1. Administrative Details

Proposal Name: Pure Water Project Las Virgenes - Triunfo

by Agency: Las Virgenes - Triunfo Joint Powers Authority

Locations: CA

Date Submitted: 08/17/2018

Confirmation Number: 545c9067-4a33-43ef-9b52-df3dadb0e110

Supporting Documents

File Name	Date Uploaded
Army Ltr 8.16.18 (002).pdf	08/17/2018
Pure Water Project Flyer.pdf	08/17/2018
Briefing Paper Pure Water Project Benefits.pdf	08/17/2018
Map.pdf	08/17/2018

2. Provide the name of the primary sponsor and all non-Federal interests that have contributed or are expected to contribute toward the non-Federal share of the proposed feasibility study or modification.

Sponsor	**Letter of Support**
Las Virgenes - Triunfo Joint Powers A uthority (Primary)	The JPA supports the Corps' participation in the Pure Wa ter Project brine line. The brine line is an essential part of the potable reuse project creating a drought proof water su pply and supporting the ecosystem restoration goals.

3. State if this proposal is for a feasibility study, a modification to an authorized USACE feasibility study or a modification to an authorized USACE project. If it is a proposal for a modification, provide the authorized water resources development feasibility study or project name.

[x] Feasibility Study

4. Clearly articulate the specific project purpose(s) of the proposed study or modification. Demonstrate that the proposal is related to USACE mission and authorities and specifically address why additional or new authorization is needed.

The JPA produces recycled water at the Tapia Water Reclamation Facility. Demands are typically low in t he winter while the supply of recycled water remains constant throughout the year creating excess recycled w ater in the winter. The excess recycled water is discharged to Malibu Creek. In 2013, EPA Region IX e stablished the Sedimentation and Nutrients to Address Benthic Community Impairments TMDL specifically addressing the impaired benthic biota in Malibu Creek. The key stressors impacting the biota are sediment ation and nutrient loading. Tapia's discharge contributes 45% of winter nutrient load. Elevated nutrients l ead to excess algal growth reducing dissolved oxygen resulting in impaired aquatic ecosystem. Eliminating T apia's winter discharge significantly reduces nutrient loading supporting aquatic ecosystem restoration. T he JPA will meet the regulatory requirements of the TMDL by eliminating discharge to Malibu Creek by usi ng the excess recycled for indirect potable reuse. The recycled water will be conveyed to a new advanced wat er treatment plant that will further treat the water using micro-filtration, reverse osmosis and advanced oxid ation. The purified water will be conveyed to the Las Virgenes Reservoir for indirect potable reuse utilizing surface water augmentation. The water is then treated at the Westlake Filtration Plant and used to meet p otable water demands. The brine from the treatment plant will be conveyed to the CMWD Salinity Manag ement Pipeline in a new 11-mile brine line. There are no local sources of potable water and all of the potabl e water in the JPA service area is imported water from the State Water Project. The specific project pro posed for study is the proposed 11-mile brine line. This brine line is an essential component of the indirect p otable reuse project that will create a new drought proof water supply. The project eliminates discharges to Malibu Creek supporting aquatic ecosystem restoration.

5. To the extent practicable, provide an estimate of the total cost, and the Federal and non-Federal share of those costs, of the proposed study and, separately, an estimate of the cost of construction or modification.

	Federal	**Non-Federal**	**Total**
Study	$150,000	$150,000	$300,000
Construction	$10,239,036	$10,239,036	$20,478,072

Explanation (if necessary)

The brine line is 63,800 feet in length. The estimated construction cost is $214 per foot for a total constructi on cost of $13,652,048. Including a 30% construction contingency and a 20% engineering contingency the to tal estimated cost is $20,478,072.

6. To the extent practicable, describe the anticipated monetary and nonmonetary benefits of the proposal including benefits to the protection of human life and property; improvement to transportation; the national economy; the environment; or the national security interests of the United States.

Anticipated monetary and non-monetary benefits are: Improved Water Supply Reliability and Reduced Imp orted Water: The JPA service area relies solely on imported potable water. The project will replace up to 5,100 acre-feet of imported water with a local supply. Reduced reliance on imported water increases local r esilience to adverse effects of climate change, lessens the environmental consequences of the State Water Proj ect, provides a drought proof local supply and results in annual savings of 10,508 MWh of electricity and 4,5 33 tons CO2 emissions. Ecosystem Restoration: In EPA Region IX established the Malibu TMDL for Se dimentation and Nutrients to Address Benthic Community Impairments. The TMDL specifically addresses the impaired benthic biota in Malibu Creek. The key stressors impacting the biota are sedimentation and n utrient loading. Tapia's discharge contributes 45% of winter nutrient load. Elevated nutrients lead to exce ss algal growth reducing dissolved oxygen resulting in impaired aquatic ecosystem. Eliminating Tapia's wint er discharge significantly reduces nutrient loading supporting the aquatic ecosystem restoration goal of the T MDL. Monetary Benefits: The reduced volume of imported water purchases create a saving for the JPA. Effective in 2018 the rate for imported treated water is $1,000_AF. A present worth analysis found that for the first year O&M will be $2,663,000 and saving from reduced purchases of imported water will be $2,373,30 0 producing a net O&M cost of $290,000. The present worth analysis, considered a 30-year period of grow th of 86 acre-feet per year in recycled water supplies. The growth in recycled water supply results from new commercial and residential customers. The results of the present worth analysis are a net present worth of $1 4,629,000. The total project capital costs is $100,000,000 and the brine line is $20,478,072.

7. Does local support exist? If 'Yes', describe the local support for the proposal.

[x] Yes

Local Support Description

The JPA provides potable water and wastewater treatment services to five cities, Agoura Hills, Calabasas, H idden Hills, Thousand Oaks and Westlake Village, and unincorporated Los Angeles and Ventura Counties. All the local cities, the two counties and local and regional non-governmental organizations such as the Sierr a Club have expressed support for the project.

8. Does the primary sponsor named in (2.) above have the financial ability to provide for the required cost share?

[x] Yes

Primary Sponsor Letter of Support

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Army Ltr 8.16.18 (002).pdf

Las Virgenes – Triunfo Joint Powers Authority
4232 Las Virgenes Road, Calabasas, CA 91302
818.251.2100

August 16, 2018

Dr. Mark T. Esper
Secretary of the Army
1400 Defense Pentagon
Washington, DC 20310-1400

RE: STATEMENT OF SUPPORT TO BE INCLUDED IN REPORT TO CONGRESS ON FUTURE WATER RESOURCES DEVELOPMENT

Dear Dr. Esper:

This letter is our Statement of Support for the Pure Water Project Las Virgenes – Triunfo to be included in the United States Army Corps of Engineers' 2019 Annual Report to Congress on Future Water Resource Development. The Las Virgenes - Triunfo Joint Powers Authority (Authority) provides water and wastewater services to a population of approximately 100,000 residents in the communities of Westlake Village, Agoura Hills, Calabasas and unincorporated areas of Western Los Angeles County and Eastern Ventura County, California.

The Pure Water Project Las Virgenes - Triunfo is a $100 million potable reuse project that includes construction of an advanced treatment plant and pipelines. By recycling treated wastewater and treating it to drinking water standards, a new water supply will be created. With this project, 5,000 acre-feet of locally sourced, reliable water will be made available to a region that continues to be stricken with drought and supply uncertainties. The project will also effectively eliminate the discharge of treated wastewater from the Authority's Tapia Water Reclamation Facility into Malibu Creek and improve the ecosystem health of downstream receiving waters – Malibu Lagoon and Santa Monica Bay.

A critical component and one of the greatest challenges with this project will be the construction of a pipeline for the disposal of the waste product from the advanced treatment plant. An 11 mile-long brine pipeline will need to be designed, constructed, and connected to an existing regional brine pipeline that is already operational. The estimated cost for the construction of this pipeline is $14 million, not including design and other ancillary costs. The Authority is seeking technical and financial assistance to design and construct the brine pipeline. Without the successful installation of the brine pipeline, the entire project will not be possible.

Glen Peterson
Chair, Las Virgenes-Triunfo
Joint Powers Authority
President, Las Virgenes Municipal Water District
Board of Directors

Michael Paule
Vice Chair, Las Virgenes-Triunfo
Joint Powers Authority
Chair, Triunfo Sanitation District
Board of Directors

Please consider including the Pure Water Project Las Virgenes – Triunfo Brine Pipeline in the subject annual report to Congress.

Sincerely,

David W. Pedersen, P.E.
Administering Agent/General Manager

Additional Proposal Information

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Pure Water Project Flyer.pdf

SUSTAINABLE WATER AND ENVIRONMENTAL STEWARDSHIP IN THE REGION

PURE WATER PROJECT
LAS VIRGENES-TRIUNFO

Bringing Our Water Full Circle

A New Source of Water for Southern California

The Las Virgenes-Triunfo Joint Powers Authority (JPA) is undertaking a visionary project to improve local water supply reliability and drought resilience, and effectively eliminate discharges to Malibu Creek, a current practice that is costly due to new regulations without commensurate public benefit.

The Pure Water Project relies on indirect potable reuse, a water supply strategy now adopted by many cities and water agencies in California and across the United States to provide local, reliable water supplies. The project involves the development of necessary infrastructure to provide for the delivery of recycled water to a proposed advanced water treatment facility where proven technology will be used to purify the water. In addition to stopping the unsustainable practice of discharging recycled water to Malibu Creek in the winter, the Pure Water Project provides an affordable, local water supply that will be cost-competitive with imported water supplies over the long-term. This important effort will require public understanding, regional leadership, and funding to move from concept to reality.

Las Virgenes Reservoir

The environmentally sensitive Malibu Creek Watershed and Las Virgenes – Triunfo Joint Powers Authority communities will benefit from the proposed Pure Water Project Las Virgenes – Triunfo, which will provide a new, local water supply for the region and eliminate discharges of recycled water to Malibu Creek.

FEBRUARY 2017

Infrastructure for Indirect Potable Reuse

The Pure Water Project will use proven technology to provide safe water through construction of an advanced water purification plant that will treat recycled water from the JPA's Tapia Water Reclamation Facility.

The purified water will be conveyed through a newly-constructed pipeline to the Las Virgenes Reservoir where it will blend with the water stored there. All reservoir water will be retreated to drinking water standards at the Westlake Filtration Plant before it is safely delivered to homes and businesses. A method for brine disposal will also be included in the project. The effort will require public understanding, regional leadership, and funding to move from concept to reality.

Tapia Water Reclamation Facility

Built in 1965, each day the Tapia Water Reclamation Facility treats upward of nine million gallons to Title 22-Tertiary Treated Recycled Water standards.

Long-Term Effort to Bring Our Water Full Circle

Years 1 – 5

- Demonstration Project
- Regulatory/Environmental Compliance
- Financing and Funding
- Pre-Design
- Land Acquisition
- Public Outreach

Years 6 – 8

- Final Design
- Construction Permitting
- Equipment Procurement
- Public Outreach

A Collaborative Approach

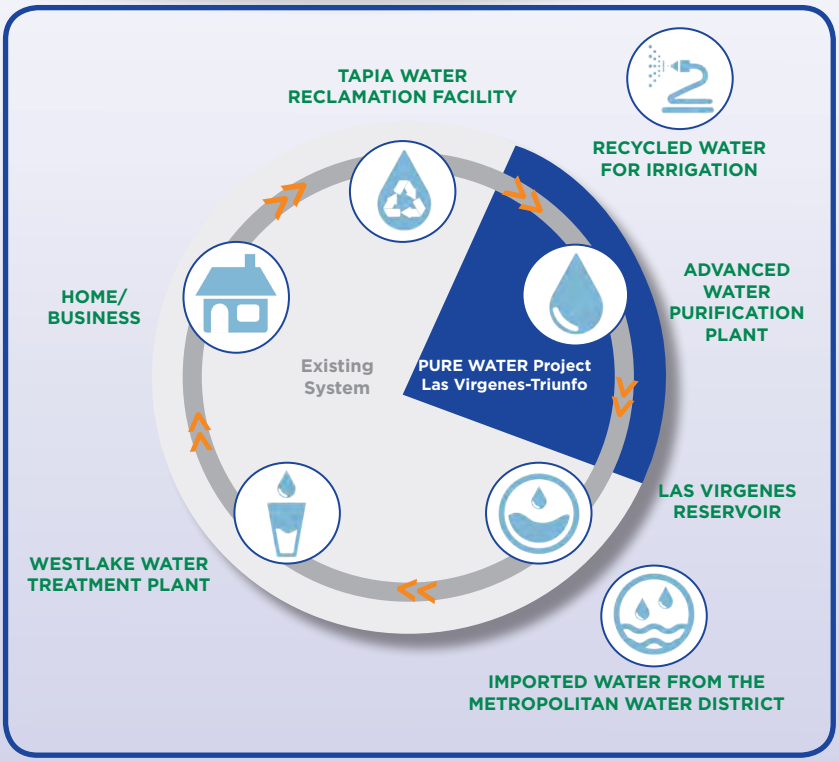
The proposed project stems from the recommendations of a stakeholder group that explored ways to maximize the beneficial use of the region's recycled water. The stakeholders, representing various interested parties in the watershed, conducted an intensive 18-month collaborative process to evaluate the political, economic, social, technical, legal and environmental aspects of a number of alternatives. Of the two options recommended by the stakeholders, the JPA selected ADVANCED WATER TREATMENT for indirect potable reuse over the Encino Reservoir Seasonal Storage alternative.

Advantages

- Reduces demand for imported potable water
- Makes use of an underutilized local resource
- Takes advantage of existing infrastructure
- Is a multi-agency and multi-county collaborative project
- Provides long-term cost benefits

Challenges

- Brine disposal
- Construction cost: $95 million (seeking State, Federal and local assistance)
- Pipeline construction in urbanized areas
- Public acceptance



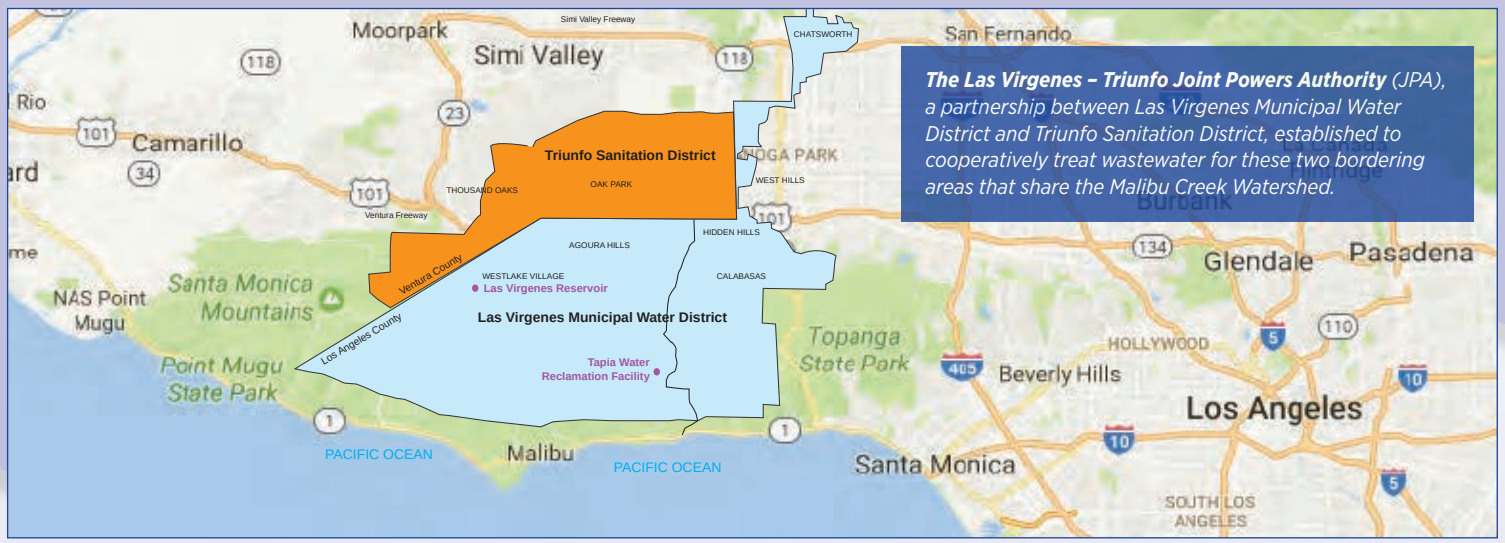
Years 9 – 11

- Construction of Pipelines and Advanced Water Treatment Facility
- Public Outreach

Years 11 – 13 1/2

- Project Start-Up
- Regulatory Compliance
- Public Outreach

Serving Southern California

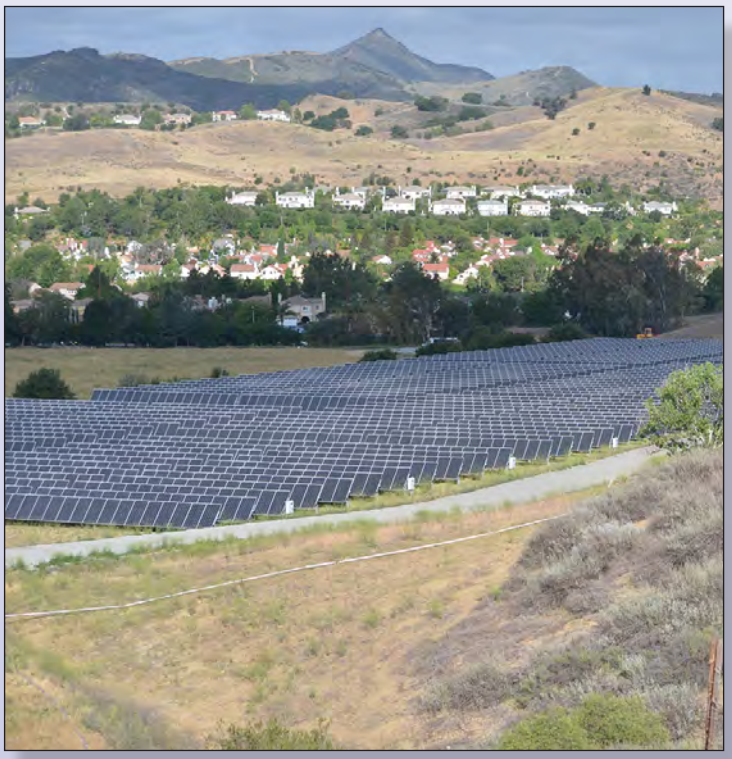


The Las Virgenes – Triunfo Joint Powers Authority *(JPA), a partnership between Las Virgenes Municipal Water District and Triunfo Sanitation District, established to cooperatively treat wastewater for these two bordering areas that share the Malibu Creek Watershed.*

JPA's Environmental Stewardship

The Las Virgenes – Triunfo JPA has demonstrated its long-term commitment to a stewardship role in the Malibu Creek Watershed:

- A leader in developing recycled water as a resource since the early 1970s.
- Built $50 million in watershed improvements including a composting facility to eliminate land application of biosolids.
- Maintains stream flow for endangered species protection.
- Invested over $12 million in nutrient reduction facilities.
- Avoids creek discharge for seven months each year at a cost of $1 million per year.
- Contracted for 20 years of solar power to pump recycled water and reduce greenhouse gases.
- Funded creek monitoring and the compilation of 40 years of water quality data.
- Representation in the Santa Monica Bay Restoration Commission.
- Conducts tours and educational programs for elected officials, residents and students on their respective roles.



One megawatt solar power facility used to pump recycled water in Calabasas, CA.

For More Information

David W. Pedersen P.E. *Administering Agent/General Manager | dpedersen@lvmwd.com*

David R. Lippman P.E. *Director of Facilities and Operations | dlippman@lvmwd.com*

Las Virgenes - Triunfo JPA 4232 Las Virgenes Road, Calabasas, CA 91302 818-251-2200

www.LVMWD.com/Pure-Water-Project

PURE WATER PROJECT
LAS VIRGENES-TRIUNFO

Bringing Our Water Full Circle

Additional Proposal Information

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Briefing Paper Pure Water Project Benefits.pdf

Pure Water Project Las Virgenes – Triunfo
Briefing Paper – Project Description and Benefits

Las Virgenes – Triunfo Joint Powers Authority Organizational Structure

The Las Virgenes – Triunfo Joint Powers Authority (JPA) was formed in 1964 to construct, operate and maintain a joint sewer system and wastewater treatment facilities to serve the Malibu Creek Watershed. The Board of the JPA consists of the Boards of the Las Virgenes Municipal Water District (LVMWD) and the Triunfo Sanitation District (TSD). A quorum of the JPA Board consists of at least three members of the Boards of LVMWD and TSD. Action by the JPA requires the affirmative vote of not less than three members of the Boards of LVMWD and TSD. LVMWD serves as the Administering Agent of the JPA. The General Manager of LVMWD acts as the Administering Agent/General Manager of the JPA. Under the direction of the Administering Agent/General Manager LVMWD staff administers, manages, operates and maintains JPA facilities.

Formed in 1958 LVMWD is a municipal water district organized and operating pursuant to California Water Code Sections 71000 et seq. A board of five directors, elected by district for four-year terms governs LVMWD. LVMWD provides potable water, wastewater treatment, recycled water and biosolids composting to more than 70,000 residents in the cities of Agoura Hills, Calabasas, Hidden Hills, Westlake Village, and unincorporated areas of western Los Angeles County.

Pursuant to California Health and Safety Code Division 5, Part 3, Chapter 3, Section 4700, TSD was formed in 1963 as a special district to provide sanitation services for the southeast portion of Ventura County. Covering approximately 50 square miles, TSD serves approximately 30,100 people and provides wastewater collection and treatment (via JPA facilities) and supplies recycled water. A board of five directors, elected at large for four-year terms, governs TSD. TSD contracts with Ventura Regional Sanitation District for administration, operation, and management services. The Oak Park Water Company is a branch of TSD and provides potable water service to about 4,600 service connections in the 4.1 square mile community of Oak Park. Other public and private water purveyors serve the other areas within TSD's service area.

The JPA as the prospective borrower will own and operate the project. LVMWD staff acting on behalf of the JPA have managed the design and construction of complex water treatment and water reclamation facilities. LVMWD staff also operates and maintains facilities that are similar in size and complexity to the facilities proposed in the project[1]. These facilities include a 12 Million Gallon per Day water reclamation facility using nitrification de-nitrification and tertiary treatment, an in-vessel composting facility for biosolids handling including anaerobic digestion and digester gas recovery and a recycled water transmission/distribution system consisting of over 60 miles of pipelines, three storage tanks and three pumping stations.

Project Description

The JPA produces tertiary treated recycled water at the Tapia Water Reclamation Facility (Tapia) by treating wastewater flows from its service area. The recycled water is beneficially reused for the

[1] LVMWD also operates an extension potable water distribution system including a surface water reservoir and treatment facility that is not part of the JPA.

irrigation of parks, schools, golf courses and common area landscapes since the 1970s. However, there is a high level of seasonal variability in recycled water demand; demands are typically low in the winter and sharply escalates in the summer. The supply of recycled water generally remains constant throughout the year creating excess recycled water in the winter and a shortage of recycled water in the summer. In the summer, the deficient supply is managed by supplementing with local groundwater and potable water. In winter, the excess recycled water is discharged to Malibu Creek. The JPA discharges to Malibu Creek pursuant to National Pollutant Discharge Elimination Permit CA0056014 CI# 4760 Order No. R4-2010-0165 issued by the Los Angeles Regional Water Quality Control Board (LARWQCB). In order to meet regulatory requirements and achieve the highest and best use for recycled water that is currently discharged to the creek, or disposed of using other methods, the JPA is planning to use this water for indirect potable reuse.

On July 2, 2013, the United States Environmental Agency (EPA) Region IX established the Malibu Creek and Lagoon Maximum Daily Loads for Sedimentation and Nutrients to Address Benthic Community Impairments (2013 TMDL). On December 8, 2016, the LARWQCB adopted an Implementation Plan for the 2013 TMDL and on September 22, 2017 the California State Water Resource Control Board approved the Implementation Plan.[2] The 2013 TMDL waste load allocations (WLA) are to be implemented for Tapia's discharge as follows:

Implementation Schedule	Total Nitrogen Summer WLA	Total Nitrogen Winter WLA	Total Phosphorus Summer WLA	Total Phosphorus Winter WLA
Upon effective date of Implementation Plan	Current performance	Current performance	Current performance	Current performance
5 years from the effective date	1.0 mg/L	Current performance	0.1 mg/L	Current performance
13.5 years from the effective date	1.0 mg/L	4.0 mg/L	0.10 mg/L	0.20 mg/L

To meet these discharge requirements at existing facilities, advanced membrane and reserve osmosis based treatment processes are needed at an estimated cost exceeding $100 million, only to discharge the highly purified water to Malibu Creek.[3] Rather than incurring this cost to discharge highly treated water, the JPA initiated and lead a stakeholder driven process in 2015 to evaluate options to discharging. The stakeholder process resulted in six alternatives considered in the Plan of Action and eventually two alternatives evaluated in the Basis of Design Report. On August 1, 2016 the JPA Board selected Indirect Potable Reuse using Surface Water Augmentation as the preferred alternative, known as Pure Water Project Las Virgenes – Triunfo.

The Pure Water Project will convey the excess recycled water produced at Tapia to a new Advanced Water Treatment (AWT) facility that will further treat the water using micro-filtration, reverse osmosis

[2] The Implementation Plan also included a 2003 EPA established Malibu Creek Watershed TMDL for Nutrients. The JPA complied with the waste load allocations in this TMDL via a Time Schedule Order in their 2005 NPDES Discharge Permit.

[3] Nutrient Reduction Measures for Low Total Nitrogen and Phosphorus – UPDATE 2013

and advanced oxidation. The purified water will then be conveyed to the existing Las Virgenes Potable Water Reservoir for indirect potable reuse utilizing surface water augmentation. After the requisite detention time, mixing and dilution the purified water will be equivalent to the raw water in the reservoir. The raw water is then treated at the existing Westlake Filtration Plant and conveyed to the LVMWD's service area in Los Angeles County and TSD's service area in Ventura County to meet potable water demands. The brine from the advanced water treatment plant will be conveyed to the Calleguas Municipal Water District (CMWD) Salinity Management Pipeline (SMP) in Ventura County. The Pure Water Project takes advantage of existing recycled water conveyance facilities, the existing Las Virgenes Reservoir and Westlake Filtration Plant and the potable water distribution systems of LVMWD, TSD and CMWD. New facilities will include the AWT, an extension of the recycled water transmission system, a purified water pipeline to Las Virgenes Reservoir, mixing facilities at Las Virgenes Reservoir and a brine disposal pipeline to the SMP.

The total potable water demand for LVMWD and TSD in 2015 was 21,566 acre-feet[4]. The 2016 Basis of Design Report determined a low and high range of purified water produced at the AWT of 680 to 2,637 acre-feet. This represents 3% to 12% of the 2015 potable water demand. The projected combined potable water demand in 2035 is projected to be 26,274 acre-feet[5]. The 2016 Basis of Design Report projected a low and high range of purified water produced at the AWT of 3,681 to 5,151 acre-feet in 2035. The water produced by the Pure Water Project represent 14% - 20% of the potable water demand in 2035.

Project Location

The Pure Water Project will serve customers of the Las Virgenes Municipal Water District (LVMWD) and Triunfo Sanitation District (TSD). LVMWD provides potable water, wastewater treatment, recycled water and biosolids composting 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. TSD provides potable water, wastewater treatment, recycled water and biosolids composting to about 30,100 people in a portion of the City of Thousand Oaks and unincorporated areas of Ventura County.

The service area is primarily the Malibu Creek Watershed. The watershed drains an area of 109 square miles and extends from the Santa Monica Mountains and adjacent Simi Hills to the Pacific Coast of Santa Monica Bay at Malibu State Beach. The entire watershed lies within the Level 3 sub-ecoregion 6 (Southern and Central California Chaparral) within the aggregate nutrient ecoregion 3 (Xeric West; USEPA, 2000c.) About 50 square miles of the watershed is parkland or conserved land including the Santa Monica National Recreation Area, various California State Parks and protected open spaces. The watershed contains a wide variety of diverse habitats including coastal strand, oak and riparian woodlands, chaparral, coastal sage scrub, native grasslands, sulphur springs and brackish water Lagoon. It is home to several threatened, endangered or endemic plants and animals including the southern steelhead trout, tidewater goby, California brown pelican, California least tern, red-legged frog, San Fernando spineflower, Malibu baccharis and the arroyo chub.

Project's Purpose and Quantitative & Qualitative Public Benefits

[4] From LVMWD and TSD 2015 Urban Water Management Plans
[5] From LVMWD and TSD 2015 Urban Water Management Plans

Las Virgenes Municipal Water District (LVMWD) and Triunfo Sanitation District (TSD) rely solely on imported water from the Metropolitan Water District of Southern California (MWDSC) for their potable water supply[6]. The combined service area includes portions of Los Angeles and Ventura Counties including the incorporated cities of Agoura Hills, Calabasas, Hidden Hills, Thousand Oaks and Westlake Village. Since the 1970s, the JPA has provided tertiary treated recycled water to the region for the irrigation of parks, schools, golf courses and common area landscaping. As a result of this forward thinking approach, recycled water currently accounts for 20% of LVMWD's total water demand. However, there is a high level of seasonal variability in recycled water demand; demands are typically low in the winter and sharply escalate in the summer. The supply of recycled water generally remains constant throughout the year creating excess recycled water in the winter and a shortage of recycled water in the summer. In the summer, the deficient in supply is managed by supplementing with local groundwater and potable water. In winter, the excess recycled water is discharged to Malibu Creek.

To beneficially reuse this excess recycled water the JPA initiated the Pure Water Project Las Virgenes – Triunfo. The Pure Water Project will convey the excess recycled water produced at Tapia to a new Advanced Water Treatment (AWT) facility that will further treat the water using micro-filtration, reverse osmosis and advanced oxidation. The purified water will then be conveyed to the existing Las Virgenes Potable Water Reservoir for indirect potable reuse utilizing surface water augmentation. After the requisite detention time, with mixing and dilution the purified water will be equivalent to the raw water in the reservoir. The raw water would then be treated at the existing Westlake Filtration Plant and conveyed to the LVMWD service area in Los Angeles County and TSD service area in Ventura County to meet potable water demands. The brine from the AWT will be conveyed to the Calleguas Municipal Water District Salinity Management Pipeline (SMP) in Ventura County. The Pure Water Project takes advantage of existing recycled and potable water conveyance facilities, the existing Las Virgenes Reservoir and Westlake Filtration Plant. New facilities will include the AWT, an extension of the recycled water transmission system, a purified water pipeline to Las Virgenes Reservoir, mixing facilities at Las Virgenes Reservoir and a brine disposal pipeline to the SMP.

The Regional quantitative & qualitative public benefits created by the Pure Water Project include:

Reduced Reliance on Imported Water

Las Virgenes Municipal Water District (LVMWD) and Triunfo Sanitation District (TSD) rely solely on imported water from the Metropolitan Water District of Southern California (MWDSC) for their potable water supply. About 30 percent of Southern California's water comes from the State Water Project, the largest state-built water and power system in the nation. The project runs from Lake Oroville in Northern California to Southern California, crossing the Sacramento-San Joaquin Delta along the way. The SWP serves a population of nearly 25 million Californians from the Bay Area to San Diego as well as providing irrigation for some of the nation's most productive farmland in the Central Valley. The State Water Project is operated and maintained by the California Department of Water Resources and includes 34 storage facilities, reservoirs and lakes; 20 pumping plants; 4 pumping-generating plants; 5 hydroelectric power plants; and about 700 miles of open canals and pipelines. Water from the State Water Project is delivered through the California Aqueduct, a 444 mile-long canal beginning at the south

[6] LVMWD is a MWDSC member agency and purchases treated water directly from MWDSC. TSD purchases treated water from Calleguas Municipal Water District, a MWDSC member agency in Ventura County.

Delta and ending at Lake Perris in Riverside County. It varies in width from 50 to 110 feet and 19 to 32 feet in depth.

MWDSC is the largest contractor on the State Water Project system, receiving about 50% of the SWP's supplies, roughly 1.2 million acre feet (MAF) in an average year. MWDSC's SWP allocation varies depending on water supply conditions in the Western Sierra Mountains and environmental conditions in the Sacramento-San Joaquin Delta, which can restrict water deliveries.

As Southern California's population and economy continues to grow, the need for additional water to meet new demands grows with it. Local resource programs such as conservation, water recycling, desalination, potable reuse and groundwater recovery and storage are important programs in the region that contribute to a diverse local resource portfolio These programs also bring greater water supply reliability to Southern California and help offset imported water supplies.

The Pure Water Project will replace up to 2,600 acre-feet of imported water in the near term and up to 5,100 acre-feet of imported water in the long term. These reductions represent 12% of the combined potable water demand in the near term and 20% of the combined potable water demand in the long term. Every acre-foot of water produced by the Pure Water Project reduces the need for imported water by the same amount.

Drought Proof Supply

The Pure Water Project is a “drought proof” water supply increasing the reliability of the JPA’s drinking water supply by reducing reliance on imported water. Droughts are a recurring feature of California’s climate. Over the last century, significant statewide droughts have occurred in 1929-1934, 1976-1977 and 1987-1992, a less severe drought occurred in 2007-2009. From 2012 to 2016, California has experienced an extreme drought affecting the amount of imported water available to Southern California. Being one hundred percent reliant upon imported water LVMWD and TSD do not have local supplies to drawn on and are very susceptible to shortages in regional and state supplies. The Pure Water Project produces a local resource that will provide up to 20% of the combined potable water demand greatly diversify LVMWD’s water portfolio which will increase local resilience to the potential adverse effects of climate change on water supply.

Environmental Benefits

The California WaterFix is a proposal to change how water is diverted from the Sacramento-San Joaquin Delta. The plan seeks to accomplish three primary goals:

1. Allow for more natural flows in the Delta to benefit salmon, smelt and other species.
2. Increase water supply reliability by giving water projects that divert from the Delta more flexibility to move water without harming fish.
3. Guard the Delta water diversion point from natural disaster disruption, such as earthquake or flood.

However, the California WaterFix is decades away from completion and has just started the final environmental review. In the meantime, the existing south Delta pumps pull water from nearby channels in an unnatural direction, called “reverse flows”, which can draw fish off their migratory paths and even entrain them in the pumps. The Pure Water Project creates a local supply that reduces the

need for imported water. This in turn reduces the amount of pumping in Delta benefiting the Delta environment.

Energy Savings and Reduced Greenhouse Gas Emissions

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.[7] 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.[8]

The JPA purchases 100 percent of their potable water from MWDSC. The water for the region is treated at the Joseph Jensen Water Treatment Plan in Granada Hills, which is supplied with imported water from the State Water Project. For each acre-foot 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 (CO_2) is emitted, so for each acre-foot of water delivered to the JPA's service area, 1.77 tons of CO_2 is emitted.[9] The transmission, distribution, and advanced treatment of an acre-foot of recycled water consumes an average of 2.05 MWh of electricity, resulting in 0.89 tons of CO_2 emitted. For every acre-foot of advanced treated recycled water, that replaces imported water, a reduction of 2.04 MWh of electricity and 0.88 tons of CO_2 emissions are realized. As a result, the production of 5,151 AF of water through the Pure Water Project will result in an annual reduction of 10,508 MWh of electricity and 4,533 tons of CO_2 emissions.

Every acre-foot of water produced by the Pure Water Project reduces the need to import an acre-foot of water from the SWP. The reduction in imported water results in increased water supply reliability, environmental benefits and reduced energy consumption and greenhouse gas emissions.

Environmental Benefits

On July 2, 2013, the United States Environmental Agency (EPA) Region IX established the Malibu Creek and Lagoon Maximum Daily Loads for Sedimentation and Nutrients to Address Benthic Community Impairments (2013 TMDL). This TMDL specifically addresses the impaired benthic biota in the Malibu Creek main stem and Malibu Lagoon. The JPA discharges to Malibu Creek pursuant to National Pollutant Discharge Permit CA0056014 CI# 4760 Order No. R4-2010-0165 issued by the Los Angeles Regional Water Quality Control Board (LARWQCB) and the main discharge point is to the Malibu Creek main stem near the confluence of Malibu Creek and Cold Creek. The EPA analysis included in the TMDL identified that excess nutrients have adversely affected aquatic habitat and stimulated the growth of excessive algae which has contributed to the reduced quality of aquatic habitat. Water discharged from the Tapia was specifically identified as contributing the excess nutrients adversely affecting aquatic habitat.

Section 303(d) of the Clean Water Act (CWA) requires that each State "shall identify those waters within its boundaries for which effluent limitations are not strong enough to implement any water quality

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[7] California Energy Commission. 2005. *Integrated Energy Policy Report.* CEC-100-2005-007-CMF. November 2005.
[8] Natural Resources Defense Council. 2004. *Energy Down the Drain: The Hidden Costs of California's Water Supply.* August 2004.
[9] Calleguas Municipal Water District. 2007. *CO_2 Emissions and Imported State Project Water to Ventura County*. January 25, 2007.

objective applicable to such waters." Malibu Creek is 303(d) listed for Benthic Macroinvertebrate Bioassessemnts, Nutrients (Algae) and Sedimentation/Siltation among other impairments. The 2013 TMDL concluded that numeric targets for total nitrogen of 0.65 mg/L in the summer and 1.0 mg/L in the winter and total phosphorous targets of 0.1 mg/L in the summer and 0.2 mg/L in the winter were necessary to obtain beneficial uses listed in the Basin Plan.

On December 8, 2016, the LARWQCB adopted an Implementation Plan for the 2013 TMDL and on September 22, 2017 the California State Water Resource Control Board approved the Implementation Plan.[10] The 2013 TMDL waste load allocations (WLA) are to be implemented for Tapia's discharge as follows:

Implementation Schedule	Total Nitrogen Summer WLA	Total Nitrogen Winter WLA	Total Phosphorus Summer WLA	Total Phosphorus Winter WLA
Upon effective date of Implementation Plan	Current performance	Current performance	Current performance	Current performance
5 years from the effective date	1.0 mg/L	Current performance	0.1 mg/L	Current performance
13.5 years from the effective date	1.0 mg/L	4.0 mg/L	0.10 mg/L	0.20 mg/L

The 2013 TMDL found that the evidence supporting the causal pathway between the JPA's winter time discharge and elevated downstream nutrient concentrations is strong and that the evidence supporting the causal pathway between the JPA's summer time discharge and elevated downstream nutrient concentrations is moderate. The 2013 TMDL further pointed out the linkage between point source discharges causing elevated nutrients that cause excess algal growth resulting in reduced habitat quality and reduced dissolved oxygen. This in turn results in impaired biology and decreased recruitment and survival[11]. The Pure Water Project allows the JPA to comply with the adopted waste load allocations as required by the Clean Water Act by significantly eliminating discharges to Malibu Creek in the winter. Significantly eliminating discharges to Malibu Creek creates public health benefits by addressing identified beneficial uses in the LARWQCB Basin Plan including contact and non-contact water recreation, warm freshwater habitat, cold freshwater habitat, wildlife habitat, rare, threatened, or endangered species, and wetland habitat.

Reduced reliance on imported water will also provide environmental benefits to the state by reducing the amount of water removed from river systems in Northern California. The resulting increase in available in-stream water will also help to address environmental concerns being addressed by the California Water Fix.

Regional Economic Benefits

[10] The Implementation Plan also included a 2003 EPA established Malibu Creek Watershed TMDL for Nutrients. The JPA complied with the waste load allocations in this TMDL via a Time Schedule Order in their 2005 NPDES Discharge Permit.
[11] 2013 TMDL

The Pure Water Project reduces the volume of water purchased from MWDSC or in the case of TSD from CMWD. The reduced purchases create a saving for the JPA. Effective in 2017 MWDSC's rate for treated water is $979 per acre-foot and CMWD's rate for treated water is $1,300 per acre-foot. In Section 4.7.1 of the Basis of Design Report (BODR) a present worth analysis found that for the first year operations & maintenance costs (O&M) will be $2,663,000 and saving from reduced purchases of imported water will be $2,373,300 producing a net O&M cost for the first year of $290,000. The present worth analysis in the BODR assumed the following parameters:

- Construction costs of $95,313,000
- 30 year period
- 2% per annum inflation rate applied to O&M costs
- 7% per annum escalation rate of MWDSC imported water rate, composed of a 2% inflation rate and a 5% increase in rates
- 5% discount rate of future values to determine present worth, composed of a 2% inflation rate and 3% interest rate

The present worth analysis, considered a 30-year period of no growth in recycled water suppling the Pure Water Project and a 30-year period of growth of 86 acre-feet per year in recycled water supplies. The growth in recycled water supply results from new commercial and residential customers. The results of the present worth analysis are:

	Present Worth Comparison	
	Without Growth	**With Growth**
Construction Cost	$95,31,3000	$95,313,000
Present worth of Annual O&M costs including imported water savings	($40,716,000)	($80,685,000)
Net Present Worth	$54,597,000	$14,629,000

As an alternative to construction the Pure Water Project to comply with the WLA of the 2013 TMDL the following facilities will be needed:

- Conversion of the JPA's water reclamation facility to membrane bioreactor process
- Construction of a reverse osmosis facilities along with pipelines to the R&O facility and to return permeate to the plant for disinfection and release
- Concentration and crystallization of the brine from the RO process

The net present worth of this option is $626,000,000[12]. The Pure Water Project has a much lower net present worth than the treatment option. This substantially reduces the need for additional rate revenue and the impact on the rates of the JPA customers in Los Angeles and Ventura Counties.

Innovative Water Reuse Process

In February 2009 the California State Water Resource Control Board (SWRCB) adopted Resolution 2009-0011 an updated water recycling policy, which includes the goal of increasing the use of recycled water

[12] Nutrient Reduction Measures for Low Total Nitrogen and Phosphorus – UPDATE 2013

in the state over 2002 levels by at least 1,000,000 acre-feet per year by 2020 and by at least 2,000,000 acre-feet per year by 2030. The Resolution also included the requirement to adopt uniform water recycling criteria for surface water augmentation by December 31, 2016. The SWRCB used an expert and advisory panel to develop recommended uniform water recycling criteria for surface water augmentation. The SWRCB adopted the regulations in March 2018.

The indirect potable reuse surface water augmentation regulations rely on treatment performance measured as "log removal" for the various treatment trains. Log removal relates to the percentage of microorganisms physically removed or inactivated by a given process. For reference, current regulations for a conventional surface water filtration plant require 4-log (99.99%) removal and/or inactivation of enteric viruses and 3-log (99.9%) removal and/or inactivation of Giardia lamblia cysts. The proposed surface water augmentation regulations require 12-log removal for enteric virus reduction, 10-log for Giardia cyst reduction and 10-log cryptosporidium oocyst reduction. The required log reduction is often referred to as 12-10-10 log reduction requirements. The treatment trains involved include microfiltration, reverse osmosis and ultra-violet light with hydrogen peroxide disinfection. The treatment trains used to achieve these reductions must be demonstrated to meet the log reduction standards using SWRCB Division of Drinking Water approved performance testing procedures.

The JPA has been working closely with the SWRCB and their expert and advisory panels during the development of the uniform water recycling criteria for surface water augmentation. This innovative water reuse process requires innovative approaches so the JPA has commissioned a demonstration project and a mixing and dilution study.

The demonstration facility serves four main purposes:

1. Public Outreach & Acceptance. The demonstration facility will provide an opportunity for the public to see and learn about the processes used for indirect potable reuse.
2. Operator Training. The demonstration facility will provide operator training on the processes used for indirect potable reuse.
3. Regulatory Compliance. The demonstration facility will help demonstrate and validate the effectiveness of the treatment trains proposed for the Pure Water Project.
4. Provide research in five focused areas:
    a. Evaluation and quantification of the natural degradation of NDMA and other constituents of emerging concern in an open-air reservoir subject to direct sunlight.
    b. Direct testing of high recovery RO, achieving recoveries above 93 percent to reduce the brine flows requiring transmission and disposal.
    c. Long-term demonstration of the benefits of operating RO membranes at elevated flux to improve contaminant rejection and product water quality.
    d. 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.
    e. Characterization of the brine to determine its compatibility for discharge to Calleguas Municipal Water District's Salinity Management Pipeline.

Although there are several indirect potable reuse groundwater recharge projects operational in California there are no permitted surface water augmentation projects. Only two other agencies in California are actively pursuing surface water augmentation projects. However, a significant distinction

of the Pure Water Project to those other projects is that it will be operated seasonally. The application of various treatment processes to achieve 12-10-10 log reduction and being one of the first projects to apply the new surface water augmentation regulations and operating seasonally makes the Pure Water Project groundbreaking and innovative.

Additional Information

Additional information may be found at https://www.lvmwd.com/about-us/joint-powers-authority/pure-water-project-las-virgenes-triunfo

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Map Document

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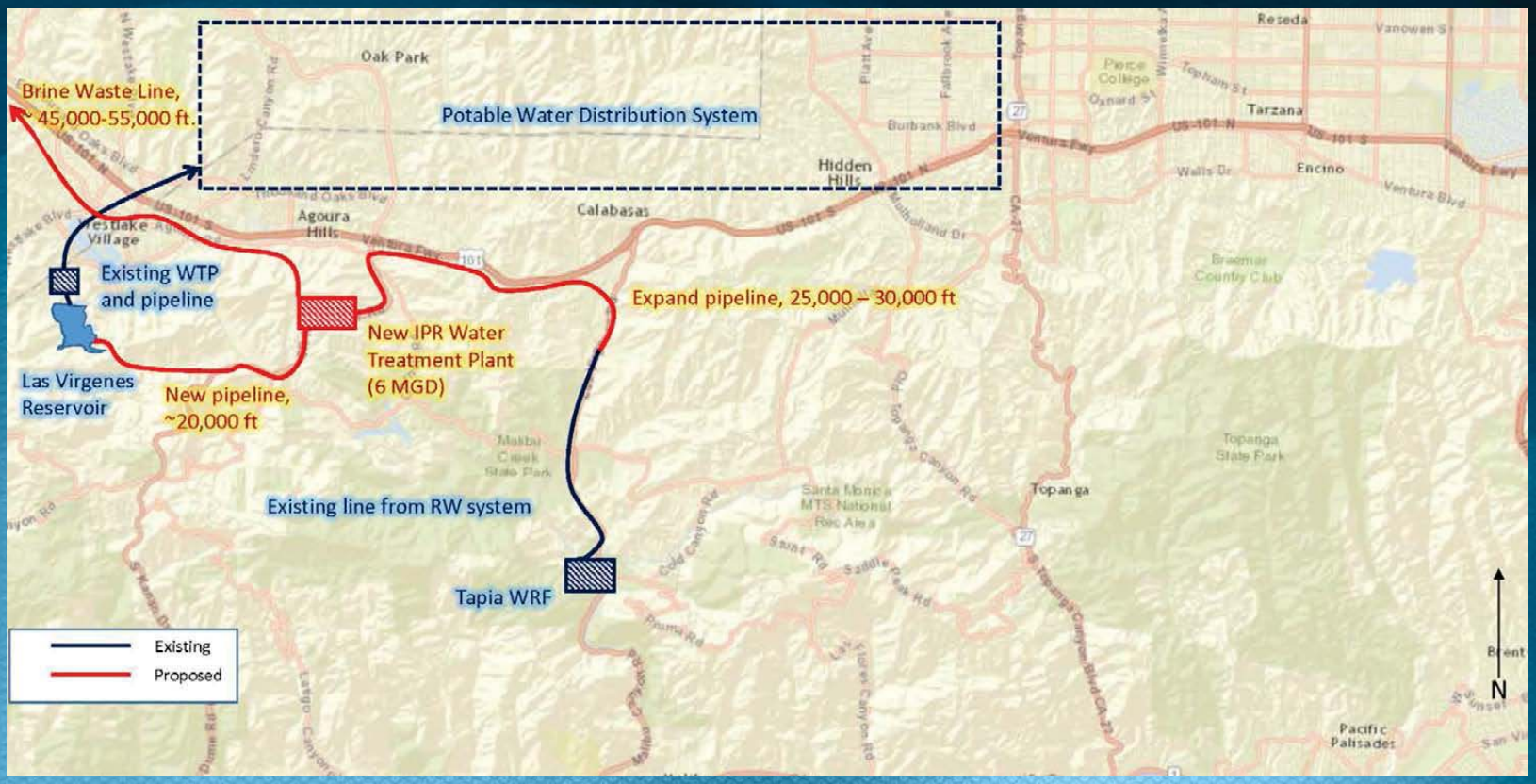
Scenario 4: Las Virgenes Reservoir (IPR)