

WaterSMART: Water Reclamation Research under the Title XVI Water Reclamation and Reuse Program for Fiscal Year 2017

Funding Opportunity BOR-DO-17-F004

Las Virgenes Municipal Water District
Pure Water Project Las Virgenes-Triunfo
Demonstration Project
Calabasas, California
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List of Abbreviations

AFY	acre-feet per year
AOP	advanced oxidation processes
BODR	Basis of Design Report
CEQA	California Environmental Quality Act
CMWD	Calleguas Municipal Water District
CO₂	carbon dioxide
CVP	Central Valley Project
DDW	California State Water Resources Control Board Division of Drinking Water
Delta	Sacramento-San Joaquin River Delta
IPR	indirect potable reuse
JPA	Joint Powers Authority
LVMWD	Las Virgenes Municipal Water District
MF	microfiltration
mg/L	milligrams per liter
MWD	Metropolitan Water District of Southern California
MWh	megawatt-hour
NDMA	N-Nitrosodimethylamine
NEPA	National Environmental Policy Act
ng/L	nanograms per liter
RO	reverse osmosis
SWP	State Water Project
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
UF	ultrafiltration
UV	ultraviolet
WRF	water reclamation facility
WRRF	WaterReuse Research Foundation

Technical Proposal and Evaluation Criteria

Executive Summary

February 6, 2017

Las Virgenes Municipal Water District, Calabasas, Los Angeles County, California.

The Las Virgenes Municipal Water District (LVMWD), in partnership with the Triunfo Sanitation District (working together as the Las Virgenes-Triunfo Joint Powers Authority [JPA]), is studying the Pure Water Project Las Virgenes-Triunfo, an indirect potable reuse (IPR) project for reservoir augmentation that would ultimately produce up to 5,151 acre-feet per year (AFY) of new, local, drought-resilient water supply. The project would enable LVMWD to capture all of its unused recycled water available during the winter low irrigation demand season, purify it at a new advanced water treatment plant, and augment imported drinking water supplies stored at its existing Las Virgenes Reservoir, while also reducing treated wastewater discharges to Malibu Creek. LVMWD is requesting funding for the Demonstration Project, an early step towards the Pure Water Project Las Virgenes-Triunfo, which will provide important information that will streamline the planning and design of the full-scale advanced treatment facility. The Demonstration Project will be a 100 gallons per minute facility that tests microfiltration (MF), reverse osmosis (RO), ultraviolet light disinfection (UV), and advanced oxidation processes (AOP) for full advanced treatment of tertiary level recycled water produced by the JPA's Tapia Water Reclamation Facility (WRF) and dry weather flows from the local MS4 permittees. The Demonstration Project's results will define the complete process train, address disinfection byproduct formation, establish the design criteria that will be acceptable to the California State Water Resources Control Board Division of Drinking Water (DDW) for surface water augmentation. This work will expand the industry knowledge of successful treatment processes applied to both surface water augmentation and stormwater and contribute to increased public education on the issue of advanced treated water.

The work to procure and install equipment for the Demonstration Project and perform the anticipated research testing is estimated to take two years and be complete in December 2019.

Technical Project Description

The technical project description should describe the work in detail, including specific activities that will be accomplished. This description should have sufficient detail to permit a comprehensive evaluation of the proposal. The technical project description should describe research methods and/or the state of the art technologies that will be investigated as part of the research study. A thorough description of past research should include information regarding why the proposed method or

technology is more appropriate for the intended use than other available methods as well as other methods considered.

LVMWD provides potable water, wastewater treatment, and recycled water to more than 65,000 residents in the cities of Agoura Hills, Calabasas, Hidden Hills, Westlake Village, and unincorporated areas of western Los Angeles County. In 1964, the Las Virgenes-Triunfo JPA was established between LVMWD and Triunfo Sanitation District to cooperatively treat wastewater for the northwestern portion of Los Angeles County and the southeastern portion of Ventura County, which share the Malibu Creek watershed. The JPA's service area of approximately 100,000 people is shown in Figure 1. LVMWD serves as the JPA's Administering Agent.

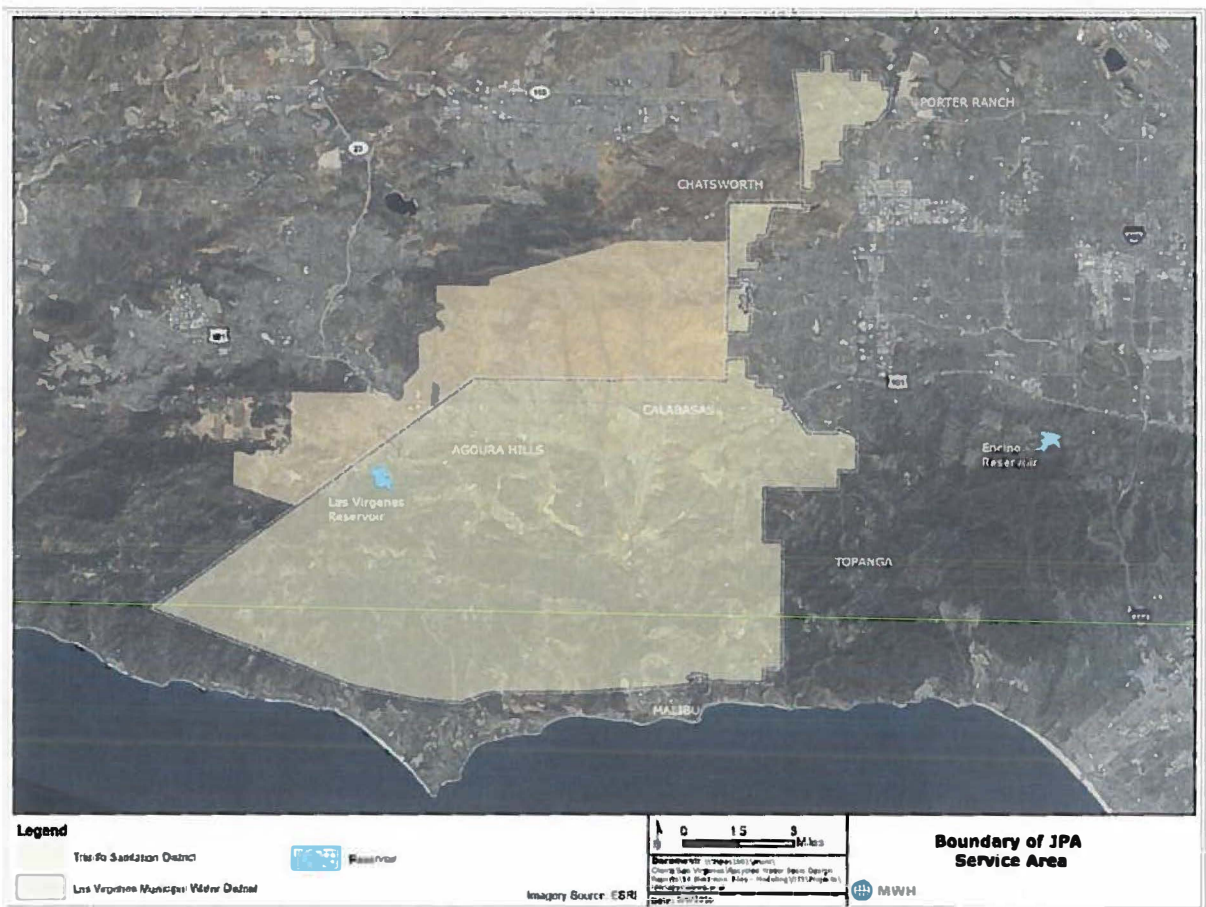


Figure 1 JPA Service Area

The JPA is studying the Pure Water Project Las Virgenes-Triunfo, an IPR surface water augmentation project that would ultimately produce up to 5,151 AFY of new, local, drought-resilient water supply. The JPA produces recycled water at its Tapia WRF by treating wastewater flows from its service area, with surplus recycled water discharged

to Malibu Creek, which is an impaired water body that drains to Santa Monica Bay. The Pure Water Project Las Virgenes-Triunfo would involve the seasonal advanced treatment of discharges from the Tapia WRF when existing recycled water demands are low. This advanced treated water would be conveyed to Las Virgenes Reservoir where it would mix and be stored with imported supplies. This project is unique in that it will be one of the first seasonally-operated IPR facilities as well as one of the first surface water augmentation projects in California.

LVMWD is requesting funding for the Demonstration Project, which will provide important information to decision makers as they assess whether to implement the Pure Water Project Las Virgenes-Triunfo, helping to streamline the planning and design of the full-scale advanced treatment facility. The Demonstration Project is needed to: 1) test design criteria and operational procedures that could optimize plant efficiency; 2) provide technical documentation and support for permitting the project by DDW as a surface water augmentation project; and 3) provide opportunities for public education, acceptance, and public outreach to its customers. The Demonstration Project will be a 100 gallons per minute facility that tests full advanced treatment processes of MF, RO, UV, and AOP on the tertiary level recycled water produced by the JPA's Tapia WRF and local dry weather flows. The Demonstration Project's treatment process equipment, chemicals, and testing laboratory will be housed in an existing, vacant LVMWD building. No new construction is necessary; only minor refurbishment of the building is needed to permit public use. The requested funding will support the procurement and installation of the Demonstration Project's equipment, testing, and public education facilities, and the laboratory testing and research.

New regulations to support the surface water augmentation are expected to be released by DDW in March 2017. It is expected that the surface water augmentation regulations will require both RO and AOP, similar to the Groundwater Recharge Reuse Regulations finalized in 2014. Beyond these core treatment processes, MF or ultrafiltration (UF) is generally provided as pretreatment for the RO and as an additional pathogen barrier. With technologies in advanced water treatment continuing to evolve, it is important that the full-scale facility design be optimized to provide flexibility to take advantage of continuing developments in the industry. The Demonstration Project's technical effort will focus on options for reducing brine quantity through higher RO recovery rates, alternatives for post-RO treatment and stabilization, and the value of the usage of a universal skid in membrane pre-treatment assessment. Brine generation is an important consideration for the full-scale project due to the distance it would be conveyed to the disposal point and the potential requirements that will be imposed on the brine water quality by Calleguas Municipal Water District (CMWD), the discharge permittee.

The high quality of the Tapia WRF effluent, and the expected large residence time in the Las Virgenes Reservoir, could allow a high degree of flexibility in the treatment processes that are employed. The Demonstration Project will focus on optimizing the primary

treatment steps, UF and RO, while evaluating alternative AOPs that are less costly than the standard UV/peroxide used for most groundwater replenishment projects. For the Demonstration Project, the use of a semi-universal membrane skid will provide an opportunity to directly test alternative membranes side-by-side, facilitating pre-approval of acceptable membranes for use in the future full-scale facility. The low ammonia levels from the nitrified and denitrified source provides an opportunity to use breakpoint chlorination for an additional level of virus inactivation and potentially for the application of UV/chlorine in place of UV/peroxide. Utilizing a UV/chlorine approach at the Demonstration Project could allow for a significant reduction in UV unit sizing at a full-scale plant, reducing both the capital and operating cost of the facility.

With the potential full-scale advanced water treatment plant potentially providing water from the WRF downstream of existing storage tanks, there is a concern that elevated levels of N-Nitrosodimethylamine (NDMA), a disinfection by-product, will be present in the source water. NDMA has a notification level of 10 nanograms per liter (ng/L) and is often present at levels ranging from 30 to 1,000 ng/L in recycled water distribution systems. NDMA can be controlled by reducing the chloramine contact time; however, this alternative is generally not available to plants fed from an existing distribution network. When NDMA formation cannot be controlled, it must be removed using high doses of UV after the RO.

A unique opportunity for NDMA control at the JPA's full-scale facility is to consider the residence time of the water in the Las Virgenes Reservoir, where extended exposure to sunlight should be expected to naturally degrade residual NDMA in the water. While no existing facilities have been given credit for natural degradation of NDMA, testing has been conducted by others after startup, storing treated water in open basins. The results demonstrated a relatively rapid breakdown of NDMA from sunlight. Conducting similar testing at the Demonstration Project would be extremely beneficial to providing baseline data for future regulatory approval of NDMA reduction credits within the Las Virgenes Reservoir. Such approval could allow for a reduced UV dose or the use of post-RO ozone, providing significant savings in both capital and operating costs for the future full-scale facility. Such an approach has not yet been approved by DDW, so it will be critical to include any novel means of NDMA reduction and any alternative AOP approach in the Demonstration Project testing.

Preliminary bench testing or water quality testing at the Demonstration Plant that will aid in the selection of a proposed process train for the full-scale facility may include:

- NDMA and nitrosamine formation potential benchtop testing;
- Spike testing for contaminants of emerging concern to assess and optimize AOP performance; and

- **N Simulated reservoir degradation of NDMA and nitrosamines through natural sunlight.**

If the Pure Water Project Las Virgenes-Triunfo were to use only tertiary treated recycled water from the Tapia WRF, its advanced treated water would only be available during the winter months (when the WRF has excess supply). The Demonstration Project will also investigate options for treating dry weather flows from the local MS4 permittees. CMWD operates the Salinity Management Pipeline, which discharges saline water from groundwater desalination facilities and excess recycled water in the region to the Pacific Ocean. CMWD is considered about the exceeding discharge permit water quality limits if the source of the brine includes urban runoff. If the Demonstration Project identified a feasible treatment method for the dry weather flows, the yield of potable water supply from the full-scale advanced water treatment plant could increase beyond 5,151 AFY.

The Demonstration Project's research will focus on six primary areas:

1. **N**Evaluation and quantification of the natural degradation of NDMA and other constituents of emerging concern in an open air reservoir subject to direct sunlight.
2. **N**Direct testing of high recovery RO, achieving recoveries above 93 percent to reduce the brine flows requiring transmission and disposal.
3. **N**Long-term demonstration of the benefits of operating RO membranes at elevated flux to improve contaminant rejection and product water quality.
4. **N**Evaluation of the benefits of RO membrane flushing to extend operating periods between chemical cleanings, reducing chemical usage, energy consumption, and high salinity waste flows.
5. **N**Characterization of the brine to determine its compatibility for discharge to CMWD's Salinity Management Pipeline.
6. **N**Evaluation of treatment two different raw water sources: tertiary treated recycled water from the Tapia WRF and urban runoff.

Evaluation Criteria

Evaluation Criterion 1: Statement of Problems and Needs

15 points

Points will be awarded based on the presence of local water resource management problems and needs for which water reclamation and reuse may provide a solution.

1. # Describe in detail the water resource management problems and needs in the local area and explain how water reclamation and reuse may address those problems and needs.

The JPA has no natural water supplies within its watershed and boundaries. There is no groundwater of sufficient quantity or quality for municipal use. The JPA's member agencies are 100 percent dependent upon imported water from the California State Water Project (SWP) delivered by the Metropolitan Water District of Southern California (MWD). The JPA built an extensive recycled water distribution system beginning the 1970s and currently reuses 60 percent of its Title 22 recycled water from the Tapia WRF for irrigation use. However, recycled water demands drop significantly in the cooler winter months while wastewater flows remain relative constant. Lacking seasonal storage for the excess recycled water, the JPA releases the valuable resource to Malibu Creek, which drains to the Pacific Ocean after passing through Malibu Lagoon.

Discharge of the WRF's recycled water to Malibu Creek is not a sustainable practice. The JPA wishes to find a more beneficial use for this valuable, local resource and increasingly stringent regulatory standards for water body impairments, particularly for nutrients, are now requiring advanced treatment of recycled water. The "2013 U.S. EPA Malibu Creek and Lagoon Total Maximum Daily Load [TMDL] for Sedimentation and Nutrients to Address Benthic Community Impairments" established new in-stream limits of 1.0 milligrams per liter (mg/L) total nitrogen and 0.1 mg/L total phosphorous for Malibu Creek. These extremely low nutrient standards cannot be met with conventional wastewater treatment, even when producing Title 22 tertiary-treated recycled water. Advanced treatment, including dual-pass RO, is required to meet the standards. As such, discharge of the excess recycled water from the WRF to Malibu Creek is no longer a viable option absent treatment to drinking water standards. The JPA is investigating the Pure Water Project Las Virgenes-Triunfo to beneficially reuse the surplus recycled water and reduce discharges to Malibu Creek.

Also, the state-wide drought has illustrated the challenges of relying on imported water, with uncertain long-term reliability associated with drought shortages, climate change, seismic events, environmental flow restrictions in the Sacramento-San Joaquin River Delta (Delta), which is the area of pumping origin for the SWP, and salinity of Colorado River supplies. Due to the significant investments being made by MWD to improve supply and system reliability, LVMWD's imported water costs are expected to increase significantly into the foreseeable future. Every acre-foot of recycled water that is beneficially used offsets an acre-foot of imported water from the SWP. Importing SWP water to the service area is very energy intensive, as compared to locally purified recycled water, and places additional strains on the sensitive Delta, which is also the pumping location for the Bureau of Reclamation's Central Valley Project (CVP).

Development of new, local, drought-resilient water supplies is desperately needed. The JPA has an opportunity with the Pure Water Project Las Virgenes-Triunfo to develop up to 5,151 AFY of new, reliable supply for its service area, while reducing the discharge of recycled water to Malibu Creek to comply with new regulatory standards.

- Identify the water supply imbalance and describe how the research study supports the establishment or expansion of water reclamation and reuse that will reduce, postpone, or eliminate the development of new or expanded water supplies.

One of the JPA’s major challenges over the last several decades has been the seasonal imbalance in the supply and demand for recycled water. Since the majority of LVMWD’s recycled water is used for irrigation, demands are highly variable, with peak demands occurring during the warm summer months. Based on recycled water demand data from the “2007 Recycled Water System Master Plan Update,” the monthly average demand during the peak summer months fluctuates from 800 to 1,000 AF per month. However, demands can drop to near zero during the cool winter months, particularly during periods of rainfall when irrigation is not required, as shown in Figure 2.

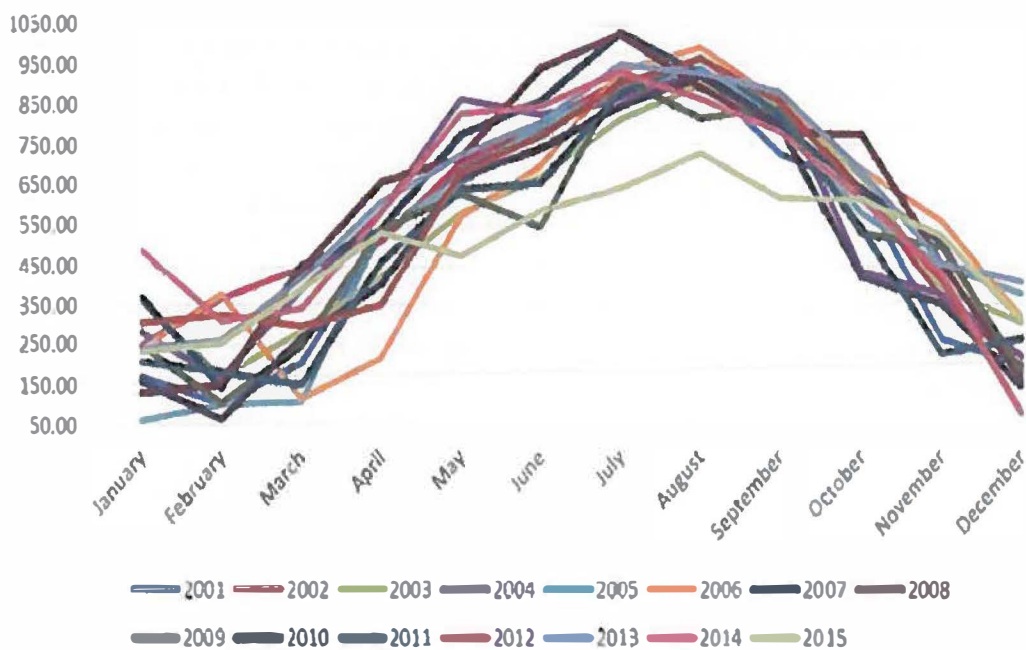


Figure 2 Monthly Recycled Water Demands in Acre-Feet

The daily supply of recycled water produced by the Tapia WRF is fairly constant. On occasion, the influent flow varies significantly, primarily due to infiltration and inflow during and after rain. Historically, Tapia WRF has produced an average of approximately 9.5 million gallons per day of recycled water, but recent average flows are lower due to significant indoor water conservations associated with response to the state-wide drought. Flows are expected to return to near historical levels in the future.

With only minimal operational storage for recycled water (i.e., no seasonal storage), the excess recycled water cannot be retained during the winter for use in the summer. As a result, the excess recycled water is discharged to Malibu Creek, draining to the Pacific

Ocean. The Demonstration Project will provide valuable data for further decision making on how the JPA should implement the Pure Water Project Las Virgenes-Triunfo to fully utilize the excess recycled water, treat it at a new advanced water treatment plant, and supplement potable supplies stored at Las Virgenes Reservoir. If the project is successful, the JPA's member agencies would be able to offset their purchases of imported water by an equivalent amount.

Due to the recent nutrient TMDL, reducing the recycled water discharges to Malibu Creek will keep the JPA from needing to treat its recycled water to the drinking water quality standards that would be required for continued discharge during winter months.

Additional consideration will be given to proposals that explain how the research study will attempt to improve resiliency to climate change in the area.

According to the California Energy Commission, 19 percent of the State's electricity, more than 30 percent of the natural gas use (aside from what is consumed by power plants), and 88 million gallons annually of diesel fuel are associated with water use and wastewater treatment.¹ The SWP is the single largest energy user in the State, consuming 5 billion kilowatt-hours per year, accounting for 2 to 3 percent of all electricity consumed in California.²

The JPA members purchase 100 percent of their potable water from MWD. The water for the region is treated at the Joseph Jensen Water Treatment Plant in Granada Hills, which is supplied with imported water from the SWP. For each AF of water transported to and treated at Jensen, 4.09 megawatt-hours (MWh) of electricity is consumed. For each MWh of electricity produced, an average of 0.433 tons of carbon dioxide (CO₂) is emitted, so for each AF of water delivered to the JPA's service area, 1.77 tons of CO₂ is emitted.³ The transmission, distribution, and advanced treatment of an AF of recycled water consumes an average of 2.05 MWh of electricity, resulting in 0.89 tons of CO₂ emitted. For every AF of advanced treated recycled water that replaces imported water, a reduction of 2.04 MWh of electricity and 0.88 tons of CO₂ emissions are realized. As a result, the production of 5,151 AF of water through IPR would result in an annual reduction of 10,508 MWh of electricity and 4,533 tons of CO₂ emissions.

In addition to significant reductions in energy consumption and greenhouse gas emissions, the Pure Water Project Las Virgenes-Triunfo, supported by the results from the Demonstration Project, would reduce the service area's dependence on limited

¹ California Energy Commission. 2005. *Integrated Energy Policy Report*. CEC-100-2005-007-CMF. November 2005.

² Natural Resources Defense Council. 2004. *Energy Down the Drain: The Hidden Costs of California's Water * Supply*. August 2004.

³ Calleguas Municipal Water District. 2007. *CO₂ Emissions and Imported State Project Water to Ventura County*. * January 25, 2007.

imported water from the SWP. The record setting state-wide drought in California has illustrated the importance of developing new, local water supplies and reducing the use of already strained imported sources. Continuing declines in the populations in the Delta Smelt and Winter-Run Chinook Salmon in the Delta have highlighted the fact that the Delta's ecosystem is in distress. Further, climate change, sea level rise, seismic activity, and subsidence threaten the Delta and its functionality as the hub of California's water system.

Evaluation Criterion 2: Local Water Reclamation and Reuse Opportunities

15 points

Points will be awarded based on the extent to which the proposal demonstrates that the research study will explore local opportunities for water reclamation and reuse.

1. . Describe the source(s) of water that will be investigated for potential reclamation, including impaired surface or ground waters.

Excess recycled water that is currently discharged to Malibu Creek, draining to the Pacific Ocean, will be investigated as the source for reclamation and testing at the Demonstration Project. The Tapia WRF produces an average of 10,000 AF per year of recycled water. Currently, approximately 6,000 AF per year is beneficially reused for irrigation purposes, leaving 4,000 AF per year that is discharged to Malibu Creek for potential potable reuse. Additionally, future connections to the wastewater system are expected to generate additional sewage and, in turn, more wastewater for reclamation opportunities.

The Demonstration Project will also investigate options for treating dry weather flows from the local MS4 permittees. CMWD operates the Salinity Management Pipeline, which discharges saline water from groundwater desalination facilities and excess recycled water in the region to the Pacific Ocean. CMWD is considered about the exceeding discharge permit water quality limits if the source of the brine includes urban runoff.

2. . Describe how the research study will support establishment or expansion of water reclamation and reuse markets in the study area.

The Demonstration Project is critical to identifying a permissible IPR surface water augmentation treatment process for the Pure Water Project Las Virgenes-Triunfo. Potable reuse offers great promise because the recycled water market has drastically expanded to include potable water customers. Together, the JPA member agencies serve potable water to a population of nearly 84,000, consisting of approximately 25,000 service connections. The potable water demand for the JPA's customers is approximately 24,000 AF per year. The full-scale advanced water treatment plant would be able to provide approximately 20 percent of the JPA's potable water demands.

3. 9 Describe how the research study will help broaden the use of reclaimed water for additional purposes in the study area (e.g., environmental restoration, fish and wildlife, groundwater recharge, municipal, domestic, industrial, agricultural, power generation, and recreation).

The Demonstration Project is critical to identifying a permittable IPR treatment process for the Pure Water Project Las Virgenes-Triunfo. The full-scale project would use recycled water for potable reuse through surface water augmentation. The project concept is one of only three currently proposed in California. The Demonstration Project is one of several studies that the JPA will require in order to develop a feasible project concept and one that can be permitted by DDW for surface water augmentation.

Evaluation Criterion 3: Advancing Water Reclamation Knowledge

15 points

Points will be awarded based on the extent to which the proposal demonstrates that the research study will advance water reclamation knowledge to support water reclamation and reuse of non-traditional water supplies.

1. 9 Describe the objectives of the proposed research study, research methodology, and how the results will advance water reclamation and reuse knowledge. References and literature citations should be provided, as applicable.

California utilities, engineering firms, and research organizations have been focusing considerable efforts on identifying measures needed to ensure the safety of direct potable reuse. These efforts have looked to evaluate treatment technologies (see WateReuse Research Foundation [WRRF] publications WRRF 14-13, and WRRF 15-10), process monitoring (WRRF 11-01, WRRF 13-03, and WRRF-4508), and the risks associated with microbial and chemical pollutants (WRRF 14-02, WRRF 14-14, and WRRF 06-18) in direct potable reuse applications. Other research has focused on groundwater recharge for potable reuse, evaluating the impact of natural soil aquifer treatment on contaminants of concern (see WRRF 10-10, WRRF 12-12).

An area that has been studied considerably less is the optimization of treatment and monitoring for surface water augmentation projects, like the Pure Water Project Las Virgenes-Triunfo. It is hoped that the Demonstration Project research will allow future facilities employing potable reuse through surface water augmentation to utilize a more efficient approach to treatment, providing a safe source of drinking water, while minimizing potentially adverse impacts to the environment.

The Demonstration Project's research will focus on six primary areas:

1. pEvaluation and quantification of the natural degradation of NDMA and other constituents of emerging concern in an open air reservoir subject to direct sunlight.
2. pDirect testing of high recovery RO, achieving recoveries above 93 percent to reduce the brine flows requiring transmission and disposal.

3. **Long-term demonstration of the benefits of operating RO membranes at elevated flux to improve contaminant rejection and product water quality.**
4. **Evaluation of the benefits of RO membrane flushing to extend operating periods between chemical cleanings, reducing chemical usage, energy consumption, and high salinity waste flows.**
5. **Characterization of the brine to determine its compatibility for discharge to CMWD's Salinity Management Pipeline.**
6. **Evaluation of treatment two different raw water sources: tertiary treated recycled water from the Tapia WRF and urban runoff.**

The results of the Demonstration Project's research will be used in the development of the JPA's full-scale surface water augmentation project, and can serve as a model for other facilities in California and other water stressed regions considering IPR through surface water augmentation.

2. , Describe any collaborators involved with the research and their respective roles.

Potential collaborators for the Demonstration Project include CMWD, the City of Thousand Oaks, and MWD. The JPA will confirm their interest in being a part of the project.

3. , Please describe the credentials, experience, and past performance of the research team. Alternatively, describe the process and criteria that will be used to select an appropriate, experienced research team.

The specific team for the Demonstration's equipment procurement, installation, and research have not been identified at this time. The JPA will develop a procurement program either for design/build or design/bid/build for the specific equipment, supplies, and testing that are necessary for the Demonstration Project. The procurement program will include specific qualifications the respondents must meet, including appropriate credentials, experience on projects of similar size and scope, and exceptional references. Selection criteria for the project team will include: 1) demonstration of a comprehensive understanding of the scope of work; 2) expertise in performing the scope of work; 3) the quality of performance on similar past projects; 4) the ability to meet time schedules and complete the work within established budgets; 5) the teams' history and resource capacity to perform the requested service; and 6) the experience and qualifications of assigned personnel.

Evaluation Criterion 4: Environment and Water Quality

15 points

Points will be awarded based on the extent to which the proposal demonstrates that the research study will provide results that could be used to improve surface, groundwater, or effluent discharge

quality; restore or enhance habitat for non-listed species; or provide water or critical habitat for federally listed threatened or endangered species. For each of the following sub-criteria, include descriptions of any specific issues that will be investigated or information that will be developed as part of the research study.

1. 2 Describe the potential for the research results to identify measures or implement technologies that improve the quality of surface or groundwater in the study area.

The results of the Demonstration Project's research will be used in the development of the JPA's full-scale advanced water treatment processes. This advanced treated water would be conveyed to Las Virgenes Reservoir where it would mix and be stored with imported supplies. Currently, the reservoir's total dissolved solids (TDS) level roughly matches the TDS of water supplied by MWD and is typically around 400 mg/L. The TDS of the advanced purified water entering the reservoir is anticipated to be about 150 mg/L, improving the overall quality of the Las Virgenes Reservoir.

2. Describe the potential for the research results to identify measures or implement technologies that improve flow conditions in a natural stream channel that benefit the environment.

The Demonstration Project research will identify the level of treatment required in the full-scale facility, which, when implemented, would reduce the JPA members' demands for imported water from the SWP by up to 5,151 AFY, thereby improving flow conditions in the Delta. Currently, the Delta ecosystem is in distress, partly due to reverse flow conditions in the south Delta that draw endangered fish species, such as the Delta Smelt, toward pumps for both the SWP and CVP.

The current practice of releasing the unused recycled water to Malibu Creek contributes to impairments of the receiving water for nutrients and benthic macroinvertebrates, according to the "2013 U.S. EPA Malibu Creek and Lagoon Total Maximum Daily Load for Sedimentation and Nutrients to Address Benthic Community Impairments." Increasing regulatory and environmental requirements, especially reduced TMDLs on nitrogen and phosphorus, are making continued seasonal stream discharges of tertiary treated recycled water to Malibu Creek challenging. The results of the Demonstration Project will support the development of the Pure Water Project Las Virgenes-Triunfo, which would allow the JPA to reduce its winter discharges to Malibu Creek and thereby reduce the nutrient loading that is a concern of the Malibu Creek TMDL.

3. 2 Describe the potential for the research results to identify measures or implement technologies that provide water or habitat for non-listed, sensitive, or federally-listed threatened or endangered species.

The Demonstration Project research will identify the level of treatment required in the full-scale facility, which, when implemented, would reduce the JPA members' demands for imported water from the SWP by up to 5,151 AFY. This decrease in Delta exports

could potentially provide water for two federally listed endangered species, the Delta Smelt and Southern Steelhead.

Delta Smelt were federally listed as endangered in 1993 and recent trawls in the Delta have created alarm that the species is on the brink of extinction. During certain times of the year, the Delta Smelt are drawn into the south Delta by the powerful SWP and CVP pumps, which can generate reverse flows in the Old and Middle Rivers. Once trapped in the south Delta, the Delta Smelt are vulnerable to entrainment in the pumps and/or could perish due to the lack of food sources. The reduction in Delta water demand from the full-scale JPA facility would in turn reduce pumping at the Banks Pumping Plant and reduce the effects of reverse flow in the Delta that are harmful to Delta Smelt.

Additionally, the project could provide higher quality water for Southern Steelhead. In August 1997, the National Marine Fisheries Service listed the Southern Steelhead as a federally endangered species. Malibu Creek is currently believed to be the southern-most spawning ground where Southern Steelhead have been identified. As a result, it is critical to maintain a sufficient supply of high quality water flowing in Malibu Creek, particularly during the dry summer months to maintain refuge areas for Southern Steelhead that fail to make the journey back to the Pacific Ocean. The JPA releases recycled water to Malibu Creek during periods of low streamflow in the summer to trim the flow to 2.5 cubic feet per second. However, concerns have emerged that nutrients in the recycled water are causing algal growth and eutrophication in Malibu Creek and Lagoon, impairing the ecosystem that supports Southern Steelhead. The results of the Demonstration Project will support the development of the Pure Water Project Las Virgenes-Triunfo, which would allow the JPA to reduce its winter discharges to Malibu Creek and thereby reduce the nutrient loading that is a concern of the Malibu Creek TMDL.

Evaluation Criterion 5: Legal and Institutional Requirements

10 points

Points will be awarded based on the extent to which the proposal demonstrates that the research study will address legal or institutional requirements or barriers to implementing a water reclamation and reuse project, including water rights issues and any unresolved issues associated with implementation of a project.

- 1.) For desktop research studies, describe how the research may identify methods or produce results that help to eliminate obstacles for using reclaimed water as a supply in the study area.

The Demonstration Project is a field-based research study, not a desktop research study. See responses to #2 below.

- 2.) For field based research studies, describe how the research study may identify methods or produce results that help to eliminate obstacles for using reclaimed water as a supply in the study area, and describe the readiness of the research study to proceed in terms of:

a. What type and level of preliminary research investigations have been completed?

The JPA has commissioned multiple studies that have led to identification of the Pure Water Project Las Virgenes-Triunfo for the advanced treatment of their recycled water supplies to increase drinking water supplies in their service area. The list of prior investigations includes:

- 2014 Multiple Recycled Water, Wastewater, and Water Master Plans;
- 2015 Woodland Hills Water Recycling Expansion Concept Evaluation technical memoranda;
- 2015 Hydraulic Evaluation and Modeling for Woodland Hills Water Recycling Project;
- U 2016 Summary of Pipeline Diameter Alternatives for Woodland Hills Water U Recycling Project; U
- 2016 Woodland Hills Water Recycling Project Preliminary Design Report;
- 2015 Recycled Water Seasonal Storage Plan of Action, which considered six different scenarios for maximizing beneficial reuse of the JPA's recycled water resource. This produced two preferred scenarios for further investigation based on four public workshops and analysis;
- 2016 Recycled Water Seasonal Storage Basis of Design Report, which analyzed the two preferred scenarios identified in the Recycled Water Seasonal Storage Plan of Action and determined that the IPR option was the preferred project; and
- 2011 Recycled Water Seasonal Storage Project Feasibility Study, which considered three possible locations for a new storage reservoir in the JPA service area and made recommendations for how to accomplish the required seasonal storage to reuse all or most of the excess recycled water lost during the winter season.

b. What type and level of preliminary research plans or testing designs have been completed?

The JPA is currently developing the preliminary design of the Demonstration Project with an expected completion date of June 2017. The focus of the preliminary design is to:

- Develop a process flow diagram and site layout (including equipment layout, piping configurations, and connection points);
- Develop relevant drawings to the 30 percent preliminary design level (including architectural, structural, process, heating/ventilation/air conditioning, electrical and instrumentation disciplines);

- I Evaluate project delivery alternatives;
 - I Develop a project implementation schedule;
 - I Describe design criteria in sufficient detail to demonstrate compliance with the National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA) documentation; and
 - I Develop a Class 3 cost estimate.
- c.) What uncertainties could affect the timing of research completion associated with environmental compliance, permitting, etc. as applicable to the research study?

LVMWD expects a Categorical Exclusion for NEPA compliance and a Categorical Exemption for CEQA compliance will be the appropriate level of environmental compliance for the Demonstration project, due to minor alternation of existing structures, involving negligible or no expansion of use. The Demonstration Project will modify an existing building on property owned by LVMWD and be temporary in nature. No ground disturbing activities are associated with the Demonstration Project. The project will only require installation of equipment and minor refurbishment of the existing building. LVMWD will develop the appropriate level of environmental documentation under an ongoing consultant agreement that is not part of this funding request.

- d.) How will research results help address regulatory or institutional requirements to implement a water reclamation and reuse project?

Results from the Demonstration Project testing will assist in identifying the level of treatment required in the full-scale advanced treatment facility, while accounting for downstream natural treatment occurring within the surface water reservoir (Las Virgenes Reservoir). The testing will also confirm removal of regulated contaminants by the unit processes within the Demonstration Project. The Demonstration Project's research will be focused to develop treatment processes to comply with DDW's upcoming surface water augmentation regulations.

Evaluation Criterion 6: Renewable Energy and Energy Efficiency

10 points

Points will be awarded based on the extent to which the proposal demonstrates that the research study will evaluate methods to incorporate the use of renewable energy or will otherwise address energy efficiency aspects of water reclamation and reuse.

The energy costs of the treatment processes evaluated by the Demonstration Project will be calculated in order to assess total overall costs. Energy costs will be used in the assessment of potential treatment processes for the full-scale facility and used in the overall lifecycle costs that will be used in full scale procurement.

Evaluation Criterion 7: Watershed Perspective

10 points

Points will be awarded based on the extent to which the proposal demonstrates that the research study will promote and apply a regional or watershed perspective to water resource management.

1. +Describe the extent to which the research study is based on recommendations from an existing plan that is sponsored or otherwise recommends research needs in the study area.

The proposal for the Demonstration Project and Pure Water Project Las Virgenes-Triunfo was developed through a collaborative, stakeholder-driving process that involved over 17 organizations with various roles in the Malibu Creek watershed. In 2014, the JPA Board of Directors approved a proposal to prepare a Recycled Water Seasonal Storage Plan of Action. The approach to develop the Plan of Action centered on conducting individual interviews with the JPA Board members and engaging a broad cross-section of stakeholders in three public workshops. The workshops resulted in six conceptual scenarios, ranging from TMDL compliance with advanced nutrient removal at Tapia WRF to a regional IPR project to balance the constant supply of recycled water with fluctuating demands.

In 2015, the JPA Board considered stakeholder comments on the six conceptual scenarios and directed staff to develop the Plan of Action focused on a scenario for IPR using Las Virgenes Reservoir and a scenario for re-purposing Encino Reservoir for recycled water seasonal storage. The Plan of Action outlined the objectives, strategies and initial actions to move forward with both scenarios on a parallel path until a decision could be made to focus on one preferred scenario. One of the initial actions called for in the Plan of Action was to complete a Basis of Design Report (BODR). The BODR developed the scenarios through various engineering and economic analyses. The work included hydraulic analyses for conveyance and pumping facilities, siting studies for new facilities, regulatory investigations and schedule and cost development. In addition to the analyses, three stakeholder workshops and one Board technical workshop were held.

The BODR, completed in 2016, identified IPR with surface water augmentation as the best option to meet the project objectives because it involves the best and highest use of the JPA's water resources and retains the full benefit of the resources for the JPA customers. The BODR identified the Demonstration Project as a critical step for achieving regulatory and public acceptance of the project and developing the design criteria for the full scale facility.

2. +Explain any additional benefits of, or specific need for, the proposed research study within the sponsor's watershed (e.g. supporting feasibility studies or construction projects planned in the watershed).

The current practice of releasing the unused recycled water to Malibu Creek contributes to impairments of the receiving water for nutrients and benthic macroinvertebrates,

according to the “2013 U.S. EPA Malibu Creek and Lagoon Total Maximum Daily Load for Sedimentation and Nutrients to Address Benthic Community Impairments.” Increasing regulatory and environmental requirements, especially reduced TMDLs on nitrogen and phosphorus, are making continued seasonal stream discharges to Malibu Creek challenging.

The project would enable LVMWD to capture the majority of its unused recycled water available during the winter low irrigation demand season, purify it at a new advanced water treatment plant, and augment imported drinking water supplies stored at its existing Las Virgenes Reservoir, while also reducing treated wastewater discharges to Malibu Creek. Reducing the winter discharges from the WRF will reduce the nutrient loading to Malibu Creek.

Evaluation Criterion 8: Broader Research Benefits

10 points

Points will be awarded based on the extent to which the proposal demonstrates that the research study will result in broader benefits that advance the implementation of water reclamation and reuse projects.

1. / Describe how the research study helps to implement new methodologies, improve best practices, or deploy state of the art technology (e.g. technology commercialized through Reclamation’s Desalination and Water Purification Research Program).

While much research has been conducted in California to support development of direct potable reuse technologies, an area that has been studied considerably less is the optimization of treatment and monitoring for surface water augmentation projects, like the Pure Water Project Las Virgenes-Triunfo. The Demonstration Project research will allow future facilities employing potable reuse through surface water augmentation to utilize a more efficient approach to treatment, providing a safe source of drinking water, while minimizing potentially adverse impacts to the environment.

The following four research areas will provide new methodologies for potable reuse monitoring and treatment, improving on best practices and allowing the advancement of the potable reuse industry:

1. J The evaluation and quantification of the natural degradation of NDMA and other constituents of emerging concern in an open air reservoir subject to direct sunlight will provide baseline information for facilities utilizing reservoir augmentation. The natural treatment provided by open air reservoirs is recognized in the industry, but has not been formally quantified or considered in the overall treatment scheme for NDMA or other light sensitive constituents of emerging concern. It is hoped that this research will provide a tool to facilities employing reservoir augmentation for potable reuse.

2. **The study will include direct testing of high recovery RO, achieving recoveries above 93 percent to reduce the brine flows requiring transmission and disposal. A critical aspect of the testing will be to confirm monitoring methods to ensure pathogen reduction in high recovery operation, as well as methods to reduce scale formation and allow efficient plant operation.**
 3. **The study will demonstrate the sustainability and benefits of operating RO membranes at elevated flux to improve contaminant rejection and product water quality.**
 4. **The study will evaluate the benefits of RO membrane flushing to extend operating periods between chemical cleanings, reducing chemical usage, energy consumption, and high salinity waste flows.**
2. + Describe how the research results will benefit other locations based on the technical, economic, or institutional questions that will be answered by the research study.

While much research has been conducted in California to support development of direct potable reuse technologies, an area that has been studied considerably less is the optimization of treatment and monitoring for surface water augmentation projects, like the Pure Water Project Las Virgenes-Triunfo. The Demonstration Project research will allow future facilities employing potable reuse through surface water augmentation to utilize a more efficient approach to treatment, providing a safe source of drinking water, while minimizing potentially adverse impacts to the environment.

The results of the Demonstration Project's research will be used in the development of the JPA's full-scale surface water augmentation project and can serve as a model for other facilities in California and other water-stressed regions considering IPR through surface water augmentation.

The JPA will share the Demonstration project's results with DDW as that agency is developing the regulatory framework for surface water augmentation.

3. + Explain how the research study includes or promotes and encourages collaboration. Identify if there is widespread support for the research study.

Potential collaborators for the Demonstration Project include CMWD, the City of Thousand Oaks, and MWD. The JPA will confirm their interest in being a part of the project. Please see Appendix A for letters of support from LVMWD member agencies.

Environmental and Cultural Resources Compliance

If the proposed project includes ground disturbing activities, environmental and cultural resources compliance will be required. To allow Reclamation to assess the probable environmental and cultural resources impacts and costs associated with a proposed research study, proposals that include ground disturbing activities must include responses to the following list of questions focusing on the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) requirements.

The Demonstration Project will modify an existing building owned by LVMWD and be temporary in nature. No ground disturbing activities are associated with the Demonstration Project. The project will only require installation of equipment and minor refurbishment of the existing building. Therefore, LVMWD expects a Categorical Exclusion for NEPA compliance and a Categorical Exemption for CEQA compliance are appropriate due to minor alternation of existing structures, involving negligible or no expansion of use. LVMWD will develop the appropriate level of environmental documentation under an ongoing consultant agreement that is not part of this funding request.

Letters of Support

Please include letters from interested stakeholders supporting the proposed project. To ensure your proposal is accurately reviewed, please attach all letters of support/ partnership letters as an appendix. (Note: this will not count against the application page limit.) Letters of support received after the application deadline for this FOA will not be considered in the evaluation of the application.

Appendix A contains letters of support for the Pure Water Project.

Required Permits or Approvals

Applicants must state in the application whether any permits or approvals are required and explain the plan for obtaining such permits or approvals.

It is not anticipated that specific permits will be required to conduct this pilot testing, other than approvals from the City of Calabasas Building & Safety Division for minor remodeling of an existing building to house the Demonstration Project facilities.

Official Resolution

Appendix B contains the resolution adopted by the LVMWD Board of Directors. It was approved on January 10, 2017.

Project Budget

Funding Plan and Letters of Commitment

Describe how the non-Federal share of project costs will be provided. Reclamation will use this information in making a determination of financial capability.

The funding plan must include all project costs, as follows:

- ; How you will make your contribution to the cost-share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).

The JPA will provide its cost share requirements for the Demonstration Project from its existing reserves supported by rate revenue and capacity fees.

- ; Describe any project expenses that have been incurred or may be incurred before the anticipated award date that you may seek to include as project costs. For each cost, identify:
 - ; The project expenditure and the amount
 - ; Whether the expenditure is or will be in the form of in-kind services or donations
 - ; The date of cost incurrence
 - ; How the expenditure benefits the project.

No prior project expenses are included as project costs.

- ; Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment.

Funds will be provided only by the JPA. There are no other funding partners.

- ; Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards the cost-share unless otherwise allowed by statute.

There is no funding requested or received for the Demonstration Project from other Federal partners.

- ; Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.

There are no pending funding requests for the Demonstration Project. There are no time constraints on the availability of funding.

Table 1 Summary of Non-Federal and Federal Funding Sources

Funding Sources	Amount
Non-Federal Entities	
Las Virgenes-Triunfo JPA	\$2,234,000
Non-Federal Subtotal:	\$2,234,000
Other Federal Entities	
None	\$0
Other Federal Subtotal:	\$0
Requested Reclamation Funding:	\$300,000
Total Study Funding:	\$2,534,000

Budget Proposal

The budget proposal should include detailed information on the categories listed below and must clearly identify all project costs. Unit costs shall be provided for all budget items including the cost of work to be provided by contractors. The budget proposal should also include any in-kind contributions of goods and services provided to complete the project. It is strongly advised that applicants use the budget proposal format shown below on Table 2 or a similar format that provides this information. If selected for award, successful applicants must submit detailed supporting documentation for all budgeted costs.

Table 2 Budget Proposal

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	\$/UNIT	QUANTITY		
Salaries and Wages				
none				
Fringe Benefits				
none				
Travel				
none				
Equipment				
none				
Supplies and Materials				
none				
Contractual/Construction				
Contract for Demonstration Project Equipment, Installation, and Lab Research	LS			\$2,519,000
Other				

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	\$/UNIT	QUANTITY		
Reclamation NEPA documentation review				\$15,000
Total Direct Costs				\$2,534,000
Indirect Costs				
none				\$0
TOTAL ESTIMATED PROJECT COSTS				\$2,534,000

Budget Narrative

Submission of a budget narrative is mandatory. An award will not be made to any applicant who fails to fully disclose this information. The budget narrative provides a discussion of, or explanation for, items included in the budget proposal. Include the value of in-kind contributions of goods and services and sources of funds provided to complete the project. The types of information to describe in the narrative include, but are not limited to, those listed in the following subsections. Costs, including the valuation of in-kind contributions and donations, must comply with the applicable cost principles contained in 2 CFR Part §200, available at the Electronic Code of Federal Regulations (www.ecfr.gov).

Salaries and Wages

The Project Manager for the Demonstration Project will be David Lippman, Director of Facilities and Operations. However, the cost of labor (salaries and wages) is not proposed to be utilized as agency match or reimbursed by Reclamation.

Fringe Benefits

No fringe benefits are proposed to be utilized as agency match or reimbursed by Reclamation.

Travel

No travel is proposed to be utilized as agency match or reimbursed by Reclamation.

Equipment

Itemize costs of all equipment having a value of over \$5,000 and include information as to the need for this equipment, as well as how the equipment was priced if being purchased for the agreement. If equipment is being rented, specify the number of hours and the hourly rate. Local rental rates are only accepted for equipment actually being rented or leased for the project. If equipment currently owned by the applicant is proposed for use under the proposed project, and the cost to use that equipment is being included in the budget as in-kind cost share, provide the rates and hours for each piece of equipment owned and budgeted. These should be ownership rates developed by the recipient for each piece of equipment. If these rates are not available, the U.S. Army Corp of Engineer's recommended equipment rates for the region are acceptable. Blue book, Federal Emergency Management Agency (FEMA), and other data bases cannot be used.

No equipment is proposed to be utilized as agency match or reimbursed by Reclamation.

Materials and Supplies

Itemize supplies by major category, unit price, quantity, and purpose, such as whether the items are needed for office use, research, or construction. Identify how these costs were estimated (i.e., quotes, past experience, engineering estimates, or other methodology).

No materials and supplies are proposed to be utilized as agency match or reimbursed by Reclamation.

Contractual

Identify all work that will be accomplished by subrecipients, consultants, or contractors, including a breakdown of all tasks to be completed, and a detailed budget estimate of time, rates, supplies, and materials that will be required for each task. If a subrecipient, consultant, or contractor is proposed and approved at the time of award, no other approvals will be required. Any changes or additions will require a request for approval. Identify how the budgeted costs for subrecipients, consultants, or contractors were determined to be fair and reasonable.

One contractual service agreement is expected to be awarded through a competitive process for the procurement and installation of equipment to assemble the Demonstration Project facilities and laboratory research, estimated to be \$2,519,000. The cost has been estimated by the JPA's existing consultant preparing the preliminary design of the Demonstration Project. This estimate was prepared using best engineering judgment and practices. The cost proposals for the Demonstration Project will be reviewed for competitiveness based on comparisons with other proposals and recently completed work for similar services. The agreement review and selection process will follow the existing procurement procedures and standards of the JPA.

Table 3 presents the contractual cost estimate.

Table 3 Demonstration Project Contractual Cost Estimate

Description	Cost Estimate
Total Labor	\$390,000
Contractor's Owned Equipment	\$13,000
Small Tools/consum.	\$10,000
Project sign/ story board	\$8,000
Porta Toilets	\$3,000
Material	\$150,000
Chemical Pumps	\$21,000
Container	\$1,000
Field Office	\$5,000
Forklift	\$9,000
Safety Equipment	\$4,000
Gen. Liabilities	\$16,000
Builder's Risk	\$8,000
Permit Application and Fees	\$13,000
Per Diem	\$13,000
Site Maintenance	\$9,000
Dumpster	\$1,000
U/G Piping and Tie-in	\$33,000
ADA requirements	\$8,000
UF Skid (Equipment)	\$312,000
UF Membranes	\$8,000
UF Skid (startup)	\$13,000
RO Skid (Equipment)	\$299,000
RO Membranes	\$14,000
RO Skid (startup)	\$13,000
UV Skid (equipment)	\$130,000
UV Skid (startup)	\$7,000
Pipe Painting	\$8,000
Chemicals	\$17,000
Laboratory Furnishing	\$13,000
Instrumentation & Control	\$155,000
Electrical & Lighting	\$155,000
Walls (refurbishment)	\$20,000
Laboratory Services	\$300,000
Research Labor	\$340,000
Total	\$2,519,000

Environmental and Regulatory Compliance Costs

If the proposed project includes ground disturbing activities, the applicant must include a line item in the budget to cover environmental compliance costs. "Environmental compliance costs" refer to costs incurred by Reclamation and the recipient in complying with environmental regulations applicable to an award under this FOA, including costs associated with any required documentation of environmental compliance, analyses, permits, or approvals. Applicable Federal environmental laws could include NEPA, ESA, NHPA, CWA, and other regulations depending on the project. Such costs may include, but are not limited to:

- = The cost incurred by Reclamation to determine the level of environmental compliance required for the project
- = The cost incurred by Reclamation, the recipient, or a consultant to prepare any necessary environmental compliance documents or reports
- = The cost incurred by Reclamation to review any environmental compliance documents prepared by a consultant
- = The cost incurred by the recipient in acquiring any required approvals or permits, or in implementing any required mitigation measures

The amount of the line item should be based on the actual expected environmental compliance costs for the project, including Reclamation's cost to review environmental compliance documentation.

How environmental compliance activities will be performed (e.g., by Reclamation, the applicant, or a consultant) and how the environmental compliance funds will be spent, will be determined pursuant to subsequent agreement between Reclamation and the applicant. The amount of funding required for Reclamation to conduct any environmental compliance activities, including Reclamation's cost to review environmental compliance documentation, will be withheld from the Federal award amount and placed in an environmental compliance account to cover such costs. If any portion of the funds budgeted for environmental compliance is not required for compliance activities, such funds may be reallocated to the project, if appropriate.

The Demonstration Project will modify an existing building owned by LVMWD and be temporary in nature. No ground disturbing activities are associated with the Demonstration Project. The project will only require installation of equipment and minor refurbishment of the existing building. Therefore, LVMWD expects a Categorical Exclusion for NEPA compliance and a Categorical Exemption for CEQA compliance are appropriate due to minor alternation of existing structures, involving negligible or no expansion of use.

LVMWD will develop the appropriate level of environmental documentation under an ongoing consultant agreement, not part of this funding request. Reclamation's review of the NEPA documentation prepared by that consultant is estimated to cost \$15,000.

Other

No other expenses are proposed to be utilized as agency match or reimbursed by Reclamation.

Indirect Costs

No indirect costs are proposed to be utilized as agency match or reimbursed by Reclamation.

Total Cost

Indicate the total amount of study costs, including the Federal and non-Federal cost-share amounts.

The total cost of the project is estimated to be \$2,534,000.

Mandatory Federal Forms

A fully completed form SF-424 signed by a person legally authorized to commit the applicant to performance of the project must be submitted. Failure to submit a properly signed SF-424 may result in the elimination of the application from further consideration.

A fully completed form SF-424A, Budget Information-Non-Construction Programs, must be submitted with the application.

A form SF-424B, Assurances—Non-Construction Programs, signed by a person legally authorized to commit the applicant to performance of the project must be included. Failure to submit a properly signed SF-424B may result in the elimination of the application from further consideration.

LVMWD's completed SF-424 forms are included in the application cover forms.

Appendix A

Letters of Support

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO CA 94249-0044
(916) 319-2044
FAX (916) 319-2144

DISTRICT OFFICE
2301 E DAILY STREET
SUITE 200
CAMARILLO, CA 93010
(805) 482-1904
FAX (805) 482-1274



COMMITTEES
CHAIR: VETERANS AFFAIRS
ACCOUNTABILITY AND
ADMINISTRATIVE REVIEW
AGRICULTURE
HIGHER EDUCATION
JOBS, ECONOMIC DEVELOPMENT,
AND THE ECONOMY

December 14, 2016

Mr. Terry Fulp, Regional Director
U.S. Bureau of Reclamation
Lower Colorado Region
P.O. Box 61470
Boulder City, NV 89006-1470

**RE: Pure Water Project Las Virgenes-Triunfo
Support for WaterSMART Grant Application under Title XVI Water Reclamation and Reuse
Program for Fiscal Year 2017**

Dear Mr. Fulp:

This letter is to express support for the WaterSMART grant application submitted by the Las Virgenes-Triunfo Joint Powers Authority (JPA), seeking assistance for development of a Pure Water Project to further treat recycled water for indirect potable reuse.

The project proposal was developed through a collaborative, stakeholder-driven process involving over 17 organizations with various roles in the Malibu Creek Watershed. The project would consist of a multi-agency undertaking in western Los Angeles and eastern Ventura Counties to develop a new source of local water supply, improve drought resilience, and comply with stringent regulatory standards for Malibu Creek.

All potable water in the JPA's region is imported. The JPA's member agencies, Las Virgenes Municipal Water District and Triunfo Sanitation District/Oak Park Water, have worked closely with their respective communities to achieve greater water-use efficiency with significant results. They have also distributed recycled water to irrigate parks, schools, golf courses, highway landscapes and common areas of commercial and multi-family residential properties, conserving limited potable water for its highest uses. For the last several years, some 20 percent of the water delivered by the JPA agencies was recycled.

The Pure Water Project would leverage the region's investments in recycled water to further reduce its dependence on imported water, while achieving energy savings and greenhouse gas emission reductions. The project would develop up to 5,000 acre-feet of new, local water supply through advanced treatment of excess recycled water currently released to Malibu Creek during the winter low-demand period.

We respectfully request that the JPA's application be given favorable review, which would support the region in improving its water supply reliability and drought resilience.

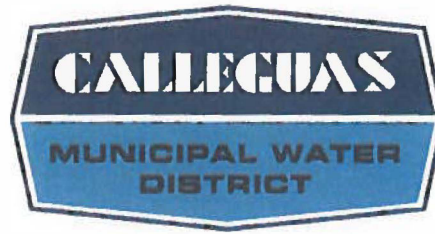
Sincerely,

Jacqui Irwin
Assemblymember, AD 44

SCOTT H. QUADY, PRESIDENT
DIVISION 2

ANDRES SANTAMARIA, SECRETARY
DIVISION 4

STEVE BLOIS, DIRECTOR
DIVISION 5



THOMAS L. SLOSSON, VICE PRESIDENT
DIVISION 1

ANDY WATERS, TREASURER
DIVISION 3

SUSAN B. MULLIGAN
GENERAL MANAGER

web site: www.calleguas.com

2100 OLSEN ROAD • THOUSAND OAKS, CALIFORNIA 91360-6800 805/526-9323 • FAX: 805/522-5730 • FAX: 805/526-3675

December 15, 2016

Mr. Terry Fulp, Regional Director
U.S. Bureau of Reclamation
Lower Colorado Region
P.O. Box 61470
Boulder City, NV 89006-1470

**Subject: Las Virgenes-Triunfo Pure Water Project
Support for WaterSMART Grant Application under Title XVI Water
Reclamation and Reuse Program for Fiscal Year 2017**

Dear Mr. Fulp:

We are writing to express support for the WaterSMART grant application submitted by the Las Virgenes-Triunfo Joint Powers Authority (JPA), seeking assistance for development of a Pure Water Project to further treat recycled water for indirect potable reuse.

The project proposal was developed through a collaborative, stakeholder-driven process involving over 17 organizations with various roles in the Malibu Creek Watershed. The project would consist of a multi-agency undertaking in western Los Angeles and eastern Ventura Counties to develop a new source of local water supply, improve drought resilience, and comply with stringent regulatory standards for Malibu Creek.

All of the potable water in the JPA's region comes from the California Water Project and must travel through the ecologically impaired Sacramento-San Joaquin Delta. In fact, the JPA's region is one of the few in Southern California that can only receive very limited quantities of Colorado River supplies. As a result, the region is more vulnerable to lengthy outages resulting from seismic damage in the Delta or along the California Aqueduct than any other.

The JPA's member agencies, Las Virgenes Municipal Water District and Triunfo Sanitation District/Oak Park Water, have worked closely with their respective communities to achieve greater water use efficiency with significant results. They have also distributed recycled water to irrigate parks, schools, golf courses, highway landscapes and common areas of commercial and multi-family residential properties, conserving limited potable water for its highest uses.

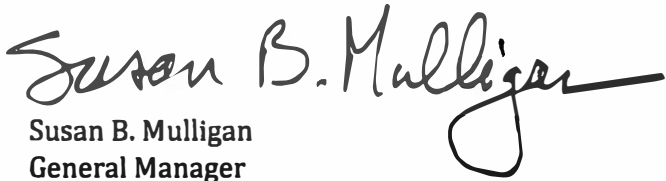
Mr. Terry Fulp
December 15, 2016
Page 2

For the last several years, approximately 20 percent of the water delivered by the JPA agencies was recycled.

The Pure Water Project would leverage the region's investments in recycled water to further reduce its dependence on imported water, while achieving energy savings and reductions in greenhouse gas emissions. The project would develop up to 5,000 acre-feet of new, local water supply through advanced treatment of excess recycled water currently released to Malibu Creek during the winter low-demand period.

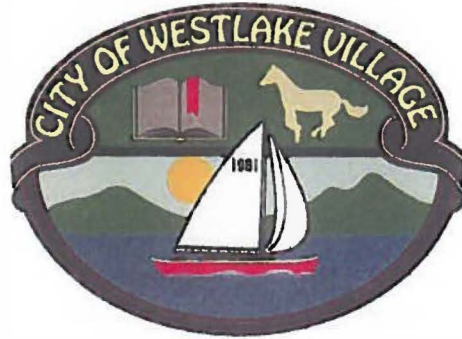
We respectfully request that the JPA's application be given favorable review, which would support the region in improving its water supply reliability and drought resilience.

Sincerely,

A handwritten signature in black ink that reads "Susan B. Mulligan". The signature is written in a cursive style with a long horizontal line extending to the right from the end of the name.

Susan B. Mulligan
General Manager

cc: David W. Pedersen, Administering Agent/General Manager, Las Virgenes-Triunfo JPA
Mark Norris, General Manager, Triunfo Sanitation District



BRAD HALPERN
Mayor

MARK RUTHERFORD
Mayor Pro Tem

NED E DAVIS
Councilmember

KELLY HONIG
Councilmember

SUSAN McSWEENEY
Councilmember

December 14, 2016

Mr. Terry Fulp, Regional Director
U.S. Bureau of Reclamation
Lower Colorado Region
P.O. Box 61470
Boulder City, NV 89006-1470

**RE: Pure Water Project Las Virgenes-Triunfo
Support for WaterSMART Grant Application under Title XVI Water
Reclamation and Reuse Program for Fiscal Year 2017**

Dear Mr. Fulp:

This letter is to express support for the WaterSMART grant application submitted by the Las Virgenes-Triunfo Joint Powers Authority (JPA), seeking assistance for development of a Pure Water Project to further treat recycled water for indirect potable reuse.

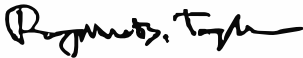
The project proposal was developed through a collaborative, stakeholder-driven process involving over 17 organizations with various roles in the Malibu Creek Watershed. The project would consist of a multi-agency undertaking in western Los Angeles and eastern Ventura Counties to develop a new source of local water supply, improve drought resilience, and comply with stringent regulatory standards for Malibu Creek.

All potable water in the JPA's region is imported. The JPA's member agencies, Las Virgenes Municipal Water District and Triunfo Sanitation District/Oak Park Water, have worked closely with their respective communities to achieve greater water-use efficiency with significant results. They have also distributed recycled water to irrigate parks, schools, golf courses, highway landscapes and common areas of commercial and multi-family residential properties, conserving limited potable water for its highest uses. For the last several years, some 20 percent of the water delivered by the JPA agencies was recycled.

The Pure Water Project would leverage the region's investments in recycled water to further reduce its dependence on imported water, while achieving energy savings and greenhouse gas emission reductions. The project would develop up to 5,000 acre-feet of new, local water supply through advanced treatment of excess recycled water currently released to Malibu Creek during the winter low-demand period.

We respectfully request that the JPA's application be given favorable review, which would support the region in improving its water supply reliability and drought resilience.

Sincerely,



Raymond B. Taylor
City Manager

cc: David W. Pedersen, Administering Agent/General Manager, Las Virgenes-Triunfo JPA



CITY of CALABASAS

December 15, 2016

Mr. Terry Fulp, Regional Director
U.S. Bureau of Reclamation, Lower Colorado Region
P.O. Box 61470
Boulder City, NV 89006-1470

**RE: PURE WATER PROJECT LAS VIRGENES-TRIUNFO
SUPPORT FOR WATERSMART GRANT APPLICATION UNDER TITLE XVI
WATER RECLAMATION AND REUSE PROGRAM FOR FISCAL YEAR 2017**

Dear Mr. Fulp:

This letter is to express support for the WaterSMART grant application submitted by the Las Virgenes-Triunfo Joint Powers Authority (JPA), seeking assistance for development of a Pure Water Project to further treat recycled water for indirect potable reuse.

The project proposal was developed through a collaborative, stakeholder-driven process involving over 17 organizations with various roles in the Malibu Creek Watershed. The project would consist of a multi-agency undertaking in western Los Angeles and eastern Ventura Counties to develop a new source of local water supply, improve drought resilience, and comply with stringent regulatory standards for Malibu Creek.

All potable water in the JPA's region is imported. The JPA's member agencies, Las Virgenes Municipal Water District and Triunfo Sanitation District/Oak Park Water, have worked closely with their respective communities to achieve greater water-use efficiency with significant results. They have also distributed recycled water to irrigate parks, schools, golf courses, highway landscapes and common areas of commercial and multi-family residential properties, conserving limited potable water for its highest uses. For the last several years, some 20 percent of the water delivered by the JPA agencies was recycled.

100 Civic Center Way, Calabasas, CA 91302
Tel: (818) 224-1600 Fax: (818) 225-7338
<http://www.cityofcalabasas.com/>



CITY of CALABASAS

The Pure Water Project would leverage the region's investments in recycled water to further reduce its dependence on imported water, while achieving energy savings and greenhouse gas emission reductions. The project would develop up to 5,000 acre-feet of new, local water supply through advanced treatment of excess recycled water currently released to Malibu Creek during the winter low-demand period.

City of Calabasas respectfully requests that the JPA's application be given favorable review, which would support the region in improving its water supply reliability and drought resilience.

Sincerely,

Alex Farassati, Ph.D.

Environmental Services Manager

cc: David W. Pedersen, Administering Agent/General Manager, Las Virgenes-Triunfo JPA



"Gateway to the Santa Monica Mountains National Recreation Area"

December 14, 2016

Mr. Terry Fulp, Regional Director
U.S. Bureau of Reclamation
Lower Colorado Region
P.O. Box 61470
Boulder City, NV 89006-1470

**RE: Pure Water Project Las Virgenes-Triunfo
Support for WaterSMART Grant Application under Title XVI Water Reclamation and
Reuse Program for Fiscal Year 2017**

Dear Mr. Fulp:

This letter is to express the City of Agoura Hills' support for the WaterSMART grant application submitted by the Las Virgenes-Triunfo Joint Powers Authority (JPA), seeking assistance for development of a Pure Water Project to further treat recycled water for indirect potable reuse.

The project proposal was developed through a collaborative, stakeholder-driven process involving over 17 organizations with various roles in the Malibu Creek Watershed. The project would consist of a multi-agency undertaking in western Los Angeles and eastern Ventura Counties to develop a new source of local water supply, improve drought resilience, and comply with stringent regulatory standards for Malibu Creek.

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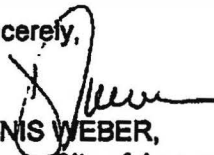
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**Mr. Terry Fulp, Regional Director
U. S. Bureau of Reclamation**

**RE: Pure Water Project Las Virgenes-Triunfo
December 14, 2016
Page Two**

We respectfully request that the JPA's application be given favorable review, which would support the region in improving its water supply reliability and drought resilience.

Sincerely,



**DENIS WEBER,
Mayor, City of Agoura Hills**

**cc: David W. Pedersen, Administering Agent/General Manager
Las Virgenes-Triunfo Joint Powers Authority (JPA)**



City of Hidden Hills

6165 Spring Valley Road • Hidden Hills, California 91302
(818) 888-9281 • Fax (818) 719-0083

December 16, 2016

Mr. Terry Fulp, Regional Director
U.S. Bureau of Reclamation
Lower Colorado Region
P.O. Box 61470
Boulder City, Nevada 89006-1470

**RE: Pure Water Project Las Virgenes-Triunfo
Support for WaterSMART Grant Application under Title XVI Water Reclamation and Reuse Program for
Fiscal Year 2017**

Dear Mr. Fulp:

This letter is to express support for the WaterSMART grant application submitted by the Las Virgenes-Triunfo Joint Powers Authority (JPA), seeking assistance for development of a Pure Water Project to further treat recycled water for indirect potable reuse.

The project proposal was developed through a collaborative, stakeholder-driven process involving over 17 organizations with various roles in the Malibu Creek Watershed. The project would consist of a multi-agency undertaking in western Los Angeles and eastern Ventura Counties to develop a new source of local water supply, improve drought resilience, and comply with stringent regulatory standards for Malibu Creek.

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We respectfully request that the JPA's application be given favorable review, which would support the region in improving its water supply reliability and drought resilience.

Sincerely,

Kerry Kallman
City Manager

cc: David W. Pedersen, Administering Agent/General Manager, Las Virgenes-Triunfo JPA

Appendix B

Official Resolution

RESOLUTION NO. 2503

A RESOLUTION OF THE BOARD OF DIRECTORS OF LAS VIRGENES MUNICIPAL WATER DISTRICT AUTHORIZING THE GENERAL MANAGER TO ENTER INTO AGREEMENTS FOR FUNDING WITH THE UNITED STATES DEPARTMENT OF INTERIOR BUREAU OF RECLAMATION FOR WATER RECYCLING AND REUSE RESEARCH UNDER TITLE XVI WATER RECLAMATION AND REUSE PROGRAM FOR FISCAL YEAR 2017

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF LAS VIRGENES MUNICIPAL WATER DISTRICT as follows:

1. Purpose

General Manager David W. Pedersen, is authorized and directed to apply for a grant under the WaterSMART Water Recycling and Reuse Research Title XVI Water Reclamation and Reuse Program for Fiscal Year 2017 and enter into agreements with the United States Department of Interior Bureau of Reclamation for the grant when and if such grant is awarded. General Manager David W. Pedersen has reviewed and supports the application to be submitted for the Pure Water Project Las Virgenes – Triunfo Demonstration Project.


2. Available Funding

The District can provide in-kind contributions and funding from existing reserves, as required by the Act, for seventy-five percent (75%) or more of the total study costs.

3. Cooperative Agreement

The District shall cooperate with the Bureau of Reclamation to meet deadlines for entering into a cooperative agreement.

PASSED, APPROVED AND ADOPTED on January 10, 2017.



Glen Peterson, President

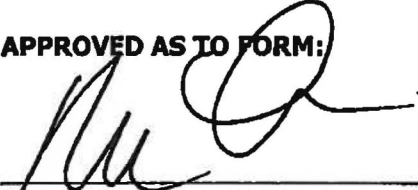
ATTEST:



Deputy Secretary for
Jay Lewitt, Secretary

(SEAL)

APPROVED AS TO FORM:



Wayne K. Lemieux, District Counsel

