] U.S. EPA. 2007. *Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110. Pp. 2-5 to 2-6, and Figure 2-10.

[60] Work Plan, Attachment 3, pg. 3-X. (Project Need); and U.S. EPA 2007.*Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110.Pg. 4-4.

[61] Sean Sterchi, CDPH. 2013. *State Revolving Fund Priority Project List*. Email dated March 5, 2013.

Rural DACs in the San Diego IRWM Region are faced with water supply systems that are inadequate to support existing connections. It is costly to provide supplemental treatment processes to improve the water quality of contaminated drinking water sources.[62] It is difficult for small DAC drinking water and wastewater systems to afford improvements because they have fewer ratepayers to share the costs. Further, rural DACs lack technical expertise and financial stability to access and comprehend funding programs. All of the example projects identified by the Rural DAC Stakeholder Committee for priority implementation (see Project Abstract above) will provide safe drinking water to economically disadvantaged communities in the backcountry, and will be offered TMF support from RCAC to operate the PWS safely.

D. Increase Water Available for Fire Protection

Fire protection is a major issue for tribes and surrounding communities, and increased water storage improves water supplies for firefighting and other emergency conditions. The San Diego backcountry is prone to 'Santa Ana' winds and associated wildfires. CalFire has documented 55 wildfire incidents in San Diego County between 2003 and 2012.[63]

Public safety will be improved by providing adequate storage necessary for fire-fighting and emergency conditions. The increased water storage from these types of projects will help ensure adequate water supplies for firefighting efforts on these rural and tribal lands.

B. Benefit Disadvantaged Communities by Addressing Critical Water Supply or Water Quality Needs

Rural communities within the San Diego IRWM Region unincorporated areas that are not served directly by the Water Authority's member agencies have water supply and quality issues exacerbated by climate change, poor economies, and lack of community expertise. Inadequate water supply to support existing communities poses a public health risk. The majority of drinking water maximum containment level (MCL) violations occur with small public water systems.[64]Further, inadequate wastewater treatment results in unplanned discharge events that pose risks to human health and the environment.

This series of small DAC projects is designed to provide safe, reliable water that is adequate to meet community needs and regulatory standards in areas that have neither the technical nor the funding capability to provide safe drinking water. In every one of these projects, the primary objective is to ensure the community has access to reliable water supplies that meet water quality standards in sufficient quantities to meet basic community and fire protection needs.

This benefit to DACs will be obtained by implementing the *Rural DAC Partnership Program*, and is not affected by which projects are selected. Per the work plan in Attachment 3, all projects considered as part of the program will meet the definition of a DAC project as defined in the 2012 Guidelines and described in Attachment 10.[65]

This program is the second phase of RCAC's *Rural DAC Partnership Program*. The projects selected for inclusion in this round will be selected by the Rural DAC Project Selection Committee. Phase II will continue partnerships established in the Phase I portion of this project (funded in Proposition 84-Round 1), and creates linkages and continued support with previous IRWM DAC projects.

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[62]U.S. EPA. 2007. *Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110.Pg. 3-6 and 4-3.

[63]CalFire. Incident Information. Available http://cdfdata.fire.ca.gov/incidents/incidents_search_results?search=Search&search=San+Diego (Accessed 15 March 2013).

[64]U.S. EPA. 2007. *Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110. Pp. 2-5 to 2-6, and Figure 2-10.

[65]DWR. 2012. Guidelines: Integrated Regional Water Management, Proposition 84 and 1E. Appendix G, pg. 85. For description of DACs in San Diego IRWM Region, refer to Attachment 8 of this application. Work Plan is available in Attachment 3 of this application.

H. Benefit Wildlife or Habitat in Bay-Delta through Reduced Imports

Some of the projects that will be considered for funding as part of this *Rural DAC Partnership Program* receive water directly from the Water Authority. The Water Authority purchases this water from MWD, which obtains its water from two sources: the Colorado River Aqueduct (CRA), which it owns and operates, and the SWP, with which MWD has a water supply contract through the state of California. Currently, imported water purchases from MWD account for about 59% (331,825 AF) of Water Authority supplies.[66]Although the Water Authority and its member agencies use a mix of imported water and local sources to supply their customers, imported water is more expensive to provide and is the marginal water source.[67] Thus, reduced overall potable water demand due to increased use of local water resources (such as through leak repair) will be used to reduce reliance on imported water supplies. Where these proposed DAC projects reduce demands for Water Authority-provided waters, the project will reduce the use of imported SWP water. This means that the program will help augment in-stream flows in the Bay-Delta (which provides the means by which the SWP delivers water from Northern California to the south) or will offset other diversions that may otherwise reduce flows. Reduced demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

L. Improve Water Quality

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to their customers. However, poor-quality source water and/or contamination during storage make it increasingly expensive and difficult to meet such standards. Increased levels of constituents, including fecal coliform, bacteria, nitrates, and TOCs that aid in the formation of THMs and other public health concerns can mean more time spent monitoring finished water in the distribution system, and the need to increase the use of expensive water treatment and disinfection processes. Increased levels of these constituents may also lead to the use of increased proportions of groundwater in the blend of water supplies in order to control them.

The objective of the *Rural DAC Partnership Program* is to provide both funding and technical support for implementing projects that will solve critical water or wastewater system issues in the Region's rural DACs. The program will improve drinking water quality through some of the projects that may be selected.

I. Reduce Demand for Net Diversions from the Bay-Delta

As described in Attachment 7, this project will reduce Water Authority member agency demand for imported water. Reduced overall potable water demand will reduce overall imported water demand and reduce net diversions from the Bay-Delta.

C. Long-term Solutions for Water Quality and Water Supply Needs of DACs

The projects that will be selected as part of this *Rural DAC Partnership Program* will improve water infrastructure in rural DACs, and reduce the amount of water wasted through inefficient systems. This will reduce the need to purchase water in excess of demand, and therefore help to reduce groundwater pumping and imported water demand. In turn, this will serve to protect groundwater supplies and increase water reliability for rural DACs, both of which are long term goals for the Region.

The *Rural DAC Partnership Program* will address three major problems identified by USEPA that impede the sustainability of a small community water system, including:

- Contamination of drinking water source water from wastewater intrusion, agricultural influences, and/or contaminant spills from industrial activities;

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[66]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 6-1, Section 6, Metropolitan Water District of Southern California.

[67]Equinox Center. 2010. *San Diego's Water Sources: Assessing the Options,* July 2010. Pg. 10. Note that despite desalinated water's high cost, the San Diego IRWM region's priority is to reduce dependence on imported water (IRWM Plan, 2007).

- Seasonal weather changes resulting in floods or droughts that require design options to bypass treatment during rain and storm events and identification of alternative water supplies (including water reuse sources) to increase capacity during droughts; and
- Deteriorating collection and distribution systems that compromise source water quality and increase the cost of water treatment.

Additionally, system sustainability will be a priority in the development of DAC funded projects. RCAC will provide appropriate training and technical assistance, and will assist when needed with tasks like selecting the right engineer for infrastructure improvements. It will also help to reduce safety risk to operators by providing adequate training. A well-maintained system run by experienced, well-trained operators will reduce risks of contamination, prolong the life of the equipment, and provide a system that is likely better able to withstand weather impacts. RCAC will also leverage sustainability activities with other RCAC state, federal and local contracts. This will serve to provide long-term solutions to critical water supply and water quality needs of DACs.

E. Improve Water Supply Reliability

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The proposed *Rural DAC Partnership Program* will help address reliability issues by ensuring the PWS operator in rural, disadvantaged areas are able to maintain the reliability of their systems. The reliability of local groundwater is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to water rights determinations. The program will also increase supply reliability by increasing access to groundwater supplies, decreasing leaks and water loss, increasing storage facilities, and decreasing O&M constraints (for example, pumping and distribution deficiencies).

Monetized Benefit Analysis (Section D3)

The individual projects that will be funded as part of this Program will be selected based on benefit criteria established by the RCAC Steering Committee. However, in order to provide an example of the types and magnitude of monetized benefits that are likely to occur, an example of monetized benefits is developed based on the physical benefits example developed in Attachment 7.

K. Avoid Bottled Drinking Water Supply Costs

The objective of the *Rural DAC Partnership Program* is to provide both funding and technical support for implementing projects that will solve critical water or wastewater system issues in the Region's rural DACs. In ***Example 3-2: Rancho Estates MWC***, the *Engineering Report* states that residents served by Rancho Estates MWC currently purchase bottled water for their drinking needs.[68] Assuming that each person requires one gallon of drinking water per day, and that 80% of the Rancho Estates MWD's 180 residents currently purchase bottled water, this results in 52,560 gallons of bottled water purchased each year. With project implementation, this would lead to a savings of 52,560 gallons per year of bottled water purchases. This estimate is conservative because some residents may also choose to use bottled water for other cooking and washing activities, in addition to drinking.

Assuming that the cost of a gallon of water is estimated to average $1.75 per gallon, the Rancho Estates MWC project would result in a water supply benefit totaling $1,372,157 over the 50-year lifetime of the *Rural DAC Partnership Program*.

F. Avoid Imported Water Supply Purchases

For rural PWS that have interconnections with Water Authority member agencies to purchase imported water supplies on an as-needed basis, the improved storage infrastructure that will be constructed

[68] Engineering Report, Pg. 2-6

through the *Rural DAC Partnership Program* will allow the rural PWS to operate their water systems to balance supply availability with demand.

In ***Example 3-2: Rancho Estates MWC***, the Rancho Estates MWC project would construct covered water storage to replace uncovered reservoirs and construct a separate domestic water supply distribution system. Rancho Estates MWC blends its water with Yuima Municipal Water District (YMWD) water in a 1:3 ratio, as explained in Attachment 7[69], in order to meet water quality standards.

This project would eliminate agricultural use of YMWD water, and meet all domestic demands with YMWD supplies. Therefore, this project would lead to a 792 AFY decreased in YMWD water demand for agriculture uses, and increase domestic demand for YWMD water by 10 AFY. The new system installed for domestic water supply would prevent loss of water through leakage, estimated at 10% of use.[70]Though the new system will reduce leakage, it will not eliminate it entirely, so no water savings from reduced leakage is included in this analysis. Net reduction in YMWD water demand by Rancho Estates MWC would be 782 AFY (-792 AFY from agriculture + 10 AFY from domestic).

These improvements would begin in 2018 following construction of the Rancho Estates MWC project and extend over the 50-year lifetime of the project.

Applying the avoided imported water rates described in detail in Appendix 8-1, this results in a monetized benefit, discounted over the 50 year project life, of $20,107,667. Although not all projects funded as part of the *Rural DAC Partnership Program* will provide exactly the same kinds of monetized benefits, this type of project, or a similar type of project, is extremely likely to occur and has thus been included in this economic analysis.

There are several empirical and conceptual challenges to forecasting the future avoided cost of import water. Appendix 8-1 discusses these issues and how they were addressed to develop the avoided water supply cost of $1,259 per acre foot (for 2013), and escalation rates for future years, that are used to evaluate the benefits of those projects that result in a reduction in imported waters in the San Diego region.

This example for the type of project likely to be funded as part of the Program results in a monetized benefit from imported water savings, discounted over the 50 year project life, of $20,107,667. Although not all projects funded as part of this Rural DAC Partnership will provide exactly the same kinds of monetized benefits this type of project, or a similar type of project, is extremely likely to occur as part of this Program.

Table 8-15 summarizes the annual benefits from the project and Table 8-16 summarizes the avoided costs from the project.

[69]Attachment 7
[70]Rancho Estates MWC. 2008. *Engineering Report Executive Summary*. Pg. 2-6.

Table 8-15: Annual Benefit (PSP Table 15)
Rural DAC Partnership Program

Annual Benefit (All benefits should be in 2012 dollars)									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value [1]	Annual $ Value [1] (f) x (g)	Discount Factor [1]	Discounted Benefits [1] (h) x (i)
2014	Avoided Imported water	Acre Feet	782	0	782	$1,303.07	$1,018,997	0.890	$906,904
	Reduced CO2e emissions	MT	0	0	0	$23.07	-	0.890	-
2015 - 2063	Avoided Imported water	Acre Feet	782	0	782	$1,348.67	$1,054,662	Variable	$19,991,143
	Reduced CO2e emissions	MT	733.5	0	733.5	$23.62	$17,328	Variable	$349,581
2064	Avoided Imported water	Acre Feet	0	0	0	$3,084.00	-	0.048	-
	Reduced CO2e emissions	MT	733.5	0	733.5	$75.52	$55,392	0.048	$2,676
Total Present Value of Discounted Benefits for Avoided Imported Water Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$20,107,667**
Total Present Value of Discounted Benefits for Reduced CO2 Emissions Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$352,268**

Table 8-16: Annual Cost of Avoided Purchase of Bottled Water (PSP Table 16)
Rural DAC Partnership Program

Annual Costs of Avoided Project (All costs should be in 2012 Dollars) Alternative: Purchase of Bottled Water						
					Discounting Calculations	
	Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)	Discount Factor	Discounted Project Costs (h) x (i)
(a) Year	(b)	(c)	(d)	(e)	(i)	(j)
2014 - 2064		$ 91,980		$91,980	Variable	$81,862
Total Present Value of Discounted Costs (Sum of Column (g))						**$1,372,157**
(%) Avoided Cost Claimed by Project						**100 %**
Total Present Value of Discounted Avoided Project Costs Claimed by Alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)						**$1,372,157**
Comments: By having the YMWC provide drinking water residents will no longer purchase bottled water. The purchase of bottled water represents an avoided cost for this project.						

G-Reduce Net Production of Greenhouse Gases

As described in Attachment 7, reduced reliance on imported water will avoid the extensive energy requirements associated with transporting water from Northern California and the Colorado River to San Diego County. This in turn will result in avoided CO2 emissions (a GHG) associated with the production of this energy.

To calculate avoided CO2 emissions with the project, we multiplied the amount of energy required to treat and convey 782AF of water (2.65 MWh/AF[71]) by the average carbon emissions rate associated with energy production in California (0.354 MT/MWh). This provided us with the annual net reduction in CO2 emissions resulting from the project. These calculations are described in detail in Attachment 7.

By avoiding 782AFY of imported water (at full implementation), the project will result in a net reduction in CO2 emissions of 733.5 MT per year. Given the schedule for project construction (with some benefits beginning to accrue in 2014), total net CO2 emissions reductions amount to 36,675 MT over the 50-year project life.

To monetize this benefit, we applied the dollar value assigned to greenhouse gas (GHG) emissions, measured in carbon dioxide equivalent (CO2e). The social cost of carbon is estimated as the aggregate net economic value of damages from climate change across the globe, and is expressed in terms of future net benefits and costs that are discounted to the present.[72] In February 2010, the U.S. Government's Interagency Working Group on Social Cost of Carbon issued guidance[73] on recommend values for the social cost of carbon for use in regulatory benefit-cost analysis. The recommended mean estimate of the social cost of reducing one metric ton (MT) of CO2 in 2012 is $22.53/MT(updated from 2010 values using CPI), with a range of values from $4.95 to $68.33 per MT. The recommended mean estimate of the social cost of carbon reflects the worldwide net benefits of reducing CO2 emissions. Estimates of the portions of the net benefits occurring in the United States range from 7% to 23% of the worldwide social cost of carbon.

For this analysis, the average value of $22.53/MT was used when calculating social benefits and costs, which produces conservative estimates for the benefits and costs associated with GHG emissions. To determine total costs over the 50-year project period, we escalate the social cost of carbon by 2.4% per year, which is above the general rate of inflation. The social cost of carbon will increase in future years because CO2 will produce larger incremental damages as physical and economic systems become more stressed in responding to greater climate change.

Over the 50-year project life, total present value benefits associated with avoided social costs of carbon amount to $352,268.

Project Benefits and Costs Summary (Section D5)

Project Economic Costs

The total present value cost of this program is $4,631,384. A summary of the discounted costs is provided in Table 8.17. Approximately $5,701,077 of the total project cost is allocated to construction/ implementation components of the *Rural DAC Partnership Program*, approximately 99% of which will go directly to infrastructure reimbursements for the Region's rural DAC water systems.

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[71]Equinox Center. 2010. *San Diego's Water Sources: Assessing the Options*, July 2010. pg. 10

[72]IPCC. 2007. Summary for policymakers. In *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson (eds.). Cambridge University Press, Cambridge, UK. pp. 7–22.

[73]Interagency Working Group. 2010. Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866. Interagency Working Group on Social Cost of Carbon, United States Government.February. Available: www.epa.gov/oms/climate/regulations/scc-tsd.pdf. Accessed 7/13/2011.

Examples of projects described in Attachment 4 illustrate the range of potential project costs. For example, ***Example 3-1 Phoenix House School*** has a total project cost, not discounted, of $444,093. Of this, $69,600 is directed to design and environmental compliance and the remaining $374,793 is allocated to construction of a new well that is not susceptible to bacteriological contamination.

Example 3-2: Rancho Estates MWC has a total undiscounted project cost of $1,636,800. This includes installation of 3,000 feet of 4" pipe, 13,500 feed of 6" pipe, 41 new hydrants, a 50,000 water storage tank, a 500 gallon hydropnuematic tank, 60 household connections and meters, design, contingency, labor, and profit. Of this, $420,400 of the total cost is allocated to design and environmental compliance with the remainder, $2,442,424 allocated to construction and performance testing. The cost of this project, updated to 2012$, is $1,745,445.

The monetized discounted benefits for this project include $3,774,117 in reduced imported water costs, $64,260 in reduced social cost of carbon and $4,699 in avoided bottle water purchases for a total project benefit of $3,843,076 in present value 2012$. For this example project, the present value benefits exceed the costs by nearly $2.1 million, at a benefit-to-cost ratio of approximately 2.2 to 1.0.

In ***Example 3-3: San Pasqual District B Water System***, the total undiscounted project cost is $940,452. Design and Environmental needs account for $110,817 of total costs with the remainder, $829,635 allocated to construction and testing of a new tank that will reduce water waste and not be susceptible to contamination due to leaking

Table 8-167: Annual Costs (PSP Table 19)
Rural DAC Partnership Program

Table 8-69 – Annual Costs of Project										
(All costs should be in 2012 Dollars)										
	Initial Costs		Annual Costs (2)						Discounting Calculations	
	Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost(1)	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2014	$290,964							$290,964	0.890	$258,957
2015	$1,454,822							$1,454,822	0.840	$1,221,497
2016	$2,385,908							$2,385,908	0.792	$1,889,863
2017	$1,687,593							$1,687,593	0.747	$1,261,068
Total Present Value of Discounted Costs (Sum of column (j)) Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										**$4,631,384**

Benefits and Costs Summary

This project will provide multiple qualitative benefits to disadvantaged communities in rural San Diego county including: providing safe drinking water, addressing critical water supply or water quality needs of DACs, increasing stakeholder involvement and stewardship, increasing water available for fire protection, benefiting wildlife or habitat in Bay-Delta through reduced imports, improving water quality, and improving water supply reliability.

Because individual projects that will be funded as part of this *Rural DAC Partnership Program* have yet to be selected, it is not possible to provide a true estimate of physically quantifiable or monetized benefits. An example of the type of physically quantifiable and monetized benefits is provided for one of the four or five likely projects. Discounted program costs are calculated to be $4,631,384. For the example project illustrated above, the PV of monetizable benefits outweighed the costs by a conservable margin (about 2.2 to 1.0). If a similar ratio of benefits to costs were obtained from other projects to be pursued under this program, then the benefits associated with the program would equal about $10 million (2.2 * $4.55 million PV program costs). The primary benefit of this *Rural DAC Partnership Program* is the supply of safe drinking water to disadvantaged communities in the San Diego IRWM region.

Omissions, Biases, and Uncertainties

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with inability to quantify or monetize the benefit of reducing the incidence of Water Borne Disease Outbreaks. These issues are listed in Table 8-18.

Table 8-17. Omissions, Biases, and Uncertainties, and Their Effect on the Project
Rural DAC Partnership Program

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Provide Safe Drinking Water	++	Safe Drinking water reduces the potential for transmission of Water Borne Disease Outbreaks and associated morbidity and mortality.
Benefit DAC	++	DACs require additional resources to ensure environmental justice.
Avoid Imported Water Purchases	U	The calculation of avoided imported water costs assumes that MWD water rates will increase annually (in real terms) by 3.5% through 2020. Beyond 2020, a 1.5% real increase in water rates is assumed. These projections are based on existing and planned MWD financial commitments and recent increases in MWD rates. It is uncertain whether actual future rate increases will be above or below these assumed rate increases.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease benefits.
–– = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Project 4: Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility

Project Abstract

The *Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility* project will provide comprehensive testing, evaluation, and demonstration of sequential failsafe treatment steps (treatment trains) for potable reuse without an environmental buffer. To accomplish this, the project will draw upon active potable reuse research projects in the United States, Singapore, South Africa, and Australia in addition to worldwide potable reuse applications and practices used and researched in these same countries. Highlighted by a workshop on hazard analysis, critical control points, and redundancy requirements, this project will convene national and international health, treatment, and water quality experts to establish an appropriate framework for demonstration of failsafe potable reuse at the City of San Diego's existing advanced water purification demonstration facility (demonstration facility).

This project consists of four distinct phases activities as described below:

Phase 1 – Develop expert panel guidelines on hazard analysis, redundancy, reliability and monitoring requirements for potable reuse without an environmental buffer: This task will identify an expert panel to participate in an international workshop that will develop the necessary guidelines to address hazard analysis, redundancy requirements, and appropriate water quality monitoring techniques for implementing potable reuse without an environmental buffer. A two-day workshop will be held in San Diego with the California Department of Public Health (CDPH) and municipalities pursuing potable reuse invited to attend. The expert panel will produce failsafe guidelines that will provide needed guidance for the potable reuse demonstration testing that will be performed as a part of this project.

Phase 2 - Develop a comprehensive test plan for a failsafe potable reuse system that incorporates failsafe guidelines from previous WRRF studies: This task will devise a test plan that incorporates the failsafe guidelines developed by the expert panel in this project along with the potable reuse treatment guidelines (developed in WRRF 11-02) and any other salient guidance from on-line monitoring (WRRF 11-01) and/or engineered storage buffer (WRRF 12-06). The test plan will be comprehensive and will include bench-scale work to better develop surrogate and indicator concepts, pilot-scale testing to demonstrate alternative disinfection and oxidation technology performance, as well as demonstration-scale testing to provide proof of failsafe system concept.

Phase 3 – Perform bench-scale, pilot-scale and demonstration-scale testing at the City of San Diego's water purification demonstration plant: This task will operate the City's demonstration facility for 52 weeks to develop long-term information that will evaluate the failsafe concepts developed in the test plan. The demonstration testing will involve microbial challenges, evaluations of intentional system failures, demonstration of on-line monitoring equipment's response, and redundancy treatment response. In addition to the demonstration testing, pilot-scale testing of alternative disinfection and oxidation processes will also be routinely operated and challenge tested. The combination of demonstration and pilot-scale testing will cover a wide range of treatment alternatives, monitoring, system response, and system reliability concepts.

Phase 4 – Prepare Final report on complete strategy for failsafe potable reuse: A final report will be compiled to provide a comprehensive pathway to failsafe potable reuse. The report will summarize expert panel guidelines and all the data gathered for on-line monitoring applications, redundancy and reliability performance, and relevant surrogate and indicators for various treatment processes. The report will be provided along with a workshop to develop a common understanding of project outcomes prior to finalizing the report with any specific comments.

The WateReuse Research Foundation is actively funding nearly $3 million in research to better develop potable reuse as a supplemental water supply. This project leverages the expertise from those investments and combines them to demonstrate failsafe potable reuse at the City of San Diego's demonstration facility.

Although this project will have important implications for the future of potable reuse in San Diego and throughout the State of California, however, it will not in itself result in immediate monetizable benefits. The true value of this project is that it will help to facilitate future implementation of failsafe potable reuse. This could potentially result in significant financial, environmental, and social benefits for water supply agencies (and their customers) throughout the State.

Summary Project Benefits and Costs

To demonstrate the magnitude of potential benefits that could ultimately result from this project, this attachment describes the benefits associated with wide-scale implementation of failsafe potable reuse in the City of San Diego. This is compared to a baseline implementation of indirect potable reuse that involves the use of a local reservoir as an environmental buffer (San Diego has planned for implementation of indirect potable reuse through reservoir augmentation but would like to explore failsafe potable reuse, which could potentially result in even greater benefits for the City). The direct benefits of the demonstration project itself are also qualitatively described.

A summary of all benefits and costs of the project are provided in Table 8-19. A description of the monetized benefits and non-monetized benefits are presented in the following sections, while physically quantified (but not monetized) benefits are described in Attachment 7. Benefits are lettered for cross-reference with Attachment 7, and are therefore not represented in order in the following sections.

Table 8-18. Benefit-Cost Analysis Overview
Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility Project

	Present Value
Costs – Total Capital and O&M	**$2,697,016**
Monetizable Benefits	
A-Avoid Construction of Pipeline to San Vicente Reservoir	$5,618,559
B-Reduce Net Generation of Greenhouse Gases	$74,002
Total Monetizable Benefits	**$5,692,561**
Quantitative Benefits	
G-Additional Statewide Water Supply Derived From Potable Reuse	0.9 million AFY
I-Reduce Ocean Discharges	0.9 million AFY
Qualitative Benefit or Cost	**Qualitative Indicator***
C-Expand Scientific and Technical Foundation for Potable Reuse	++
D-Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts	+
F- Leverage Existing Research Efforts	
H-Improve Water Supply Reliability	+

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Non-Monetized Benefits Analysis (Section D2)

Narrative descriptions of the benefit categories marked “Yes” in the *Proposal Solicitation Package* Table 12 are provided below.

C-Expand Scientific and Technical Foundation for Potable Reuse

Through comprehensive testing, evaluation, and demonstration of failsafe treatment trains, the *Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility* project will expand industry knowledge related to the implementation of potable reuse without environmental buffers.

As described in Attachment 7, a challenge in establishing regulations for all types of potable reuse is a lack of industry knowledge regarding specific treatment objectives required to protect public health, the myriad of alternative treatment processes available to enhance water quality, treatment train redundancy requirements, system reliability requirements and real-time water quality monitoring techniques. This project seeks to fill this gap and ultimately support wider implementation of potable reuse by increasing industry understanding and easing the burden on regulators to address the complex issues associated with the variations of possible potable reuse scenarios.

In addition, the City's Advanced Water Purification Demonstration Facility will continue to be open for public tours throughout implementation of the demonstration project. This will provide for additional public education regarding San Diego's water supply challenges and the role that full advanced water treatment technology and potable reuse can have in addressing those challenges.

D-Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts

Senate Bill 918 (SB 918) requires the California Department of Public Health (CDPH) to finalize regulations for indirect potable reuse through groundwater recharge and reservoir augmentation by the end of 2013 and 2016,respectively. CDPH must also report on the feasibility of direct potable reuse, which would not require an environmental buffer and could increase the viability of potable reuse for water agencies throughout the State. The proposed demonstration project will provide guidelines and scientific assessment that will help CDPH to make a determination regarding direct potable reuse for the State of California.

Senate Bill X7-7 mandates a 20% reduction in per capita urban water use by December 31, 2020(and by at least 10% by December 31, 2015).[74]Under this legislation, the use of recycled water in lieu of potable supplies can be counted towards SBX7-7 compliance.The *Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility* project could help to facilitate up to 100,000 AFY of failsafe potable reuse in the San Diego region. Implementation of direct potable reuse will help to meet requirements set forth in Senate Bill X7-7.

This project also helps to meet statewide goals established through the State Water Resources Control Board (SWRCB) Recycled Water Policy to increase use of recycled wastewater by at least 1 million AFY by 2020 and by at least 2 million AFY by 2030.[75]

E-Improve Water Quality by Reducing Salt Loading

The*San Diego Recycled Water Study* notes that when blended with imported water, water produced at the AWPF has the potential to reduce salinity in reservoirs by up to 50% due to its purity.[76] Imported water entering San Vicente Reservoir averages 500mg/L of total dissolved solids (TDS), while water from Orange County's Groundwater Replenishment System – an operating advanced water treatment plant – averages 35-50 mg/L.[77]On land, the reservoirs that receive the advanced purified water, theresidents that use the water, and the soil that is irrigated with the water would all benefit from having waterwith up to half the current salinity levels. Residents would benefit from softer water and extended lives ofhousehold appliances such as water heaters, dishwashers, clothes washers and faucets.

In order to estimate the magnitude of potential Statewide water quality improvement that could accrue from failsafe potable reuse, Attachment 7 calculated the amount of salt import that is avoided by using purified water in lieu of imported water supplies. Using the estimated quantity of 0.9 million AFY Statewide failsafe supply (see G- Additional Statewide Water Supply Derived from Potable Reuse), the estimated salt content (50 mg/l) of failsafe supply, and an assumption that failsafe potable reuse could offset 50% of MWD's imports, this results in 320 million lbs/year of salt import avoided.

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[74]San Diego County Water Authority. 2011. *2010Urban Water Management Plan*. Page 1-4, Section 1.2.
[75]State Water Resources Control Board. 2009. Recycled Water Policy. Available: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/recycledwaterpolicy_approved.pdf. Accessed March 2013
[76]City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-1.
[77]City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Section 6.1, page 6-1.

F-Leverage Existing Research Efforts

This project will build upon research developed as part of the WRRF's Potable Reuse Development Program. This program has funded close to $3 million in research efforts to investigate on-line monitoring technologies for evaluating system performance (WRRF 11-01), as well as alternative potable reuse treatment trains and public health criteria for direct potable reuse (WRRF 11-02).

Failsafe Potable Reuse at the Advanced Water Purification Facility will demonstrate the treatment and monitoring methods developed in these WRRF projects, which is necessary for regulatory approval of the failsafe potable reuse concept.

G-Additional Statewide Water Supply Derived from Potable Reuse

Although the most important benefit of the *Failsafe Potable Reuse at the Advanced Water Purification Facility* project is to demonstrate the feasibility of failsafe treatment trains, the development of potable reuse in general (whether it involves an environmental buffer or not) will provide important benefits for the City of San Diego, as well as throughout the State of California. For San Diego, a key benefit of increased potable reuse includes the development of a local, drought-resistant source of high-quality drinking water that will reduce reliance on unsustainable water supply sources.

In Southern California many water supply agencies receive imported water supplies from MWD. The availability of imported water (from both the Colorado River and the SWP) is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought, changes in snowpack and earthquakes, to environmental regulations, water rights determinations, and associated legal challenges and Court rulings. Local groundwater is also limited in many areas, highlighting the need for additional reliable sources of water to meet current and future demands under all hydrologic conditions.

In addition, by reducing the need for imported SWP water, wide-scale implementation of potable reusewill augment in-stream flows in Sacramento-San Joaquin River Delta (which provides the means by which the SWP delivers water from Northern California to the south) or will offset other diversions that may otherwise reduce flows. Reduced demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

Further, if failsafe approaches to potable reuse without an environmental buffer can be demonstrated to be safe and reliable – as this proposed project is intended to help demonstrate – then there will be many additional opportunities to expand reuse throughout the State. In most communities this would also likely provide significant financial cost savings and environmental benefits (e.g., from reduced piping and pumping in most locations) compared to the alternatives of more limited and often more costly forms of potable and non-potable reuse.

As described in Attachment 7, the magnitude of potential Statewide benefit that could accrue from failsafe potable reuse was estimated using two different methods and then averaging them. Noting that approximately 3.5 million AFY offresh water is currently discharged to the ocean as wastewater,[78] our analysis equates to 0.9 million AFY of purified water produced through failsafe potable reuse.

H-Improve Water Supply Reliability

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The *Failsafe Potable Reuse at the Advanced Water Purification Facility* project will help address reliability issues for the City of San Diego by providing a drought proof-supply. As noted above, the reliability of imported water – which is the region's primary current supply – is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands), to drought and earthquakes, to environmental regulations and water rights determinations.

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[78]WateReuse California. 2009. Potable Reuse Program Position Statement. Available: http://www.watereuse.org/sites/default/files/u8/PR%20position%20statement%20v3a.pdf
SWRCB.2009 Survey.

Though the increase in local water supply (equivalent to the total purified water produced by the AWPF, or 100,000 AFY) can be quantified, reliability is more challenging because it is subject to a number of natural and human forces (e.g., drought, earthquakes, population growth, legal agreements). This project contributes towards water supply reliability, but it does not guarantee a reliable water supply. However, failsafe potable reuse provides high quality water that is of equal or better quality than untreated imported water. It is a locally developed sustainable water supply that is uninterruptible and is not affected by outside influences, and as such would increase water supply reliability if implemented at full scale in the region.

I-Reduce Ocean Discharges

In 2010, the U.S. Environmental Protection Agency (USEPA) allowed the City of San Diego to continue to operate the Point Loma Wastewater Treatment Plant (PLWWTP) as a chemically enhanced primary treatment facility under a modification to its National Pollutant Discharge Elimination System (NPDES) Permit.[79] During the 2008-2010 permit modification process, two environmental organizations entered into a Cooperative Agreement with the City to conduct the *Recycled Water Study*which sought to identify alternatives to large-scale wastewater system upgrades, including a water reuse program. Water reuse programs provide valuable water supplies by using resources that otherwise are sent to the ocean.[80]

The supply of purified water that would be reused by the City of San Diego AWPF totals 100,000 AFY.[81] The calculated supply for failsafe potable reuse Statewide (0.9 million AF)includes wastewater that would be otherwise discharged to the ocean. This reduction in ocean discharges would have a substantial impact on coastal ecosystems directly adjacent to ocean outfalls.

Monetized Benefit Analysis (Section D3)

As described above, the demonstration project itself will not result in immediate monetizable benefits. However, this project would potentially facilitate wide-scale implementation of direct potable reuse in the City of San Diego (up to 100,000 AFY). To demonstrate the magnitude of potential benefits that could ultimately result from this project; this attachment describes the benefits associated with failsafe potable reuse in San Diego compared to a “without project” baseline of IPR/RA that involves the use of San Vicente Reservoir as an environmental buffer.

In San Diego, failsafe potable reuse would result in the following benefits compared to IPR/RA:

- Avoided costs associated with construction of a 22 mile pipeline to San Vicente Reservoir
- Reduced social costs ofGHG (CO_2) emissions associated with the pipeline

A-Avoid Construction of Pipeline to San Vicente Reservoir

Due to increasing concerns over the reliability of imported water in Southern California, the City of San Diego has developed extensive plans for expanding potable reuse within its service area. Currently, the City is evaluating the potential for an IPR/RA program that would ultimately recycle 100,000 AFY of wastewater using advanced treatment technologies. Following treatment, this water would be pumped to San Vicente Reservoir (which effectively serves as the environmental buffer), blended with water from other sources, and ultimately treated again at the potable water treatment plant. The pipeline from the City’s Advanced Water Purification Facility (AWPF) to San Vicente Reservoir would be 22 miles long.

Although IPR/RA (i.e., using the San Vicente Reservoir as an environmental buffer) would provide important benefits to the City, potable reuse without the use of an environmental buffer has the potential to save the City significant amounts of money. With this option, recycled water would also be developed at the City’s AWPF but would be delivered directly to the Water Authority’s regional raw aqueduct system (which serves the City of San Diego and other local communities). Similar to IPR/RA, this water would be

[79]City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-1.
[80]City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-1.
[81]City of San Diego. 2012. *San Diego Recycled Water Study* (Final Draft). May 10. Page ES-6.

treated again at a potable water treatment plant. The pipeline from the City's AWPF to the raw aqueduct system would be 10 miles long.

Due to the much shorter pipeline and the less difficult terrain that the pipeline would traverse, failsafe potable reuse would result in significant cost savings for the City compared to the IPR/RA alternative. Table 8-20 presents the estimated capital costs associated with construction of the pipelines and associated pumping facilities required for direct and indirect potable reuse in San Diego. By eliminating the need for an environmental buffer, failsafe potable reuse would save the City about $127 million in initial construction costs for the pipe and pumping facilities alone.

Table 8-20: Construction Costs Associated with IPR/RA and DPR Facilities in San Diego
Failsafe Potable Reuse at the Advanced Water Purification Facility

Indirect Potable Reuse Through Reservoir Augmentation	
Pipeline to San Vicente (22 miles)	$132,666,112
Tunneling for pipeline	$37,755,000
Pump Stations (2)	$33,536,502
Total costs	**$203,957,614**
Failsafe Potable Reuse	
Pipeline to Water Authority Aqueduct (10 miles) – assumed proportional $/mile cost as IPR/RA minus tunneling	$60,302,778
Pump station (1) – assumed 50% of IPR/RA cost	$16,768,251
Total costs	**$77,071,029**
Cost Difference	**$126,886,585**

Source: Appendix F, City of San Diego Recycled Water Study, 2012

Although the capital costs associated with failsafe potable reuse are significantly lower than those for IPR/RA, there may be additional savings or costs associated with the O&M requirements of operating the failsafe potable reuse approach compared to the IPR/RA approach. Unfortunately, O&M costs for each approach are not currently available, hence the analysis here is confined to the capital costs only.

In general, it is likely that in most applications, direct potable reuse will require less piping and pumping in order to deliver the recycled water supplies to the potable water treatment and distribution facilities as compared to the pipe and pumping distances typically associated with delivering recycled water to an environmental buffer such as the SVR. Thus, it is likely to be the case that DPR approaches will typically have lower energy needs and lower related O&M costs for water transport. This will vary be location, depending on site-specific circumstances (for example, in the San Diego setting, the failsafe approach would have a far shorter pumping distance, but would need to pump to slightly higher elevation becausethe water would be piped to the raw water aqueduct system at a higher elevation than the reservoir, so the net difference in pumping-related energy use across the options is not clear). For the purposes of this illustration, we assume the total O&M costs across the failsafe and IPR/RA options are roughly equal (and thus net out to a zero difference between the two options).Hence, O&M costs are not included in the calculations or results.

To calculate the present value cost savings associated with the failsafe project compared to IPR/RA option, this analysis assumes that construction would begin in 2025 and take three years to complete. Thus, failsafe potable reuse would result in a present value cost savings of 56,185,593 in terms of initial costs for pipeline and pump station requirements alone.

We estimate that the proposed demonstration project will be partly responsible for facilitating the implementation of failsafe potable reuse within the City of San Diego. We therefore attribute 10% of the present value cost savings associated with direct potable reuse directly to this project ($5,618,559).

B-Reduce Net Generation of Greenhouse Gases

As described above, failsafe potable reuse in this site-specific illustration will require slightly more energy than indirect potable reuse for treated water conveyance (on a per AF basis) because the raw aqueduct system is located at a higher elevation than San Vicente Reservoir. This will result in slightly higher CO_2 emissions associated with conveyance of treated water under the failsafe potable reuse alternative.

However, the slightly higher energy requirements (and related CO2 emissions) associated with failsafe potable reuse will be offset by the energy requirements associated with construction of the 22 mile pipeline to San Vicente under the IPR/RA alternative. Recent research has revealed that there is a considerable carbon footprint associated with pipelines. As described in Attachment 7, much of this footprint is associated with the production phase (i.e., manufacturing the pipe accounts for between 70% to 99% of the total carbon footprint), with the balance attributed to transport of the pipe to the installation site, and actual installation activities.

For the San Diego illustration, the pipe is anticipated to be cement mortar lined steel and 36 inches in diameter, for either the 22 mile IPR/RA or the 10 mile failsafe pipelines. Based on the research described in Attachment 7, the avoidance of 12 miles of pipeline under the failsafe alternative would save approximately 53,280 MT of CO2e emissions. To calculate the net CO2 emissions associated with IPR/RA and failsafe potable reuse, we multiplied the amount of energy required to convey 100,000 AF of treated water under each alternative, as well as the energy use associated with construction of the pipelines required under each alternative, by the average carbon emissions rate associated with energy production in California (0.354 MT/MWh). This analysis showed that over an expected project life of 50-years, failsafe potable reuse would result in a net reduction in CO2 emissions of 53,280 MT compared to IPR/RA.

To monetize this benefit, we applied the dollar value assigned to greenhouse gas (GHG) emissions, measured in carbon dioxide equivalent (CO2e). The social cost of carbon is estimated as the aggregate net economic value of damages from climate change across the globe, and is expressed in terms of future net benefits and costs that are discounted to the present.[82] In February 2010, the U.S. Government's Interagency Working Group on Social Cost of Carbon issued guidance[83] on recommend values for the social cost of carbon for use in regulatory benefit-cost analysis. The recommended mean estimate of the social cost of reducing one metric ton (MT) of CO2 in 2012 is $22.53/MT(updated from 2010 values using CPI), with a range of values from $4.95 to $68.33 per MT. The recommended mean estimate of the social cost of carbon reflects the worldwide net benefits of reducing CO2 emissions. Estimates of the portions of the net benefits occurring in the United States range from 7% to 23% of the worldwide social cost of carbon.

For this analysis, the average value of $22.53/MT was used when calculating social benefits and costs, which produces conservative estimates for the benefits and costs associated with GHG emissions. To determine total costs over the 60-year project period, we escalate the social cost of carbon by 2.4% per year, which is above the general rate of inflation. The social cost of carbon will increase in future years because CO2 will produce larger incremental damages as physical and economic systems become more stressed in responding to greater climate change.

Assuming the pipeline would be manufactured in 2026 (the second of the three-year anticipated project construction timeline, assumed to begin in 2025), then the present value benefits associated with the net reduction in carbon emissions with failsafe potable reuse (compared to IPR/RA) amount to $740,019.Again, because the proposed demonstration project will be partly responsible for facilitating the

[82]IPCC. 2007. Summary for policymakers. In *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson (eds.). Cambridge University Press, Cambridge, UK. pp. 7–22.

[83]Interagency Working Group. 2010. Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866. Interagency Working Group on Social Cost of Carbon, United States Government.February. Available: www.epa.gov/oms/climate/regulations/scc-tsd.pdf. Accessed 7/13/2011.

implementation of direct potable reuse within the City of San Diego, we attribute 10% of this present value benefit directly to this project ($74,002).

Summary of Monetized Benefits

Table 8-20 shows the cost savings associated with failsafe potable reuse resulting from avoided construction of a 22 mile pipeline from the AWPF to San Vicente Reservoir. This table also summarizes the annual benefits associated with reduced social costs of CO_2 emissions with failsafe potable reuse (with 10% of the total benefits directly attributed to this project).

Table 8-20: Annual Cost of the Avoided Pipeline To San Vicente Reservoir (PSP Table 16)
Failsafe Potable Reuse at the Advanced Water Purification Facility

Annual Costs of Avoided Project						
(All costs should be in 2012 Dollars)						
Pipeline and pump station construction costs saved, including GHG emissions avoided						
					Discounting Calculations	
	Avoided Capital Costs	Avoided GHG Emissions Value in Pipeline	Avoided Operations and Maintenance costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)	Discount Factor	Discounted Project Costs (h) x (i)
(a) Year	(b)	(c)	(d)	(e)	(i)	(j)
2025	$42,295,528			$42,295,528	0.469	$19,829,794
2026	$42,295,528	$1,673,111		$43,968,640	0.442	$19,447,372
2027	$42,295,528			$42,295,528	0.417	$17,648,446
Total Present Value of Discounted Costs (Sum of Column (g))						**$56,925,612**
(%) Avoided Cost Claimed by Project						**10%**
Total Present Value of Discounted Avoided Project Costs Claimed by Alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)						**$5,692,561**

Project Benefits and Costs Summary (Section D5)

Project Economic Costs

Total costs for the proposed demonstration project total $3,151,703 (in $2012). Direct construction and implementation costs account for $1,466,460 (about 46%) of total capital costs, while grant administration, planning, design, engineering, and environmental documentation and compliance costs account for the remainder of the budget.

Because this project is a demonstration project that will be implemented over 5 years, all costs are considered to be implementation costs. There are therefore no O&M costs associated with this project.

Over the 5-year implementation period, the present value costs of the project amount to $2,697,016. Table 8-22 summarizes the economic project costs for the project.

Table 8-21: Annual Costs (PSP Table 19)

Failsafe Potable Reuse at the Advanced Water Purification Facility

Annual Costs of Project										
(All costs should be in 2012 Dollars)										
	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost(1)	Annual Costs (2)						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012	$63,034							$63,034	1.000	$63,034
2013	$315,170							$315,170	0.943	$297,330
2014	$693,375							$693,375	0.890	$617,101
2015	$1,512,817							$1,512,817	0.840	$1,270,190
2016	$567,307							$567,307	0.792	$449,360
2017								$0	0.747	$0
Total Present Value of Discounted Costs (Sum of Column (j)) Transfer to Table 17, column (c), Proposal Benefits and Costs Summaries										**$2,697,016**

Benefits and Costs Summary

As shown in the Table 8-20 above, the total present value benefits associated with the *Failsafe Potable Reuse at the Advanced Treatment Demonstration Facility* project amount to $5,692,561 (assuming a 60-year life for failsafe potable reuse in San Diego, and assuming that this demonstration project will increase the probability of failsafe potable reuse acceptance for the San Diego application by 10%). The total present value cost of the project is $2,697,016. The proposed project will therefore result in total present value net benefits (benefits exceeding costs) of $2,978,430.

Total monetized benefits of the project include avoided construction of a 22-mile pipeline from the AWPF to San Vicente Reservoir, and reduced social costs of GHG emissions compared to the implementation of IPR/RA. In addition to monetized benefits and costs, the proposed project will also result in the following non-monetized benefits: provide education and technology benefits for the water industry, provide CDPH with a scientific assessment of failsafe potable reuse, help to meet state mandates associated with water recycling, and leverage existing research efforts related to failsafe potable reuse.

Omissions, Biases, and Uncertainties

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with the level of import savings potentially made feasible state-wide, and the cost savings reflectedin the illustration developed for San Diego.. These issues are listed in Table 8-23

Table 8-23. Omissions, Biases, and Uncertainties, and Their Effect on the Project
Failsafe Potable Reuse at the Advanced Water Purification Facility

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Additional Statewide Water Supply Derived from Potable Reuse	U	The calculation presented herein for potential state-wide opportunities to reduce water imports is considered a first approximation of the benefit. No comprehensive study of statewide failsafe potable reuse opportunities has been conducted.
Cost savings from Failsafe project compared to San Diego IPR/RA	U	Cost savings based here on available data for capital costs differential for an illustrative DPR to IPR comparison. O&M costs were not available and are thus not included in the calculation. In addition, an assumed 10% was used to attribute the contribution of the study to the ability to successfully pursue DPR in the San Diego illustration.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease benefits.
–– = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Project 5: Sustaining Healthy Tributaries to the Upper San Diego River

Project Abstract

The Upper San Diego River Watershed contains water bodies that provide source water for the City of San Diego's El Capitan Reservoir, the largest local water supply source in San Diego County, which is impaired by water quality concerns and is on the 303(d) list of impaired water bodies. The streams and creeks that drain into El Capitan Reservoir are relatively healthy, but are under continued threat of degradation from both natural and man-made sources. This project seeks to develop a means of engaging local community members in assessing and monitoring the health of this important watershed and using the information collected to identify emerging threats and changing conditions.

This project will restore and maintain a portion of Boulder Creek, an important tributary to the El Capitan Reservoir in the San Diego River Watershed that captures rain, snow melt, and spring water and drains into El Capitan Reservoir. Areas of the Boulder Creek catchment, including Cuyamaca Peak, average more than 40 inches of rain a year. Boulder Creek is of unique significance because it is used to transfer water between Helix Water District's Lake Cuyamaca and the City of San Diego's El Capitan Reservoir where water is stored until treated for potable use.As part of this project, the community will be engaged in restoring approximately 4.4 acres of degraded riparian and associated buffer habitat on Boulder Creek. The project will also include monitoring of Boulder Creek and surrounding creeks to increase knowledge of the creeks and provide baseline information that will allow for early actions to be taken in the event that the creek begins to degrade. With a relatively small investment now, the creek and watershed can remain healthy, improving the health of the environment, maintaining carrying capacity in the reservoir, and reducing potential water treatment costs.

Boulder Creek is one of two known creeks in the San Diego River Watershed that supports wild rainbow trout. The presence of trout indicates a high quality stream with cold water. These unique conditions offer an exciting potential to use Boulder Creek and nearby creeks as baselines for monitoring the overall health of the 440 square mile San Diego River Watershed. Identifying a suitable creek to use as a baseline for "healthy" conditions and creating a robust monitoring program is a primary goal of the overall watershed water quality monitoring program for the San Diego River Watershed.

Preliminary studies have shown that Boulder Creek is threatened by rural development, legacy mines, erosion and sedimentation from wildfires, and invasive plants and animals. Some hydromodifications have occurred on Boulder Creek, most of which is in public ownership. Recently, the San Diego River Park Foundation (SDRPF) purchased a privately owned 3,000-foot section of the Creek. This project will also include work to restore this section, which has been damaged by private development and wildfire.

Through integration with partners and to bring a more holistic approach to assessing baseline conditions for Boulder Creek, this project includes field surveys of other creeks that drain into the El Capitan Reservoir. Monitoring will include real-time monitoring stations, biological assessments, and invasive animal and plant surveys. Education elements will provide information to private land owners in the area on how to reduce pollutant loading and activities that result in erosion and sedimentation. Another important component is outreach to three Native American Tribes in the area to provide training to empower their members to survey their tribal lands.

Summary Project Benefits and Costs

A summary of all benefits and costs of the project are provided in Table 8-24. Monetized benefits and non-monetized benefits are presented in this attachment, while physically quantified (but not monetized) benefits are described in Attachment 7. Benefits are lettered for cross-reference with Attachment 7, and are therefore not represented in order in the following sections.

Table 8-24. Benefit-Cost Analysis Overview
Sustaining Healthy Tributaries to the Upper San Diego River

	Present Value
Costs – Total Capital and O&M	**$597,340**
Monetizable Benefits	
B. Reduce Net Greenhouse Gas Emissions via Habitat Restoration	$2,875
Total Monetizable Benefits	**$2,875**
Physically Quantified Benefits	**Project Life Total**
A. Restore Native Habitat and Benefits to Wildlife	4.4 acres
I. Provide Access to Restored Lands	13.35 acres available
Qualitative Benefits	**Qualitative Indicator***
F. Scientific and Technical Foundation of Water Management	++
E. Source Water Protection for El Capitan Reservoir	+
G. Community and Tribal Engagement	+
C. Prevent Water Quality Degradation	+
D. Improve water supply reliability	+
H. Provide Education or Technology Benefits	+

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Non-Monetized Benefits Analysis (Section D2)

Narrative descriptions of the benefit categories marked “Yes” in DWR’s *Proposal Solicitation Package* Table 12 are provided below.

H. Provide Education or Technology Benefits

Education and technology benefits are a key part of the *Sustaining Healthy Tributaries to the Upper San Diego River* project. This project will engage many community members, and educate them on native ecosystems, the benefits of native ecosystems, the importance of Boulder Creek, and the role riparian ecosystems play in river health. This project also involves informing and updating the public about the progress of the project, as well as educating landowners about actions they can take to improve water quality by reducing nutrient and sediment loads. The focus on involvement is expected to result in a more active and educated community, as well as real improvements in environmental quality. Further, this project will open 11.35 acres to the public for recreation, and install educational signage along trails.

In addition to the educational efforts at the site itself, this project will engage with local Tribes to conduct ecosystem monitoring. In particular, trainings will be held with Tribe members on water quality assessments and invasive species monitoring – especially feral pigs.[84]

The ongoing monitoring component has inherent education and technology benefits. It involves a partnership between the SDRPF and San Diego State University to set up and operate a monitoring station in Boulder Creek. The station is customizable, and researchers will be able to swap out various sensors and parts to get the inputs they need in real-time. The data will be made publically available and explicitly shared with land managers. Data on Boulder Creek is especially valuable because it is a relatively healthy cold water stream, which allows it to serve as a baseline (or attainable goal) for other, more impaired creeks. This should make it easier for researchers and water managers to evaluate and improve water bodies throughout the watershed.

[84] Work Plan, Attachment 3, Subtask 9.3.

I. Provide Access to Restored Land

A major component of this project involves providing access to 13.35 acres of restored SDRPF land through signage, fencing and a public information web portal. As one of two known creeks in the watershed supporting wild rainbow trout, public access to Boulder creek is very valuable to anglers. The SDRPF is collaborating with San Diego Fly Fishers to develop a monitoring program that will ensure recreation benefits for years to come. The area is also used by hikers and birders, and provides scenic views. Value is enhanced through the restoration component, where 4.4 acres will be newly restored and cleared of invasives.

G. Community and Tribal Engagement

The *Sustaining Healthy Tributaries to the Upper San Diego River* project relies heavily on the contribution of volunteers. Volunteers will collect data and participate in restoration activities.[85] Through this process, volunteers will receive training on native species, monitoring techniques, and the importance of healthy ecosystems. Educational materials will be installed along trails in the 11.35 acres of this project, which will further engage the community when they arrive to recreate.

There are 18 Native American tribes in San Diego County, and the San Diego River and its adjacent lands are the ancestral home of the Barona and Viejas tribes. These tribes have a unique and important history with the watershed, and all project staff working on the initial multi-creek assessment are trained to recognize culturally significant objects, including arrowheads, pounding stones, clay potsherds etc.

The SDRPF recognizes these tribes continue to play an important role in protecting the watershed today. This project involves a concerted effort to work with these local tribes. The SDRPF has partnered with the Kumeyaay Digueno Land Conservancy, which is affiliated with several tribes, and on-site workshops are planned for the Viejas, Barona, and Inaja Reservations. Many face similar issues, and the Viejas and Barona tribes jointly administer Capitan Grande, which is another reservation also located in the watershed.

A. Restoration of Native Habitat and Benefits to Wildlife or Habitat

One the primary goals of *Sustaining Healthy Tributaries to the Upper San Diego River* is to restore 4.4 acres of riparian habitat along Boulder Creek. This restoration activity will include invasive species removal (e.g., tamarisk, palms) and planting of native species. In addition to enhancing and protecting native plant ecosystems, this will increase available habitat for native species by removing invasive plants and planting in burned areas that have not recovered. Water quality improvements related to riparian restoration – reduced sedimentation, reduced pollutant concentration, decreased stream temperatures, and reduced water loss from increased shading – will provide a high quality cold water stream for wild rainbow trout and other cold-water species.

The real-time monitoring component of the project benefits wildlife and habitat by allowing for early warning of any anomalies. This is particularly important for Boulder Creek's wild rainbow trout population. The project's focus on invasives also provides a significant benefit to both wildlife and habitat. In addition to the 4.4 acres of riparian habitat restored, one of the most valuable ways the project addresses invasives is by partnering with local Native American tribes to monitor for and control feral pig populations. These pigs can be disastrous for important native plant species – the Nature Conservancy and the National Park Service spent $5 million to eradicate wild pigs from Santa Cruz Island, CA in 2007 – and there is worry that feral pigs may serve as a disease vector.[86] Monitoring for feral pigs will enable implementation of control measures early, which will reduce feral pig control costs, and help protect the newly restored habitat before it is damaged.

F. Scientific and Technical Foundation of Water Management

The *Sustaining Healthy Tributaries to the Upper San Diego River p*roject will collect real-time monitoring data, field assessments of three tributaries to the Upper San Diego River, and implement a field

[85] Work Plan, Attachment 3, Task 9.2 and 9.6.
[86] Kreith, M. 2007. *Wild Pigs in California: The Issues*. University of California – Agricultural Issues Center. December 2007. Available: http://aic.ucdavis.edu/pub/briefs/brief33_v3.pdf

monitoring program. Knowledge of invasives and additional hydromodifications (there are at least two known modifications) are helpful in planning and prioritizing future removal efforts. In addition, an initial, comprehensive assessment also gives researchers an idea of the effectiveness of the project by allowing them to gauge how habitat quality changes as the project progresses. This helps guide future research efforts, both in the Upper San Diego River Watershed and elsewhere.

C. Prevent Water Quality Degradation

The *San Diego River Watershed Management Plan* notes that the water quality in the undeveloped upper watershed is much higher than that found in the lower watershed.[87] The Plan notes that source water and reservoir monitoring in the El Capitan Watershed management Area showed the primary constituents of concern to water quality are excessive nutrients, total organic carbon (TOC), and total dissolved solids (TDS).[88]As described in Attachment 3, this project will restore 4.4 acres along Boulder Creek. A portion of this restoration involves replanting an area along the creek that was damaged by fire, which will reduce loadings of sediment and other nonpoint source pollutants from these fire-damaged areas.

In addition, a portion of the project involves two hydromodification removal studies, which will involve analyzing the costs, benefits and feasibility of removing two separate creek modifications. If these modifications do end up being removed it will likely be because of benefits associated with lowered flow velocities, mainly a reduction in erosion and sedimentation.

It is important to note this project does *not* involve any actual modification removal, just studies to determine whether removal is a good idea. This does not preclude benefits from these studies, however, which are similar to an option value. Currently, the net gain for each of these removal studies can be expressed as the probability that removal is pursued, times the benefits of removal minus the cost of removal. In addition, there is knowledge gained benefits in terms of developing more precise estimates on what these costs and benefits will be. In the worst case scenario, the costs will outweigh the benefits of removal, and the modifications will remain in place. The downside, in other words, is bounded at the cost of the studies.[89] Importantly, the upside has no such bound. The benefits may outweigh the costs by a substantial amount, in which case the modifications will be removed, and the citizens of the San Diego region will gain. For these reasons, it is likely the hydro-modification removal studies have a positive expected value.

E. Source Water Protection for El Capitan Reservoir

The *San Diego River Watershed Management Plan* notes that surface water from the El Capitan Watershed Management Area (including Boulder Creek) is an important source of water supply. The 2003 Cedar Fire burned this entiremanagement area, and the *San Diego River Watershed Management Plan* concludes that water quality issues associated with sediment loading and nutrientcycling will persist for many years. This will require additional effort and expense by the City of San Diego and they will incur additional near-term water treatment costs due to post-fireinputs of sediment, ash, and nutrients.[90]

Boulder Creek directly flows into the El Capitan Reservoir, and water quality in the creek and Reservoir will benefit from the 4.4 acres of riparian habitat restoration. It is anticipated that the greatest water quality benefits that the reservoir will experience are reduced sediment loads (which settle in the reservoir and eventually reduce capacity) and reduced nutrient loading from runoff.

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[87] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 2.3 Surface Water Quality, page 15.

[88] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 3.2 Surface Water Quality, page 40.

[89]Even this may be too low, as information about the benefits and costs of removal is likely valuable regardless of whether the modifications get removed.

[90] San Diego River Watershed Working Group. 2005. *San Diego River Watershed Management Plan*.Prepared by Anchor Environmental, et al. Section 3.2 Surface Water Quality, page 40.

D. Improve Water Supply Reliability

A portion of the project involves canopy restoration along the bank of the upper San Diego River. Studies have shown canopy shade can reduce evaporative water loss by more than 50%.[91]Invasives removal, including tamarisk, will also yield some water supply enhancements. These activities will provide some additional (but unquantifiable) water supply yields and, because this is a local resource, will contribute to water supply reliability (by enabling a small offset of less reliable import water).

Monetized Benefit Analysis (Section D3)

This project will provide a range of important benefits. However, only one can be reliably estimated in monetary terms – the reduction in net greenhouse gas emissions. Table 8-25 summarizes the annual benefits from the project.

B. Reduce Net Greenhouse Gas Emissions

The *Sustaining Healthy Tributaries to the Upper San Diego River* project will restore 4.4 acres of riparian habitat along Boulder Creek. This land was previously burned in the Cedar fire, and the land has not yet recovered. Restoration activities would involve replanting the area with native riparian species, which will act as a carbon sink, because it will replace either currently unvegetated land or will replace non-native grassland, which is essentially carbon-neutral.[92] Part of *this* restoration project however, involves replanting an area that was damaged by fire and currently lacks vegetation. As a result, the restoration is offsetting greenhouse gas (GHGs) emissions through carbon sequestration.

Assuming a 50 year project life time, we can calculate the total amount of carbon dioxide the 4.4 acres of restored habitat will sequester. As described in Attachment 7, this project anticipates restoring 4.4 acres of riparian habitat for a project lifetime sequestration of 230 MT of CO_2.

To monetize this benefit, we applied the dollar value assigned to greenhouse gas (GHG) emissions, measured in carbon dioxide equivalent (CO2e). The social cost of carbon is estimated as the aggregate net economic value of damages from climate change across the globe, and is expressed in terms of future net benefits and costs that are discounted to the present.[93] In February 2010, the U.S. Government's Interagency Working Group on Social Cost of Carbon issued guidance[94] on recommend values for the social cost of carbon for use in regulatory benefit-cost analysis. The recommended mean estimate of the social cost of reducing one metric ton (MT) of CO2 in 2012 is $22.53/MT (updated from 2010 values using CPI), with a range of values from $4.95 to $68.33 per MT. The recommended mean estimate of the social cost of carbon reflects the worldwide net benefits of reducing CO2 emissions. Estimates of the portions of the net benefits occurring in the United States range from 7% to 23% of the worldwide social cost of carbon.

For this analysis, the average value of $22.53/MT was used when calculating social benefits and costs, which produces conservative estimates for the benefits and costs associated with GHG emissions. To determine total costs over the 50-year project period, we escalate the social cost of carbon by 2.4% per year, which is above the general rate of inflation. The social cost of carbon will increase in future years

[91]Stormont, J., Farfan, E., and Coonrod, J. (2009). "Total Soil Water Evaporation in a Riparian Environment: Model Development and Application." J. Hydrol. Eng., 14(9), 904–912. Available: http://ascelibrary.org/doi/abs/10.1061/%28ASCE%29HE.1943-5584.0000069

[92]Defenders of Wildlife. 2010. *An Economic Analysis of the Benefits of Habitat Conservation on California Rangelands*. Pg. 28.

[93]IPCC. 2007. Summary for policymakers. In *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson (eds.). Cambridge University Press, Cambridge, UK. pp. 7–22.

[94]Interagency Working Group. 2010. Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866. Interagency Working Group on Social Cost of Carbon, United States Government.February. Available: www.epa.gov/oms/climate/regulations/scc-tsd.pdf. Accessed 7/13/2011.

because CO_2 will produce larger incremental damages as physical and economic systems become more stressed in responding to greater climate change.

Over the 50-year project life, total present value benefits associated with avoided social costs of carbon amount to $2,875.

Benefit Summary

Only one of the project benefits was monetized – A-Reduce Net Greenhouse Gas Emissions – and, discounted over the 50 year project life, is $2,875. Though the other benefits for this project were not monetized, they do hold value and remain important.

Table 8-25: Annual Benefit of Reduction in Greenhouse Gas Emissions
Sustaining Healthy Tributaries to the Upper San Diego River

Annual Benefit (All benefits should be in 2012 dollars)									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
2017-2036	Reduction in CO2	MT	0	9.179852	9.179852	Variable	Variable	Variable	$2,556.39
2037-2056	Reduction in CO2	MT	0	2.195182	2.195182	Variable	Variable	Variable	$306.30
2057-2066	Reduction in CO2	MT	0	0.299343	0.299343	Variable	Variable	Variable	$12.25
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$2,875**

Project Benefits and Costs Summary (Section D5)

Project Economic Costs

The main costs associated with this project the involve the restoration of 4.4 acres of riparian habitat ($272,223), conducting the initial in-field assessment and developing and implementing the monitoring program ($149,391) and purchasing and installing the real time monitoring station and establishing the web portal ($117,367). Note much of the in-field assessment work will be done by volunteers. There are opportunity costs to volunteering—and estimates of this opportunity cost *have* been included in the budget—but these are not explicit monetary expenditures per say. Other costs include designing and implementing the education plan ($48,261) and conducting the two hydro-modification removal studies ($60,000). Total present value costs are $597,340. Table 8-26 summarizes the economic project costs for the project.

Benefits and Costs Summary

While the type of benefits associated with this project—public access and education, ongoing monitoring, habitat restoration etc—are traditionally difficult to monetize, this does not mean they are unimportant. The present value costs of the Sustaining Healthy Tributaries Project are $597,340, and mostly consist of the restoration project, the initial assessment, and ongoing monitoring and web data portal.

Table 8-26: Annual Costs (PSP Table 19)
Sustaining Healthy Tributaries to the Upper San Diego River

Annual Costs of Project (All costs should be in 2012 Dollars)										
			Annual Costs						Discounting Calculations	
	Initial Costs Grand Total Cost from Table 6 (row (i), column (d))	Adjusted Grand Total Cost	Admin	Operation	Maintenance	Replace-ment	Other	Total Costs (a) +…+ (g)	Discount Factor (Capital) Present Value Coeff (O&M)	Discounted Project Costs (h) x (i)
Year			(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012										
2013	$71,185							$71,185	0.943	$67,156
2014	$128,134							$128,134	0.890	$114,039
2015	$220,675							$220,675	0.840	$185,283
2016	$284,742							$284,742	0.792	$225,542
2017	$7,119							$7,119	0.747	$5,320
2018										
Total Present Value of Discounted Costs (Sum of Column (j)) Transfer to Table 17, column (c), Proposal Benefits and Costs Summaries										**$597,340**

Project 6: Chollas Creek Integration Project – Phase II

Project Abstract

The *Chollas Creek Integration Project - Phase II* aims to improve water and habitat quality in a Chollas Creek segment at Northwest Village, and engage members of the surrounding DAC in water quality monitoring along Chollas Creek. The project will reduce flood damage and improve water quality at Northwest Village Chollas Creek through creek realignment, headwall installation, and drop structures; improve habitat through invasives removal and native riparian revegetation; and conduct pre/post water quality monitoring.

A. Northwest Village Creek Restoration: Construction will accomplish flood damage reduction and water quality improvement through 1) creek re-alignment 2) construction of inlets 3) drop structure installation 4) non-native removal/restoration..Specifically, two 3-foot drop structures (rip-rap) will be developed along the northwest and southwest segments of this creek section to slow the creek flow at these points. Plants removed during construction will be replaced with native riparian species to restore habitat disturbed during this phase.

B. Habitat Improvement Through Invasive Removal: Invasives removal and restoration will improve water quality through erosion control and pollution uptake, and will contribute to improved habitat values for wildlife. Recreational and public access benefits will also be achieved. This Phase II project will support a comprehensive invasives removal effort at Northwest Village Creek (Euclid Avenue and Market Street), as well as 47th Street and Castana. Building upon *Chollas Creek Integration Project - Phase I*, biological site assessment data (delineation of vegetation communities/wetland resources and identification of sensitive plant and animal species) will inform the Phase II invasives removal efforts, reflecting community removal priorities where the greatest water quality, recreation, wildlife conservation, and stakeholder benefits can be achieved. The project design is 90% complete with CEQA compliance approval pending in mid-2013.

C. Water Pollution Source Tracking, Citizen Monitoring, Pollution/Conservation Education, and Community Engagement: Phase II will build upon *Chollas Creek Integration Project - Phase I*'s engagement of institutional stakeholders in the determination of water quality, natural resource, and environmental justice opportunities/constraints. Phase II will expand stakeholder outreach to include residentsin water quality monitoring, and conduct targeted educational messaging. Thirty (30) area youth will be trained and employed as water quality monitors. Water quality monitoring will utilize existing City of San Diego Stormwater data for pollution source tracking, and will expand upon the San Diego Coastkeeper's Citizen Science Monitoring and Pollution/Conservation Education programs. The project will also partner with Groundwork's Green Team Community Service Project for engagement of student volunteers, and a coalition of institutional stakeholders in the determination of water quality, natural resource, and environmental justice opportunities/constraints.

A summary of all benefits and costs of the project are provided in Table 8-1. Monetized benefits and non-monetized benefits are presented in this attachment, while physically quantified (but not monetized) benefits are described in Attachment 7.

Summary Project Benefits and Costs

A summary of all benefits and costs of the project are provided in Table 8-27. Monetized benefits and non-monetized benefits are presented in this attachment, while physically quantified (but not monetized) benefits are described in Attachment 7. Benefits are lettered for cross-reference with Attachment 7, and are therefore not represented in order in the following sections.

Table 8-27. Benefit-Cost Analysis Overview
Chollas Creek Integration Project - Phase II

	Present Value
Costs – Total Capital and O&M	**$591,454**
Monetizable Benefits	
A. Avoid Flood Damage	$7,953
C. Improve Water Quality and AvoidMore Costly BMPs	$38,864
Total Monetizable Benefits	**$46,817**
Physically Quantified Benefits	**Project Life Total**
B. Reduce Stormwater Runoff	0.12 acre feet/year
E. Benefits to Wildlife and Habitat	6.3 acres
F. Provide Recreation Opportunities	6.3 acres
I. Increase Scientific Knowledge of Creek	300 WQ samples
Qualitative Benefits	**Qualitative Indicator***
G. Educational Benefits	+
H. Stakeholder and Community Involvement, Including DACs	
F. Improved Water Quality	+
D. Reduce Public Health Hazards	+

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Non-Monetized Benefits Analysis (Section D2)

Narrative descriptions of the benefit categories marked "Yes" in DWR's *Proposal Solicitation Package* Table 12 are provided below.

B. Reduce Stormwater Runoff

Runoff from properties near Chollas Creek currently sheet flows towards the creek from surrounding paved surfaces and is discharged over creek bank. Other properties discharge storm water runoff onto Market Street viasurface flow or via public catch basinsthe collect runoff via private grated inlets and discharge into the public 42"-RCP storm drain pipe in MarketStreet.The public 42"-RCP storm drain pipe discharges into Chollas Creek at the Market Street culvert.[95]

Rick Engineering has estimated runoff reduction benefits for the restoration project by comparing the % rainfall runoff (runoff coefficient) before the restoration project (0.95) and after the restoration project (0.45). Based on this comparison, there is approximately a 52% decrease in the anticipated runoff volume from the Phase II restoration site, which includes 2.3 acres of construction/restoration within the channel and installation of stormwater BMPs for an additional 2.9-acre catchment area.[96] This equates to a 0.12 acre-ft per year reduction in runoff based on an average annual rainfall of 9.8 inches over the 5.2 acre site.

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[95]Rick Engineering. 2011. *Water Quality Technical Report for Northwest Village Creek*. January 2011 (with revisions through June 2012).Page 3.
[96] Rick Engineering. 2013. Personal Communication with Joe Hammond. 21 March 2013.

G. Provide Education or Technology Benefits

This qualitative benefit of the *Chollas Creek Integration Project – Phase II*results from the community-based water quality sampling program that will be implemented by Coastkeeper and Groundworks. Sampling will be conducted by 30 student volunteers who will receive training as water quality monitors. This training will educate them on water issues in the area and what affects factors affect water quality. This project then goes further to incorporate the results of the water quality sampling effort into the City of San Diego's stormwater data, Coastkeeper's Citizen Science Monitoring data, and Groundwork's watershed assessment data, as well as the City's Think Blue outreach materials for the community. .

H. Stakeholder and Community Involvement, Including DACs

The work plan for the *Chollas Creek Integration Project – Phase II* calls for a high level of community engagement in all three components of the project. This project will continue the community involvement efforts of Phase I by implementing a restoration and invasives control plan that reflects community priorities. This project will utilize citizen scientists for water quality monitoring through Coastkeeper and Groundworks programs. Groundworks will also continue facilitating a coalition of watershed stakeholders to determine water quality natural resource, and environmental justice opportunities and constraints.

The 30 student water quality monitors that would be employed by this project would not have this opportunity to develop important environmental stewardship and work ethic values without this project. These activities do more than just monitoring the water quality of Chollas Creek – they encourage and inspire local DAC residents to feel a sense of stewardship and ownership over their local waterways. This benefit is invaluable.

E. Benefits to Wildlife or Habitat

One the primary goals of the *Chollas Creek Integration Project – Phase II* are to restore 6.3 acres of riparian habitat along Chollas Creek. This will involve removal of invasives, channel improvements, and native plant revegetation. Total restored area for the proposed project will include the channel and banks restored during the Northwest Village Creek Restoration (Component A, 2.3 acres) or as part of the Habitat Improvement Through Invasives Removal (Component B, 4 acres).Restoration efforts will improve water quality through erosion control and pollution uptake. Invasive colonies threaten native riparian habitats by monopolizing water resources, altering flood regimes, and reducing habitat quality. This has an effect on animals as well as plants. The *Chollas Creek Integration Project – Phase II*will improve riparian and aquatic habitats that serve as nesting and foraging grounds for native wildlife.

F. Provide Recreation Opportunities

Parkland and open space are currently lacking in the Encanto neighborhood, where Chollas Creek is located. While the City of San Diego seeks to provide 2.8 acres of parkland per 1,000 residents, there are only 1.2 acres of parkland per 1,000 residents in the Encanto neighborhood.[97] The *Chollas Creek Integration Project – Phase II* helps remedy that by restoring an additional 6.3 acres of riparian habitat. An open space easement will encompass the creek, revegetation areas, and the existing coastal sage scrub habitat that is being left in place.[98]

D. Reduce in Public Health Hazards

The *Chollas Creek Integration Project – Phase II* promotes social health and safety through invasive removal and native restoration. Thick colonies of giant reed (arundo) at the site are associated with homeless populations. Giant reed grows in large, dense clumps that homeless people have found may provide some measure of privacy and safety.While on the surface this seems as if it could be a successful social adaptation, it has inherent problems in that it makes residents extremely vulnerable to both flood and fire dangers. It also creates critical pollution problems due to the lack of sanitary facilities. As documented in Attachment 7, there are higher concentrations of crime occurrences at streets and

[97]City of San Diego. 2007. Draft General Plan Final PEIR. Pg. 2-12.
[98]City of San Diego. 2012. Draft Mitigated Negative Declaration, Project No. 230777. November 2012. Page 16.

intersections that provide transient access to the creek.[99] Note the cluster of crime occurrences along 47th Street (Segment 4) and Euclid Street (Segment 2) where invasives removal activities are proposed.

I. Increase Scientific Knowledge of Creek

The USEPA has identified increased scientific knowledge as a key component to motivating environmental stewardship in its 2005 *Everyday Choices: Opportunities for Environmental Stewardship*.[100] This project seeks to improve its scientific understanding of Chollas Creek, its nonpoint pollutant sources, and the effectiveness of creek restoration in pollution update and erosion control through collection of 300 pre- and post-project water quality samples.[101]These water quality samples will be analyzed and results shared with other agencies, such as the City of San Diego, which allows for the discussion of restoration successes to be broadcast throughout the region.

Monetized Benefit Analysis (Section D3)

A monetizable benefit in the form of avoidance of more costly BMPs is expected to accrue over the expected 50 year life of the project.

C. Improve Water Quality and Avoid More Costly BMPs

The *Chollas Creek Integration Project – Phase II* will restore 6.3 acres of land to native habitat, and remove invasive species along a reach of Chollas Creek. Restored native habitat will act as a filter for runoff, reducing the amount of pollutants entering the creek following a storm event or through other sources of runoff. The creek realignment, culvert widening, and installation of drop structures and headwalls will reduce erosion and sedimentation within the channel, while removal of invasives can also improve water quality. Invasive species, namely arundo and tamarisk, are associated with water quality indicators such as low dissolved oxygen and associated eutrophication.

As described in C- Reduce Stormwater Runoff, this project is anticipated to generate a 0.12 AFY reduction in runoff due to Phase II restoration activities. This represents a 52% reduction in stormwater runoff and associated nonpoint source pollutant loading to the creek. Although stormwater runoff discharging to Chollas Creek from the Northwest Village properties will comply with the City of San Diego's Storm Water Standards[102], this site-specific reduction in runoff will help ensure that the City does not have to implement costly treatment BMPs in the future to address TMDL mandates.

To calculate avoided BMP costs, we multiply the amount of turf that will be replaced each year by the annual cost per acre of wastewater treatment. The *Sun Valley Watershed Management Plan Environmental Impact Report* provides project lifetime costs of four alternatives to treat pollutants from runoff.[103] Two of the four alternatives are of interest in the context of this project: Alternative 2 (Water Conservation) and Alternative 4 (Full Conveyance with Regional BMPs). These alternatives represent our with-project and without-project scenarios, respectively. Over a 50-year project lifetime, Alternative 2 (our with-project scenario) costs $171.58 million over a 4.4 mi^2 area (2002 dollars, discounted). Alternative 4 (our without-project scenario), would cost $206.61 million over a 4.4 mi^2 area (2002 dollars, discounted). If this section of Chollas Creek is not restored, it will continue to produce urban runoff that will need to be treated prior to being discharged from the municipal separate stormwater system (MS4) which is located in Market Street. The cost to collect and treat urban runoff is estimated at $46.96 million per square mile, while the cost to conserve water is estimated at $39 million per square mile (2002 dollars).[104] The

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[99]Groundworks San Diego-Chollas Creek. Map from Leslie Reynolds via email, February 26, 2013.
[100]U.S. EPA. 2005. *Everyday Choices: Opportunities for Environmental Stewardship*, EPA Innovation Action Council. Pg. 2
[101] Work Plan. Attachment 3. Task 4 and Task 9.3
[102] Rick Engineering. 2012. Water Quality Technical Report. Pg 1.
[103]County of Los Angeles Department of Public Works. 2004. *Environmental Impact Report for the Sun Valley Watershed Management Plan*. Available http://www.sunvalleywatershed.org/ceqa_docs/plan.asp. Pg. 4-16.
[104]County of Los Angeles Department of Public Works. 2004. *Environmental Impact Report for the Sun Valley Watershed Management Plan*. Available http://www.sunvalleywatershed.org/ceqa_docs/plan.asp. Pg. 4-16.

difference between the two is $7.96 million per square mile, or $12,439.63 per acre, in 2002 dollars ($7.96 million per square mile x 1 square mile per 640 acres). Converting this to 2012 dollars, we get a benefit of $15,876.74 per acre. This project will reduce stormwater runoff by 52% (effectively conserving it); therefore, over the 50 year period from 2017-2066, it is estimated that restoration of 6.3 acres to native riparian habitat would save $52,012.20 cumulatively in avoided BMP costs (savings per acre x total acres x 0.52). Assuming that the combined restoration areas only contribute 52% to the future avoided cost of surface water treatment BMPs, this results in a PV avoided project cost of $38,867. Please note that because this analysis has been explained here, the calculation figures are not provided in the appendices to this attachment.

Reduced runoff will also result in a reduction of pollutants entering the creek. Native plants in the restored riparian habitat will be able to act as filters for pollutants carried by runoff, further reducing the amount of pollutants entering and transported by the creek. However, it is not possible to quantify the amount of pollutant reduction that will be attained by this component of the project.

Table 8-28: Annual Costs of Avoided BMPs (PSP Table 16)
Chollas Creek Integration Project – Phase II

Annual Costs of Avoided Projects (2012 Dollars)						
	Costs				Discounting Calculations	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
	Avoided Surface Water Treatment BMPs					
Year	Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance Costs	Total Costs Avoided for Individual Alternatives (b) + (C) + (d)	Discount Factor	Discounted Costs (e) x (f)
2017 - 2066			$52,012	$52,012	Already included from source	$52,012
Total Present Value of Discounted Costs (Sum of column (g))						**$52,012**
(%) Avoided Cost Claimed by Project						**52%**
Total Present Value Discounted Avoided Project Costs Claimed by Alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)						**$38,867**

Flood Damage Reduction Benefit Analysis (Section D4)

According to the *Water Quality Technical Report for Northwest Village Creek*, runoff from properties near Chollas Creek currently sheet flows towards the creek from surrounding paved surfaces and is discharged over creek bank.[105]Other properties discharge storm water runoff onto Market Street viasurface flow or via public catch basinsthe collect runoff via private grated inlets and discharge into the public 42”-RCP storm drain pipe in MarketStreet.The public 42”-RCP storm drain pipe discharges into Chollas Creek at the Market Street culvert.

[105]Rick Engineering. 2011. *Water Quality Technical Report for Northwest Village Creek*. January 2011 (with revisions through June 2012).Page 3.

A- Avoid Flood Damage

According to the *Water Quality Technical Report for Northwest Village Creek*, runoff from properties near Chollas Creek currently sheet flows towards the creek from surrounding paved surfaces and is discharged over the creek bank.[106]

Figure 7-1 in Attachment 7 shows floodplains for the 50-year, 100-year, 200-year, and 500-year floods at the Northwest Village Creek restoration site. Currently, flooding will occur for each of these flood events, with the majority of flooding occurring to the east of the creek. The hydromodifications included as part of the Chollas Creek Integration Project - Phase II are expected to have flood damage avoidance benefits, mainly by reducing expected damage to two commercial buildings located near the creek. According to flood analyses by Rick Engineering, the proposed hydromodifications will reduce the commercial building area affected by the 200-year flood by 1,704 square feet.

The reduction in flood risk because of this project will also benefit the planned Village at Market Creek community development. This development will convert 60 acres of blighted land into productive properties including recreational, commercial, and residential properties.[107] In total, the *Chollas Creek Integration Project - Phase II* will protect 1.7 million square feet of future development at the Village at Market Creek.

It is assumed commercial property has a value of $151.41per square foot, clean-up costs are 30% of structural damages[108] and the buildings have an 80% depreciated value to replacement value ratio. Running these estimates through the F-RAM model gives a discounted value of $10,040 in avoided costs over the 50 year life of the project (2017 – 2067). Discounting this from 2016values to present, 2012 values gives $7,953.

The present value of flood damage reduction benefits are summarized in Table 8-29 (which corresponds to PSP Table 18). Benefits are assumed to commence in 2016 and have useful life of 50 years. Future benefits are discounted using a 6% discount rate.

Project Benefits and Costs Summary (Section D5)

Project Economic Costs

Table 8-30 summarizes the economic project costs for the project. The primary budgeted costs associated with the project are the installation of stream structures and habitat restoration ($562,126). Additional costs include training and employing student monitors ($52,162) and permitting ($17,380). Total present value costs are $591,454.

[106] Rick Engineering. 2011. *Water Quality Technical Report for Northwest Village Creek*. January 2011 (with revisions through June 2012).Page 3.
[107] The Village at Market Creek. Available: http://thevillageatmarketcreek.com/index.html (Accessed 18 March 2013).
[108] CA Department of Water Resources, Division of Flood Management. 2008. *Flood Rapid Assessment Model (F-RAM) Development*

Table 8-29: Value of Flood Reduction Benefit
Chollas Creek Integration Project – Phase II

Present Value of Expected Annual Damage Reduction Benefits (All values in 2012 Dollars)			
(a)	Expected Annual Damage Without Project (1)		$1,038
(b)	Expected Annual Damage With Project (1)		$401
(c)	Expected Annual Benefit	(a) – (b)	$637
(d)	Present Value Coefficient (2)		15.76
(e)	**Present Value of Future Benefits Transfer to Table 20, column (e). (3)**	**(c) x (d)**	**$7,953**
(1)This program assumes no land use changes in the floodplain. So, EAD will be constant over analysis period. Note it is assumed annual damages begin accruing upon project completion in 2017.			
(2)6% discount rate; 50-year analysis period (2017-2067) discounted to 2012.			
(3) Note: this is the 10,040 output from FRAM discounted to 2012 dollars (because value FRAM gives is value over 2017-2067).			

Benefits and Costs Summary

Present value monetized benefits, mainly avoided BMP costs and flood damage reduction, total $46,817. Present value costs are higher at $591,454, although the project also contains many valuable non-monetized benefits. These include educational, community and social benefits, as well as qualitative improvements to wildlife and habitat, water quality and public access.

Omissions, Biases, and Uncertainties

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with avoided water import costs and flood damage. These issues are listed in Table 8-31

Table 8-31. Omissions, Biases, and Uncertainties, and Their Effect on the Project
Chollas Creek Integration Project – Phase II

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Value of commercial real-estate	U	Flood analysis involves FRAM assumptions about the value each commercial square foot, which assumes it is the same across all buildings.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease benefits.
–– = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Table 8-30: Annual Costs
Chollas Creek Integration Project – Phase II

Annual Costs of Project (All costs should be in 2012 Dollars)										
			Annual Costs						Discounting Calculations	
	Initial Costs Grand Total Cost from Table 6 (row (i), column (d))	Adjusted Grand Total Cost	Admin	Operation	Maintenance	Replace-ment	Other	Total Costs (a) +…+ (g)	Discount Factor (Capital) Present Value Coeff (O&M)	Discounted Project Costs (h) x (i)
Year			(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2011								$3,793	1.000	$3,793
2012	$33,936							$18,088	1.000	$18,088
2013	$33,936		$625					$60,924	0.943	$57,475
2014	$305,425		$2,500					$434,264	0.890	$386,493
2015	$237,553		$625					$149,598	0.840	$125,605
2016	$67,872									
Total Present Value of Discounted Costs (Sum of Column (j)) Transfer to Table 17, column (c), Proposal Benefits and Costs Summaries										**$591,454**

Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Project Abstract

Nitrogen and phosphorous loading from the Santa Margarita River (SMR) Watershed can result in low dissolved oxygen (DO) and increased algal blooms in the estuary and stream segments, several of which have been 303(d)-listed for nitrogen, phosphorus, or eutrophication. Total Maximum Daily Loads (TMDLs) are not currently in place in most of the SMR Watershed segments which are listed for nutrient impairment. However, TMDLs are likely to be instituted in the near future. As there is little scientific knowledge about the appropriate level of nutrients that the SMR can sustainably assimilate, the TMDLs would be based on a generalized approach if no actions are taken.

Thisproject aims to establish the science and seek stakeholder consensus to develop nutrient water quality goals that are protective of beneficial uses and could be employed in the development of alternative nutrient water quality objectives (WQOs) forthe SMR Watershed in response to the *Water Quality Control Plan for the San Diego Basin* (Basin Plan) Triennial Update. This is the second phase of work, which consists of continued stakeholder facilitation and continued monitoring, modeling, and data analyses to determine nutrient water quality goals. The project leverages an investment of over $2 million in data collection and other resources contributed by watershed stakeholders and partners in Phase I. The project aims to:

(1) Maximize community involvement in the SMR watershed through ongoing stakeholder group facilitation (established in Phase I),
(2) Continue work with the group to obtain feedback and critical review of technical work products to achieve consensus on the nutrient water quality goals,
(3) Continue core monitoring and special studies to address data gaps required to develop the nutrient water quality goals for the river,
(4) Further refine proposed nutrient water quality goals developed as part of Phase I for the SMR Estuary, if deemed necessary by the Stakeholder Group, and
(5) Develop nutrient water quality goals for the SMR River as needed based on the Nutrient Numeric Endpoints (NNE) approach and local data that are protective of beneficial uses

The project benefits the SMR watershed and the region by providing scientifically–based nutrient water quality goals that will control eutrophication. Stakeholders believe that since the estuary through which the SMR flows is open to the ocean during the winter (the wet season), nutrients in the river only have a short residence time before they enter the ocean. This effort will counteract hydromodifications. Within the region, the project will further the technical foundation of water management by demonstrating a science-based approach to establishing nutrient water quality goals that can be developed jointly with the regulatory agencies. If warranted by the results, the scientific studies will provide the underpinnings necessary to support Nutrient Site-Specific Objectives (SSOs) that require a Basin Plan amendment. This effort will serve as a template for similar efforts within the region.

This analysis concerns itself with the second phase of a three phase project. Phases I and III are not directly connected to this phase, and so are not included in the analysis.

Summary Project Benefits and Costs

A summary of all benefits and costs of the project are provided in Table 8-32. Monetized benefits and non-monetized benefits are presented in this attachment. Benefits are lettered for cross-reference with Attachment 7, and are therefore not represented in order in the following sections.

Table 8-32. Benefit-Cost Analysis Overview
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

	Present Value
Costs – Total Capital and O&M	**$1,408,396**
Monetizable Benefits	
C. Avoid Municipal Stormwater Treatment Facility	$135,008,438
Total Monetizable Benefits	**$135,008,438**
Quantifiable Benefits	
A. Stakeholder Involvement in Nutrient Assessment	15 meetings
Qualitative Benefit or Cost	**Qualitative Indicator***
B. Improve Scientific Knowledge of the Santa Margarita River Watershed	+
D. Avoid Third Party Litigation Related to TMDL Compliance	+
E. Improve Water Quality and ReduceEutrophication Due to Nutrient Management	+

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Non-Monetized Benefits Analysis (Section D2)

Narrative descriptions of the benefit categories marked “Yes” in DWR’s *Proposal Solicitation Package* Table 12 are provided below.

B. Improve Scientific Knowledge of the Santa Margarita River Watershed

A qualitative benefit of this project is improved scientific knowledge of the SMR.Increased knowledge is nearly impossible to quantify. However, it is possible to consider the number of studies that are produced as a result of this project as an increase in scientific knowledge relating to the SMR watershed. Thisproject aims to establish the science and seek stakeholder consensus to develop nutrient water quality goals that are protective of beneficial uses and could be employed in the development of alternative nutrient WQOs forthe SMR Watershed in response to the Basin Plan Triennial Update.

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II will conduct field and special studies during task 4B of this project, from which they will develop nutrient water quality goals for the SMR in Task 4C. Results will be reported in *The Technical Studies Supporting Proposed Nutrient Water Quality Goals for Santa Margarita River Report*. In addition to the reports, the knowledge gained in Tasks 4B and 4C will be shared during the Stakeholder Advisory Group meetings that constitute Task 4A.

Within the region, the project will further the technical foundation of water management by demonstrating a science-based approach to establishing nutrient water quality goals that can be developed jointly with the regulatory agencies. If warranted by the results, the scientific studies will provide the underpinnings necessary to support Nutrient Site-Specific Objectives (SSOs) that require a Basin Plan amendment. This effort will serve as a template for similar efforts within the region.

D. Avoid Third Party Litigation Related to TMDL Compliance

A qualitative benefit of this project is potential avoidance of third party litigation related to TMDLs set under a generalized approach. In the absence of the project, TMDLs that are neither site-specific nor season-specific are likely to be set for the SMR in the near future. If the County of San Diego does not meet the TMDL targets, the County may face pressure from third parties demanding that the TMDLs be met. If the third parties are not satisfied with the county's response, they could bring litigation, resulting in additional costs to the County.[109]

Litigation may occur over a number of issues related to water quality standards, such as violating current standards or the current standards violating beneficial uses. A scientifically-sound site-specific set of nutrient standards is likely to reduce litigation over violations of beneficial uses. Additionally, if stakeholders are involved in developing the recommendations for new standards, there will be increased understanding by all stakeholders (including dischargers) on how their activities impact the watershed, increased knowledge over the source of potential violations, increased dialogue between stakeholders, and an understanding of how best to address water quality concerns. All of these activities are likely to reduce potential litigation and instead promote a collaborative solution, though without knowing what the recommended standards and management practices may be, it is not possible to quantify this benefit.

E. Improve Water Quality and Reduce Eutrophication Due to Nutrient Management

If the project is undertaken, project proponents think that nutrient loading to the SMR Watershed would be managed to achieve maximum benefit for all beneficial uses. Using an NNE approach, rather than a numerical approach for establishing water quality standards, may allow for variable nutrient loading based on seasonality, wet/dry weather, and other conditions which may affect nutrient assimilation in the watershed. The NNE approach allows for this flexibility because it is designed to reduce the risk of impairment, regardless of actual measured levels of contaminants.[110] As such, nutrient loading may be heavier during wet weather when the assimilative capacity of the watershed is great and lower during dry weather when the potential for eutrophication is greatest. By adjusting nutrient loading for seasonality, dry weather nutrient concentrations may be reduced and eutrophication controlled.

Without the project, should stringent TMDLs and a treatment facility be constructed to address stream water quality, nutrient loading and algal blooms may still persist. Establishing the NNE and new WQOs/SSOs with stakeholder support will make it more likely that those stakeholders implement changes that would reduce loading during the dry season consistent with watershed management goals.

A. Stakeholder Involvement in Nutrient Assessment

A qualitative benefit of this project is the engagement of the different SMR stakeholders. These stakeholders, representing many different viewpoints, will collectively determine how to manage the watershed to its maximum benefit.

The work plan for *Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II*, calls for continued facilitation of the Stakeholder Advisory Group (Subtask 4A) established during Phase I. Subtask 4A, the "Facilitate Stakeholder Advisory Group", calls for 15 meetings to take place over the four years of the project. During these meetings, stakeholders will:

- Guide project activities and reviews,
- Provide feedback on technical and policy elements of the project,
- Identify key questions and a conceptual approach,
- Determine specific technical activities and information required to carry out that approach,
- Evaluate existing data, and
- Identify any current data gaps.

After data are collected, models run, and results interpreted, the Stakeholder Advisory Group will determine the appropriate nutrient water quality goals for the SMR. Maximizing stakeholder involvement in all aspects of the project would foster a sense of stewardship and consensus to further watershed management goals.

[109] In the 1990s, the Natural Resources Defense Council brought litigation against the County of San Diego for violating a Consent Decree.
[110] USBR. 2010. Hydrological and Biological Support to Lower Santa margarita River Watershed Monitoring Program Water Years 2008-2009. Pg. 5-9.

Monetized Benefit Analysis (Section D3)

One monetized benefit is expected to accrue over the expected 15 year life of the project: the avoided project costs associated with building and operating a municipal stormwater treatment facility.

C. Avoid Municipal Stormwater Treatment Facility

Project proponents think that nutrient loading to the SMR Watershed could be managed to achieve maximum benefit. Nutrient loading may be adjusted for seasonality by those sources that have flexible operations. By adjusting nutrient loading for seasonality, dry weather nutrient concentrations may be reduced thereby leading to de-listing of the SMR Estuary and stream segments from the 303(d) list and/or establishment of watershed management strategies in lieu of a formal TMDL. However, without the project, TMDLs may be set such that the County of San Diego may need to build one or more municipal stormwater treatment facilities in order to treat stormwater that is discharged from the municipal separate storm sewer system (MS4) into the SMR, particularly after storm events. This would result in costs to the County of San Diego if the project does not occur.

In particular, the County of San Diego has determined the percentage of nitrogen and phosphorus reductions (75% and 50%, respectively) expected to be set for the SMR under the generalized TMDLs (that is, if the project does not occur). Using these percentage reductions with the current annual loading of these nutrients in the SMR, the County of San Diego has determined that the municipal stormwater treatment facility(ies) would need to remove about 745,000 pounds of nitrogen per year and about 25,000 pounds of phosphorous per year. The capital and operations and maintenance costs associated with the facility(ies) needed has also been determined from costs of other treatment facilities that are in operation for nutrient loadings in the San Luis Rey River Watershed, located just south of the SMR.

Costs for the municipal stormwater treatment facility are based on BMPs sized to conditions in the San Luis Rey River. Capital and O&M costs were estimated from the *San Luis Rey River Watershed Comprehensive Load Reduction Plan*.[111] A description of how these costs were derived are in Section 4.3.2 and state, "Capital and O&M cost opinions were based on SBPAT default unit costs for BMPs, which were based on very preliminary order-of-magnitude opinions of construction costs derived from regression equations found in literature and from construction estimates derived from RS Means.[112]" The San Luis Rey BMP groupings (and their related efficiencies) were then scaled to meet the estimated load reduction described in Attachment 7. Since nitrogen has the largest scalar, it was used to calculate the total capital and operations & maintenance costs needed to reduce loading and meet the current Basin Plan WQO. Finally, the analysis assumes that the plant would be operational from 2018 to 2032.

Over the 15 year expected useful life of municipal stormwater treatment facility(ies), the present value cost associated with building and operating the facility(ies) that can remove the designated amounts of nitrogen and phosphorus is$1,350,084,385.($2012).However, this analysis assumes that only 10% of this cost, or $135,008,438, is the benefit from undertaking the project. That is, if thereis only a 10% chance that the municipal stormwater treatment facility(ies) would actually be built in the absence of the project, the expected benefit is $135,008,438.

Table 8-33 shows the avoided costs from the project.

[111] County of San Diego, City of Oceanside, City of Vista, and Caltrans.2012. *San Luis Rey River Watershed Comprehensive Load Reduction Plan*. June 2012. Available: http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=44&Itemid=34.Section 4.3.2.

[112] RS Means is a unit cost database that is updated annually (http://meanscostworks.com/). When costs from literature are not available, a project's design criteria and unit costs from the database were used to estimate the project's cost

Table 8-33: Annual Costs of Avoided Projects (PSP Table 16)
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Annual Costs of Avoided Projects Avoided Municipal Stormwater Treatment Facility (2012 dollars)						
	Costs				Discounting Calculations	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
Year	Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance Costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)	Discount Factor	Discounted Costs (e) x (f)
2012	$0	$0	$0	$0	1.000	$0
2013 - 2017	$311,635,546	$0	$0	$311,635,546	Variable	$1,312,722,289
2018-2032	$0	$0	$5,148,026	$5,148,026	Variable	$37,362,096
Total Present Value of Discounted Costs (Sum of Column (g))						**$1,350,084,385**
(%) Avoided Cost Claimed by Project						**10%**
Total Present Value of Discounted Avoided Project Costs Claimed by Alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)						**$135,008,438**
Comments: Costs for the Municipal Stormwater Treatment Facility (an avoided project) are shown in the table. Capital costs occur in years 2013 through 2017; O&M costs occur in years 2018 through 2032. Once construction is finished in 2017, the Municipal Stormwater Treatment Facility has an expected life of 15 years, from 2018 to 2032.						

Project Benefits and Costs Summary (Section D5)

Project Economic Costs

Project costs for *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* total $1,596,159 (non-discounted). Direct assessment costs account for $1,510,062 (about 95%) of the total project costs. Phase I costs totaled $618,000 and were funded through the San Diego IRWM Region under a Proposition 84-Round 1 grant. Phase III costs are roughly estimated to total $1,000,000, however they are so uncertain that they were not included in the following table. There are no annual costs (administration, operation, maintenance, replacement, or other) for this project.

Table 8-35 summarizes the economic costs for the project. The total present value cost for *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* is $1,782,722.

Benefits and Costs Summary

As shown in Table 8-3 above, the total present value benefits associated with the *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II* project amount to $135,008,438.The total present value cost of the project is $1,408,396. The proposed project will therefore result in total present value net benefits of$133,600,042 ($135,008,438 minus $1,408,396).

Total monetized benefits include 10% of the avoided cost of a municipal stormwater treatment facility. (This can be thought of as the expected benefit if the municipal stormwater treatment facility only has a 10% probability of being constructed without the project.) If the project did not occur, the County of San Diego may need to install and operate a municipal stormwater treatment facility (or a series of facilities), which would cost $1,350,084,385 in present value capital and O&M costs over 15 years of operation (or $135,008,438 if 10% of the total is taken). The cost of undertaking the project, $1,408,396, is extremely small compared to the benefit.

Table 8-35: Annual Project Costs (PSP Table 19)

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Annual Project Costs										
(All costs should be in 2012 Dollars)										
	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[(1)]	Annual Costs [(2)]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	**(a)**	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**	**(h)**	**(i)**	**(j)**
2010	-		-	-	-	-	-	-	1.000	-
2011	$238,580		-	-	-	-	-	$238,580	1.000	$238,580
2012	-		-	-	-	-	-	-	1.000	-
2013	$381,728		-	-	-	-	-	$381,728	0.943	$360,121
2014	$318,106		-	-	-	-	-	$318,106	0.890	$283,113
2015	$286,297		-	-	-	-	-	$286,297	0.840	$240,380
2016	$286,297		-	-	-	-	-	$286,297	0.792	$226,774
2017	$79,527		-	-	-	-	-	$79,527	0.747	$59,427
Total Present Value of Discounted Costs (Sum of column (j)) Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										**$1,408,396**
There are no annual costs (administration, operation, maintenance, replacement, or other) for this project.										

In addition to monetized benefits and costs, the proposed project will also achieve the following non-monetized benefits: improve scientific knowledge of the SMR, avoid third party litigation related to TMDL compliance, improve water quality and reduce eutrophication due to nutrient management, and stakeholder involvement in nutrient assessment. All four of these will likely yield modest benefits; however, avoiding third party litigation related to TMDL compliance would yield larger benefits if in the without-project scenario it was not assumed that a municipal stormwater treatment facility would be constructed to remove nitrogen and phosphorous from the SMR.

Omissions, Biases, and Uncertainties

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with the avoided project costs of the municipal stormwater treatment facility. These issues are listed in Table 8-36.

Table 8-36. Omissions, Biases, and Uncertainties, and Their Effect on the Project
Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Avoided project costs (municipal stormwater treatment facility)	U	Both with and without the project, it is uncertain at what nutrient concentrations will be established for the SMR Watershed either through Basin Plan WQOs, TMDLs, and other in-lieu management strategies. The levels that would be set (in both with- and without-project scenarios) would have a significant impact on the benefits of undertaking the project. Even if the project is carried out, it is possible that a municipal stormwater treatment facility may eventually be needed. The studies undertaken with this project will illuminate how nutrient loading in the SMR affects the river's beneficial uses.
Avoided project costs (municipal stormwater treatment facility)	U	There is variation in the amount of annual and seasonable loading of nitrogen and phosphorous into the SMR. More (less) loading will increase (decrease) the benefits associated with undertaking the project.
Avoided project costs (municipal stormwater treatment facility)	U	Capital and operations and maintenance costs are estimates from ten other municipal stormwater treatment facilities in the area; costs associated with treatment facilities built in the without-project scenario are likely to be similar to these ten other facilities, but not exactly so.
Avoided project costs (municipal stormwater treatment facility)	U	Without the project, it is uncertain whether a municipal stormwater treatment facility would be built. However, even so, without the project, there would need to be less than a 1% probability that the municipal stormwater treatment facility would need to be built for the expected monetized benefit to exceed the cost of the project.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease benefits.
–– = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Appendix 8-1: Estimating the Avoided Future Imported Water Supply Costs from Developing Local Supplies in the San Diego Region

Introduction

Water produced by conservation, recycling, groundwater extraction, and other "local sources" will offset the need to use imported water supply. Imported water supply in the San Diego region is derived from the State Water Project (SWP) and/or Colorado River Aqueduct (CRA) from the Metropolitan Water District of Southern California (MWD),water transfers with Imperial Irrigation District (IID), and the All-American and Coachella Canal lining projects. The value of adding new local supplies can thus be estimated based on the costs avoided by reducing local demands for imported water.

The cost savings arising from reducing demands for imported water should be estimated based on the projected future cost of imports, at the margin. This in turn requires a projection of the cost of providing additional imported water, at the levels needed in the future if local resources are not expanded in accordance with the *San Diego IRWM Implementation Grant Proposal – Round 2*. The key empirical question for valuation is thus, "What is the future cost, at the margin, of acquiring another acre-foot (AF) of imported water, and having it delivered (and treated, where applicable) to the users of the local supply alternatives?"[113]

There are several empirical and conceptual challenges to forecasting the future avoided cost of import water.This appendixdiscusses these issues and how they were addressed to develop the avoided water supply costs that are used to evaluate the benefits of those projects that provide local water (or conserve water) in the San Diego region.

Wholesale Water Supplies

San Diego County Water Agency (Water Authority) wholesales water to 24 member agencies within its service area. The two uses for water within the service area are municipal and industrial (M&I), which accounts for 91% of total consumption; and agricultural, which accounts for the remaining 9% of the total.[114]

Since experiencing severe shortages during the 1987-1992 drought, the Water Authority has diversified its sources to enhance overall reliability.[115]Today, water supplies within the Water Authority service area include imports from MWD, water transfers from IID, conservation savings from the canal lining projects, and local supplies of member agencies. Historically, imports have accounted for the single largest proportion of total supplies, followed by Water Authority (transfer and canal lining) supplies and local supplies. Imports from MWD are wholesaled to the Water Authority from both SWP and CRA supplies. One of 26 MWD member agencies, the Water Authority is the largest agency in terms of deliveries, purchasing 331,825 AF or about 21 percent of all the water MWD delivered in FY 10.[116]SWP supplies have been restricted since 2006, due to drought and regulatory restrictions. In the past, MWD had relied on surplus supplies on the Colorado River to fill the aqueduct but are now limited to their entitlement. However, additional supplies have been implemented through the long-term transfer agreement with IID and conserved water from projects lining the All-American and Coachella Canals. The Water Authority

[113] Cost of treatment and delivery need to be included in the avoided import water costs, to provide a suitable "apples-to-apples" comparison of import water costs to the local supplies.This is because the costs used in these analyses for local supplies are generally inclusive of treatment and delivery.

[114]San Diego County Water Authority. 2011. 2010 Urban Water Management Plan.

[115]San Diego County Water Authority. 2008. Long-Range Financing Plan 2008

[116]San Diego County Water Authority. 2011. *2010 Urban Water Management Plan*.

entered into a Water Conservation and Transfer Agreement with IID, an agricultural district in neighboring Imperial County, to receive an annually increasing volume of water from 30,000 AFY in 2005 to 200,000 AFY in 2021. Additionally, the Quantification Settlement Agreement (QSA) on the Colorado River assigned the Water Authority rights to 77,700 AFY of conserved water from projects to line the All-American and Coachella Canals. The Water Authority had also acquired short-term dry-year water transfers from agencies in Northern California during the last drought. Local water sources within the Water Authority service area include surface water, groundwater, recycled water, and desalinated seawater (under construction).[117]In 1991, local member agency supplies comprised only 5% of the Water Authority's total requirements and MWD imported supplies comprised the remaining 95%. By 2010, the Water Authority had decreased reliance on MWD imports to 59% (331,825 AF), with increased use of IID transfers (13% or 70,000 AF), canal lining transfers (14% or 80,200 AF), and member agency local sources (14% or 76,100 AF) (derived from Water Authority 2011). The local supply goal for 2020 is 36% made up of 13% from conservation, 7% from seawater desalination, 6% from recycled water, 6% from local surface water, and 4% from groundwater.[118]

Water Prices

The Water Authority sells both untreated and treated water to its member agencies. As the name suggests, untreated water is raw and has not been processed to meet minimum standards acceptable for human consumption.Treated water has been treated and meets federal drinking water standards.Because treated water is subject to processing more than the untreated resource, treated water is more expensive. The current melded supply rate for treated water for the Water Authority (effective January 1, 2013) is $256 per AF. Treatment costs have increased to that level from $125 per AF in calendar year 2006.[119]

MWD has established a two-tiered rate structure. Including both Tier 1 and Tier 2 classes, the Water Authority's water rate schedule parallels that of MWD.[120]

For this analysis, only Water Authority Tier 1 prices are projected, as the extent of Tier 2 versus Tier 1 future usage is unknown. The projected future water costs used to calculate the avoided costs of imported water reflect the total "all in" treated water rate described below.The Water Authority's current melded supply rate is set to recover the costs of purchasing Tier 1 water from MWD, water purchases from IID, payments in connection with the All-American and Coachella Canal lining projects, payments to MWD under the 2003 Exchange Agreement for conveyance of IID and canal lining water, and other costs associated with acquisition of the IID supply source. For CY 2013, the melded Municipal and Industrial (M&I) supply rate for untreated water is $714 per AF. The corresponding melded supply rate for treated water is $970 per AF. The transportation charges on both treated and untreated water are $93 per AF.

Water Authority water prices include both fixed and variable charges. The variable rates, described above, include the untreated and treated melded supply rates plus transportation charges on a per AF basis. Fixed charges are those which are primarily invariant with water volume and include, across all Water Authority water sources, MWD capacity and readiness-to serve charges, and Water Authority customer service, emergency storage, infrastructure access, and property taxes/in-lieu charges.

Current Prices

With transportation charges, the CY 2013 Water Authority rate for untreated water is $807 per AF and $1,063 per AF for treated water. The estimated unit rate for storage is calculated on a regional average

[117]San Diego County Water Authority. 2011. *2010 Urban Water Management Plan.*

[118]San Diego County Water Authority. 2011. *2010 Urban Water Management Plan.*

[119]San Diego County Water Authority (Water Authority). 2010. Historical Rates and Charges. Website http://www.sdcwa.org/historical-rates-and-charges, accessed December 13, 2010.

[120]Metropolitan Water District of Southern California (MWD). 2010. Water Rates and Charges Effective 1/1/2013, and 1/1/2014.Website:http://www.mwdh2o.com/mwdh2o/pages/finance/finance_03.html, accessed February 20, 2013.

and does vary by agency, but for the purpose of the funding application a regional average will be used. This is estimated by taking the fixed charge of $60.2 million divided by the projected sales forecast for 2013 to derive $139 per AF. The same approach is used to derive the projected customer service charge by taking the fixed charge of $26.4 million divided by the projected sales to net a unit cost of $57 per AF.

With fixed charges for storage and customer service included, the Water Authority charged its member agencies an "all in" rate of $1,003 per AF for untreated water and $1,259 per AF for treated water. The Water Authority's "all in" rates for CY 2013 are shown in Table 8-A below. The difference is the treatment surcharge of $256 per AF.[121]

Table 8-A: Water Authority Water Rates Effective January 1, 2013 ($2013)

	Untreated ($/AF)	Treated ($/AF)
Volumetric Charges		
Melded Supply Rate	$714	$970
Transportation	$93	$93
Melded Tier 1	$807	$1,063
Fixed Charges (in Volumetric Terms)		
Storage	$139	$139
Customer Service	$57	$57
Total Fixed Charges	$196	$196
Total "All In" Costs for M&I Water	$1,003	$1,259
Source: Water Authority 2013		

Real Price Escalation for Imported Water

Several proposed projects enhance local water supplies and, thus, reduce the Region's reliance on waters imported from the Bay-Delta and the Colorado River. The avoided cost of imported water is thus an important monetized benefit for projects that enhance local supplies.

An important aspect in monetizing the value of avoided imports entails predicting the future cost of imported water. The economic analyses in this funding application was developed in real terms (based on $2012), meaning that the future stream of benefits and costs typically are not adjusted for general inflation. This is because most outcomes are expected to see price changes that generally align with broader measures of inflation, such as the Consumer Price Index (CPI), which is measured and reported by the federal Bureau of Labor Statistics.[122]

The price of imported water is an important exception, because various factors have led to rate increases that have considerably outpaced general inflation over the past two decades (as detailed below).This trend of real price increases for imported water (i.e., above the projected CPI) is likely to continue in the future as well, because the same factors that have driven these prices upward will remain relevant for several years to come.These factors principally include limitations on overall supply, due to a variety of factors primarily linked to the declining health of the Bay-Delta system from which these waters are extracted.

The supply-constraining factors for the Bay-Delta include Court rulings and environmental regulations related to the severe adverse impacts that declining water levels and the associated alterations in water quality (e.g., salinity) have imposed on this important ecosystem. Fish populations have declined dramatically in recent decades (including threatened and endangered species such as salmon and the delta smelt, for which the Bay Delta provides critical habitat). The levee system is aging, and vulnerability

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121San Diego County Water Authority (Water Authority). 2013. CY 2012 and CY2013 Rates and Charges. Website: http://www.sdcwa.org/rates-charges, accessed February 19, 2013.

[122] Bureau of Labor Statistics data can be accessed at: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt

of the Delta to flooding, sea level rise, or a major earthquake has contributed to concerns about possible levee collapse which could have devastating and far-reaching consequences. In addition, water quality problems continue, with impacts not only on fisheries and natural systems, but also on water treatment needs to meet drinking water standards for protecting human health and aesthetics.

These factors – and the associated investments that MWD and other water agencies have needed to make in infrastructure and potable water treatment – have resulted in dramatic increases in the cost of water that MWD wholesales throughout southern California. Large investments in new infrastructure made over the past ten to twenty years include the Diamond Valley Lake and Inland Feeder. In the coming years, additional large-scale costs are likely to be incurred for the Delta Conveyance, which may cost around $20 billion in its current formulation, with MWD likely to bear a large portion (e.g., one-third to one-half) of the cost.

Tables 8-B and 8-C reveal the extent to which MWD water rates have increased over the past 10 to 20 years, relative to general inflation as reflected by the federal CPI. Table 8-B shows the change in MWD “Tier 1 treated” supply rates, and Table 8-C provides the same information for MWD’s “Tier 2 treated” water rates.[123] In both instances, it is evident that over both the recent short-term (5-year period) and longer-term periods (10-year and 20-year), imported water costs have increased at rates well above inflation.For example, Tier 1 rates in the 2008 through 2012 period increased by over 56%, which is 8.5 times greater than the CPI over the same period. A very similar result is evident for Tier 2 rates. This indicates that the real rate of price increase (above general inflation) for MWD water has been between 9.4% and 10.2% over the past five years (as shown in the right-most column in Tables 8-B and 8-C).

Over a longer timeframe, similar escalations are evident as well. Over the last decade, the 10-year average annual cost increase for MWD water has been from 4.8% to 5.2% per year above inflation, for Tier 2 and Tier 1, respectively.The 20-year price trend indicates a real annual increase in imported water costs of nearly 2% above inflation.

Table 8--B: MWD Tier 1 Treated Rates compared to CPI

		cumulative change			average annual change		
time interval	# years	Tier 1	CPI	ratio	Tier 1	CPI	Real Tier 1
2008 - 2012	5 years	56.3%	6.6%	8.5	11.8%	1.6%	10.2%
2003 - 2012	10 years	94.6%	24.8%	3.8	7.7%	2.5%	5.2%

Table 8-C: MWD Tier 2 Treated Rates compared to CPI

		cumulative change			average annual change		
time interval	# years	Tier 2	CPI	ratio	Tier 2	CPI	Real Tier 2
2008 - 2012	5 years	51.8%	6.6%	7.8	11.0%	1.6%	9.4%
2003 - 2012	10 years	88.1%	24.8%	3.6	7.3%	2.5%	4.8%
1993 - 2012	20 years	123.3%	58.9%	2.1	4.3%	2.5%	1.9%

Based on these data, it is appropriate for the economic analyses to reflect how imported water costs in southern California are likely to continue to increase at rates considerable above general inflation. To reflect real prices of imported water in the future, we have adopted the following conservative assumptions:

[123] MWD rates derived from http://www.mwdh2o.com/mwdh2o/pages/finance/finance_03.html

1. For water imported from 2012 and 2013, we use rates published by the Water Authority as of February 2013.[124]
2. For water imported between 2014 and 2020 (inclusive), we derive a 2012 real cost by escalating by 3.5%.This escalation of 3.5% above CPI is fairly conservative (i.e., low end), given the documented trends over the past 5 to 10 years for which real increases have ranged from 4.8% to 10.2% per year.
3. For water imported in 2021 and years thereafter, we escalate at a rate of 1.5% per year to obtain real prices. This is also a conservative, given that observed 10 to 20 year escalation rates have been in the 1.9% to 5.2% range.

Another benchmark for considering these real price adjustments is provided by the long-term forecast for CPI for the upcoming 10-year period, 2013 through 2022. The Federal Reserve Bank of Philadelphia indicates an anticipated annual average CPI of 2.3% over the next ten years.[125]

Combining the CPI forecast with the real escalation rates we propose above for MWD imports, this suggests an average *nominal* increase in imported water costs of only 5.8% per year through 2020 (2.3% + 3.5%), and 3.8% from 2021 onwards (2.3% + 1.5%). Both of these nominal price increases are well below the average nominal price increases observed for MWD over the relevant comparable time periods:

- The MWD 5- and 10-year average nominal rate increase has ranged from 7.3% to 11.8% (as shown in Tables 8-B and 8-C), compared to our use of 5.8% over the 6-year period 2015 – 2020; and
- The 10- and 20-year MWD history shows nominal increases of 4.3% to 7.7%, contrasted to our use of a 3.8% nominal increase starting in 2012, eight years in the future.

Projected Prices for Water Authority Supplies

Based on the escalation methodology presented above, Table 8-1-D projects the cost of the melded supply rate for treated Water Authority supplies through year 2072.These "all in" water rates are used in this funding application to estimate the avoided costs of purchasing treated imported water for M&I uses (generally landscape irrigation)within the Water Authority's service area.

Table 8-1-D: Water Authority Water Rates: Melded Treated Supply ($/AF, in real prices, $2012)

Year	Cost	% Change
2012		
2013	$1,259.00	
2014	$1,303.07	3.5%
2015	$1,348.67	3.5%
2016	$1,395.88	3.5%
2017	$1,444.73	3.5%
2018	$1,495.30	3.5%
2019	$1,547.63	3.5%
2020	$1,601.80	3.5%
2021	$1,625.83	1.5%
2022	$1,650.21	1.5%
2023	$1,674.97	1.5%
2024	$1,700.09	1.5%

[124] Water Authority CY2012 and CY2013 rates from http://www.sdcwa.org/rates-charges, accessed February 19, 2013

[125] Survey of Professional Forecasters, http://www.phil.frb.org/research-and-data/real-time-center/survey-of-professional-forecasters/2013/survq113.cfm, accessed February 28, 2013

Year	Cost	% Change
2025	$1,725.59	1.5%
2026	$1,751.48	1.5%
2027	$1,777.75	1.5%
2028	$1,804.42	1.5%
2029	$1,831.48	1.5%
2030	$1,858.95	1.5%
2031	$1,886.84	1.5%
2032	$1,915.14	1.5%
2033	$1,943.87	1.5%
2034	$1,973.03	1.5%
2035	$2,002.62	1.5%
2036	$2,032.66	1.5%
2037	$2,063.15	1.5%
2038	$2,094.10	1.5%
2039	$2,125.51	1.5%
2040	$2,157.39	1.5%
2041	$2,189.75	1.5%
2042	$2,222.60	1.5%
2043	$2,255.94	1.5%
2044	$2,289.78	1.5%
2045	$2,324.12	1.5%
2046	$2,358.99	1.5%
2047	$2,394.37	1.5%
2048	$2,430.29	1.5%
2049	$2,466.74	1.5%
2050	$2,503.74	1.5%
2051	$2,541.30	1.5%
2052	$2,579.42	1.5%
2053	$2,618.11	1.5%
2054	$2,657.38	1.5%
2055	$2,697.24	1.5%
2056	$2,737.70	1.5%
2057	$2,778.76	1.5%
2058	$2,820.45	1.5%
2059	$2,862.75	1.5%
2060	$2,905.69	1.5%
2061	$2,949.28	1.5%
2062	$2,993.52	1.5%
2063	$3,038.42	1.5%
2064	$3,084.00	1.5%
2065	$3,130.26	1.5%
2066	$3,177.21	1.5%
2067	$3,224.87	1.5%
2068	$3,273.24	1.5%
2069	$3,322.34	1.5%
2070	$3,372.18	1.5%
2071	$3,422.76	1.5%
2072	$3,474.10	1.5%

Conclusions

The water supply benefits of local water supply development and conservation projects are typically characterized according to the avoided costs of obtaining the added yields from the most expensive of the other viable supply options.For the San Diego region, such projects avoid the “all in” water supply costs for imported water, as furnished to the region by MWD and blended with other sources. Treatment and distribution costs also need to be factored into the cost of avoided import water, because the local options typically include the cost of delivering treated water to the relevant users.

The Water Authority’s projected “all in” supply rates – which include the MWD Tier 1 full service volumetric rate, Canal lining water rate, IID supply cost, and various fixed charges – provide a sound basis for beginning the exercise of estimating the avoided cost of imported water. We believe that the avoided costs developed here are generally conservative projections because at the margin, and especially in dry years (but also conceivably in normal ones), offset supplies may need to reflect Tier 2 water rather than Tier 1 water, which are generally more expensive. Further, if import waters become as scarce as is conceivable (e.g., due to climate change and/or other events that may impact extractable yields from the Bay-Delta), then prices will escalate faster than projected and local desalination (which according to the Water Purchase Agreement will be on the order of between $1,849 to $2,064 per AF in $2012, depending on how much water is purchased annually) may not become the most expensive alternative.

Appendix 8-2: Economic Analysis Tables

✓ Project 1: North County Regional Recycled Water Project – Phase II

✓ Project 2: Turf Replacement and Agricultural Irrigation Efficiency Program

✓ Project 3: Rural Disadvantaged Community (DAC) Partnership Program

✓ Project 4: Failsafe Potable Reuse at the Advanced Water Purification Facility

✓ Project 5: Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies

✓ Project 6: Chollas Creek Integration Project – Phase II

✓ Project 7: Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: NSDCRRWP - Phase II									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value [1]	Annual $ Value [1] (f) x (g)	Discount Factor [1]	Discounted Benefits [1] (h) x (i)
2012	Imported water supply	AF						1.000	
	Fertilizer use	lbs						1.000	
	Social costs of CO_2 emissions	MT						1.000	
2013	Imported water supply	AF						0.943	
	Fertilizer use	lbs						0.943	
	Social costs of CO_2 emissions	MT						0.943	
2014	Imported water supply	AF	36	0	36	$ 1,303	$ 46,911	0.890	**$ 41,750**
	Fertilizer use	lbs	842	0	842	$ 0.46	$ 387	0.890	**$ 345**
	Social costs of CO_2 emissions	MT	23	0	23	$ 23.62	$ 553	0.890	**$ 492**
2015	Imported water supply	AF	912	0	912	$ 1,349	$ 1,229,994	0.840	**$ 1,032,727**
	Fertilizer use	lbs	21,519	0	21,519	$ 0.46	$ 9,899	0.840	**$ 8,311**
	Social costs of CO_2 emissions	MT	597	0	597	$ 24.19	$ 14,447	0.840	**$ 12,130**
2016	Imported water supply	AF	5,364	0	5,364	$ 1,396	$ 7,487,507	0.792	**$ 5,930,806**
	Fertilizer use	lbs	126,594	0	126,594	$ 0.46	$ 58,233	0.792	**$ 46,126**
	Social costs of CO_2 emissions	MT	3,513	0	3,513	$ 24.77	$ 87,031	0.792	**$ 68,937**
2017	Imported water supply	AF	6,582	0	6,582	$ 1,445	$ 9,509,259	0.747	**$ 7,105,871**
	Fertilizer use	lbs	155,327	0	155,327	$ 0.46	$ 71,450	0.747	**$ 53,392**
	Social costs of CO_2 emissions	MT	4,311	0	4,311	$ 25.37	$ 109,350	0.747	**$ 81,713**
2018	Imported water supply	AF	6,790	0	6,790	$ 1,495	$ 10,153,106	0.705	**$ 7,157,539**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.705	**$ 51,964**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 25.98	$ 115,517	0.705	**$ 81,435**
2019	Imported water supply	AF	6,790	0	6,790	$ 1,548	$ 10,508,465	0.665	**$ 6,988,729**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.665	**$ 49,023**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 26.60	$ 118,290	0.665	**$ 78,670**
2020	Imported water supply	AF	6,790	0	6,790	$ 1,602	$ 10,876,261	0.627	**$ 6,823,901**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.627	**$ 46,248**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 27.24	$ 121,129	0.627	**$ 75,998**
2021	Imported water supply	AF	6,790	0	6,790	$ 1,626	$ 11,039,405	0.592	**$ 6,534,207**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.592	**$ 43,630**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 27.89	$ 124,036	0.592	**$ 73,417**
2022	Imported water supply	AF	6,790	0	6,790	$ 1,650	$ 11,204,996	0.558	**$ 6,256,811**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.558	**$ 41,161**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 28.56	$ 127,013	0.558	**$ 70,923**
2023	Imported water supply	AF	6,790	0	6,790	$ 1,675	$ 11,373,071	0.527	**$ 5,991,192**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.527	**$ 38,831**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 29.25	$ 130,061	0.527	**$ 68,515**
2024	Imported water supply	AF	6,790	0	6,790	$ 1,700	$ 11,543,667	0.497	**$ 5,736,849**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.497	**$ 36,633**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 29.95	$ 133,183	0.497	**$ 66,188**
2025	Imported water supply	AF	6,790	0	6,790	$ 1,726	$ 11,716,822	0.469	**$ 5,493,303**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.469	**$ 34,559**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 30.67	$ 136,379	0.469	**$ 63,940**
2026	Imported water supply	AF	6,790	0	6,790	$ 1,751	$ 11,892,574	0.442	**$ 5,260,097**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.442	**$ 32,603**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 31.40	$ 139,652	0.442	**$ 61,768**
2027	Imported water supply	AF	6,790	0	6,790	$ 1,778	$ 12,070,963	0.417	**$ 5,036,791**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.417	**$ 30,758**

	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 32.16	$ 143,004	0.417	**$ 59,670**
2028	Imported water supply	AF	6,790	0	6,790	$ 1,804	$ 12,252,027	0.394	**$ 4,822,965**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.394	**$ 29,017**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 32.93	$ 146,436	0.394	**$ 57,644**
2029	Imported water supply	AF	6,790	0	6,790	$ 1,831	$ 12,435,808	0.371	**$ 4,618,217**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.371	**$ 27,374**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 33.72	$ 149,950	0.371	**$ 55,686**
2030	Imported water supply	AF	6,790	0	6,790	$ 1,859	$ 12,622,345	0.350	**$ 4,422,160**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.350	**$ 25,825**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 34.53	$ 153,549	0.350	**$ 53,795**
2031	Imported water supply	AF	6,790	0	6,790	$ 1,887	$ 12,811,680	0.331	**$ 4,234,427**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.331	**$ 24,363**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 35.36	$ 157,234	0.331	**$ 51,968**
2032	Imported water supply	AF	6,790	0	6,790	$ 1,915	$ 13,003,855	0.312	**$ 4,054,664**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.312	**$ 22,984**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 36.20	$ 161,008	0.312	**$ 50,203**
2033	Imported water supply	AF	6,790	0	6,790	$ 1,944	$ 13,198,913	0.294	**$ 3,882,532**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.294	**$ 21,683**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 37.07	$ 164,872	0.294	**$ 48,498**
2034	Imported water supply	AF	6,790	0	6,790	$ 1,973	$ 13,396,897	0.278	**$ 3,717,707**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.278	**$ 20,456**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 37.96	$ 168,829	0.278	**$ 46,851**
2035	Imported water supply	AF	6,790	0	6,790	$ 2,003	$ 13,597,850	0.262	**$ 3,559,880**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.262	**$ 19,298**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 38.87	$ 172,881	0.262	**$ 45,260**
2036	Imported water supply	AF	6,790	0	6,790	$ 2,033	$ 13,801,818	0.247	**$ 3,408,753**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.247	**$ 18,205**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 39.81	$ 177,030	0.247	**$ 43,723**
2037	Imported water supply	AF	6,790	0	6,790	$ 2,063	$ 14,008,845	0.233	**$ 3,264,042**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.233	**$ 17,175**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 40.76	$ 181,279	0.233	**$ 42,238**
2038	Imported water supply	AF	6,790	0	6,790	$ 2,094	$ 14,218,978	0.220	**$ 3,125,474**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.220	**$ 16,203**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 41.74	$ 185,629	0.220	**$ 40,803**
2039	Imported water supply	AF	6,790	0	6,790	$ 2,126	$ 14,432,263	0.207	**$ 2,992,789**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.207	**$ 15,286**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 42.74	$ 190,084	0.207	**$ 39,417**
2040	Imported water supply	AF	6,790	0	6,790	$ 2,157	$ 14,648,747	0.196	**$ 2,865,736**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.196	**$ 14,420**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 43.77	$ 194,647	0.196	**$ 38,079**
2041	Imported water supply	AF	6,790	0	6,790	$ 2,190	$ 14,868,478	0.185	**$ 2,744,078**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.185	**$ 13,604**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 44.82	$ 199,318	0.185	**$ 36,785**
2042	Imported water supply	AF	6,790	0	6,790	$ 2,223	$ 15,091,505	0.174	**$ 2,627,584**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.174	**$ 12,834**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 45.89	$ 204,102	0.174	**$ 35,536**
2043	Imported water supply	AF	6,790	0	6,790	$ 2,256	$ 15,317,877	0.164	**$ 2,516,036**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.164	**$ 12,108**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 47.00	$ 209,000	0.164	**$ 34,329**
2044	Imported water supply	AF	6,790	0	6,790	$ 2,290	$ 15,547,646	0.155	**$ 2,409,223**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.155	**$ 11,422**

	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 48.12	$ 214,016	0.155	**$ 33,163**
2045	Imported water supply	AF	6,790	0	6,790	$ 2,324	$ 15,780,860	0.146	**$ 2,306,944**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.146	**$ 10,776**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 49.28	$ 219,152	0.146	**$ 32,037**
2046	Imported water supply	AF	6,790	0	6,790	$ 2,359	$ 16,017,573	0.138	**$ 2,209,008**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.138	**$ 10,166**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 50.46	$ 224,412	0.138	**$ 30,949**
2047	Imported water supply	AF	6,790	0	6,790	$ 2,394	$ 16,257,837	0.130	**$ 2,115,229**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.130	**$ 9,590**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 51.67	$ 229,798	0.130	**$ 29,898**
2048	Imported water supply	AF	6,790	0	6,790	$ 2,430	$ 16,501,704	0.123	**$ 2,025,432**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.123	**$ 9,047**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 52.91	$ 235,313	0.123	**$ 28,883**
2049	Imported water supply	AF	6,790	0	6,790	$ 2,467	$ 16,749,230	0.116	**$ 1,939,447**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.116	**$ 8,535**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 54.18	$ 240,961	0.116	**$ 27,902**
2050	Imported water supply	AF	6,790	0	6,790	$ 2,504	$ 17,000,468	0.109	**$ 1,857,112**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.109	**$ 8,052**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 55.48	$ 246,744	0.109	**$ 26,954**
2051	Imported water supply	AF	6,790	0	6,790	$ 2,541	$ 17,255,475	0.103	**$ 1,778,272**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.103	**$ 7,596**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 56.81	$ 252,666	0.103	**$ 26,039**
2052	Imported water supply	AF	6,790	0	6,790	$ 2,579	$ 17,514,308	0.097	**$ 1,702,779**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.097	**$ 7,166**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 58.18	$ 258,730	0.097	**$ 25,154**
2053	Imported water supply	AF	6,790	0	6,790	$ 2,618	$ 17,777,022	0.092	**$ 1,630,491**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.092	**$ 6,761**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 59.57	$ 264,939	0.092	**$ 24,300**
2054	Imported water supply	AF	6,790	0	6,790	$ 2,657	$ 18,043,677	0.087	**$ 1,561,273**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.087	**$ 6,378**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 61.00	$ 271,298	0.087	**$ 23,475**
2055	Imported water supply	AF	6,790	0	6,790	$ 2,697	$ 18,314,333	0.082	**$ 1,494,992**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.082	**$ 6,017**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 62.47	$ 277,809	0.082	**$ 22,677**
2056	Imported water supply	AF	6,790	0	6,790	$ 2,738	$ 18,589,048	0.077	**$ 1,431,525**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.077	**$ 5,677**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 63.97	$ 284,476	0.077	**$ 21,907**
2057	Imported water supply	AF	6,790	0	6,790	$ 2,779	$ 18,867,883	0.073	**$ 1,370,753**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.073	**$ 5,355**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 65.50	$ 291,304	0.073	**$ 21,163**
2058	Imported water supply	AF	6,790	0	6,790	$ 2,820	$ 19,150,902	0.069	**$ 1,312,561**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.069	**$ 5,052**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 67.07	$ 298,295	0.069	**$ 20,444**
2059	Imported water supply	AF	6,790	0	6,790	$ 2,863	$ 19,438,165	0.065	**$ 1,256,839**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.065	**$ 4,766**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 68.68	$ 305,454	0.065	**$ 19,750**
2060	Imported water supply	AF	6,790	0	6,790	$ 2,906	$ 19,729,738	0.061	**$ 1,203,482**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.061	**$ 4,496**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 70.33	$ 312,785	0.061	**$ 19,079**
2061	Imported water supply	AF	6,790	0	6,790	$ 2,949	$ 20,025,684	0.058	**$ 1,152,391**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.058	**$ 4,242**

	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 72.02	$ 320,292	0.058	**$ 18,431**
2062	Imported water supply	AF	6,790	0	6,790	$ 2,994	$ 20,326,069	0.054	**$ 1,103,469**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.054	**$ 4,002**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 73.75	$ 327,979	0.054	**$ 17,805**
2063	Imported water supply	AF	6,790	0	6,790	$ 3,038	$ 20,630,960	0.051	**$ 1,056,624**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.051	**$ 3,775**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 75.52	$ 335,850	0.051	**$ 17,201**
2064	Imported water supply	AF	6,790	0	6,790	$ 3,084	$ 20,940,424	0.048	**$ 1,011,767**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.048	**$ 3,562**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 77.33	$ 343,911	0.048	**$ 16,617**
2065	Imported water supply	AF	6,790	0	6,790	$ 3,130	$ 21,254,531	0.046	**$ 968,815**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.046	**$ 3,360**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 79.19	$ 352,164	0.046	**$ 16,052**
2066	Imported water supply	AF	6,790	0	6,790	$ 3,177	$ 21,573,349	0.043	**$ 927,686**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.043	**$ 3,170**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 81.09	$ 360,616	0.043	**$ 15,507**
2067	Imported water supply	AF	6,790	0	6,790	$ 3,225	$ 21,896,949	0.041	**$ 888,303**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.041	**$ 2,990**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 83.03	$ 369,271	0.041	**$ 14,980**
2068	Imported water supply	AF	6,790	0	6,790	$ 3,273	$ 22,225,403	0.038	**$ 850,592**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.038	**$ 2,821**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 85.03	$ 378,134	0.038	**$ 14,472**
2069	Imported water supply	AF	6,790	0	6,790	$ 3,322	$ 22,558,784	0.036	**$ 814,482**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.036	**$ 2,661**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 87.07	$ 387,209	0.036	**$ 13,980**
2070	Imported water supply	AF	6,790	0	6,790	$ 3,372	$ 22,897,166	0.034	**$ 779,905**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.034	**$ 2,511**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 89.16	$ 396,502	0.034	**$ 13,505**
2071	Imported water supply	AF	6,790	0	6,790	$ 3,423	$ 23,240,623	0.032	**$ 746,796**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.032	**$ 2,369**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 91.30	$ 406,018	0.032	**$ 13,047**
2072	Imported water supply	AF	6,790	0	6,790	$ 3,474	$ 23,589,233	0.030	**$ 715,092**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.030	**$ 2,235**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 93.49	$ 415,762	0.030	**$ 12,604**
2073	Imported water supply	AF	6,790	0	6,790	$ 3,526	$ 23,943,071	0.029	**$ 684,734**
	Fertilizer use	lbs	160,244	0	160,244	$ 0.46	$ 73,712	0.029	**$ 2,108**
	Social costs of CO_2 emissions	MT	4,447	0	4,447	$ 95.73	$ 425,741	0.029	**$ 12,176**
2074	Imported water supply	AF	6754	0	6,754	$ 3,579	$ 24,173,369	0.027	**$ 652,189**
	Fertilizer use	lbs	159402	0	159,402	$ 0.46	$ 73,325	0.027	**$ 1,978**
	Social costs of CO_2 emissions	MT	4423.85	0	4,424	$ 98.03	$ 433,670	0.027	**$ 11,700**
2075	Imported water supply	AF	5878	0	5,878	$ 3,633	$ 21,353,632	0.025	**$ 543,503**
	Fertilizer use	lbs	138725	0	138,725	$ 0.46	$ 63,814	0.025	**$ 1,624**
	Social costs of CO_2 emissions	MT	3849.99	0	3,850	$ 100.38	$ 386,472	0.025	**$ 9,837**
2076	Imported water supply	AF	1426	0	1,426	$ 3,687	$ 5,258,087	0.024	**$ 126,256**
	Fertilizer use	lbs	33650	0	33,650	$ 0.46	$ 15,479	0.024	**$ 372**
	Social costs of CO_2 emissions	MT	933.87	0	934	$ 102.79	$ 95,994	0.024	**$ 2,305**
2077	Imported water supply	AF	208	0	208	$ 3,743	$ 778,462.31	0.023	**$ 17,634**
	Fertilizer use	lbs	4917	0	4,917	$ 0.46	$ 2,262	0.023	**$ 51**
	Social costs of CO_2 emissions	MT	136.45	0	136	$ 105.26	$ 14,363	0.023	**$ 325**
							Total Present Value of Discounted Benefits Based on Unit Value		**$ 178,127,244**
Comments:									

(1) Complete these columns if dollar value is being claimed for the benefit.

Table 19 – Annual Costs of Project
(All costs should be in 2012 Dollars)

Project: NSDCRRWP - Phase II

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012								$0	1.000	$0.00
2013	$766,009			$1,909				$767,918	0.943	$724,451.28
2014	$5,745,068			$33,458				$5,778,526	0.890	$5,142,867.38
2015	$8,617,603	$1,440,000		$152,870				$10,210,473	0.840	$8,572,910.41
2016	$3,830,046	$720,000		$263,038				$4,813,084	0.792	$3,812,413.50
2017	$191,502			$279,705				$471,207	0.747	$352,113.18
2018				$283,038				$283,038	0.705	$199,530.76
2019				$283,038				$283,038	0.665	$188,236.57
2020				$283,038				$283,038	0.627	$177,581.67
2021				$283,038				$283,038	0.592	$167,529.88
2022				$283,038				$283,038	0.558	$158,047.05
2023				$283,038				$283,038	0.527	$149,100.99
2024				$283,038				$283,038	0.497	$140,661.31
2025				$283,038				$283,038	0.469	$132,699.35
2026				$283,038				$283,038	0.442	$125,188.07
2027				$283,038				$283,038	0.417	$118,101.95
2028				$283,038				$283,038	0.394	$111,416.94
2029				$283,038				$283,038	0.371	$105,110.32
2030				$283,038				$283,038	0.350	$99,160.68
2031				$283,038		$451,023		$734,061	0.331	$242,616.78
2032				$283,038		$748,500		$1,031,538	0.312	$321,638.49
2033				$283,038				$283,038	0.294	$83,257.22
2034				$283,038				$283,038	0.278	$78,544.54
2035				$283,038				$283,038	0.262	$74,098.63
2036				$283,038				$283,038	0.247	$69,904.36
2037				$283,038				$283,038	0.233	$65,947.51
2038				$283,038				$283,038	0.220	$62,214.64
2039				$283,038				$283,038	0.207	$58,693.05
2040				$283,038				$283,038	0.196	$55,370.80
2041				$283,038				$283,038	0.185	$52,236.61
2042				$283,038				$283,038	0.174	$49,279.82
2043				$283,038				$283,038	0.164	$46,490.39
2044				$283,038				$283,038	0.155	$43,858.86
2045				$283,038				$283,038	0.146	$41,376.29
2046				$283,038				$283,038	0.138	$39,034.23
2047				$283,038		$451,023		$734,061	0.130	$95,505.19
2048				$283,038		$748,500		$1,031,538	0.123	$126,611.80
2049				$283,038				$283,038	0.116	$32,773.89
2050				$283,038				$283,038	0.109	$30,918.77
2051				$283,038				$283,038	0.103	$29,168.65
2052				$283,038				$283,038	0.097	$27,517.59
2053				$283,038				$283,038	0.092	$25,959.99
2054				$283,038				$283,038	0.087	$24,490.56
2055				$283,038				$283,038	0.082	$23,104.30
2056				$283,038				$283,038	0.077	$21,796.51
2057				$283,038				$283,038	0.073	$20,562.75
2058				$283,038				$283,038	0.069	$19,398.82
2059				$283,038				$283,038	0.065	$18,300.77
2060				$283,038				$283,038	0.061	$17,264.88
2061				$283,038				$283,038	0.058	$16,287.62
2062				$283,038				$283,038	0.054	$15,365.68
2063				$283,038		$451,023		$734,061	0.051	$37,595.26
2064				$283,038		$748,500		$1,031,538	0.048	$49,840.26
2065				$283,038				$283,038	0.046	$12,901.32
2066				$283,038				$283,038	0.043	$12,171.06
2067				$283,038				$283,038	0.041	$11,482.13
2068				$283,038				$283,038	0.038	$10,832.20
2069				$283,038				$283,038	0.036	$10,219.05
2070				$283,038				$283,038	0.034	$9,640.62
2071				$283,038				$283,038	0.032	$9,094.92
2072				$283,038				$283,038	0.030	$8,580.12
2073				$283,038				$283,038	0.029	$8,094.45
2074				$279,697				$279,697	0.027	$7,546.12
2075				$236,654				$236,654	0.025	$6,023.43
2076				$78,767				$78,767	0.024	$1,891.33
2077				$18,333				$18,333	0.023	$415.30
	$19,150,228	$2,160,000	$0	$17,194,571	$0	$3,598,569	$0	$42,103,368		$22,603,038.86
Total Present Value of										
Comments:										

(1) If any, based on opportunity costs, sunk costs and associated costs

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

Table 15 – Annual Benefit (All benefits should be in 2012 dollars)									
Project: Turf Replacement and Agricultural Irrigation Efficiency									
SCWDA Tier 1 real price escalation rate through 2020:		3.5%							
SCWDA Tier 1 real price escalation rate after 2020:		1.5%							
SCWDA Tier 1 real price escalation rate after 2020:		2.4%							
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
2013	Avoided Imported Water Supply Purchases	Acre-Feet	0	5	5	$ 1,259	$ 5,666	0.943	**$ 5,345**
	Avoided Wastewater Treatment Costs	Square Feet	0	38,361	38,361	$ 0.02	$ 651	0.943	**$ 614**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	4	4	$ 22.53	$ 95	0.943	**$ 90**
	Avoided Fertilizer Costs	Lbs.	0	1,688	1,688	$ 0.46	$ 911	0.943	**$ 860**
2014	Avoided Imported Water Supply Purchases	Acre-Feet	0	27	27	$ 1,303	$ 35,183	0.890	**$ 31,313**
	Avoided Wastewater Treatment Costs	Square Feet	0	191,804	191,804	$ 0.02	$ 3,254	0.890	**$ 2,896**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	25	25	$ 23.07	$ 584	0.890	**$ 520**
	Avoided Fertilizer Costs	Lbs.	0	8,439	8,439	$ 0.46	$ 4,557	0.890	**$ 4,056**
2015	Avoided Imported Water Supply Purchases	Acre-Feet	0	170	170	$ 1,349	$ 229,274	0.840	**$ 192,503**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$ 0.02	$ 5,424	0.840	**$ 4,554**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	124	124	$ 23.62	$ 2,931	0.840	**$ 2,461**
	Avoided Fertilizer Costs	Lbs.	0	17,016	17,016	$ 0.46	$ 9,188	0.840	**$ 7,715**
2016	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$ 1,396	$ 411,783	0.792	**$ 326,171**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$ 0.02	$ 5,424	0.792	**$ 4,296**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$ 24.19	$ 4,982	0.792	**$ 3,946**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$ 0.46	$ 10,781	0.792	**$ 8,540**
2017	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$ 1,445	$ 426,196	0.747	**$ 318,478**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$ 0.02	$ 5,424	0.747	**$ 4,053**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$ 24.77	$ 5,102	0.747	**$ 3,812**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$ 0.46	$ 10,781	0.747	**$ 8,057**
2018	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$ 1,495	$ 441,113	0.705	**$ 310,967**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$ 0.02	$ 5,424	0.705	**$ 3,824**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$ 25.37	$ 5,224	0.705	**$ 3,683**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$ 0.46	$ 10,781	0.705	**$ 7,600**
2019	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$ 1,548	$ 456,552	0.665	**$ 303,633**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$ 0.02	$ 5,424	0.665	**$ 3,607**

	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	25.98	$	5,349	0.665	**$**	**3,558**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.665	**$**	**7,170**
2020	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,602	$	472,531	0.627	**$**	**296,472**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.627	**$**	**3,403**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	26.60	$	5,478	0.627	**$**	**3,437**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.627	**$**	**6,764**
2021	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,626	$	479,619	0.592	**$**	**283,886**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.592	**$**	**3,210**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	27.24	$	5,609	0.592	**$**	**3,320**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.592	**$**	**6,382**
2022	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,650	$	486,813	0.558	**$**	**271,834**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.558	**$**	**3,029**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	27.89	$	5,744	0.558	**$**	**3,207**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.558	**$**	**6,020**
2023	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,675	$	494,115	0.527	**$**	**260,294**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.527	**$**	**2,857**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	28.56	$	5,882	0.527	**$**	**3,098**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.527	**$**	**5,680**
2024	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,700	$	501,527	0.497	**$**	**249,244**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.497	**$**	**2,695**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	29.25	$	6,023	0.497	**$**	**2,993**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.497	**$**	**5,358**
2025	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,726	$	509,050	0.469	**$**	**238,662**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.469	**$**	**2,543**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	29.95	$	6,167	0.469	**$**	**2,892**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.469	**$**	**5,055**
2026	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,751	$	516,686	0.442	**$**	**228,531**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.442	**$**	**2,399**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	30.67	$	6,315	0.442	**$**	**2,793**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.442	**$**	**4,769**
2027	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,778	$	524,436	0.417	**$**	**218,829**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.417	**$**	**2,263**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	31.40	$	6,467	0.417	**$**	**2,698**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.417	**$**	**4,499**
2028	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,804	$	532,303	0.394	**$**	**209,539**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.394	**$**	**2,135**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	32.16	$	6,622	0.394	**$**	**2,607**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.394	**$**	**4,244**

2029	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,831	$	540,287	0.371	**$**	**200,643**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.371	**$**	**2,014**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	32.93	$	6,781	0.371	**$**	**2,518**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.371	**$**	**4,004**
2030	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,859	$	548,391	0.350	**$**	**192,126**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.350	**$**	**1,900**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	33.72	$	6,944	0.350	**$**	**2,433**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.350	**$**	**3,777**
2031	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,887	$	556,617	0.331	**$**	**183,969**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.331	**$**	**1,793**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	34.53	$	7,110	0.331	**$**	**2,350**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.331	**$**	**3,563**
2032	Avoided Imported Water Supply Purchases	Acre-Feet	0	295	295	$	1,915	$	564,967	0.312	**$**	**176,159**
	Avoided Wastewater Treatment Costs	Square Feet	0	319,673	319,673	$	0.02	$	5,424	0.312	**$**	**1,691**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	206	206	$	35.36	$	7,281	0.312	**$**	**2,270**
	Avoided Fertilizer Costs	Lbs.	0	19,966	19,966	$	0.46	$	10,781	0.312	**$**	**3,362**
2033	Avoided Imported Water Supply Purchases	Acre-Feet	0	291	291	$	1,944	$	564,694	0.294	**$**	**166,108**
	Avoided Wastewater Treatment Costs	Square Feet	0	281,312	281,312	$	0.02	$	4,773	0.294	**$**	**1,404**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	202	202	$	36.20	$	7,303	0.294	**$**	**2,148**
	Avoided Fertilizer Costs	Lbs.	0	18,278	18,278	$	0.46	$	9,870	0.294	**$**	**2,903**
2034	Avoided Imported Water Supply Purchases	Acre-Feet	0	268	268	$	1,973	$	528,771	0.278	**$**	**146,737**
	Avoided Wastewater Treatment Costs	Square Feet	0	127,869	127,869	$	0.02	$	2,170	0.278	**$**	**602**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	181	181	$	37.07	$	6,696	0.278	**$**	**1,858**
	Avoided Fertilizer Costs	Lbs.	0	11,526	11,526	$	0.46	$	6,224	0.278	**$**	**1,727**
2035	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,003	$	500,655	0.262	**$**	**131,070**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.262	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	37.96	$	6,215	0.262	**$**	**1,627**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.262	**$**	**834**
2036	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,033	$	508,165	0.247	**$**	**125,506**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.247	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	38.87	$	6,365	0.247	**$**	**1,572**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.247	**$**	**787**
2037	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,063	$	515,788	0.233	**$**	**120,178**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.233	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	39.81	$	6,517	0.233	**$**	**1,519**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.233	**$**	**742**
2038	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,094	$	523,524	0.220	**$**	**115,076**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.220	**$**	**-**

	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	40.76	$	6,674	0.220	**$**	**1,467**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.220	**$**	**700**
2039	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,126	$	531,377	0.207	**$**	**110,191**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.207	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	41.74	$	6,834	0.207	**$**	**1,417**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.207	**$**	**661**
2040	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,157	$	539,348	0.196	**$**	**105,513**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.196	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	42.74	$	6,998	0.196	**$**	**1,369**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.196	**$**	**623**
2041	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,190	$	547,438	0.185	**$**	**101,033**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.185	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	43.77	$	7,166	0.185	**$**	**1,323**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.185	**$**	**588**
2042	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,223	$	555,650	0.174	**$**	**96,744**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.174	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	44.82	$	7,338	0.174	**$**	**1,278**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.174	**$**	**555**
2043	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,256	$	563,984	0.164	**$**	**92,637**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.164	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	45.89	$	7,514	0.164	**$**	**1,234**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.164	**$**	**523**
2044	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,290	$	572,444	0.155	**$**	**88,704**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.155	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	47.00	$	7,694	0.155	**$**	**1,192**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.155	**$**	**494**
2045	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,324	$	581,031	0.146	**$**	**84,939**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.146	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	48.12	$	7,879	0.146	**$**	**1,152**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.146	**$**	**466**
2046	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,359	$	589,746	0.138	**$**	**81,333**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.138	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	49.28	$	8,068	0.138	**$**	**1,113**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.138	**$**	**439**
2047	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,394	$	598,593	0.130	**$**	**77,880**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.130	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	50.46	$	8,262	0.130	**$**	**1,075**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.130	**$**	**415**

2048	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,430	$	607,571	0.123	**$**	**74,574**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.123	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	51.67	$	8,460	0.123	**$**	**1,038**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.123	**$**	**391**
2049	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,467	$	616,685	0.116	**$**	**71,408**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.116	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	52.91	$	8,663	0.116	**$**	**1,003**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.116	**$**	**369**
2050	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,504	$	625,935	0.109	**$**	**68,376**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.109	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	54.18	$	8,871	0.109	**$**	**969**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.109	**$**	**348**
2051	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,541	$	635,324	0.103	**$**	**65,474**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.103	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	55.48	$	9,084	0.103	**$**	**936**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.103	**$**	**328**
2052	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,579	$	644,854	0.097	**$**	**62,694**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.097	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	56.81	$	9,302	0.097	**$**	**904**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.097	**$**	**310**
2053	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,618	$	654,527	0.092	**$**	**60,033**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.092	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	58.18	$	9,525	0.092	**$**	**874**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.092	**$**	**292**
2054	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,657	$	664,345	0.087	**$**	**57,484**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.087	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	59.57	$	9,754	0.087	**$**	**844**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.087	**$**	**276**
2055	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,697	$	674,310	0.082	**$**	**55,044**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.082	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	61.00	$	9,988	0.082	**$**	**815**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.082	**$**	**260**
2056	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,738	$	684,425	0.077	**$**	**52,707**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.077	**$**	**-**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$	62.47	$	10,228	0.077	**$**	**788**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$	0.46	$	3,186	0.077	**$**	**245**
2057	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$	2,779	$	694,691	0.073	**$**	**50,469**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$	0.02	$	-	0.073	**$**	**-**

	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$ 63.97	$ 10,473	0.073	**$ 761**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$ 0.46	$ 3,186	0.073	**$ 231**
2058	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$ 2,820	$ 705,111	0.069	**$ 48,327**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$ 0.02	$ -	0.069	**$ -**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$ 65.50	$ 10,724	0.069	**$ 735**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$ 0.46	$ 3,186	0.069	**$ 218**
2059	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$ 2,863	$ 715,688	0.065	**$ 46,275**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$ 0.02	$ -	0.065	**$ -**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$ 67.07	$ 10,982	0.065	**$ 710**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$ 0.46	$ 3,186	0.065	**$ 206**
2060	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$ 2,906	$ 726,423	0.061	**$ 44,311**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$ 0.02	$ -	0.061	**$ -**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$ 68.68	$ 11,245	0.061	**$ 686**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$ 0.46	$ 3,186	0.061	**$ 194**
2061	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$ 2,949	$ 737,320	0.058	**$ 42,430**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$ 0.02	$ -	0.058	**$ -**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$ 70.33	$ 11,515	0.058	**$ 663**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$ 0.46	$ 3,186	0.058	**$ 183**
2062	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$ 2,994	$ 748,380	0.054	**$ 40,628**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$ 0.02	$ -	0.054	**$ -**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$ 72.02	$ 11,792	0.054	**$ 640**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$ 0.46	$ 3,186	0.054	**$ 173**
2063	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$ 3,038	$ 759,605	0.051	**$ 38,904**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$ 0.02	$ -	0.051	**$ -**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$ 73.75	$ 12,075	0.051	**$ 618**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$ 0.46	$ 3,186	0.051	**$ 163**
2064	Avoided Imported Water Supply Purchases	Acre-Feet	0	250	250	$ 3,084	$ 770,999	0.048	**$ 37,252**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$ 0.02	$ -	0.048	**$ -**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	164	164	$ 75.52	$ 12,364	0.048	**$ 597**
	Avoided Fertilizer Costs	Lbs.	0	5,900	5,900	$ 0.46	$ 3,186	0.048	**$ 154**
2065	Avoided Imported Water Supply Purchases	Acre-Feet	0	125	125	$ 3,130	$ 391,282	0.046	**$ 17,835**
	Avoided Wastewater Treatment Costs	Square Feet	0	-	-	$ 0.02	$ -	0.046	**$ -**
	Reduced Social Cost of CO2 Emission	Metric Tons	0	82	82	$ 77.33	$ 6,331	0.046	**$ 289**
	Avoided Fertilizer Costs	Lbs.	0	2,950	2,950	$ 0.46	$ 1,593	0.046	**$ 73**
Total Present Value of Discounted Benefits Based on Unit Value									**$ 7,348,499**

Table 19 – Annual Costs of Project (All costs should be in 2012 Dollars) Project: Turf Replacement and Agricultural Irrigation Efficiency										
	Initial Costs Grand Total Cost from Table 7	Adjusted Grant Total Cost(1)	Annual Costs (2)						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2013	$ 78,459	$ 69,689		$ 605				$ 148,753	0.943	**$ 140,333**
2014	$ 392,296	$ 398,444		$ 605				$ 791,345	0.890	**$ 704,294**
2015	$ 313,836	$ 328,755		$ 605				$ 643,196	0.840	**$ 540,040**
2016				$ 605				$ 605	0.792	**$ 479**
2017				$ 605				$ 605	0.747	**$ 452**
Total Present Value of Discounted Costs (Sum of column (j))										**$ 1,385,598**

Table 15 – Annual Benefit

(All benefits should be in 2012 dollars)

Project: Rural DAC Program

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value [1]	Annual $ Value [1] (f) x (g)	Discount Factor [1]	Discounted Benefits [1] (h) x (i)
2012								1.000	
2013						$ 1,259.00		0.943	
2014	Avoided Imported water	Acre Feet	0	0	0	$ 1,303.07	$ -	0.890	**$ -**
	Reduced CO2e emissions	MT	0	0	0	$ 23.07	$ -	0.890	**$ -**
2015	Avoided Imported water	Acre Feet	782	0	782	$ 1,348.67	$ 1,054,661.72	0.840	**$ 885,514**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 23.62	$ 17,327.97	0.840	**$ 14,549**
2016	Avoided Imported water	Acre Feet	782	0	782	$ 1,395.88	$ 1,091,574.88	0.792	**$ 864,630**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 24.19	$ 17,743.84	0.792	**$ 14,055**
2017	Avoided Imported water	Acre Feet	782	0	782	$ 1,444.73	$ 1,129,780.00	0.747	**$ 844,237**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 24.77	$ 18,169.69	0.747	**$ 13,577**
2018	Avoided Imported water	Acre Feet	782	0	782	$ 1,495.30	$ 1,169,322.30	0.705	**$ 824,326**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 25.37	$ 18,605.77	0.705	**$ 13,116**
2019	Avoided Imported water	Acre Feet	782	0	782	$ 1,547.63	$ 1,210,248.58	0.665	**$ 804,884**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 25.97	$ 19,052.30	0.665	**$ 12,671**
2020	Avoided Imported water	Acre Feet	782	0	782	$ 1,601.80	$ 1,252,607.28	0.627	**$ 785,901**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 26.60	$ 19,509.56	0.627	**$ 12,241**
2021	Avoided Imported water	Acre Feet	782	0	782	$ 1,625.83	$ 1,271,396.39	0.592	**$ 752,538**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 27.24	$ 19,977.79	0.592	**$ 11,825**
2022	Avoided Imported water	Acre Feet	782	0	782	$ 1,650.21	$ 1,290,467.34	0.558	**$ 720,590**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 27.89	$ 20,457.26	0.558	**$ 11,423**
2023	Avoided Imported water	Acre Feet	782	0	782	$ 1,674.97	$ 1,309,824.35	0.527	**$ 689,999**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 28.56	$ 20,948.23	0.527	**$ 11,035**
2024	Avoided Imported water	Acre Feet	782	0	782	$ 1,700.09	$ 1,329,471.71	0.497	**$ 660,707**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 29.24	$ 21,450.99	0.497	**$ 10,660**
2025	Avoided Imported water	Acre Feet	782	0	782	$ 1,725.59	$ 1,349,413.79	0.469	**$ 632,658**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 29.95	$ 21,965.81	0.469	**$ 10,298**
2026	Avoided Imported water	Acre Feet	782	0	782	$ 1,751.48	$ 1,369,654.99	0.442	**$ 605,800**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 30.67	$ 22,492.99	0.442	**$ 9,949**
2027	Avoided Imported water	Acre Feet	782	0	782	$ 1,777.75	$ 1,390,199.82	0.417	**$ 580,082**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 31.40	$ 23,032.82	0.417	**$ 9,611**
2028	Avoided Imported water	Acre Feet	782	0	782	$ 1,804.42	$ 1,411,052.82	0.394	**$ 555,456**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 32.15	$ 23,585.61	0.394	**$ 9,284**
2029	Avoided Imported water	Acre Feet	782	0	782	$ 1,831.48	$ 1,432,218.61	0.371	**$ 531,875**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 32.93	$ 24,151.66	0.371	**$ 8,969**
2030	Avoided Imported water	Acre Feet	782	0	782	$ 1,858.95	$ 1,453,701.89	0.350	**$ 509,295**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 33.72	$ 24,731.30	0.350	**$ 8,664**
2031	Avoided Imported water	Acre Feet	782	0	782	$ 1,886.84	$ 1,475,507.42	0.331	**$ 487,674**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 34.53	$ 25,324.86	0.331	**$ 8,370**
2032	Avoided Imported water	Acre Feet	782	0	782	$ 1,915.14	$ 1,497,640.03	0.312	**$ 466,971**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 35.35	$ 25,932.65	0.312	**$ 8,086**
2033	Avoided Imported water	Acre Feet	782	0	782	$ 1,943.87	$ 1,520,104.63	0.294	**$ 447,147**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 36.20	$ 26,555.04	0.294	**$ 7,811**
2034	Avoided Imported water	Acre Feet	782	0	782	$ 1,973.03	$ 1,542,906.20	0.278	**$ 428,164**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 37.07	$ 27,192.36	0.278	**$ 7,546**
2035	Avoided Imported water	Acre Feet	782	0	782	$ 2,002.62	$ 1,566,049.79	0.262	**$ 409,988**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 37.96	$ 27,844.97	0.262	**$ 7,290**
2036	Avoided Imported water	Acre Feet	782	0	782	$ 2,032.66	$ 1,589,540.54	0.247	**$ 392,582**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 38.87	$ 28,513.25	0.247	**$ 7,042**
2037	Avoided Imported water	Acre Feet	782	0	782	$ 2,063.15	$ 1,613,383.64	0.233	**$ 375,916**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 39.81	$ 29,197.57	0.233	**$ 6,803**
2038	Avoided Imported water	Acre Feet	782	0	782	$ 2,094.10	$ 1,637,584.40	0.220	**$ 359,957**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 40.76	$ 29,898.31	0.220	**$ 6,572**
2039	Avoided Imported water	Acre Feet	782	0	782	$ 2,125.51	$ 1,662,148.16	0.207	**$ 344,676**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 41.74	$ 30,615.87	0.207	**$ 6,349**
2040	Avoided Imported water	Acre Feet	782	0	782	$ 2,157.39	$ 1,687,080.39	0.196	**$ 330,044**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 42.74	$ 31,350.65	0.196	**$ 6,133**
2041	Avoided Imported water	Acre Feet	782	0	782	$ 2,189.75	$ 1,712,386.59	0.185	**$ 316,032**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 43.77	$ 32,103.07	0.185	**$ 5,925**

2042	Avoided Imported water	Acre Feet	782	0	782	$ 2,222.60	$ 1,738,072.39	0.174	**$ 302,616**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 44.82	$ 32,873.54	0.174	**$ 5,724**
2043	Avoided Imported water	Acre Feet	782	0	782	$ 2,255.94	$ 1,764,143.48	0.164	**$ 289,769**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 45.89	$ 33,662.51	0.164	**$ 5,529**
2044	Avoided Imported water	Acre Feet	782	0	782	$ 2,289.78	$ 1,790,605.63	0.155	**$ 277,468**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 46.99	$ 34,470.41	0.155	**$ 5,341**
2045	Avoided Imported water	Acre Feet	782	0	782	$ 2,324.12	$ 1,817,464.71	0.146	**$ 265,688**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 48.12	$ 35,297.70	0.146	**$ 5,160**
2046	Avoided Imported water	Acre Feet	782	0	782	$ 2,358.99	$ 1,844,726.69	0.138	**$ 254,409**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 49.28	$ 36,144.84	0.138	**$ 4,985**
2047	Avoided Imported water	Acre Feet	782	0	782	$ 2,394.37	$ 1,872,397.59	0.130	**$ 243,609**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 50.46	$ 37,012.32	0.130	**$ 4,815**
2048	Avoided Imported water	Acre Feet	782	0	782	$ 2,430.29	$ 1,900,483.55	0.123	**$ 233,267**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 51.67	$ 37,900.61	0.123	**$ 4,652**
2049	Avoided Imported water	Acre Feet	782	0	782	$ 2,466.74	$ 1,928,990.80	0.116	**$ 223,364**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 52.91	$ 38,810.23	0.116	**$ 4,494**
2050	Avoided Imported water	Acre Feet	782	0	782	$ 2,503.74	$ 1,957,925.66	0.109	**$ 213,882**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 54.18	$ 39,741.67	0.109	**$ 4,341**
2051	Avoided Imported water	Acre Feet	782	0	782	$ 2,541.30	$ 1,987,294.55	0.103	**$ 204,802**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 55.48	$ 40,695.47	0.103	**$ 4,194**
2052	Avoided Imported water	Acre Feet	782	0	782	$ 2,579.42	$ 2,017,103.97	0.097	**$ 196,107**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 56.81	$ 41,672.17	0.097	**$ 4,051**
2053	Avoided Imported water	Acre Feet	782	0	782	$ 2,618.11	$ 2,047,360.53	0.092	**$ 187,782**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 58.18	$ 42,672.30	0.092	**$ 3,914**
2054	Avoided Imported water	Acre Feet	782	0	782	$ 2,657.38	$ 2,078,070.94	0.087	**$ 179,810**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 59.57	$ 43,696.43	0.087	**$ 3,781**
2055	Avoided Imported water	Acre Feet	782	0	782	$ 2,697.24	$ 2,109,242.00	0.082	**$ 172,177**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 61.00	$ 44,745.15	0.082	**$ 3,653**
2056	Avoided Imported water	Acre Feet	782	0	782	$ 2,737.70	$ 2,140,880.63	0.077	**$ 164,867**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 62.47	$ 45,819.03	0.077	**$ 3,528**
2057	Avoided Imported water	Acre Feet	782	0	782	$ 2,778.76	$ 2,172,993.84	0.073	**$ 157,868**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 63.97	$ 46,918.69	0.073	**$ 3,409**
2058	Avoided Imported water	Acre Feet	782	0	782	$ 2,820.45	$ 2,205,588.75	0.069	**$ 151,166**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 65.50	$ 48,044.74	0.069	**$ 3,293**
2059	Avoided Imported water	Acre Feet	782	0	782	$ 2,862.75	$ 2,238,672.58	0.065	**$ 144,749**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 67.07	$ 49,197.81	0.065	**$ 3,181**
2060	Avoided Imported water	Acre Feet	782	0	782	$ 2,905.69	$ 2,272,252.67	0.061	**$ 138,604**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 68.68	$ 50,378.56	0.061	**$ 3,073**
2061	Avoided Imported water	Acre Feet	782	0	782	$ 2,949.28	$ 2,306,336.46	0.058	**$ 132,720**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 70.33	$ 51,587.64	0.058	**$ 2,969**
2062	Avoided Imported water	Acre Feet	782	0	782	$ 2,993.52	$ 2,340,931.50	0.054	**$ 127,085**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 72.02	$ 52,825.75	0.054	**$ 2,868**
2063	Avoided Imported water	Acre Feet	782	0	782	$ 3,038.42	$ 2,376,045.48	0.051	**$ 121,690**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 73.75	$ 54,093.56	0.051	**$ 2,770**
2064	Avoided Imported water	Acre Feet	782	0	782	$ 3,084.00	$ 2,411,686.16	0.048	**$ 116,524**
	Reduced CO2e emissions	MT	733.5	0	733.5	$ 75.52	$ 55,391.81	0.048	**$ 2,676**
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$ 20,459,925**

	Table 16 – Annual Costs of Avoided Project (All costs should be in 2012 Dollars)						
	Project: Rural DAC Partnership Program						
	Alternative: Purchase of bottled water						
	Avoided Project Description: Currently residnets are required to purchase bottled water to ensure their drinking water supply is safe						
						Discounting Calculations	
		Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)	Discount Factor	Discounted Project Costs (h) x (i)
	(a) Year	(b)	(c)	(d)	(e)	(i)	(j)
0	2010				$ -	1.000	$ -
0	2011				$ -	1.000	$ -
0	2012				$ -	1.000	$ -
1	2013				$ -	0.943	$ -
2	2014		$ 91,980		$ 91,980	0.890	$ 81,862
3	2015		$ 91,980		$ 91,980	0.840	$ 77,228
4	2016		$ 91,980		$ 91,980	0.792	$ 72,857
5	2017		$ 91,980		$ 91,980	0.747	$ 68,733
6	2018		$ 91,980		$ 91,980	0.705	$ 64,842
7	2019		$ 91,980		$ 91,980	0.665	$ 61,172
8	2020		$ 91,980		$ 91,980	0.627	$ 57,709
9	2021		$ 91,980		$ 91,980	0.592	$ 54,443
10	2022		$ 91,980		$ 91,980	0.558	$ 51,361
11	2023		$ 91,980		$ 91,980	0.527	$ 48,454
12	2024		$ 91,980		$ 91,980	0.497	$ 45,711
13	2025		$ 91,980		$ 91,980	0.469	$ 43,124
14	2026		$ 91,980		$ 91,980	0.442	$ 40,683
15	2027		$ 91,980		$ 91,980	0.417	$ 38,380
16	2028		$ 91,980		$ 91,980	0.394	$ 36,208
17	2029		$ 91,980		$ 91,980	0.371	$ 34,158
18	2030		$ 91,980		$ 91,980	0.350	$ 32,225
19	2031		$ 91,980		$ 91,980	0.331	$ 30,401
20	2032		$ 91,980		$ 91,980	0.312	$ 28,680
21	2033		$ 91,980		$ 91,980	0.294	$ 27,056
22	2034		$ 91,980		$ 91,980	0.278	$ 25,525
23	2035		$ 91,980		$ 91,980	0.262	$ 24,080
24	2036		$ 91,980		$ 91,980	0.247	$ 22,717
25	2037		$ 91,980		$ 91,980	0.233	$ 21,431
26	2038		$ 91,980		$ 91,980	0.220	$ 20,218
27	2039		$ 91,980		$ 91,980	0.207	$ 19,074
28	2040		$ 91,980		$ 91,980	0.196	$ 17,994
29	2041		$ 91,980		$ 91,980	0.185	$ 16,976
30	2042		$ 91,980		$ 91,980	0.174	$ 16,015
31	2043		$ 91,980		$ 91,980	0.164	$ 15,108
32	2044		$ 91,980		$ 91,980	0.155	$ 14,253
33	2045		$ 91,980		$ 91,980	0.146	$ 13,446
34	2046		$ 91,980		$ 91,980	0.138	$ 12,685
35	2047		$ 91,980		$ 91,980	0.130	$ 11,967
36	2048		$ 91,980		$ 91,980	0.123	$ 11,290
37	2049		$ 91,980		$ 91,980	0.116	$ 10,651
38	2050		$ 91,980		$ 91,980	0.109	$ 10,048

39	2051		$ 91,980		$ 91,980	0.103	$ 9,479
40	2052		$ 91,980		$ 91,980	0.097	$ 8,942
41	2053		$ 91,980		$ 91,980	0.092	$ 8,436
42	2054		$ 91,980		$ 91,980	0.087	$ 7,959
43	2055		$ 91,980		$ 91,980	0.082	$ 7,508
44	2056		$ 91,980		$ 91,980	0.077	$ 7,083
45	2057		$ 91,980		$ 91,980	0.073	$ 6,682
46	2058		$ 91,980		$ 91,980	0.069	$ 6,304
47	2059		$ 91,980		$ 91,980	0.065	$ 5,947
48	2060		$ 91,980		$ 91,980	0.061	$ 5,611
49	2061		$ 91,980		$ 91,980	0.058	$ 5,293
50	2062		$ 91,980		$ 91,980	0.054	$ 4,993
51	2063		$ 91,980		$ 91,980	0.051	$ 4,711
52	2064		$ 91,980		$ 91,980	0.048	$ 4,444
	Total Present Value of Discounted Costs (Sum of Column (g))						**$ 1,372,157**
	(%) Avoided Cost Claimed by Project						
	Total Present Value of Discounted Avoided Project Costs Claimed by Alternative Project						
	Comments: By having the YMWC provide drinking water residents will no longer purchase bottled water. The purchase of bottled water						

Table 19 – Annual Costs of Project (All costs should be in 2012 Dollars)												
Project: Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies												
	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost(1)	Annual Costs (2)								Discounting Calculations	
			Admin,Labor compliance. Reporting	Assessment & Eval	Design & Permitting & Environ Eval	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)			(d)	(e)	(f)	(g)	(h)	(i)	(j)
2010										$ -	1.000	$ -
2011										$ -	1.000	$ -
2012										$ -	1.000	$ -
2013	$ -									$ -	0.943	$ -
2014	$ 290,964									$ 290,964	0.890	$ 258,957
2015	$ 1,454,822									$ 1,454,822	0.840	$ 1,221,497
2016	$ 2,385,908									$ 2,385,908	0.792	$ 1,889,863
2017	$ 1,687,593									$ 1,687,593	0.747	$ 1,261,068
2018										$ -	0.705	$ -
2019										$ -	0.665	$ -
2020										$ -	0.627	$ -
2021										$ -	0.592	$ -
2022										$ -	0.558	$ -
2023										$ -	0.527	$ -
2024										$ -	0.497	$ -
2025										$ -	0.469	$ -
2026										$ -	0.442	$ -
2027										$ -	0.417	$ -
2028										$ -	0.394	$ -
2029										$ -	0.371	$ -
2030										$ -	0.350	$ -
2031										$ -	0.331	$ -
2032										$ -	0.312	$ -
2033										$ -	0.294	$ -
2034										$ -	0.278	$ -
2035										$ -	0.262	$ -
2036										$ -	0.247	$ -
2037										$ -	0.233	$ -
2038										$ -	0.220	$ -
2039										$ -	0.207	$ -
2040										$ -	0.196	$ -
2041										$ -	0.185	$ -
2042										$ -	0.174	$ -
2043										$ -	0.164	$ -
2044										$ -	0.155	$ -
2045										$ -	0.146	$ -
2046										$ -	0.138	$ -

2047										$ -	0.130	$ -
2048										$ -	0.123	$ -
2049										$ -	0.116	$ -
2050										$ -	0.109	$ -
2051										$ -	0.103	$ -
2052										$ -	0.097	$ -
2053										$ -	0.092	$ -
2054										$ -	0.087	$ -
2055										$ -	0.082	$ -
2056										$ -	0.077	$ -
2057										$ -	0.073	$ -
2058										$ -	0.069	$ -
2059										$ -	0.065	$ -
2060										$ -	0.061	$ -
2061										$ -	0.058	$ -
2062										$ -	0.054	$ -
2063										$ -	0.051	$ -
2064										$ -	0.048	$ -
2065										$ -	0.046	$ -
Total Present Value of Discounted Costs (Sum of column (j)) Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries												**$ 4,631,384**

Comments:

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

	Table 16 – Annual Costs of Avoided Project (All costs should be in 2012 Dollars)						
	Project: Failsafe Potable Reuse						
	Alternative (Avoided Project Name): Indirect Potable Reuse via San Vicente reservoir						
	Avoided Project Description:Pipeline and pumpstation construction costs saved, including GHG emissions avoided						
						Discounting Calculations	
		Avoided Capital Costs	Avoided GHG Emissions Value in Pipeline	Avoided Operations and Maintenance costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)	Discount Factor	Discounted Project Costs (h) x (i)
	(a) Year	(b)	(c)	(d)	(e)	(i)	(j)
0	2010				$ -	1.000	$ -
0	2011				$ -	1.000	$ -
0	2012				$ -	1.000	$ -
1	2013				$ -	0.943	$ -
2	2014				$ -	0.890	$ -
3	2015				$ -	0.840	$ -
4	2016				$ -	0.792	$ -
5	2017				$ -	0.747	$ -
6	2018				$ -	0.705	$ -
7	2019				$ -	0.665	$ -
8	2020				$ -	0.627	$ -
9	2021				$ -	0.592	$ -
10	2022				$ -	0.558	$ -
11	2023				$ -	0.527	$ -
12	2024				$ -	0.497	$ -
13	2025	$ 42,295,528			$ 42,295,528	0.469	$ 19,829,794
14	2026	$ 42,295,528	$ 1,673,111		$ 43,968,640	0.442	$ 19,447,372
15	2027	$ 42,295,528			$ 42,295,528	0.417	$ 17,648,446
16	2028				$ -	0.394	$ -
17	2029				$ -	0.371	$ -
18	2030				$ -	0.350	$ -
19	2031				$ -	0.331	$ -
20	2032				$ -	0.312	$ -
21	2033				$ -	0.294	$ -
22	2034				$ -	0.278	$ -
23	2035				$ -	0.262	$ -
24	2036				$ -	0.247	$ -
25	2037				$ -	0.233	$ -
26	2038				$ -	0.220	$ -
27	2039				$ -	0.207	$ -
28	2040				$ -	0.196	$ -
29	2041				$ -	0.185	$ -
30	2042				$ -	0.174	$ -
31	2043				$ -	0.164	$ -
32	2044				$ -	0.155	$ -
33	2045				$ -	0.146	$ -
34	2046				$ -	0.138	$ -
35	2047				$ -	0.130	$ -
36	2048				$ -	0.123	$ -
37	2049				$ -	0.116	$ -
38	2050				$ -	0.109	$ -
39	2051				$ -	0.103	$ -
40	2052				$ -	0.097	$ -
41	2053				$ -	0.092	$ -
42	2054				$ -	0.087	$ -
43	2055				$ -	0.082	$ -
44	2056				$ -	0.077	$ -
45	2057				$ -	0.073	$ -
46	2058				$ -	0.069	$ -
47	2059				$ -	0.065	$ -
48	2060				$ -	0.061	$ -
49	2061				$ -	0.058	$ -
50	2062				$ -	0.054	$ -
51	2063				$ -	0.051	$ -
52	2064				$ -	0.048	$ -
53	2065				$ -	0.046	$ -
54	2066				$ -	0.043	$ -
55	2067				$ -	0.041	$ -
56	2068				$ -	0.038	$ -

57	2069				$ -	0.036	$ -
	column sum	$ 126,886,585	$ 1,673,111	$ -	$ 128,559,696	1.000	$ 56,925,612
	Total Present Value of Discounted Costs (Sum of Column (g))						**$ 56,925,612**
	(%) Avoided Cost Claimed by Project						**10%**
	Total Present Value of Discounted Avoided Project Costs Claimed by Alternative Project						**$ 5,692,561**
	Comments:						

Table 19 – Annual Costs of Project (All costs should be in 2012 Dollars) Project: Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility										
	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012	$63,034							$63,034	1.000	$63,034
2013	$315,170							$315,170	0.943	$297,330
2014	$693,375							$693,375	0.890	$617,101
2015	$1,512,817							$1,512,817	0.840	$1,270,190
2016	$567,307							$567,307	0.792	$449,360
column sum	$ 3,151,703	$ -	$ -	$ -	$ -	$ -	$ -	$3,151,703		$2,697,016
Total Present Value of Discounted Costs (Sum of Column (j)) Transfer to Table 17, column (c), Proposal Benefits and Costs Summaries										$2,697,016

(1) If any, based on opportunity costs, sunk costs and associated costs

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

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Sustaining Healthy Tributaries to the Upper San Diego River and Protecting Local Water Supplies									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value [1]	Annual $ Value [1] (f) x (g)	Discount Factor [1]	Discounted Benefits [1] (h) x (i)
2012								1.000	
2013								0.943	
2014								0.890	
2015								0.840	
2016								0.792	
2017	Reduction in CO2	MT	0	9.179852	9.179852	$ 25.37	$ 232.86	0.747	**$ 174.01**
2018	Reduction in CO2	MT	0	9.179852	9.179852	$ 25.98	$ 238.45	0.705	**$ 168.10**
2019	Reduction in CO2	MT	0	9.179852	9.179852	$ 26.60	$ 244.17	0.665	**$ 162.39**
2020	Reduction in CO2	MT	0	9.179852	9.179852	$ 27.24	$ 250.03	0.627	**$ 156.87**
2021	Reduction in CO2	MT	0	9.179852	9.179852	$ 27.89	$ 256.03	0.592	**$ 151.55**
2022	Reduction in CO2	MT	0	9.179852	9.179852	$ 28.56	$ 262.18	0.558	**$ 146.40**
2023	Reduction in CO2	MT	0	9.179852	9.179852	$ 29.25	$ 268.47	0.527	**$ 141.43**
2024	Reduction in CO2	MT	0	9.179852	9.179852	$ 29.95	$ 274.91	0.497	**$ 136.62**
2025	Reduction in CO2	MT	0	9.179852	9.179852	$ 30.67	$ 281.51	0.469	**$ 131.98**
2026	Reduction in CO2	MT	0	9.179852	9.179852	$ 31.40	$ 288.27	0.442	**$ 127.50**
2027	Reduction in CO2	MT	0	9.179852	9.179852	$ 32.16	$ 295.19	0.417	**$ 123.17**
2028	Reduction in CO2	MT	0	9.179852	9.179852	$ 32.93	$ 302.27	0.394	**$ 118.99**
2029	Reduction in CO2	MT	0	9.179852	9.179852	$ 33.72	$ 309.53	0.371	**$ 114.95**
2030	Reduction in CO2	MT	0	9.179852	9.179852	$ 34.53	$ 316.95	0.350	**$ 111.04**
2031	Reduction in CO2	MT	0	9.179852	9.179852	$ 35.36	$ 324.56	0.331	**$ 107.27**
2032	Reduction in CO2	MT	0	9.179852	9.179852	$ 36.20	$ 332.35	0.312	**$ 103.63**
2033	Reduction in CO2	MT	0	9.179852	9.179852	$ 37.07	$ 340.33	0.294	**$ 100.11**
2034	Reduction in CO2	MT	0	9.179852	9.179852	$ 37.96	$ 348.49	0.278	**$ 96.71**
2035	Reduction in CO2	MT	0	9.179852	9.179852	$ 38.87	$ 356.86	0.262	**$ 93.42**
2036	Reduction in CO2	MT	0	9.179852	9.179852	$ 39.81	$ 365.42	0.247	**$ 90.25**
2037	Reduction in CO2	MT	0	2.195182	2.195182	$ 40.76	$ 89.48	0.233	**$ 20.85**
2038	Reduction in CO2	MT	0	2.195182	2.195182	$ 41.74	$ 91.63	0.220	**$ 20.14**
2039	Reduction in CO2	MT	0	2.195182	2.195182	$ 42.74	$ 93.83	0.207	**$ 19.46**
2040	Reduction in CO2	MT	0	2.195182	2.195182	$ 43.77	$ 96.08	0.196	**$ 18.80**
2041	Reduction in CO2	MT	0	2.195182	2.195182	$ 44.82	$ 98.39	0.185	**$ 18.16**
2042	Reduction in CO2	MT	0	2.195182	2.195182	$ 45.89	$ 100.75	0.174	**$ 17.54**
2043	Reduction in CO2	MT	0	2.195182	2.195182	$ 47.00	$ 103.16	0.164	**$ 16.95**
2044	Reduction in CO2	MT	0	2.195182	2.195182	$ 48.12	$ 105.64	0.155	**$ 16.37**
2045	Reduction in CO2	MT	0	2.195182	2.195182	$ 49.28	$ 108.18	0.146	**$ 15.81**
2046	Reduction in CO2	MT	0	2.195182	2.195182	$ 50.46	$ 110.77	0.138	**$ 15.28**
2047	Reduction in CO2	MT	0	2.195182	2.195182	$ 51.67	$ 113.43	0.130	**$ 14.76**
2048	Reduction in CO2	MT	0	2.195182	2.195182	$ 52.91	$ 116.15	0.123	**$ 14.26**
2049	Reduction in CO2	MT	0	2.195182	2.195182	$ 54.18	$ 118.94	0.116	**$ 13.77**
2050	Reduction in CO2	MT	0	2.195182	2.195182	$ 55.48	$ 121.80	0.109	**$ 13.30**
2051	Reduction in CO2	MT	0	2.195182	2.195182	$ 56.81	$ 124.72	0.103	**$ 12.85**
2052	Reduction in CO2	MT	0	2.195182	2.195182	$ 58.18	$ 127.71	0.097	**$ 12.42**
2053	Reduction in CO2	MT	0	2.195182	2.195182	$ 59.57	$ 130.78	0.092	**$ 11.99**
2054	Reduction in CO2	MT	0	2.195182	2.195182	$ 61.00	$ 133.92	0.087	**$ 11.59**
2055	Reduction in CO2	MT	0	2.195182	2.195182	$ 62.47	$ 137.13	0.082	**$ 11.19**
2056	Reduction in CO2	MT	0	2.195182	2.195182	$ 63.97	$ 140.42	0.077	**$ 10.81**
2057	Reduction in CO2	MT	0	0.299343	0.299343	$ 65.50	$ 19.61	0.073	**$ 1.42**

2058	Reduction in CO2	MT	0	0.299343	0.299343	$ 67.07	$ 20.08	0.069	**$ 1.38**
2059	Reduction in CO2	MT	0	0.299343	0.299343	$ 68.68	$ 20.56	0.065	**$ 1.33**
2060	Reduction in CO2	MT	0	0.299343	0.299343	$ 70.33	$ 21.05	0.061	**$ 1.28**
2061	Reduction in CO2	MT	0	0.299343	0.299343	$ 72.02	$ 21.56	0.058	**$ 1.24**
2062	Reduction in CO2	MT	0	0.299343	0.299343	$ 73.75	$ 22.08	0.054	**$ 1.20**
2063	Reduction in CO2	MT	0	0.299343	0.299343	$ 75.52	$ 22.61	0.051	**$ 1.16**
2064	Reduction in CO2	MT	0	0.299343	0.299343	$ 77.33	$ 23.15	0.048	**$ 1.12**
2065	Reduction in CO2	MT	0	0.299343	0.299343	$ 79.19	$ 23.70	0.046	**$ 1.08**
2066	Reduction in CO2	MT	0	0.299343	0.299343	$ 81.09	$ 24.27	0.043	**$ 1.04**
Total Present Value of Discounted Benefits Based on Unit Value									**$ 2,874.94**
Comments:									

(1) Complete these columns if dollar value is being claimed for the benefit.

	Table 19 – Annual Costs of Project (All costs should be in 2012 Dollars)												
	Project: 5 Sustaining Healthy Tributarties to the Upper San Diego River and Protecting Local Water Supplies												
		Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost(1)	Annual Costs (2)								Discounting Calculations	
				Admin,Labor compliance. Reporting	Assessment & Eval	Design & Permitting & Environ Eval	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
	Year	(a)	(b)	(c)			(d)	(e)	(f)	(g)	(h)	(i)	(j)
0	2010										$ -	1.000	$ -
0	2011										$ -	1.000	$ -
0	2012										$ -	1.000	$ -
1	2013	$ 71,185									$ 71,185	0.943	$ 67,156
2	2014	$ 128,134									$ 128,134	0.890	$ 114,039
3	2015	$ 220,675									$ 220,675	0.840	$ 185,283
4	2016	$ 284,742									$ 284,742	0.792	$ 225,542
5	2017	$ 7,119									$ 7,119	0.747	$ 5,320
6	2018										$ -	0.705	$ -
7	2019										$ -	0.665	$ -
8	2020										$ -	0.627	$ -
9	2021										$ -	0.592	$ -
10	2022										$ -	0.558	$ -
11	2023										$ -	0.527	$ -
12	2024										$ -	0.497	$ -
13	2025										$ -	0.469	$ -
14	2026										$ -	0.442	$ -
15	2027										$ -	0.417	$ -
16	2028										$ -	0.394	$ -
17	2029										$ -	0.371	$ -
18	2030										$ -	0.350	$ -
19	2031										$ -	0.331	$ -
20	2032										$ -	0.312	$ -
21	2033												
22	2034										$ -	0.278	$ -
23	2035										$ -	0.262	$ -
24	2036										$ -	0.247	$ -
25	2037										$ -	0.233	$ -
26	2038										$ -	0.220	$ -
27	2039										$ -	0.207	$ -
28	2040										$ -	0.196	$ -
29	2041										$ -	0.185	$ -
30	2042										$ -	0.174	$ -
31	2043										$ -	0.164	$ -
32	2044										$ -	0.155	$ -
33	2045										$ -	0.146	$ -
34	2046										$ -	0.138	$ -
35	2047										$ -	0.130	$ -
36	2048										$ -	0.123	$ -
37	2049										$ -	0.116	$ -
38	2050										$ -	0.109	$ -
39	2051										$ -	0.103	$ -
40	2052										$ -	0.097	$ -
41	2053										$ -	0.092	$ -
42	2054										$ -	0.087	$ -
43	2055										$ -	0.082	$ -
44	2056										$ -	0.077	$ -
45	2057										$ -	0.073	$ -
46	2058										$ -	0.069	$ -
47	2059										$ -	0.065	$ -
48	2060										$ -	0.061	$ -
49	2061										$ -	0.058	$ -
50	2062										$ -	0.054	$ -
51	2063										$ -	0.051	$ -
52	2064										$ -	0.048	$ -
53	2065										$ -	0.046	$ -
54	2066										$ -	0.043	$ -
55	2067										$ -	0.041	$ -
56	2068										$ -	0.038	$ -
57	2069										$ -	0.036	$ -
58	2070										$ -	0.034	$ -
59	2071										$ -	0.032	$ -
60	2072										$ -	0.030	$ -
61	2073										$ -	0.029	$ -
62	2074										$ -	0.027	$ -
63	2075										$ -	0.025	$ -
64	2076										$ -	0.024	$ -
65	2077										$ -	0.023	$ -
66	2078										$ -	0.021	$ -
67	2079										$ -	0.020	$ -
68	2080										$ -	0.019	$ -
69	2081										$ -	0.018	$ -
70	2082										$ -	0.017	$ -
71	2083										$ -	0.016	$ -
72	2084										$ -	0.015	$ -
73	2085										$ -	0.014	$ -
74	2086										$ -	0.013	$ -
75	2087										$ -	0.013	$ -
76	2088										$ -	0.012	$ -

77	2089										$ -	0.011	$ -
78	2090										$ -	0.011	$ -
79	2091										$ -	0.010	$ -
80	2092										$ -	0.009	$ -
81	2093										$ -	0.009	$ -
82	2094										$ -	0.008	$ -
83	2095										$ -	0.008	$ -
84	2096										$ -	0.007	$ -
85	2097										$ -	0.007	$ -
86	2098										$ -	0.007	$ -
87	2099										$ -	0.006	$ -
88	2100										$ -	0.006	$ -
89	2101										$ -	0.006	$ -
90	2102										$ -	0.005	$ -
91	2103										$ -	0.005	$ -
92	2104										$ -	0.005	$ -
93	2105										$ -	0.004	$ -
94	2106										$ -	0.004	$ -
95	2107										$ -	0.004	$ -
96	2108										$ -	0.004	$ -
97	2109										$ -	0.004	$ -
98	2110										$ -	0.003	$ -
99	2111										$ -	0.003	$ -
100	2112										$ -	0.003	$ -
101	2113										$ -	0.003	$ -
102	2114										$ -	0.003	$ -
103	2115										$ -	0.002	$ -
	Total Present Value of Discounted Costs (Sum of column (j))												**$ 597,340**
	Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries												

FRAM annual:	637
sum pv model 1	10040.31
sum pv model 2	7952.862

model 1

initial FRAM output

nyear	year	benefit	pv
0	2012		
1	2013	637	600.9434
2	2014	637	566.9277
3	2015	637	534.8375
4	2016	637	504.5637
5	2017	637	476.0035
6	2018	637	449.0599
7	2019	637	423.6414
8	2020	637	399.6617
9	2021	637	377.0393
10	2022	637	355.6975
11	2023	637	335.5637
12	2024	637	316.5695
13	2025	637	298.6505
14	2026	637	281.7457
15	2027	637	265.7978
16	2028	637	250.7527
17	2029	637	236.5591
18	2030	637	223.169
19	2031	637	210.5368
20	2032	637	198.6196
21	2033	637	187.377
22	2034	637	176.7707
23	2035	637	166.7649
24	2036	637	157.3253
25	2037	637	148.4201
26	2038	637	140.019
27	2039	637	132.0934
28	2040	637	124.6164
29	2041	637	117.5626
30	2042	637	110.9082
31	2043	637	104.6303
32	2044	637	98.70786
33	2045	637	93.12062
34	2046	637	87.84965
35	2047	637	82.87702
36	2048	637	78.18587
37	2049	637	73.76026

model 2

proposed (discounted to reflect actual construction completed in 2016)

nyear	year	benefit	pv
0	2012		
1	2013		0
2	2014		0
3	2015		0
4	2016		0
5	2017	637	476.00346
6	2018	637	449.05986
7	2019	637	423.64138
8	2020	637	399.66168
9	2021	637	377.03932
10	2022	637	355.69747
11	2023	637	335.56365
12	2024	637	316.56948
13	2025	637	298.65046
14	2026	637	281.74571
15	2027	637	265.79784
16	2028	637	250.75268
17	2029	637	236.55913
18	2030	637	223.16899
19	2031	637	210.53679
20	2032	637	198.61961
21	2033	637	187.37699
22	2034	637	176.77075
23	2035	637	166.76486
24	2036	637	157.32534
25	2037	637	148.42013
26	2038	637	140.01899
27	2039	637	132.09339
28	2040	637	124.6164
29	2041	637	117.56264
30	2042	637	110.90815
31	2043	637	104.63033
32	2044	637	98.707862
33	2045	637	93.120624
34	2046	637	87.849646
35	2047	637	82.877024
36	2048	637	78.185872
37	2049	637	73.760256

38	2050	637	69.58515
39	2051	637	65.64637
40	2052	637	61.93053
41	2053	637	58.42503
42	2054	637	55.11795
43	2055	637	51.99807
44	2056	637	49.05478
45	2057	637	46.2781
46	2058	637	43.65858
47	2059	637	41.18734
48	2060	637	38.85598
49	2061	637	36.65659
50	2062	637	34.58169
51	2063		0
52	2064		0
53	2065		0
54	2066		0
55	2067		0
56	2068		0
57	2069		0
58	2070		0
59	2071		0
60	2072		0

38	2050	637	69.585148
39	2051	637	65.646366
40	2052	637	61.930534
41	2053	637	58.425032
42	2054	637	55.117954
43	2055	637	51.99807
44	2056	637	49.054783
45	2057	637	46.278097
46	2058	637	43.658582
47	2059	637	41.187342
48	2060	637	38.855983
49	2061	637	36.656588
50	2062	637	34.581686
51	2063	637	32.624233
52	2064	637	30.777578
53	2065	637	29.035451
54	2066	637	27.391935
55	2067		0
56	2068		0
57	2069		0
58	2070		0
59	2071		0
60	2072		0
			$ 7,953

Table 8-3 (PSP Table 16) Implementing Nutrient Management in the Santa Margarita River Watershed - Phase II Annual Costs of Avoided Projects: Avoided Municipal Stormwater Treatment Facility (2012 dollars)						
	Costs				Discounting Calculations	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
Year	Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance Costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)	Discount Factor	Discounted Costs (e) x (f)
2012	$0	$0	$0	$0	1.000	**$0**
2013	$311,635,546	$0	$0	$311,635,546	0.943	**$293,995,798**
2014	$311,635,546	$0	$0	$311,635,546	0.890	**$277,354,527**
2015	$311,635,546	$0	$0	$311,635,546	0.840	**$261,655,214**
2016	$311,635,546	$0	$0	$311,635,546	0.792	**$246,844,541**
2017	$311,635,546	$0	$0	$311,635,546	0.747	**$232,872,209**
2018	$0	$0	$5,148,026	$5,148,026	0.705	**$3,629,155**
2019	$0	$0	$5,148,026	$5,148,026	0.665	**$3,423,731**
2020	$0	$0	$5,148,026	$5,148,026	0.627	**$3,229,935**
2021	$0	$0	$5,148,026	$5,148,026	0.592	**$3,047,109**
2022	$0	$0	$5,148,026	$5,148,026	0.558	**$2,874,631**
2023	$0	$0	$5,148,026	$5,148,026	0.527	**$2,711,916**
2024	$0	$0	$5,148,026	$5,148,026	0.497	**$2,558,411**
2025	$0	$0	$5,148,026	$5,148,026	0.469	**$2,413,596**
2026	$0	$0	$5,148,026	$5,148,026	0.442	**$2,276,977**
2027	$0	$0	$5,148,026	$5,148,026	0.417	**$2,148,091**
2028	$0	$0	$5,148,026	$5,148,026	0.394	**$2,026,501**
2029	$0	$0	$5,148,026	$5,148,026	0.371	**$1,911,794**
2030	$0	$0	$5,148,026	$5,148,026	0.350	**$1,803,579**
2031	$0	$0	$5,148,026	$5,148,026	0.331	**$1,701,490**
2032	$0	$0	$5,148,026	$5,148,026	0.312	**$1,605,179**
Total Present Value of Discounted Costs						**$1,350,084,385**
(%) Avoided Cost Claimed by Project						**10%**
Total Present Value of Discounted Avoided Project Costs Claimed by Alternative Project						**$135,008,438**

Comments: Costs for the Municipal Stormwater Treatment Facility (an avoided project) are shown in the table. Capital costs occur in years 2013 through 2017; operations and maintenance costs occur in years 2018 through 2032. Once construction is finished in 2017, the Municipal Stormwater Treatment Facility has an expected life of 15 years, from 2018 to 2032.

This project claims 10% of the avoided project's costs.

Table 8-4 (PSP Table 19)

(All costs should be in 2012 Dollars)

Project: Implementing Nutrient Management in the Santa Margarita River Watershed - Phase II

		Initial Costs		Annual Costs [2]						Discounting Calculations	
		Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost[1]	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
	Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
0	2010	$ -		$ -	$ -	$ -	$ -	$ -	$ -	1.000	$ -
0	2011	$ 238,580		$ -	$ -	$ -	$ -	$ -	$ 238,580	1.000	$ 238,580
0	2012	$ -		$ -	$ -	$ -	$ -	$ -	$ -	1.000	$ -
1	2013	$ 381,728		$ -	$ -	$ -	$ -	$ -	$ 381,728	0.943	$ 360,121
2	2014	$ 318,106		$ -	$ -	$ -	$ -	$ -	$ 318,106	0.890	$ 283,113
3	2015	$ 286,297		$ -	$ -	$ -	$ -	$ -	$ 286,297	0.840	$ 240,380
4	2016	$ 286,297		$ -	$ -	$ -	$ -	$ -	$ 286,297	0.792	$ 226,774
5	2017	$ 79,527		$ -	$ -	$ -	$ -	$ -	$ 79,527	0.747	$ 59,427
										Total Present Value of Discounted Costs (Sum of column (j))	**$ 1,408,396**
										Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries	

Attachment 9

Program Preferences

Attachment 9

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Program Preferences

Attachment 9 consists of the following item:

✓ **Program Preferences.** This attachment contains information regarding how this *San Diego IRWM Implementation Grant Proposal* contributes to the Program Preferences set by PRC §75026.(b) and CWC §10544.

Program Preferences

The Program Preferences described in Section II.F of the 2012 IRWM Grant Program Guidelines are those set forth in PRC §75026.(b) and CWC §10544. These preferences are summarized in Table 9-1. Note that none of the proposed projects listed are applying for Stormwater Flood Management (SWFM) funding, and as such, none of the projects were evaluated with respect to the SWFM-specific Program Preference.

Table 9-1: Program Preferences and Statewide Priorities

Program Preferences	Statewide Priorities
1. Include regional projects or programs	1. Drought Preparedness
2. Effectively integrate water management programs and projects within a hydrologic region identified in the California Water Plan; RWQCB region or subdivision; or other region or sub-region specifically identified by DWR	2. Use and Reuse Water More Efficiently
3. Effectively resolve significant water-related conflicts within or between regions	3. Climate Change Response Actions
4. Contribute to attainment of one or more of the objectives of the CALFED Bay-Delta Program	4. Expand Environmental Stewardship
5. Address critical water supply or water quality needs of disadvantaged communities (DACs) within the region	5. Practice Integrated Flood Management
6. Effectively integrate water management with land use planning	6. Protect Surface Water and Groundwater Quality
7. For eligible SWFM funding… (*not applicable*)	7. Improve Tribal Water and Natural Resources
8. Address Statewide priorities (*see right*)	8. Ensure Equitable Distribution of Benefits

Each of the projects included within this proposal is ready to proceed, and was identified as a Tier 1 priority project by the Regional Water Management Group (RWMG), Regional Advisory Committee (RAC), and Project Selection Workgroup in accordance with the project prioritization process that was approved and adopted in the 2007 IRWM Plan. As a result of the thorough analysis that was performed on these projects by the Project Selection Workgroup and analysis that was completed with respect to monitoring, assessment, and performance measures (refer to Attachment 6), it is **fully certain** that each of the projects included in this proposal will provide the benefits described below.

The package of projects included in this proposal will address each of the aforementioned Program Preferences on a local, regional, or statewide scale. These terms, used to define the breadth and magnitude to which each project addresses the Program Preferences, are defined as follows:

- *Local*: Project benefits are focused locally within the project area.
- *Regional*: Project benefits extend throughout the San Diego IRWM Region (Region).

- *Statewide*: Project benefits are widespread and will benefit not only the Region, but also other areas throughout California.

Table 9-2 identifies the Program Preferences that will be addressed by each of the proposed projects and demonstrates the magnitude and breadth to which each Program Preference will be addressed.

Table 9-2: Proposed Projects and Program Preferences

Proposed Projects	1: Regional Projects	2: Integrate Water Mgmt	3: Resolve Conflict	4: Bay-Delta Objectives	5: Benefits DACs	6:Land Use Planning	7: Statewide Priorities
1. North San Diego County Regional Recycled Water Project – Phase II	✓	✓	✓	✓			✓
2. Turf Replacement and Agricultural Irrigation Efficiency Program	✓	✓	✓	✓			✓
3. Rural Disadvantaged Community (DAC) Partnership Program		✓	✓		✓		✓
4. Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility	✓	✓	✓	✓			✓
5. Sustaining Healthy Tributaries to the Upper San Diego River		✓	✓			✓	✓
6. Chollas Creek Integration Project – Phase II		✓	✓			✓	✓
7. Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II		✓	✓				✓
Degree of Certainty Preferences Will Be Addressed	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
Magnitude and Breadth to Which Preference will be Addressed	Region	Region	Region	State	Local	Region	Region

Program Preference 1: Include Regional Projects or Programs

As shown in Table 9-2, three projects within this proposal include regional projects or programs. As evident in Figure 3-1 (see Attachment 3), these projects all span throughout the Region, and have a regional emphasis. As such, these programs are considered regional pursuant to CWC §10544, and it is **fully certain** that these projects will adhere to this Program Preference on a regional level.

North San Diego County Regional Recycled Water Project – Phase II: This project will construct pipelines, storage facilities, pumping facilities, and interties that implement recycled water consolidation opportunities identified in Phase I for ten partner agencies in the northern portion of San Diego County (defined in the Work Plan in Attachment 3).

Turf Replacement and Agricultural Irrigation Efficiency Program: This project will provide guidance and incentives to property owners in the Water Authority's Service Area and the City of San Diego who convert turf to sustainable landscaping. Additionally, the project provides incentives to agricultural users in the Water Authority's service area to retrofit irrigation equipment with more efficient technology or to convert potable irrigation systems to non-potable systems. As such, water conservation, water recycling, water quality improvements, and other benefits provided by this project will span throughout the Region as the financial incentives and other components of this program will be available to residents throughout the Water Authority's service area.

Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility: This project is located at the City of San Diego's Advanced Water Purification Demonstration Facility and will develop and rigorously test failsafe potable reuse treatment trains. Information that will be provided by this project can be used to benefit the entire Region, as well as the state, by providing a robust scientific foundation for evaluating and potentially approving future failsafe potable reuse facilities.

Program Preference 2: Effectively Integrate Water Management Programs and Projects within the San Diego IRWM Region

All of the projects included within this proposal will address the Program Preference of effectively integrating water management programs and projects within a region specifically identified by DWR. DWR specifically approved the San Diego IRWM Region as part of the Region Acceptance Process that took place in 2009. Each of the seven projects listed within this proposal would be contained within this DWR-identified region, and it is **fully certain** that these projects will adhere to this Program Preference on a regional level. Further, as described in detail in Attachment 3, many of the projects included in this proposal effectively integrate water management efforts as they were developed through a specific integration effort (the Strategic Integration Workshop) that was conducted by the IRWM Program in September of 2012.

North San Diego County Regional Recycled Water Project – Phase II: This project is being developed to address the regional need for a diversified water supply portfolio by producing and distributing additional recycled water. The purpose of the project is to integrate recycled water system components from ten neighboring water agencies into a more efficient, interconnected North County regional recycled water system, and to maximize use of the recycled water produced and used in the Region. This project will therefore effectively integrate recycled water management within the North County area of a region specifically identified by DWR (the San Diego IRWM Region).

Turf Replacement and Agricultural Irrigation Efficiency Program: This program will provide incentives for urban and agricultural users throughout the Water Authority's service area to convert lawns to water-efficient landscaping, and improve agricultural irrigation efficiency. This program is a partnership between the Water Authority and the City, who are working together to effectively integrate their outdoor water use efficiency (conservation) programs. This program and the integrated partnership between the Water Authority and the City was developed, in part through the IRWM Strategic Integration Workshop. As such, this program will effectively integrate water conservation and efficiency programs throughout the Water Authority's service area, which is located within the San Diego IRWM Region.

Rural DAC Partnership Program: The goal of this program is to provide funding and support to implement projects that address inadequate water supply and water quality issues affecting rural DACs. Projects considered for funding through this partnership program will be evaluated by the Rural DAC Stakeholder Committee, who will evaluate projects based on a pre-determined set of criteria (refer to Attachment 3). This program is an integrated water management program, because it strives to bring together individuals that are familiar with and committed to water management issues in rural DACs, and to provide the funding and support necessary to implement critical DAC projects in rural areas that are not served by municipal water agencies.

Failsafe Potable Reuse at the Advanced Water Purification Facility: This project will design and test a failsafe treatment train for potable reuse without an environmental buffer (failsafe potable reuse). The testing conducted for this project will result in information that may be used to evaluate the safety of failsafe potable reuse facilities in the Region and the State, and may potentially lead to a more affordable potable reuse option in the future. As such, this project is an integrated water management effort that will conduct pilot testing necessary to implement future potable reuse projects within the state of California.

Sustaining Healthy Tributaries to the Upper San Diego River: This project will involve protection, restoration, and data collection efforts for Boulder Creek, an important tributary to the largest local water supply in San Diego County, El Capitan Reservoir. By collecting data and restoring the creek, this project will reduce or avoid future costs associated with creek degradation, water quality issues, and sedimentation in the reservoir. Data from this project may also be used to evaluate the health of other, similar, creeks by accumulating baseline data. This project is an integrated effort involving multiple partners that will work together to maximize benefits and address regional needs associated with establishing baseline data for a healthy portion of the San Diego River Watershed.

Chollas Creek Integration Project – Phase II: This project is an integrated effort of multiple partners, and will expand upon the San Diego Coastkeeper's Citizen Science Monitoring and Pollution/Conservation Education program, include a partnership with Groundwork's Green Team Community Service Project, and contribute additional data to the City of San Diego's Stormwater dataset.

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II: The goal of this project is to establish nutrient water quality objectives for the Santa Margarita River watershed. Due to its watershed-level scale and interregional scope, this project is linked to a large list of other projects (refer to Attachment 3). This project will effectively integrate water management programs and projects throughout the Santa Margarita watershed, because results and conclusions from this project will lead to the consistent implementation of nutrient reduction and water conservation practices throughout the entire watershed.

Program Preference 3: Effectively Resolve Significant Water-Related Conflicts

The IRWM Plan Objectives were established as a result of an open and transparent stakeholder process, where all RWMG, RAC, and other stakeholders were invited to voice their significant issues and conflicts within the region. In accordance with the 2012 IRWM Guidelines, the draft IRWM Plan Update Objectives were developed such that they specifically address the major water-related issues and conflicts of the Region. Together, the seven projects address all of the twelve draft IRWM Plan Update Objectives (see Table 3-2 in Attachment 3), and therefore will effectively resolve water-related conflicts identified by the comprehensive stakeholder group.

In addition, each project resolves local funding issues through their inclusion in this proposal. Each of these projects will help to alleviate regional conflicts associated with a short supply of regional funding. The analysis below provides specific information on how each project will effectively resolve significant water-related conflicts within the Region. Due to the degree of analysis performed on these projects, it is **fully certain** that this proposal will meet the Program Preference of effectively resolving significant water-related conflicts throughout the Region (on a regional level).

North San Diego County Regional Recycled Water Project – Phase II: This project is a comprehensive recycled water program that will consolidate individual recycled water components of ten separate agencies to more effectively meet recycled water needs of North County San Diego. The physical scope of this project will eliminate jurisdictional conflicts, and the individual water components will complement and support each other, allowing the Region to move forward with recycled water provisions that will help reduce potential conflicts associated with state-mandated conservation requirements set forth in Senate Bill x7-7. Further, the cooperative inter-agency coordination required for this project will help to reduce potential conflicts that could otherwise arise between the agencies if they were to implement separate, segregated recycled water systems.

Turf Replacement and Agricultural Irrigation Efficiency Program: This program will help make conversion to water-efficient landscaping and irrigation more affordable for both urban and agricultural water users. This will reduce future conflict over water prices between customer groups, as well as reduce conflict between customers and agencies, by reducing the amount of water used by customers. This program also opens up communication between agencies and customers, which can help build understanding between the two, and reduce future conflicts.

Rural DAC Partnership Program: There is a critical need for safe drinking water and wastewater infrastructure in rural DACs in the Region. This program will benefit numerous DACs throughout the Region by implementing projects that will solve critical water supply or water quality needs. These efforts will help reduce jurisdictional conflicts, as well as address potential environmental justice issues and help resolve water-related conflicts between DACs and other communities. DAC projects will be selected by a stakeholder committee, which will allow opportunities for projects to be carefully considered and vetted through interested parties. This comprehensive stakeholder approach will further reduce conflicts by reducing the potential for competing plans and projects.

Failsafe Potable Reuse at the Advanced Water Purification Facility: This project brings together experts to develop comprehensive information to support the potential future implementation of failsafe potable reuse. By bringing experts together, competing theories can be tested and conflicting ideas resolved. This project supports water reuse efforts, and will contribute towards future ability to maximize water reuse in the Region and the State. This will reduce water-related conflicts regionally and potentially state-wide.

Sustaining Healthy Tributaries to the Upper San Diego River: This project is predicated on the idea that a small investment now will reduce costs associated with continued creek degradation in the future. In so doing, this project will protect the water quality and capacity of an important local water supply. Continued protection of this local water supply will reduce future conflict over a potential for an increase in imported water (due to reduced reservoir capacity) or potential increase in treatment costs to address water quality concerns.

Chollas Creek Integration Project – Phase II: This project will improve water quality, reduce flooding, and preserve open green space and habitat for the neighborhood surrounding Chollas Creek. This project involves a multitude of partners, and will therefore help resolve potentially conflicting interests by bringing interested parties together to implement activities associated with Chollas Creek. In addition, this project will address conflicts relating to water quality by effectively reducing sources of pollutants and environmental stressors.

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II: Phase I of this project is currently evaluating nutrient Water Quality Objectives (WQOs) for the Santa Margarita River Estuary and now Phase II aims to establish nutrient WQOs for the entire watershed. Phase I and Phase II efforts will ultimately lead to the implementation of nutrient reduction and water conservation practices in the watershed. This project will address water quality concerns between San Diego and Riverside Counties and avoid jurisdictional interests by bringing the two counties together to achieve project goals. Due to its watershed-level scale, this project will resolve conflicts by complementing existing plans. This project will also resolve water quality-related conflicts by developing nutrient WQOs that will help reduce sources of pollutants and other environmental stressors associated with runoff.

Program Preference 4: Contribute to Attainment of One or More of the Objectives of the CALFED Bay-Delta Program

The CALFED Bay-Delta Program has the following four objectives:

- *Water Quality*: to invest in projects that improve the State's water quality from source to tap.
- *Water Supply*: comprised of five critical elements: conveyance, storage, environmental water account, water use efficiency and water transfer.
- *Ecosystem Restoration*: aims at restoring habitats, ecosystem functions, and native species.
- *Levee Integrity*: to protect water supplies by reducing the threat of levee failures.

As described below, three projects meet three of the four CALFED Bay-Delta Program objectives: water quality, water supply, and ecosystem restoration. Due to the degree of analysis performed on these projects, it is **fully certain** that this proposal will meet the Program Preference of contributing to attainment of one or more of the objectives of the CALFED Bay-Delta Program (on a statewide level).

North San Diego County Regional Recycled Water Project – Phase II

- *Water Supply*: By integrating recycled water components of ten different agencies and working cooperatively, this project will allow for additional production and use of recycled water supply in the Region. Increasing recycled water use will help achieve water use efficiency objectives set forth by CALFED and thereby reduce demands for imported Bay-Delta water supply.
- *Ecosystem Restoration*: By reducing dependence on Bay-Delta water supplies, this project will help to protect and improve the Bay-Delta ecosystem.

Turf Replacement and Agricultural Irrigation Efficiency Program

- *Water Supply*: This project will increase water use efficiency by reducing the amount of water used for irrigation in the Region. Therefore, this project will reduce demands for potable water, approximately 80% of which is imported to the Region. As such, the project will reduce the need for water imported from the Bay-Delta system.
- *Ecosystem Restoration*: By reducing demands on Bay-Delta water supplies, this project will help to protect and improve the Bay-Delta ecosystem.

Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility:

- *Water Supply:* This project will contribute necessary research and testing that will facilitate future water reuse activities on both a regional and a statewide level. This project will therefore support water reuse activities, which can offset demands on imported water and maximize the use of local water supplies.
- *Water Quality:* Imported water is high in salts and nutrients, so reducing need for imported water will improve water quality in the Region's reservoirs and aquifers.

- *Ecosystem Restoration*: By reducing dependence on Bay-Delta water supplies, this project will help to protect and improve the Bay-Delta ecosystem.

Program Preference 5: Address Critical Water Supply or Water Quality Needs of DACs

DWR specifies that preference will be given to proposals that include projects that will include safe drinking water and water quality projects that serve DACs. One of the projects included in this proposal directly addresses critical water supply or water quality needs of DACs within the Region. Due to the degree of analysis performed on this project, it is **fully certain** that this proposal will meet the Program Preference of addressing critical water supply or water quality needs of DACs within the Region (on a regional level).

Rural DAC Partnership Program: This project will address inadequate water supply and water quality affecting rural DACs, including tribal communities. The project will reduce potential for high public health risks in water and/or wastewater systems specifically for DACs through the implementation of projects that will solve these critical issues.

Projects that Indirectly Address DAC Needs

Though the *Rural DAC Partnership Program* is the only project that meets DWR's criteria for directly addressing a critical water supply or water quality need of DACs, five of the other six projects will benefit the DACs within their project area in other ways. Refer to Figure 10-1 to see where DACs occur within the project areas. These projects include:

North San Diego County Regional Recycled Water Project – Phase II: This project will maximize recycled water use in the North San Diego County Region, which includes DACs. This will reduce dependence on imported water, and potentially prevent significant water cost increases in the future.

Turf Replacement and Agricultural Irrigation Efficiency Program: This program will encompass the Water Authority's service area, benefitting DACs throughout the Region by reducing dependence on imported water and reducing costs associated with outdoor water use through conservation and water recycling. Additionally, users living in DACs within the Region are eligible to participate in the program and reap the direct benefits of implementing water conservation measures.

Failsafe Potable Reuse at the Advanced Water Purification Facility: This project has regional and statewide benefits, and will therefore indirectly benefit all DACs within the Region and the state. This project will provide the basis for potential failsafe potable reuse, maximize water reuse opportunities in the state, and potentially decrease future water costs to users, including DACs.

Chollas Creek Integration Project – Phase II: This project will include creek restoration, pollution prevention, and flood protection activities in and around Chollas Creek, which is adjacent to the Encanto neighborhood of San Diego, an urban DAC. While this project does not address critical water quality or water supply needs of a DAC, it will provide direct benefits to an urban DAC and address priority needs associated with flooding and water quality in Chollas Creek.

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II: A significant portion of the Santa Margarita River Watershed is made up of DACs, in both San Diego and Riverside Counties. By creating science-based water quality standards, this project may potentially reduce the costs of treating and permitting discharges and other activities in the watershed, while protecting beneficial uses of the watershed.

Program Preference 6: Effectively Integrate Water Management with Land Use Planning

Many of the land use plans and regulations of land use agencies within the Region are consistent with the water management goals, objectives, and strategies included in the San Diego IRWM Plan. Further, two of the projects included in this proposal include land use considerations that will increase overall project benefits by effectively integrating water management with land use planning. Due to the degree of analysis performed on these projects, it is **fully certain** that this proposal will meet the Program Preference of integrating water management with land use planning in the Region (on a regional level).

Sustaining Healthy Tributaries to the Upper San Diego River: This project includes restoration activities on Boulder Creek and its associated tributaries, which are hydrologically connected to El Capitan

Reservoir. El Capitan Reservoir is an important component of the Region's water supply, and is currently impacted by water quality impairments. The project will effectively implement source control components, which will help protect water quality in El Capitan Reservoir by removing hydromodifications and addressing other land use-related concerns that may impact the water quality of El Capitan Reservoir. As such, this project will effectively integrate water management with land use planning by implementing low-cost restoration activities that will benefit the long-term water quality of El Capitan Reservoir.

Chollas Creek Integration Project – Phase II: The Phase I portion of this project identified and prioritized location and types of upland and wetland restoration projects in the Pueblo Hydrologic Unit. Phase II of this project will restore native habitat within Chollas Creek by replacing non-native plants with native riparian vegetation, removing debris, and protecting seasonal nesting areas within the creek. Planning for this project considered the growth needs for the DACs in the project area, and the project is designed to help reduce flooding that could damage properties, as well as install plants which will help treat runoff from the community. The activities included in this project effectively integrate water management with land use planning by considering growth needs and land uses adjacent to Chollas Creek that experience direct flood-related impacts.

Program Preference 7: Address Statewide Priorities

This proposal will either directly or indirectly address every Statewide Priority established by DWR. Table 9-3 demonstrates which Statewide priorities are addressed by each of the projects included in this proposal. As part of the project prioritization and ranking process, each project submitted to the San Diego IRWM Project Database for consideration in this proposal was evaluated for its consistency with Statewide priorities. As such, based on the level of analysis for each project, it is **fully certain** that each of these projects and the proposal will achieve the Statewide priorities at a regional level (throughout the Region).

Table 9-3: Proposed Projects and Programs with Statewide Priorities

Proposed Projects	Drought Preparedness	Reuse Water More Efficiently	Climate Change Response Actions	Expand Environmental Stewardship	Practice Integrated Flood Management	Protect Surface/ Groundwater Quality	Improve Tribal Water/Natural Resources	Ensure Equitable Distribution of Benefits
1. North San Diego County Regional Recycled Water Project – Phase II	●	●	●			○		○
2. Turf Replacement and Agricultural Irrigation Efficiency Program	●	●	●					○
3. Rural Disadvantaged Community (DAC) Partnership Program	●	●				●	●	●
4. Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility	○	●				○		○
5. Sustaining Healthy Tributaries to the Upper San Diego River	○			●		●		
6. Chollas Creek Integration Project – Phase II		●	●	●	●	●		●
7. Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II		●	○	○		●		○

○ indirectly related; ● directly related

North San Diego County Regional Recycled Water Project – Phase II

- *Drought Preparedness*: Maximizing recycled water use through this project will improve landscape and agricultural irrigation efficiencies, promoting water reuse/recycling and water conservation. This project will contribute to long-term drought preparedness by contributing to a more sustainable water supply and increased reliability during water shortages.

- *Reuse Water More Efficiently*: This recycled water project's main goal is to ensure that all recycled water produced in the North County region is efficiently and effectively distributed to and used by North County customers. The partnerships established by this project ensure that water is reused efficiently throughout the North County region, as it will reduce system redundancies and increase infrastructure-sharing between neighboring agencies.
- *Climate Change Response Action*: This project provides greater connectivity and reliability for a non-potable supply. This will help the Region reduce its dependence on imported water supplies and the climate change impacts associated with long-distance water transfers. Expansion of recycled water systems ensures water supply availability and reliability should imported water supplies be reduced due to changing climates.
- *Protect Surface/Groundwater Quality*: This project will indirectly improve surface/groundwater quality conditions by decreasing wastewater discharges and thus curbing the associated effects of pollution.
- *Ensure Equitable Distribution of Benefits*: This project will indirectly contribute to ensuring equitable distribution of benefits by implementing a wide-scale recycled water project. This project will help meet State policies intended to provide affordable water, which will benefit DAC customers served by the project.

Turf Replacement and Agricultural Irrigation Efficiency Program

- *Drought Preparedness*: By increasing irrigation efficiency and promoting water conservation, this program reduces overall water demand. Reduced water demand will improve water security in the event of a drought, by reducing water use and the need for imported water, which may become unreliable or increase in price during a drought.
- *Reuse Water More Efficiently*: This program is designed to promote water use efficiency by providing incentives to replace high water-consuming turf with water-efficient landscaping, and for agricultural users to convert to more efficient irrigation equipment.
- *Climate Change Response Actions*: Reducing the amount of potable water used for urban and agricultural irrigation reduces greenhouse gas emissions related to water treatment and imported water supplies.
- *Ensure Equitable Distribution of Benefits*: This program will indirectly contribute to ensuring equitable distribution of benefits by implementing a wide-scale water conservation program that will reduce outdoor water demands and make more water available for other water users, including DACs and Native American Tribes.

Rural DAC Partnership Program

- *Drought Preparedness*: Management practices carried out by selected projects will promote water conservation, reuse, and recycling, which all effectively address long-term drought preparedness. Further, projects implemented through this program will potentially provide water supply infrastructure that will increase water supply reliability in DACs, making these areas less susceptible to water supply shortages that could otherwise occur during a drought.
- *Reuse Water More Efficiently*: Projects that address conservation of groundwater and surface water supplies, water reuse and/or regionalization will be priorities during rural DAC project selection. Efficient use of finite water supplies and energy resources will be incorporated into DAC projects when appropriate and affordable.
- *Protect Surface/Groundwater Quality*: The goal of the program is to provide funding to DACs to address inadequate water supply and water quality issues. As such, this program will likely include activities to protect and restore water quality to safeguard public health.
- *Improve Tribal Water/Natural Resources*: RCAC will manage the grant funds to address inadequate water supply and water quality in rural DACs, including tribal communities. RCAC has also created a 'Green Infrastructure Guide' for DACs (including tribal communities) with the intent of limiting pollution and environmental stressors due to aging infrastructure. Using this and other reputable guidance during project development will help assure that new infrastructure supports environmentally sound and efficient projects that will better sustain water and natural resources.

- *Ensure Equitable Distribution of Benefits*: This project will give rural DACs within the San Diego IRWM Region an opportunity to submit projects, thereby ensuring equitability in the IRWM process. Project selection will select projects depending on how well they address public health risks in water and or wastewater systems; the projects will undoubtedly solve safe drinking water needs, water quality and water supply needs of Tribes and DACs within the Region, thereby ensuring equitable distribution of program-related benefits.

Failsafe Potable Reuse at the Advanced Water Purification Demonstration Facility

- *Drought Preparedness*: By providing robust scientific data on failsafe potable reuse, this project will play an important role in the potential approval process by the State for future potable reuse facilities that will maximize the reuse of water across the State. Maximizing water reuse will reduce dependence on imported water, and increase local water supplies, therefore increasing the drought tolerance.
- *Reuse Water More Efficiently*: This project will provide data for potential future failsafe potable reuse projects throughout the State. Failsafe potable reuse is an important future technology in water recycling, which will ensure that water us reused as efficiently as possible and reduce water that is essentially wasted through ocean discharges.
- *Protect Surface/Groundwater Quality*: Treated water produced at the Advanced Water Purification Demonstration Facility is of higher quality than imported water. Using this water instead of imported water for recharge and in local reservoirs will improve the water quality of the Region's reservoirs and aquifers.
- *Ensure Equitable Distribution of Benefits*: This project will indirectly contribute to ensuring equitable distribution of benefits by implementing a wide-scale recycled water project. This project will help meet State policies intended to provide affordable water, which will benefit DAC customers served by the project.

Sustaining Healthy Tributaries to the Upper San Diego River

- *Drought Preparedness*: Restoration of Boulder Creek will reduce sedimentation in El Capitan Reservoir. By reducing sedimentation, this project will maintain the capacity of the reservoir, providing for more water storage in the event of a drought.
- *Expand Environmental Stewardship*: This project relies heavily on volunteer participation in restoration activities, which will serve as a way to expand environmental stewardship in the community. This project also includes important research and data collection efforts that will help establish baseline conditions against which the health of the entire San Diego River Watershed can be assessed.
- *Protect Surface/Groundwater Quality*: Restoration activities in this project will serve to protect water quality in Boulder Creek and the El Capitan Reservoir. It will also collect data important to assessing water quality issues and needs in other tributaries within the San Diego River Watershed.

Chollas Creek Integration Project – Phase II

- *Reuse Water More Efficiently*: This project will implement water improvement strategies that will help solve issues regarding the capture and treatment of stormwater runoff. These strategies may contribute to long term water supply conservation and reliability coming from Chollas Creek.
- *Climate Change Response Action*: Modifications made to the creek will help stabilize banks and reduce flooding. This will serve to protect the creek and surrounding communities from potential extreme weather events due to climate change.
- *Expand Environmental Stewardship*: The project utilizes a stakeholder-driven process to implement a conceptual watershed management work plan, prioritize restoration and maintenance needs, develop funding strategies, and institutionalize community-based water and habitat conservation and stewardship. It will train and utilize local students to monitoring, testing, and restoration activities, in the process educating them about watershed management and environmental stewardship.
- *Practice Integrated Flood Management*: Through structural modifications and habitat restoration, this project will reduce flooding caused by channelization, soil erosion/sedimentation, and dumping of trash and construction debris into Chollas Creek.

- *Protect Surface/Groundwater Quality*: This project will restore native vegetation, make structural modifications, and clean up sections of Chollas Creek through removal of homeless encampments and debris. These activities will reduce sedimentation and pollution in the creek, helping to improve and protect water quality.
- *Ensure Equitable Distribution of Benefits*: This project will implement measures for water quality, flood control, habitat restoration and open space. The distribution of the program's benefits will be equally beneficial to the citizens of the Chollas Creek and Encanto areas, which are largely economically disadvantaged.

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

- *Reuse Water More Efficiently*: Through implementation of irrigation optimization and best management practices to reduce nutrient runoff from wet and dry weather sources, this project will eventually improve water conservation and recycling allowing for efficient use of a diverse mix of water resources.
- *Climate Change Response Action*: The project will result in the reduction of stressors to native stream and estuarine flora and fauna, which decreases their susceptibility to stressors associated with long-term climate change.
- *Protect Surface/Groundwater Quality*: This project will develop nutrient WQOs that will help reduce sources of pollutants, specifically nutrients, and other environmental stressors associated with point and non-point source runoff that discharge into surface waters.
- *Ensure Equitable Distribution of Benefits*: This project will indirectly contribute to ensuring equitable distribution of benefits by implementing a wide-scale project to improve the quality and management of the Santa Margarita River Watershed. This project will benefit all residents within the Santa Margarita River Watershed, which includes many DACs.

Attachment 10

Disadvantaged Community Assistance

Attachment 10

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Disadvantaged Community Assistance

Attachment 10 consists of the following items:

- ✓ **Documentation of Presence and Needs of DACs.** Local DACs are defined and mapped using U.S. Census 2010 data. Critical water supply and water quality needs identified by local DAC representatives are summarized.
- ✓ **Description of Proposed Projects and Targeted Benefits to DACs.** The targeted benefits to local DACs from the proposed projects are described.
- ✓ **Letters of Support.** Letters of support from local DAC representatives for the proposed projects are included in Appendix10-1.

This attachment documents the presence and needs of disadvantaged communities (DACs), and also documents information regarding the *Rural DAC Partnership Program – Phase II,* which addresses critical water supply and water quality needs in DACs, as well as how other projects in this proposal address non-critical water-related needs of DACs.

Funding Match Waiver

One program included in this grant proposal, the *Rural DAC Partnership Program,* addresses a critical water supply and water quality need of local DACs. This program has a 27% funding match and will therefore not be applying for a funding match waiver (see Table 4-1 in Attachment 4).

The *Rural DAC Partnership Program*, submitted by the Rural Community Assistance Corporation (RCAC), has provided approximately $1.55 million in funding match (27%) through local cost share (in-kind services) and federal funding programs, including the U.S. Department of Health and Human Services, U.S. Department of Agriculture Rural Development, Indian Health Services, and the U.S. Environmental Protection Agency (Region 9).

Presence and Needs of DACs

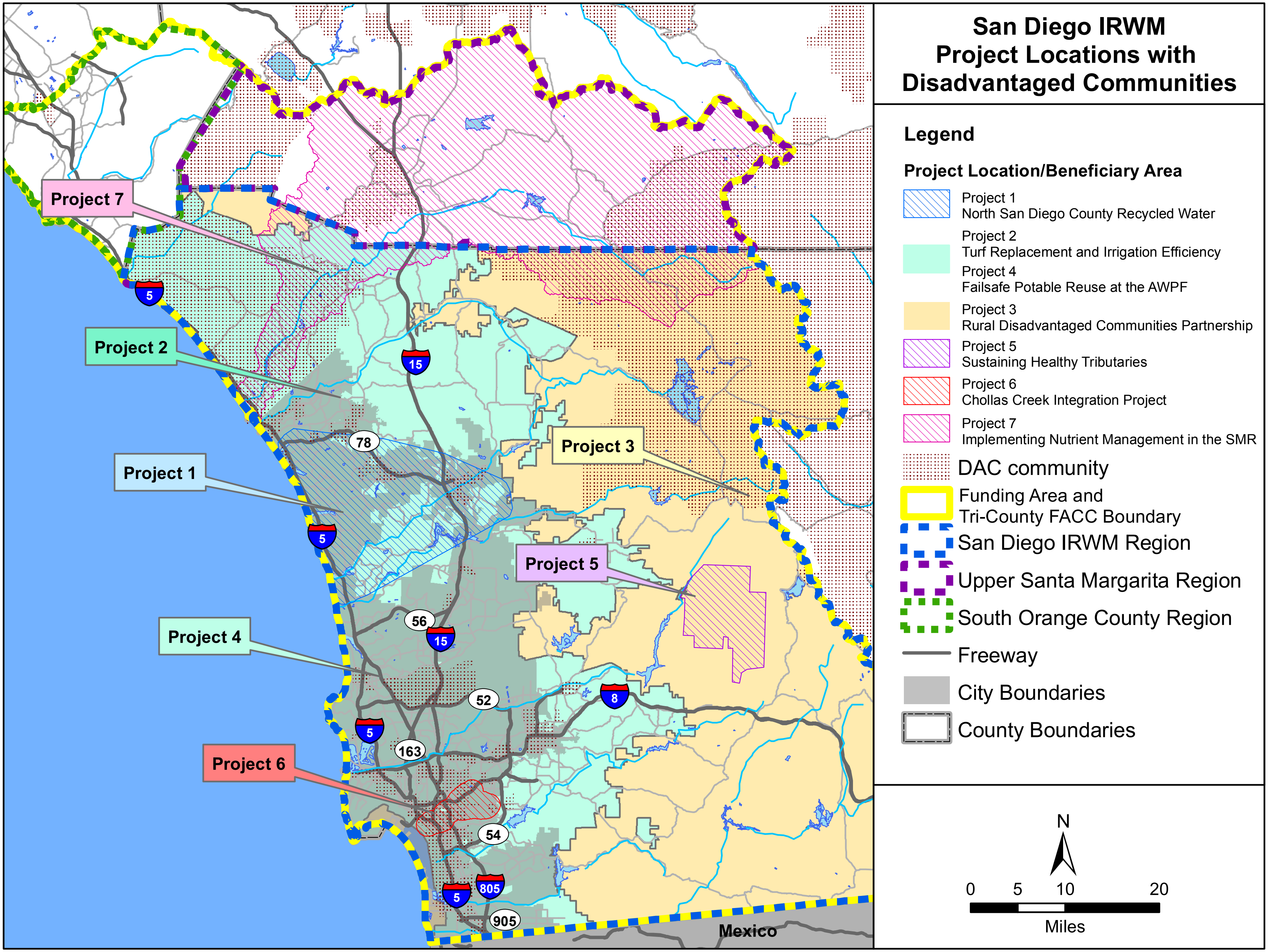
A DAC is defined by DWR in the 2012 IRWM Guidelines as a community with an average median household income (MHI) that is less than 80 percent of the Statewide MHI. The American Community Survey (ACS) of the U.S. Census includes social and demographic data, including information regarding MHI estimates for the State of California and individual communities within the state. According to the 2012 Guidelines, ACS data show that 80% of the Statewide MHI is $48,706, meaning that any community with an MHI of $48,706 or less would qualify as a DAC. Within the San Diego IRWM Region (Region), several communities and rural areas have an average MHI less than 80 percent of the Statewide MHI. The 2007 IRWM Plan used various geographical designations to analyze DACs, including cities, County of San Diego community planning areas, and City of San Diego community planning areas. However, the use of larger planning areas can at times cause smaller portions of the planning area that are economically disadvantaged to be overlooked. The RWMG recently analyzed MHI values on a census tract-basis to identify smaller pockets of DACs for outreach purposes. Figure 10-1 illustrates the census tracts within the Region that are considered economically disadvantaged according to the 2010 ACS data and MHI criteria set forth by DWR. Figure 10-1 also demonstrates the location of DACs with respect to the seven projects included in this grant proposal.

Consistent with the recommendations of the *San Diego IRWM Public Outreach and Disadvantaged & Environmental Justice Community Involvement Plan,* actions are underway to identify specific locations of DACs throughout the Region. In addition to identifying communities meeting the State's MHI definition of disadvantaged, efforts are being undertaken to identify areas that are recognized as economically disadvantaged by the Region's planning agencies, but do not meet the State's MHI definition. DAC advocates have indicated that additional efforts to identify DACs in the Region are necessary, because U.S. Census data is often unable to capture the true economic conditions of various communities in San Diego County, particularly those communities with a high number of undocumented residents, tribal communities, or other residents that may not participate in providing information to the U.S. Census.

The RWMG has worked directly with numerous organizations that are involved with addressing water-related issues of DACs within the Region, including: San Diego Coastkeeper, Environmental Health Coalition, RCAC, Jacobs Center for Neighborhood Innovation, Groundwork San Diego-Chollas Creek, WildCoast, and others. Outreach to the aforementioned organizations has focused on identifying and characterizing DAC issues and needs within the Region. Directed outreach to DACs is currently being conducted as part of the IRWM Plan Update, and efforts taken to date have helped further define DAC issues within the Region. Identified DAC issues include but are not limited to the following:

- Effective management of small water systems permitted by the County Department of Environmental Health is challenging. Operations and maintenance are difficult, and small water systems need funding for improvements.
- Groundwater contamination in the San Dieguito and San Diego basins.
- Water conservation education to DACs in both urban areas (Pueblo/Otay watersheds) and rural (eastern San Diego County) areas. Outreach techniques are different for different communities. Specifically, urban DACs need to hear messaging from their peers rather than from the agencies.
- Implementation of the Chollas Creek TMDL for metals and bacteria is a priority.
- Flooding at creek constrictions presents impacts to DACs living in those areas.
- Support for implementation of low impact development techniques to reduce stormwater runoff and subsequent flooding.
- Leaking septic systems in eastern/rural San Diego County present water quality issues.
- How to pay for conversion of septic systems to advanced water treatment.
- Lack of water-based recreational access for DAC/EJ communities.
- Impacts of San Diego Bay water quality contamination on individuals that rely on subsistence fishing.
- Plastic/trash reduction in local creeks and watersheds.

Figure 10-1: Program Overview with Disadvantaged Communities



Projects that Meet a Critical Water Supply or Water Quality Need of DACs

The following program included in this proposal would meet the DAC Program Preference of meeting a critical water supply and water quality need of a DAC. Information regarding how the program will meet identified DAC needs is provided below.

Rural DAC Partnership Program

Background – Critical Water Supply and Water Quality Needs

Drinking water systems that serve DACs often lack both access to much needed infrastructure, financing, and the resources to adequately maintain existing system facilities. This is especially true in rural areas of the Region that are not provided municipal water supply or wastewater infrastructure because they are located outside of the jurisdictional boundaries of the Region's water and wastewater agencies. As a result, these systems face significant challenges in complying with longstanding and new drinking water rules.[1]Three major problems that impede the sustainability of a small community water system include:

1) contamination of drinking water source water from wastewater intrusion, agricultural influences, and/or contaminant spills from industrial activities;
2) seasonal weather changes resulting in floods or droughts may require design options to bypass treatment during rain and storm events and identification of alternative water supplies (including water reuse sources) to increase capacity during droughts; and
3) deteriorating collection and distribution systems compromise source water quality and increase the cost of water treatment.

Rural communities within the San Diego IRWM region unincorporated areas that are not served by water or wastewater agencies have water supply and water quality issues that may be exacerbated by climate change, poor economies, and lack of community expertise. Inadequate water supply to support existing communities is a public health risk, especially considering that the rural (backcountry) portions of the Region are also those that are particularly susceptible to wildfires. The majority of drinking water maximum containment level (MCL) violations in the Region occur with small public water systems, and inadequate wastewater treatment can result in unplanned discharge events.

The infrastructure needs of rural DACs are so extensive that currently, there is not enough available funding to meet the needs of rural DACs throughout the Region. The California Department of Public Health (CDPH) has 41 small (less than 10,000 population) systems located in San Diego County on its 2013 State Revolving Fund (SRF) Priority Project List (PPL)[2], with many listed more than once. The Rancho Estates MWC project, identified as a sample project by the Rural DAC Stakeholder Committee, is listed in the CDPH PPL with a funding target of $500,000. The State Water Resources Control Board (SWRCB) has a similarly lengthy list of communities requesting funding from the Clean Water SRF for wastewater improvements.

Rural DACs in the San Diego IRWM Region are faced with critical water supply issues in that some areas have inadequate water supplies to support existing connections. Rural DACs also face water quality issues associated with costs as it is costly to provide supplemental treatment processes to improve the water quality of contaminated drinking water source waters, and it is also difficult for small DAC systems to afford improvements because they have fewer ratepayers to share the costs. Further, rural DACs may lack the technical expertise and financial stability to access and comprehend funding programs that could be implemented to address cost-related issues. The *Rural DACs Partnership Program – Phase II* will continue to support the Region's small community water systems in rural areas by providing the grant funding and technical expertise necessary to implement infrastructure improvements.

Project Information

In the *Rural DAC Partnership Program*, RCAC will manage the Proposition 84 – Round 2 grant funds to address inadequate water supply and water quality in rural DACs, including tribal communities, with

[1] U.S. EPA 2007.*Small Drinking Water Systems: State of the Industry and Drinking Water Technologies to Meet the Safe Drinking Water Act Requirements*. EPA/600/R-07/110.
[2] Sean Sterchi, CDPH. 2013. *State Revolving Fund Priority Project List*. Email dated March 5, 2013.

populations less than 10,000 residents. The targeted benefit of this program is to provide a reliable source of quality water supply to rural DACs in the Region. DACs will be identified based on 2010 U.S. Census 2010 income data, and additional information regarding the presence of DACs, as described in preceding sections of this attachment.

RCAC will lead a representative group of stakeholders and agencies, including a representative of the San Diego IRWM Regional Advisory Committee (RAC), to solicit and select rural DACs for funding of critical infrastructure improvement projects. Criteria for project selection will be based on the following factors:

Primary Criteria

1) DAC per 2010 U.S. Census data and other applicable data
2) Construction project
3) Addresses public health issue
4) Critical water project (quantity/quality/reliability)
5) Adequate technical, managerial, and financial capacity
6) Shovel ready or ability to complete within project timeframe.

Secondary Criteria

1) Project ability to leverage other funding
2) Capital cost per connection
3) Multiple benefits
4) Green technology
5) Addresses environmental justice concerns.

Opportunities to merge related projects will be evaluated. Projects will be selected from both tribal and non-tribal rural DACs. Preference will be given to DAC projects that are ready to be constructed. In every case, RCAC will look at other available funding resources to leverage Proposition 84 grant funding.

RCAC will provide DACs with outreach, program information, assistance with project scope and readiness, project documentation for funding, assistance with engineering and contractor selection, project oversight, and disbursement of individual DAC project payments. To extend Proposition 84 dollars, RCAC will provide supplementary capacity development, training, and technical assistance to support project sustainability utilizing existing RCAC programs.

RCAC is a certified Community Development Financial Institution and will be responsible for disbursements for selected DAC projects. The reporting process for the DAC projects will, at a minimum, include quarterly reporting and invoices, and work will be verified by RCAC before payments are made. RCAC will provide written quarterly reports to the San Diego County Water Authority and will be available to report directly to the RWMG if requested.

Projects Providing Indirect Benefits to DACs

The following projects also benefit DACs within their respective project areas; however, these projects do not meet DWR's criteria for addressing critical water quality or water supply needs. The manner in which each of these projects will benefit DACs is described detail below.

- *North San Diego County Regional Recycled Water Project – Phase II*
- *Turf Replacement and Agricultural Irrigation Efficiency Program*
- *Failsafe Potable Reuse at the Advanced Water Purification Facility*
- *Chollas Creek Integration Project – Phase II*
- *Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II*

North San Diego County Regional Recycled Water Project – Phase II

The *North San Diego County Regional Recycled Water Project – Phase II* will implement and construct connections identified in Phase I to maximize the use of recycled water across the ten partner agencies in the North County region. There are DACs located within the project area (North County region), which will realize benefits accrued by the project. Specifically, by maximizing recycled water use in the North County region, the project partners will reduce costs associated with water treatment and distribution, reduce the need to construct additional facilities such as outfalls and redundant recycled water infrastructure, and improve drought and climate change resilience. The "without project" costs (costs that would occur without this project), particularly those associated with additional infrastructure needs, would have been borne by the partner agencies and their applicable water users. As water users within the North County region include DACs, this project will provide cost savings benefits to DACs by potentially reducing future water rate increases that would occur without the project. In addition, energy savings realized through reduction of water treatment and water imports will also provide environmental and economic benefits to the North County region, including its DACs. Further, because some of the connections will convert golf courses to recycled water irrigation, water use conflicts between different socio-economic groups in the North County region may be reduced.

Turf Replacement and Agricultural Irrigation Efficiency Program

The *Turf Replacement and Agricultural Irrigation Efficiency Program* provides incentives to replace turf with water-efficient landscaping and incentives to replace inefficient irrigation equipment on agricultural lands throughout the Water Authority's Service Area, which includes DACs. Benefits incurred by the Region will also be incurred by DACs within the Region. Benefits of importance to DACs may include:

- *Decreased potable water demand* – reducing potable water demand will improve the Region's water security. This can help reduce future water rate increases. DACs are more susceptible to negative impacts associated with increased water rates.
- *Increased resilience to drought and climate change* – water conservation provides a buffer against droughts and climate change.
- *Reduced water costs* - If people in DACs choose to participate in the program, they will reduce their water bills by converting to water-efficient landscaping or irrigation.
- *Potential reduced food costs*– Water is a significant cost for farmers, so decreasing their water demand and related costs may reduce local produce costs to consumers. This could serve two benefits: decreasing cost of living and increasing access to healthy food choices in the Region, including DACs.

Failsafe Potable Reuse at the Advanced Water Purification Facility

As with the *Turf Replacement and Agricultural Irrigation Efficiency Program*, the *Failsafe Potable Reuse at the Advanced Water Purification Facility* project will result in Region-wide benefits, and will therefore also benefit DACs. Because this project will be designing and testing failsafe treatment trains for failsafe potable reuse, many of these benefits will be realized as potential future benefits of failsafe potable reuse implementation. Benefits to DACs include increased future water security, improved water quality, and potential reduced water costs if failsafe potable reuse projects are implemented in lieu of other more expensive water supply projects.

Chollas Creek Integration Project – Phase II

The *Chollas Creek Integration Project – Phase II* will implement restoration and monitoring activities along Chollas Creek as identified in Phase I. The project will collect data on creek health, both before and after restoration, engage stakeholders from the Encanto area (an urban DAC), remove sources of pollution to Chollas Creek, stabilize banks, and restore open space. Through the aforementioned activities, this project will address community concerns related to flooding, water quality, and habitat restoration.

As mentioned in the upfront sections of this attachment, flooding, water quality, and water-related recreation access were all identified as issues of concerns in DACs. Therefore, while this project will not address "critical" water supply or water quality concerns as defined by DWR, the project will directly address specific DAC-related issues identified by San Diego IRWM stakeholders.

Implementing Nutrient Management in the Santa Margarita River Watershed – Phase II

Phase II of *Implementing Nutrient Management in the Santa Margarita River Watershed* will draft science-based water quality standards for the Santa Margarita River Watershed. This will allow appropriate water quality thresholds to be set for these waterways based on impacts to beneficial uses. It is possible that information learned through this project will support a broader range of discharges to the Santa Margarita River that may be naturally sustained and remain protective to beneficial uses.

Many areas within the Santa Margarita River Watershed qualify as DACs per the 2010 ACS data (refer to Figure 10-1), particularly the lower and the upper regions of the watershed. These areas will benefit from this project in the following ways:

1) *Protection of beneficial uses*– All recommendations provided by this project are guided by the beneficial uses of the water. Current water quality objectives (WQOs) may not protect beneficial uses if data gaps are too great. Protecting beneficial uses will benefit DACs who rely on such beneficial uses, including municipal water use, agricultural water use, recreation, etc.
2) *Potential removal from 303(d) listings*– Many streams in the Santa Margarita River Watershed are listed as impaired on the 303(d) list. Some of these streams may be listed based on requirements that are artificially restrictive and do not take into consideration natural pollution loading in the watershed. If the science shows that these requirements are unnecessarily restrictive, these streams may be removed from the 303(d) listings, saving treatment costs and fines to dischargers, and providing potential development opportunities for DACs looking to grow and expand their economies.
3) *Potential water treatment cost savings and associated benefits* – As stated in the work plan (see Attachment 3), there are data gaps related to water quality in the Santa Margarita River Watershed. Current WQOs may be artificially restrictive, and there is potential that this project will collect data supporting a broader range of discharges. This could allow recycled water to be discharged into the streams with less treatment, saving costs in treatment and energy that will ultimately be borne by ratepayers, including DACs.
4) *Increased knowledge of the system* – Increased knowledge of contaminant levels that will protect beneficial uses and be naturally sustained will help guide community development decisions, and prevent potentially costly decisions. This is of particular concern in DACs, which often lack the funds or support to correct mistakes or accommodate changes in water quality standards.
5) *Increased stakeholder participation* – This project has multiple opportunities for stakeholder involvement, allowing DACs to voice concerns and participate in the process. This helps to empower DACs and invest them in the water issues of their areas.

Letters of Support

Letters of support that were submitted by agencies and organizations representing DACs in the San Diego region are included in Appendix10-1. The letters included in Appendix 10-1 include the following:

- City of San Diego Development Services, Planning Division – Letter of Support for the Chollas Creek Integration Project – Phase II

Appendix 10-1: Letters of Support

Included in this appendix is a letter of support from the City of San Diego for *Chollas Creek Integration Project – Phase II*. This letter states that the project supports all three planning documents for the area, that this project will address needs of a DAC, and notes the successful efforts of the project partners. It also states the City's strong support for their inclusion in this proposal.

THE CITY OF SAN DIEGO

Letter of Support
Chollas Creek Integration Project Phase II

FEB 25 2013

Mr. Mark Stadler
IRWM Program Manager
San Diego County Water Authority
4677 Overland Avenue
San Diego, Ca 92123

Dear Mr. Stadler,

On behalf of the City of San Diego Development Services Department Planning Division, I write in support of the Jacobs Center/Groundwork San Diego-Chollas Creek application to the Integrated Regional Water Management Program. This Phase II project expands upon Phase I data collection, analysis, and technical studies, and will bring desperately-needed improvements to the South Branch of Chollas Creek.

Chollas Creek is a 303(d) listed waterway, and flows through the most ethnically diverse, lowest income, highest unemployment, and most park deficient communities in the San Diego region. Regional water quality, multiple species conservation, and environmental justice goals make this watershed amongst the cities highest priorities for restoration and physical improvements. The Chollas Creek Integration Project Phase II will restore the critical Northwest Village creek segment; remove a minimum of four acres of nonnative vegetation; and work with City Stormwater to complete water pollution source tracking and urban water outreach education in at-risk communities along Chollas Creek.

The project expands on the recommendations of the Chollas Creek Enhancement Program and the South Branch Implementation Plan adopted in 2002, and conforms to the goals and policies of the San Diego General Plan, the Southeastern Community Plan, and, most recently, the community-driven Euclid+ Market Land Use and Mobility Plan.

Over the past ten years, the Jacobs Center and Groundwork San Diego-Chollas Creek have successfully restored and maintained creek segments that now contribute to water quality improvements, flood control, public health and safety, and active recreation. The City Planning Division strongly supports their grant application to further this excellent work.

Sincerely,

Lara Gates
Supervising Plan Update Project Manager

DIVERSITY
BRINGS US ALL TOGETHER

Development Services • Planning Division
1222 First Avenue, MS 413 • San Diego, CA 92101-4101
Tel (619) 235-5200 • Fax (619) 236-6478

Attachment 11

GWMP, AB 1420, and Water Meter Compliance Information

Attachment

11

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

GWMP, AB 1420, and Water Meter Compliance

Attachment 11 consists of the following items:

- ✓ **AB 1420 and Water Meter Self Certification Forms.** San Diego County Water Authority (Water Authority) and Olivenhain Municipal Water District (OMWD) are urban water suppliers that would receive grant funding, and have therefore completed and submitted AB 1420 Self Certification Tables 1 and 2 and Water Meter Compliance forms.
- ✓ **GWMP Self Certification Forms.** Not applicable.
- ✓ **Appendix 11-1.** AB 1420 Self Certification forms, Water Meter Compliance forms, and concurrence letters are attached.

As defined in the *IRWM Grant Program Guidelines*, all urban water suppliers must provided the required documentation of compliance with AB 1420 (CWC §10631.5) and water meter implementation (CWC §525 *et seq*.).

AB 1420 Self Certification Forms

AB 1420 conditions the receipt of IRWM grant funds on implementation of demand management measures in compliance with CWC §10631(f). There are two urban water suppliers included in this grant proposal which must comply with AB 1420 requirements: the Water Authority and OMWD.

The Water Authority and OWMD had both previously submitted AB 1420 Self Certification forms to DWR through the Proposition 84-Round 1 Implementation Grant application process. DWR has responded with confirmations that both agencies are in compliance with AB 1420 and are eligible for state grants and loans. Those compliance letters are included in Appendix 11-1.

Water Meter Compliance Forms

CWC §529.5 requires urban water suppliers applying for IRWM grant funds to demonstrate that they meet the State's water meter requirements. There are two urban water suppliers included in this grant proposal which must also comply with Water Meter requirements: the Water Authority and OMWD. As Water Authority and OMWD have already submitted wet (original) hard copies of these forms, electronic versions of these forms are found in Appendix 11-1.

GWMP Self Certification Documents

None of the projects in this proposal are anticipated to have potential groundwater impacts. As such, the GWMP (CWC §10753.7) self certification documentation is not required from any project sponsor.

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY
ARNOLD SCHWARZENEGGER, *Governor*

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

November 22, 2010

Mr. William J. Rose
Water Conservation Program Executive
San Diego County Water Authority
4677 Overland Avenue
San Diego, California 92123-1233

Dear Mr. Rose:

The Department of Water Resources (DWR) has reviewed the San Diego County Water Authority's (SDCWA) Self-Certification Statement – Table 1 submitted on September 9, 2010, regarding implementation of the Urban Best Management Practices (BMPs).

The purpose of DWR's review is to determine eligibility of the SDCWA to receive water management grant or loan funds. DWR has followed the *Draft AB 1420 Compliance Requirements* dated June 1, 2009. For detailed information, please visit http://www.water.ca.gov/wateruseefficiency/finance/.

Based on DWR's review of the information in Table 1, the SDCWA has and is currently implementing the BMPs consistent with AB 1420 and, therefore, is eligible to receive water management grant or loan funds.

DWR reserves the right to request additional information and documentation, including reports from the SDCWA to substantiate the accuracy of the information provided in Table 1. DWR may reverse or modify its eligibility determination and notify you and the funding agency if inaccuracies are found in the supporting documentation or in Table 1.

If you have any questions, please contact me at (916) 651-7025 or Jodi Evans at (916) 651-7026.

Sincerely,

Fethi BenJemaa

Fethi BenJemaa
Ag Water Use Efficiency Section Chief

AB 1420 Self- Certification Statement Table 1

Note: Table 1 documents Status of Past and Current BMP implementation.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1, and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1, and Table 2 and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory:_William J. Rose________Title of Signatory: _Water Conservation Program Executive_______ Signature of signatory: William J. Rose Date: 9/9/10

Application Date:

Proposal Identification Number: San Diego IRWM CUWCC Member? Yes/No: Yes

Has Urban Water Supplier submitted a 2005 Urban Water Management Plan? Yes/No: Yes

Is the UWM Plan Deemed Complete by DWR? Yes/No: Yes

Applicant Name: Mark Stadler, Principal Water Resources Specialist

Project Title:

Applicant's Contact Information: Name: Mark Stadler Phone: 858.522.6735 E-mail: mstadler@sdcwa.org

Participants:

Retailer (List Below)	*Wholesaler (List Below)*
n/a	*San Diego County Water Authority*

C1

C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
			BMP Implemented by Retailers and/or Wholesalers / BMP			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer *Yes/No*	CUWCC MOU Requirement Met: Wholesaler *Yes/No*	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
	✓	BMP 1 Water Survey for Single/Multi-Family Residential Customers														
	✓	BMP 2 Residential Plumbing Retrofit														
✓	✓	BMP 3 System Water Audits, Leak Detection		yes	no	✓							yes	11/4/2008		yes
✓	✓	BMP 3 Leak Repairs		yes	no	✓							yes	11/4/2008		yes
	✓	BMP 4 Metering with Commodity Rates for All New connections														
	✓	BMP 4 Retrofit of Existing Connections														

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C1

C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
			BMP Implemented by Retailers and/or Wholesalers / *BMP*			**Compliance Options/Alternative Conservation Approaches (1)**			**BMP Is Exempt (2)**			**BMP Implementation Requirements Met**				
BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer *Yes/No*	CUWCC MOU Requirement Met: Wholesaler *Yes/No*	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
	✓	BMP 5 Large Landscape Conservation Programs and Incentives														
	✓	BMP 6 High-Efficiency Washing Machine Rebate Programs														
✓	✓	BMP 7 Public Information		yes	yes	✓							yes	11/4/2008		yes
✓	✓	BMP 8 School Education		yes	yes	✓							yes	11/4/2008		yes
	✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts														
✓		BMP 10 Wholesale Agency Assistance Programs		yes	yes	✓							yes	11/4/2008		
	✓	BMP 11 Conservation Pricing														
✓	✓	BMP 12 Conservation Coordinator		yes	no	✓							yes	11/4/2008		
	✓	BMP 13 Water Waste Prohibitions														
	✓	BMP 14 Residential ULFT Replacement Programs														

***C6:** Wholesaler may also be a retailer (supplying water to end water users)
****C8, **C9, **, and C10:** Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.

(1) For details, please see: http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, and lack of legal authority criteria as detailed in the CUWCC MOU
(3) Non MOU signatories must submit to DWR reports and supporting documents in the same format as CUWCC.

AB 1420 Self- Certification Statement Table 2

Provide Schedule, Budget, and Finance Plan to Demonstrate Commitment to Implement All BMP's to Become in Compliance with BMP Implementation - Commencing Within 1st Year of Agreement for Which Applicant Receives Funds.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1 and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1 and Table 2, and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory:_William J. Rose________Title of Signatory: _Water Conservation Program Executive_______ Signature of signatory:_William J Rose_ Date: 9/9/10

Application Date:

Proposal Identification Number: San Diego IRWM

CUWCC Member? Yes/No: Yes

Applicant Name: Mark Stadler, Principal Water Resources Specialist

Is the UWM Plan Deemed Complete by DWR? Yes/No: Yes

Project Title:

Applicant's Contact Information: Name: Mark Stadler

Participants:	*Retailer (List Below)*		
	n/a		

C1	C2	C3	C4	C5	*C6	C7	C8	**C9	**C10	**C11	C12			C13	C14	C15	C16	C17	C18	C19
				BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer Yes/No	Wholesaler Yes/No	Regional Yes/No	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
1. Utility Operations Programs																				
1.11	✓	✓	BMP 12 Conservation Coordinator		yes	no		✓												
1.12		✓	BMP 13 Water Waste Prohibitions																	
1.13	✓	✓	BMP 10 Wholesale Agency Assistance Programs		yes	yes		✓												
1.20	✓	✓	BMP 3 System Water Audits, Leak Detection/**Repair**		yes			✓												
1.30		✓	BMP 4 Metering with Commodity Rates for All New/**Retrofit of Existing** connections																	
1.40		✓	BMP 11 Conservation Pricing																	
2. Educational Programs																				
2.10	✓	✓	BMP 7 Public Information		yes	yes		✓												
2.20	✓	✓	BMP 8 School Education		yes	yes		✓												
3. Residential																				
3.11		✓	BMP 1 **Indoor** Water Survey for Single/Multi-Family Residential Customers																	
3.12			BMP 1 **Outdoor** Water Survey for Single/Multi-Family Residential Customers																	
3.20		✓	BMP 2 Residential Plumbing Retrofit																	

				BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
3.30		✓	BMP 6 High-Efficiency Washing Machine Rebate Programs																	
3.40		✓	BMP 14 Residential ULFT Replacement Programs																	
4. Commercial, Industrial, Institutional																				
4.00		✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts																	
5. Landscape																				
5.00		✓	BMP 5 Large Landscape Conservation Programs and Incentives																	

*C6: Wholesaler may also be a retailer (supplying water to end water users)
**C9, ** C10, and **C11: Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.
(1) For details, please see http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, or lack of legal authority, as detailed in the CUWCC MOU.

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

October 27, 2009

Ms. Teresa Chase
Olivenhain Municipal Water District
1966 Olivenhain Road
Encinitas, California 92024

Dear Ms. Chase:

The Department of Water Resources (DWR) has reviewed the Olivenhain Municipal Water District's (OMWD) Self-Certification Statement – Tables 1 and 2 submitted by OMWD on October 2, 2009, regarding implementation of the Urban Best Management Practices (BMPs).

The purpose of DWR's review is to determine eligibility of OMWD to receive water management grant or loan funds. DWR has followed the *Compliance with AB 1420 Requirements* dated June 1, 2009. For detailed information, please visit www.owue.water.ca.gov/finance/index.cfm.

Based on DWR's review of the information in Table 1, OMWD has and is currently implementing the BMPs consistent with AB 1420 and, therefore, is eligible to receive water management grant or loan funds.

DWR reserves the right to request additional information and documentation to substantiate the accuracy of the information provided in Tables 1 and 2. Additionally, DWR may reverse or modify its eligibility determination and notify you if it finds inaccuracies in the supporting documentation or in Tables 1 and 2.

If you have any questions, please contact me at (916) 651-9666 or Chriss Fakunding at (916) 651-9673.

Sincerely,

B. Davidoff

Baryohay Davidoff, Chief
Agricultural Water Management Planning
And Financial Assistance

AB 1420 Self- Certification Statement Table 1

Note: Table 1 documents Status of Past and Current BMP implementation.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1, and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1, and Table 2 and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory__ Olivenhain MWD

Application Date: 1-Oct-09

Proposal Identification Number: CUWCC Member? Yes/No Yes

Has Urban Water Supplier submitted a 2005 Urban Water Management Plan? Yes/No Yes

Is the UWM Plan Deemed Complete by DWR? Yes/No Yes

Applicant Name: Olivenhain Municipal Water District

Project Title:

Applicant's Contact Information: Name: Teresa Chase Phone: 760-632-4641 E-mail: tchase@olivenhain.com

Participants:

Retailer (List Below)	Wholesaler (List Below)
	San Diego County Water Authority

C1	C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
				BMP Implemented by Retailers and/or Wholesalers / BMP			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs		Retailer Yes/No	Wholesaler Yes/No	Regional Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer Yes/No	CUWCC MOU Requirement Met: Wholesaler Yes/No	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
	✓	BMP 1 Water Survey for Single/Multi-Family Residential Customers		Yes	Yes	Yes	x				X		Yes	Yes	12/31/2008		Yes
	✓	BMP 2 Residential Plumbing Retrofit		Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
✓	✓	BMP 3 System Water Audits, Leak Detection		Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
✓	✓	BMP 3 Leak Repairs		Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
	✓	BMP 4 Metering with Commodity Rates for All New connections		Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
	✓	BMP 4 Retrofit of Existing Connections		Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes

C1

C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
			BMP Implemented by Retailers and/or Wholesalers / BMP			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer Yes/No	Wholesaler Yes/No	Regional Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer Yes/No	CUWCC MOU Requirement Met: Wholesaler Yes/No	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
	✓	BMP 5 Large Landscape Conservation Programs and Incentives	Yes	Yes	Yes	X				X		Yes	Yes	12/31/2008		Yes
	✓	BMP 6 High-Efficiency Washing Machine Rebate Programs	Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
✓	✓	BMP 7 Public Information	Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
✓	✓	BMP 8 School Education	Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
	✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts	Yes	Yes	Yes	X				X		Yes	Yes	12/31/2008		Yes
✓		BMP 10 Wholesale Agency Assistance Programs	No	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
	✓	BMP 11 Conservation Pricing	Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
✓	✓	BMP 12 Conservation Coordinator	Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
	✓	BMP 13 Water Waste Prohibitions	Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes
	✓	BMP 14 Residential ULFT Replacement Programs	Yes	Yes	Yes	X						Yes	Yes	12/31/2008		Yes

*C6: Wholesaler may also be a retailer (supplying water to end water users)
**C8, **C9, **, and C10: Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.

(1) For details, please see: http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, and lack of legal authority criteria as detailed in the CUWCC MOU
(3) Non MOU signatories must submit to DWR reports and supporting documents in the same format as CUWCC.

Tess L Chase

Signature

Teresa L. Chase
OMWD Representative

California State Water Resources Control Board
California Department of Water Resources
California Department of Public Health

CERTIFICATION FOR COMPLIANCE WITH WATER METERING REQUIREMENTS FOR FUNDING APPLICATIONS

Funding Agency name: Department of Water Resources

Funding Program name: Integrated Regional Water Management Grant Program

Applicant (Agency name): San Diego County Water Authority

Project Title (as shown on application form): San Diego IRWM Implementation Grant Proposal (January 2011)

Please check one of the boxes below and sign and date this form.

☐ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the agency is not an urban water supplier, as that term is understood pursuant to the provisions of section 529.5 of the Water Code.

☒ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the applicant agency has fully complied with the provisions of Division 1, Chapter 8, Article 3.5 of the California Water Code (sections 525 through 529.7 inclusive) and that ordinances, rules, or regulations have been duly adopted and are in effect as of this date.

I understand that the Funding Agency will rely on this signed certification in order to approve funding and that false and/or inaccurate representations in this Certification Statement may result in loss of all funds awarded to the applicant for its project. Additionally, for the aforementioned reasons, the Funding Agency may withhold disbursement of project funds, and/or pursue any other applicable legal remedy.

Ken Weinberg
Name of Authorized Representative (Please print)

[signature]
Signature

Director of Water Resources
Title

1/5/11
Date

California State Water Resources Control Board
California Department of Water Resources
California Department of Public Health

CERTIFICATION FOR
COMPLIANCE WITH WATER METERING REQUIREMENTS
FOR FUNDING APPLICATIONS

Funding Agency name: Department of Water Resources

Funding Program name: Prop 84

Applicant (Agency name): Olivenhain Municipal Water District

Project Title (as shown on application form): North San Diego County Regional Recycled Water Project

Please check one of the boxes below and sign and date this form.

☐ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the agency is not an urban water supplier, as that term is understood pursuant to the provisions of section 529.5 of the Water Code.

☑ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the applicant agency has fully complied with the provisions of Division 1, Chapter 8, Article 3.5 of the California Water Code (sections 525 through 529.7 inclusive) and that ordinances, rules, or regulations have been duly adopted and are in effect as of this date.

I understand that the Funding Agency will rely on this signed certification in order to approve funding and that false and/or inaccurate representations in this Certification Statement may result in loss of all funds awarded to the applicant for its project. Additionally, for the aforementioned reasons, the Funding Agency may withhold disbursement of project funds, and/or pursue any other applicable legal remedy.

Kimberly A. Thorner
Name of Authorized Representative
(Please print)

Kimberly A Thorner
Signature

General Manager
Title

12/6/10
Date

Recycled Paper

Attachment 12

Consent Form

Attachment 12

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Consent Form

Attachment 12 consists of the following item:

- ✓ **Consent Form.** This attachment contains a consent form that acknowledges the San Diego RWMG's commitment to enter into a binding agreement with DWR to meet the conditions detailed in Section II.B of the *IRWM Grant Program Guidelines*.

This attachment contains a consent form demonstrating that the San Diego Regional Water Management Group (RWMG) acknowledges that it agrees to enter into a binding agreement with DWR to update, within two years of the execution date of the Implementation Grant Agreement (assumed October 1, 2013) to meet the IRWM Plan Standards contained in the *2012 IRWM Grant Program Guidelines*. This update is currently underway, and the RWMG governing bodies – San Diego County Water Authority Board of Directors, County of San Diego Board of Supervisors, and City of San Diego City Council – are all scheduled to adopt the San Diego IRWM Plan Update in October 2013.

Projects in this proposal have been considered in the context of the IRWM Plan Update, though final decisions regarding projects were made based on the 2007 San Diego IRWM Plan which has been adopted by all participating agencies and organizations. Further, the RWMG has undertaken all reasonable and feasible efforts to take into account water-related needs of DACs within the San Diego IRWM region. The outreach mechanisms that the RWMG used to engage DACs in the project solicitation and selection process for this *San Diego IRWM Implementation Grant Proposal – Round 2* are described in Attachment 10.

Appendix 12-1 contains a copy of the signed Consent Form. This Consent Form acknowledges the San Diego IRWM Region's agreement to update the 2007 IRWM Plan. As this update will be completed in October, 2013 per the San Diego RWMG's agreement with DWR, the San Diego IRWM Plan Update will be completed well within the two-year timeframe required by this funding agreement.

Appendix 12-1: Water Authority Consent Form
San Diego IRWM Plan Update

Applicant: Mark Stadler, San Diego County Water Authority

IRWM Region: San Diego IRWM Region

RWMG: San Diego RWMG – San Diego County Water Authority, City of San Diego, and County of San Diego

Date of Adoption: October 25, 2007

As the authorized representative of the above-referenced RWMG, I acknowledge and affirm that the RWMG is utilizing an IRWM Plan that was adopted on or before September 30, 2008, to meet part of the grant Eligibility Criteria for the Proposition 84-Round 2 IRWM Grant Program, Implementation Grant solicitation.

I also acknowledge that the RWMG understands that it must enter into a binding agreement with DWR to update, within two years of the execution date of the grant agreement, the IRWM Plan to meet the IRWM Plan standards contained in the Guidelines; and to undertake all reasonable and feasible efforts to take into account water-related needs of disadvantaged communities in the area within the IRWM region.

I further acknowledge that the RWMG understands that failure to meet the condition listed above may result in termination of the grant agreement by DWR and that DWR may demand the immediate repayment to State of an amount equal to the amount of grant funds disbursed to Grantee prior to such termination.

Mark Stadler

Name of Authorized Representative

Principal Water Resources Specialist

Title

Signature

March 27, 2013

Date

Attachment 13

IRWM Plan — Reduce Delta Water Dependence

Attachment

13

San Diego Integrated Regional Water Management

Implementation Grant Proposal – Round 2

Reduce Delta Water Dependence

Attachment 13 consists of the following item:

- ✓ **Summary of IRWM Plan Relating to Reducing Delta Water Dependence.** This attachment describes how the 2007 San Diego IRWM Plan will reduce dependence on the Sacramento-San Joaquin Delta for water supply.
- ✓ **Assurances that IRWM Plan Update Will Continue Reducing Delta Water Dependence.** The San Diego RWMG is committed to ongoing implementation and revision of the IRWM Plan in ways that continue to reduce dependence on the Sacramento-San Joaquin Delta.

This attachment summarizes the portions of the 2007 San Diego IRWM Plan that reduce dependence on the Sacramento-San Joaquin Delta for water supply and documents relevant Plan excerpts to support this summary.

Summary of IRWM Plan Relating to Reducing Delta Water Dependence

The 2007 IRWM Plan addresses reduced water supply dependence on the Sacramento-San Joaquin Delta water in three key areas:

1) IRWM Plan Objectives (Section C);
2) IRWM Plan Benefits (Section H); and
3) Selection of Tier 1 projects that reduce reliance on imported water (Section L).

These three areas are described below with IRWM Plan excerpts provided for support and documentation.

IRWM Plan Objectives Relating to Reducing Delta Water Dependence

One of the nine objectives of the San Diego IRWM Plan, Objective D, is to "Develop and maintain a diverse mix of water resources" in order to reduce dependence on imported water supplies. The presentation of that objective includes eight designated targets for the region in achieving that objective, as shown in the excerpt below from *Section C: Vision, Mission, Goals and Objectives*.

> **Section C: Vision, Mission, Goals and Objectives (pages C-8 to C-10)**
>
> ***Objective D: Develop and maintain a diverse mix of water resources.***
>
> *Continue to develop diverse water resources to meet the local supply and conservation goals identified in the Region's local water plans, and reduce dependence on imported water supplies and avoid shortages during drought periods. The diverse mix of water resources being developed includes water transfers, recycled water, water conservation, seawater desalination, local surface water, and groundwater.*
>
> The focus of this objective is to meet the requirements of Goal 1 (optimize local water supply reliability). The Region's approximate population of three million and the Region's economy (gross regional product of more than $160 billion, as shown in Table B-7) are both dependent upon a reliable water supply.
>
> *Determination and Rationale for Objective D.* As documented within the *California Water Plan Update 2005* (DWR, 2005), water allocation, environmental, and hydrologic constraints present significant challenges to the sustainability of historic State Water Project and Colorado River

supplies, particularly during long-term droughts. Additionally, the Region's reliance on Metropolitan water supplies renders the region vulnerable to short-term reliability issues (e.g., earthquake, landslides, terrorism). Water demands within the region are also expected to increase, based on SANDAG's Regional Growth Forecast despite conservation efforts (see Table B-28 on page B-67).

During the last major drought in California (1987-1992), the Region was over 90 percent reliant on supplies from Metropolitan. As a result of the drought, however, Metropolitan ordered a 50 percent cutback of the Region's imported supplies. The results of Metropolitan's cutback would have been devastating to the businesses and residents in the Region except for a late season "Miracle March" rainfall that allowed Metropolitan to roll back its proposed imported water reductions from 50 to 31 percent. Even at this level the Region was impacted more than other regions in Southern California because of its high dependence upon imported supplies from Metropolitan.

Since the 1987-1992 drought, the Water Authority and its member water supply agencies adopted plans and policies to diversify the Region's supplies and reduce reliance on a single supply source. Diversification of regional water portfolios is also a key element of Initiative (see pages A-3 and A-4) of the *California Water Plan Update 2005* (DWR, 2005). Maximizing development of local supplies is a key objective of the Water Authority's *Updated 2005 Urban Water Management Plan* and in water management plans developed by the Region's water supply agencies. Objective D is consistent with these plans and policies.

Water conservation (reducing water demand and use) is the Region's most cost effective option, and is a central component of the Region's diversification program. Significant progress in water conservation has resulted in over 50,000 acre-feet of water savings within the region, and forecasted water conservation within the region is projected to result in water savings of more than 100,000 acre-feet per year by 2030 (see Table B-29 on page B-70).

Objective D Targets. Table C-4 presents quantifiable Objective D targets established by the RWMG with input from the RAC. Objective D targets were derived from the water supply targets and goals within water plans of the Water Authority and County.

Table C-4
Designated Targets for Achieving IRWM Plan Objective D
Develop and Maintain a Diverse Mix of Water Resources

Targets for Measuring Progress Toward Achieving Objective D1
1. Increase water conservation savings from about 51,090 AFY in 2006 to at least 79,960 AFY by 2010 and 108,400 AFY by 2030. 2. Increase seawater desalination capability within the region from zero AFY to 34,690 AFY by 2015 3. Increase recycled water use from about 14,830 AFY in 2006 to 33,670 AFY by 2010 and 47,580 AFY by 2030. 4. Increase groundwater supply within the Water Authority service area from about 14,960 AFY in 2006 to 28,580 AFY by 2010 and 31,180 AFY by 2030. 5. Implement Colorado River conservation and transfer programs, increasing deliveries from 35,000 AFY in 2006 to 277,700 AFY by 2030. 6. Include an analysis in the Water Authority 2010 Urban Water Management Plan that assesses the effect of climate change on future water supplies. 7. Develop and implement regional drinking water source protection guidelines for the Region by 2012. 8. Meet groundwater supply and water quality objectives identified in the County's General Plan 2020 for groundwater-dependent communities by 2012.
[1] IRWM Plan objective targets developed by the RWMG and RAC IRWM Plan objective targets developed by the RWMG and RAC to be collectively achieved by the Region's IRWM institutional structure, government agencies, non-government organizations, and stakeholders. Targets are from Water Authority's Fiscal Year 2006 Annual Report (Water Authority, 2007).

> The numerical targets for Objective D (water supply diversity) address water conservation, seawater desalination, recycled water use, groundwater use, water transfers, climate change effects, and drinking water source protection. The targets also address sustaining water supply in groundwater-dependent areas of the Region.

IRWM Plan Benefits Relating to Reducing Delta Water Dependence

The IRWM Plan lists reduced Delta water dependence as one of the inter-regional benefits of implementing proposed Tier 1 projects that focus on water conservation, groundwater, water transfer, desalination and recycled water, as presented in *Section H: Impacts and Benefits*:

> **Section H: Impacts and Benefits (page H-11)**
>
> **H.3 Inter-Regional Benefits and Impacts**
>
> Tier 1 projects proposed as part of this IRWM Plan help implement recommendations presented in the *Updated 2005 Urban Water Management Plan.* Implementation of proposed Tier 1 water conservation, groundwater, water transfer, desalination, and recycled water projects within the Region are projected to result in a decreased demand for State Water Project and Colorado River supplies within the next 20 years. (As shown in Tables B-30 and B-31 on pages B-72 and B-73, this overall decline in imported water needs is forecast both for normal year and for drought conditions.)
>
> Reduced dependency of the Region on imported water supplies will, in turn, reduce needs forBay-Delta waters delivered through the State Water Project. This reduction in imported water need, in concert with other statewide programs, will help implement the following two objectives established as part of the CALFED Bay Delta Program for Bay-Delta waters:
>
> - Improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species. (CALFED, 2000)
> - Reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system. (CALFED, 2000)
>
> Reducing the Region's dependence on imported water will also result in inter-regional benefits associated with reductions in capacity and flows within the State Water Project, Colorado River Aqueduct, and Metropolitan conveyance, treatment, and storage facilities. Populations within Riverside County, in particular, will benefit from reductions in the Region's capacity needs at Metropolitan's Lake Skinner Water Filtration Plant. Such a reduction in treated water needs (both as a result of reduced imported water demands and as a result of increased local water treatment capacity) will free treatment capacity within the Lake Skinner facility that will be required to serve significant growth increases within Riverside County.

Selection of Tier 1 Projects That Reduce Delta Water Dependence

According to *Section L: Statewide Priorities* of the Plan, over 30 Tier I IRWM implementation projects would help achieve the CALFED Bay-Delta goal of reducing the Region's reliance on imported water from the Sacramento-San Joaquin Bay Delta by increasing local supply or resulting in demand reduction. As noted above, these projects focus on water conservation, groundwater, water transfer, desalination and recycled water.

Section L: Statewide Priorities (pages L-5 to L-6)

L.3 Conformance of Tier I Projects with Statewide Priorities

Appendix 12 summarizes conformance of the proposed Tier I water management projectswith statewide priorities. A general description of how these projects conform to thestatewide priorities is presented below.

…

CALFED Goals and Water Quality Objectives. Tier 1 projects that increase local supply or result in demand reduction (water use efficiency) will help to achieve CALFED Bay-Delta goals and water quality objectives by reducing the Region's reliance on imported water from the Bay-Delta. More than 20 Tier 1 projects (see Appendix 12) would help achieve CALFED Bay-Delta water quality objectives, and over 30 projects would help achieve CALFED Bay-Delta goals.

Assurances that IRWM Plan Update Will Continue Reducing Delta Water Dependence

The San Diego RWMG is committed to updating the Plan within two years of execution of the Implementation Grant Agreement to meet the IRWM Plan Standards contained within the 2012 IRWM Grant Program Guidelines. This update is currently underway, and the RWMG governing bodies – San Diego County Water Authority Board of Directors, County of San Diego Board of Supervisors, and City of San Diego City Council – are all scheduled to adopt the San Diego IRWM Plan Update in October 2013. Due to an increasing importance of issues involving water supply availability and reliability in the Delta, and the reflection of that importance within the Guidelines, the IRWM Plan Update will include an increased emphasis on helping to reduce San Diego region's dependence on the Sacramento-San Joaquin Delta for water supply through expansion of local supply sources.