WaterSMART WATER AND ENERGY EFFICIENCY GRANTS FOR FY 2018 FUNDING OPPORTUNITY NO. BOR-DO-18-F006

RIVERSIDE CANAL LINING PROJECT:

A Best-Practices Water Efficiency and Conservation Improvement in El Paso

TOTAL PROJECT COST: $2,000,000

Applicant
El Paso County Water Improvement District No. 1
13247 Alameda Avenue, Clint, Texas 79836

Project Manager
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TABLE OF CONTENTS

I EXECUTIVE SUMMARY

A. General Project Information

A.1. Applicant Information

Date:	May 07, 2018
Applicant Name:	El Paso County Water Improvement District No. 1
City, County, State:	El Paso, El Paso County, Texas
Project Name:	Riverside Canal Lining Project: A Best-Practices Water Efficiency and Conservation Improvement in El Paso
Project Manager: Telephone: E-mail:	Dr. Al Blair, P.E., District Engineer 512-394-1011 awblair@awblair.com
Project Funding Request:	The total project cost is $2,000,000 and the District is requesting $1,000,000 in federal funds.
D-U-N-S Number:	128044773

A.2. Project Summary

The Riverside Canal Lining Project consists of constructing 1.36 miles (7,190 feet) of reinforced concrete on an earthen-lined portion of the Riverside Canal. The properly designed and constructed system will support the efficient management of water resources by reducing water losses due to seepage and evaporation. Additional benefits to existing and planned water infrastructure can be achieved as part of the proposed project. The estimated amount of water to be saved after completion of the project is 4,087 acre-feet of water at a cost of $24.47 per acre-foot.

The proposed project is the third of multiple planned improvements to the Riverside Canal Project. In 2014, approximately 4,000 feet of the Riverside Canal were concrete lined immediately upstream of the proposed project using District funds and financial support from the Texas Water Development Board (TWDB). Also starting in 2014, the District lined approximately 5,000 feet of the Riverside Canal immediately downstream of the proposed project and made improvements to the Partidor Check Structure using District funds. The proposed project will complete more than 3 miles of concrete lining in the Riverside Canal. A project location map denoting this recent construction is available for reference in Figure 2.

This proposal is being submitted under Funding Group II under Water Conservation Projects: Canal Lining/Piping.

A.3. Estimated Schedule

The construction of the project will take thirty-three months from the date of funding authorization. Concrete lining work will need to take place outside of the irrigation season (typically March 15 to October 15) and is expected to be completed by March of 2021.

Evaluation and final report preparation will take an additional three months. The project completion date is June 30, 2021. The project will be accomplished within the three-year allowance. A project timeline is available for reference in Figure 8.

A.4. Federal Facility

El Paso County Water Improvement District No. 1 lies within Reclamation's Upper Colorado Region. The District manages a maximum annual allocation of 376,960 acre-feet of water per year from the Rio Grande Project, a federal Reclamation project.

II BACKGROUND DATA

A. History

The United States Reclamation Act passed on June 17, 1902 initiated formal development of the large-scale irrigation system in the El Paso Valley. The Rio Grande Reclamation (Project) Act of February 25, 1905 provided for the construction of Elephant Butte Dam and Reservoir, which was completed in 1916. Significant major canals and drains were constructed under the Rio Grande Reclamation Project from 1915 to 1925 and a second impoundment, the Caballo Dam and Reservoir, was completed in 1938. The United States Bureau of Reclamation maintained the dams, reservoirs, canals and drains until 1980, when the maintenance responsibilities (in Texas) were assumed by the El Paso County Water Improvement District Number 1 (the District). The District assumed actual ownership of all canals, drains, laterals and waterways within its boundaries on January 22, 1996.

The Applicant, the El Paso County Water Improvement District Number One (the "District"), was established in 1917 by the El Paso County Commissioner's Court as El Paso County Irrigation District Number One, and is a political subdivision of the State of Texas. It is organized under, and by virtue of, Article XVI, Section 59, of the Constitution of the State of Texas. The District is operated under the statutes of Chapter 55, and Chapter 49, in part, of the Texas Water Code and is located in El Paso County, Texas.

A District boundary map is provided for reference in Figure 1.

B. Water Supply and Usage

The District obtains water by annual allocation from the United States Bureau of Reclamation's Rio Grande Project. The District's diversion right of water during a full allocation year during the primary irrigation season is 376,860 acre-feet per year.

C. Current water uses and water users served

The District provides water from the Rio Grande for 69,010 acres of water rights lands. Active irrigation users include approximately 325 large farms and 4,500 irrigated tracts of five acres or less. Irrigated crops include cotton, alfalfa, pecan trees, sorghum, chilies, wheat, milo, vegetables, pasture grass, and family gardens.

In partnership with the City of El Paso, the District contributes to the municipal water needs of a population of 735,000 as party to Contract No. 01-WC-40-6760, joined by the United States Bureau of Reclamation and the City of El Paso and its Public Utility Board, which allows the conversion of Rio Grande Project Water for municipal use by the City of El Paso. The contract allows for delivery of a maximum amount of 28,116 acre-feet of water to the City. The City of El Paso currently has water rights for approximately 70,000 acre-feet per year in total from Rio Grande Project Water in subsequent contracts and from leasing water rights from holders. The amount of water attainable by the City of El Paso is subject to availability and is dependent on the District's total diversion rights and prior appropriations.

D. Current and Projected Water Demand

Water conservation is critical to the El Paso region, which has an arid climate and receives an average annual rainfall of about 8 inches with net evaporation exceeding 70 inches. Irrigation, municipal, and industrial water use as well as international and interstate treaties all place significant demands on the limited water resources in the area.

Water demand in Texas is determined at the state level by the Texas Water Development Board (TWDB). The Texas State Water Plan is updated every five year using records of actual local water use data and through input from a local review process spearheaded by the Far West Texas Water Planning Group. The Texas State Water Plan is available at https://twdb.texas.gov.

The Texas State Water Plan estimates that the total water demand in El Paso County is 406,422 acre-feet of water per year. By 2070, water demand is expected to increase to 476,929 acre-feet of water per year. Irrigation currently accounts for over 60% of water use in El Paso County, and a significant portion of future municipal water needs are projected to be supplied using increasing amounts of water previously allocated for irrigation. Municipal water demand projections in the State Water Plan are based on current and future per capita consumption and are therefore susceptible to any variations in actual population increases.

One such variation is the continued expansion of Fort Bliss as a result of the Army's Base Realignment and Closure (BRAC) program, which from 2008 to 2011 brought 13,700 additional military personnel and over 20,000 dependents. Increasing the military value of Fort Bliss is one of the top economic development priorities for the City of El Paso, opening the possibility of future increases in military personnel. Fort Bliss received approximately 26% of its water supply from the City of El Paso in 2017.

Another variable is the increasing water demand in Ciudad Juarez, Mexico, which is located across the Rio Grande from the City of El Paso. According to the *Junta Municipal de Agua y Saneamiento de Juárez* (JMAS), Ciudad Juarez's potable water utility, the city is 100% dependent on groundwater to satisfy all of its municipal and industrial water demands. According to Mexico's *Consejo Nacional de Poblacion* (CONAPO) 2010 – 2030 population projections, the current population of Ciudad Juarez is estimated at over 1.4 million and is expected to grow by over 9% by 2030. In 2014, 144,213 acre-feet of water were pumped from the Hueco Bolson aquifer, following a 15-year trend of average annual increases in pumping of 1,289 acre-feet since 2000. The City of El Paso shares the Hueco Bolson with Ciudad Juarez and

is used to meet anywhere from 28-61% of municipal and industrial water needs in El Paso, depending on the availability of Rio Grande Project water.

These variables exemplify the vulnerability of the future water supply in relation to population growth, further supporting the need for conservation and drought resilience projects.

D.1. Unmet Water Demand

The Texas State Water Plan estimates that there are 53,202 acre-feet of annual unmet water needs for irrigation in El Paso County. A portion of the agricultural land in El Paso County has access to private irrigation wells of which a majority of the wells produce water with Total Dissolved Solids of greater than 1,000 mg/l (many in excess of 2,500 mg/l) with significant sodium content. The high salt content of the groundwater limits the amount of groundwater that can be used to grow irrigated crops. Consequently, many farmers rely on blending surface water from the Rio Grande with groundwater to meet their water quality needs or use surface water exclusively. During years of drought, many agricultural operations are fallowed or deficit irrigated.

The Texas State Water Plan estimates that a minimum of 25,000 acre-feet of water can be conserved during periods of drought and a minimum of 50,000 acre-feet of water per year during full allocation years by making improvements to the District's conveyance system, including the concrete lining of canals. The proposed project is well accepted by District members as the next logical step for the District to continue providing the water necessary to sustain farming operations and provide additional water to the City of El Paso under its contracts with the District.

Conservation via concrete lining is a more cost effective option to meet future water demands compared to other projects proposed in the Texas State Water Plan, including meeting municipal water demands via desalination, advanced purification, and the importation of water from outside El Paso County. A 2017 report by El Paso Water Utilities compared drinking water quality treatment costs per acre-feet, determining that treatment costs for surface river water are the second least expensive option at $300 per acre-foot, while costs for desalination are $508 per acre-foot, costs for advanced purification are $1,370 per acre foot, and costs for long-distance importation are $2,840 per acre foot.

As water demand is met by a more efficient system, the District will not require using as large of an annual allocation of Rio Grande Project water, thereby allowing storage in Elephant Butte and Caballo Reservoirs to accumulate and provide critical water in drought years when unmet water demands are highest.

E. Potential Shortfalls in Water Supply

E.1. Water Losses

The number one potential shortfall for the District is water losses due to seepage and evaporation. The District is part of a federal U.S. Bureau of Reclamation project and its water delivery system uses gravity flow to deliver desired water volumes. The process involves using

carefully controlled releases the Elephant Butte and Caballo Reservoirs from a distance of 140 miles upstream and using canals, laterals, and existing telemetry infrastructure to plan and coordinate the use of released water.

A report from the United States Geological Survey (USGS) investigated accumulative seepage losses along a 64-mile reach of the Rio Grande from below Leasburg Dam in Leasburg, New Mexico to above the American Dam in El Paso, Texas (*USGS Scientific Investigations Report 2016-5011*). This report determined that the cumulative seepage losses in 2015 were 17.3 cubic feet per second (cfs) (plus or minus 2.6 cfs depending on a series of factors). These losses are a result of seepage in the Rio Grande streambed, evaporation from the water surface, and transpiration by vegetation along the river banks. These inevitable losses and additional losses further upstream starting from Elephant Butte Reservoir must also be accounted as part of the District's water delivery operations and drought planning.

Because the District has limited ability to address losses upstream, the District continuously invests in projects within its jurisdiction that increase efficiency and reduce losses due to seepage and evaporation. The District has performed multiple efficiency and water loss prevention studies, including seepage tests for the proposed project in 1999, and worked with Texas A&M University to perform additional inflow-outflow seepage studies across the District's system in 2002, 2003, 2009, and 2013. The proposed project is one of the District's most cost-effective water conservation strategies at $24.47 per acre-foot of water. Additional information on water savings estimates is available in Section V.A of this proposal.

E.2. Previous Drought and the Economy

The westernmost part of Texas, as well the headwaters of the Rio Grande in Colorado and New Mexico from which the District's water supply originates, have been experiencing drought conditions for much of the past two decades, with only 1997, 2005, 2008, 2016, and 2017 experiencing average or above-average spring runoff into Elephant Butte Reservoir. According to the U.S. Bureau of Reclamation El Paso Office, Elephant Butte Reservoir has been near or below 20% of the combined storage capacity of 2.23 million acre-feet since 2010, reaching only three percent capacity in 2013. 2013 was the shortest irrigation season in El Paso (less than six weeks) and supplied the least amount of water in the almost 100 year history of the Rio Grande Project. To meet municipal water demands, the City of El Paso was forced to drill new groundwater wells and operate its desalination plant at maximum capacity at high costs.

Beneficial use and conservation of water is critical to the economy within the District's boundaries. A 2015 report by the Texas Water Development Board (TWDB) that studied the socioeconomic impacts of projected water shortages in El Paso County determined that, if unmet, water shortages would have a negative economic impact of $3.45 billion by 2070 and include almost 25,000 jobs lost. The economic impact of unmet irrigation water demands directly contributes to the slowing or reversal of job growth in areas where the economy benefits from agricultural revenues. Estimates from Texas A&M University in 2015 determined that $150 million in agricultural sales were lost due to irrigation water reductions from drought conditions in 2011-2015.

Economic activity in other sectors can also be impacted as a result of water shortages. According to the *2014 Southern New Mexico and El Paso Joint Land Use Study*, water source diversification efforts have allowed Fort Bliss to augment its water supplies by purchasing water from the City of El Paso, consequently increasing the military value of the base. 1 in 5 jobs in the El Paso region are linked to military installations. The Texas Comptroller estimates that Fort Bliss contributed $24.1 billion to the Texas economy in 2015.

E.3. Drought Conditions Today

Prolonged drought conditions in the headwaters of the Rio Grande in Colorado and New Mexico have led to low storage levels. According to data from the National Resources Conservation Service and the National Weather and Climate Center, the Elephant Butte Reservoir as of April of 2018 is below 20% of capacity and at 34% of the average storage levels based on a reference period from 1981 to 2010. This report can be referenced in Appendix D.

The U.S. Drought Monitor April 12, 2018 report shows extreme and severe drought conditions in areas at or within the headwaters of the Rio Grande in Colorado and New Mexico. According to the U.S. Bureau of Reclamation El Paso Office, snowpack and total precipitation are 0% to 37% of the long-term average for April of 2018. Consequently, storage levels in Elephant Butte Reservoir in 2019 may possibly return to near record-low levels similar to those in 2013.

In March and April of 2018, U.S Department of Agriculture issued disaster declarations in several counties impacted by drought within the Rio Grande watershed. In March of 2018, the counties of Alamosa, Costilla, and Saguache in Colorado (part of or hydrologically-linked to the headwaters of the Rio Grande) were among the counties that qualified for federal natural disaster assistance. In April of 2018, 12 counties in New Mexico were designated as primary natural disaster areas, allowing the contiguous Sierra County where Elephant Butte and Caballo Reservoirs are located to qualify for federal natural disaster assistance. 27 of New Mexico's 33 counties are affected by the designations. In April of 2018, the State of Texas proclaimed disaster declarations in response to drought conditions across 91 counties, primarily in West Texas. Although El Paso County has not been part of the disaster declarations as of April 2018, El Paso County will be impacted from drought conditions within the Rio Grande watershed.

F. Water Delivery System

The District's boundary encompasses 156 square miles containing over 350 miles of canals and laterals, 269 miles of drains and 62 wells. The canals are predominantly earth-lined. 90% of the check structures are manually operated. The District possesses a system of automated recording and control along many of its existing canals, which has resulted in improvements in water savings and operational efficiency. The current system possesses 76 telemetry sites for water level recording and flow metering. A central data recording station has been established, which may be accessed remotely via internet connection by management and technical personnel.

The District delivers also river water for municipal use to the City of El Paso at the W.E. Robertson/Umbenhauer Water Treatment Plant located in downtown El Paso and at the Jonathan W. Rogers Water Treatment Plant located in the El Paso Lower Valley.

F.1. Recent Improvements on the Riverside Canal Project

The proposed 1.36 mile concrete canal lining project is the third of multiple planned improvements to the Riverside Canal Project. The proposed project will complete 3 miles of concrete lining work in the Riverside Canal up to Waste Way 1. Subsequent concrete lining work is planned for an additional 8 miles from Riverside Canal Waste Way 1 to Waste Way 2 with planning and design efforts beginning in 2017.

In 2014, the District was awarded a grant from the Texas Water Development Board (TWDB) to concrete line 4,000 feet of Reach B of the Riverside Canal starting at the tail end of the Rio Grande American Canal Extension. This project benefitted the City of El Paso's water intake structure to the Jonathan W. Rogers Water Treatment Plant by reducing sediment and the water discharge structure from the Roberto R. Bustamante Wastewater Treatment Plant by reducing maintenance costs due to erosion from concentrated flow of the previous earth lined canal.

Starting in 2014 and in collaboration with the International Boundary and Water Commission (IBWC), the District made improvements to the Waste Way 1 structure and concrete lined 100 feet downstream at the Riverside Canal. The District subsequently concrete lined an additional 4,000 feet of Reach A of the Riverside Canal, replaced the diversion check structure at the Franklin Feeder Canal, and lined an additional 10,000 feet further on the Franklin Feeder Canal. Finally, in 2018, the District was awarded a grant from the TWDB for the engineering, design, and environmental work to concrete line Reach D of the Riverside Canal, located immediately downstream from Waste Way 1. These improvements are located immediately downstream of the proposed project and, although not part of this proposal, have already resulted in significant water conservation gains and reduced maintenance costs, and demonstrate the value of the proposed project. A labeled location map with descriptions is provided for reference in Figure 3.

G. Partnership with Reclamation

The District has a long-standing and productive relationship with the United States Bureau of Reclamation. The District shares Reclamation's goals and objectives and over the years much of the District's infrastructure has been built in collaboration with Reclamation.

III PROJECT LOCATION

The Riverside Canal Lining Project is located in the southeastern end of the incorporated area of the City of El Paso, Texas and adjacent to the south of the City of Socorro, Texas. The Riverside Canal is situated alongside the U.S.-Mexico border. The project linear length begins at latitude *31°38'23.6"N* and longitude *106°31'06.8"W* and ends at latitude *31°39'19.6"N* and longitude *106°19'07.7"W*. Since the Riverside Canal partially feeds other major canals in the District, the project improvements benefit the entire system of canals and drains. A location map is provided for reference in Figure 2.

The proposed project is located at a water infrastructure and services "hub" in the El Paso Lower Valley, where crucial surface water, water treatment, wastewater, and stormwater infrastructure is located. A labeled location map with descriptions is provided for reference in Figure 3.

IV TECHNICAL PROJECT DESCRIPTION

The technical project description should describe the work in detail, including specific activities that will be accomplished. This description shall have sufficient detail to permit a comprehensive evaluation of the proposal.

A. Project Components

This proposal is being submitted under Funding Group II, Task A-Water Conservation: Canal Lining. The project implements physical improvements to the system that will result in increased overall operational efficiency and water savings. We assume that the improvements will have a useful life of 20 years.

A.1. Task 1: Canal Lining

The Riverside Canal Lining Project will consist of constructing 1.36 miles (7,190 feet) of reinforced concrete on an earthen-lined portion of the Riverside Canal. A 4-inch fiber-reinforced concrete slab is proposed for the canal lining. Concrete lining provides a durable canal surface with excellent hydraulic properties that is stable and easier to maintain than earth-lined canals. The concrete will be applied in the field as shotcrete. Fiber reinforcement contributes to the strength and durability of the concrete at a lower cost than steel reinforcement. A typical canal lining operation performed on Riverside Canal is shown in Figure 4. Figure 5 shows typical equipment for application of shotcrete for canal lining.

The 1.36 mile section of Riverside Canal from the Roberto R. Bustamante Wastewater Treatment Plant to the Partidor Check Structure is designated Reach B in the Riverside Canal Phase I plans produced in 2004. The canal cross-section reduction and alignment approved for the Phase I plans are incorporated into the present plan. The canal cross-section has a 14 feet bottom width, 1.5:1 side slopes and an average depth of 11' along Reach A. Figure 6 shows Phase I drawings of typical canal lining for Reach A.

The proposed project incorporates a significant portion of the 7,700 foot portion of the Riverside Canal that constituted Reach A within the Phase 1 design. The only modification to the phase 1 Reach A design is the use of shotcrete rather than reinforced concrete slabs as a cost-saving measure.

B. Project Schedule

According to the terms of the Funding Opportunity, the project must be completed by June 30, 2021. It is assumed that funding announcements will be made by August of 2018, and Assistance Agreements will be awarded within one to three months of the announcement.

The schedule presented in Figure 7 assumes that design and review activities can proceed upon notification, and that contract awards or expenditures for materials will begin around November 1, 2018, but not before the Assistance agreement is awarded. Due to the need to avoid construction in the canal during the irrigation season, physical construction is planned between October 15 and March 1, with construction being complete by March 1, 2021. Only reporting activities continue through the projected June 2018 completion date.

V EVALUATION CRITERIA

A. Evaluation Criterion A: Quantifiable Water Savings

A.1. ***Describe the amount of estimated water savings.***

For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please include a specific quantifiable water savings estimate; do not include a range of potential water savings.

Savings may be achieved by reducing seepage and evaporation losses summarized in Table 1 below.

TABLE 1

El Paso County Water Improvement District No. 1
RIVERSIDE CANAL LINING PROJECT
Water Conservation Calculations – Seepage & Evaporation

Existing Condition Losses (per year)

Seepage	1.36	miles	@	3000	ac-ft/mile/yr	4,080.00	ac-ft
Evaporation	17.37	acres	@	6	ft /acre/year	104.22	ac-ft
Total Existing						***4,184.22***	***ac-ft***

Proposed Condition Losses (per year)

Seepage	1.36	miles	@	60	ac-ft/mile/yr	81.60	ac-ft
Evaporation	2.59	acres	@	6	ft/acre/year	15.54	ac-ft
Total Proposed						***97.14***	***ac-ft***

Total Water Conserved (per year) ***4,087.08*** ***ac-ft***

The estimated cost of the Riverside Canal Lining Project is $2 million. Since the estimated amount of water conserved is 4,087 acre-feet per year, over the assumed 20-year life of the improvements, the cost of each acre-foot conserved is:

$2,000,000 / (4087 ac-ft/year * 20 years) = $24.47 per acre foot

A.2. *Describe current losses.*

Please explain where the water that will be conserved is currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground?)

The water that will be conserved as a result of the proposed project is primarily lost to seepage through earthen banks and expansion joints between concrete sections. Damages from erosion in these expansion joints can be referenced in Figure 8. Approximately 4,087 acre feet of water per year can be conserved through canal lining the proposed project area.

Additional water is lost to evaporation of water from the flowing water surface. The proposed project will reduce evaporation losses primarily by decreasing the width of the banks of the Riverside Canal. Approximately 104.22 acre feet of water is currently lost to evaporation each year. Evaporation losses are typically small and cannot be avoided in open channel systems.

Water lost to seepage typically flows downward towards shallow groundwater. Some seepage may be intercepted and consumed by deep-rooted vegetation, including riparian vegetation in the neighboring Rio Bosque Wetlands Park. Water loss estimates resulting from surrounding vegetation are not included as part of this proposal.

A.3. *Describe the support/documentation of estimated water savings.*

Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Note: projects that do not provide sufficient supporting detail/calculations may not receive credit under this section. Please be sure to consider the questions associated with your project type when determining the estimated water savings, without additional documentation/data, are not sufficient to receive credit under this section. Further, the water savings must be the result of reducing or eliminating a current, ongoing loss, not the result of an expected future loss.

The District performed a hydrostatic test on approximately the first 2.25 miles of the Riverside Canal up to the Partidor Check in 1998. The results of the test indicated that approximately 3,000 acre-feet of water can be conserved annually as a result of concrete lining the Riverside Canal. Measurements are shown in the report titled Salvage of Water in El Paso County Water Improvement District No. 1 Canal System in Appendix B.

Riverside Project Annual Acre-feet Savings per Mile Equation

$$4.21 \text{ cfs} \left| \frac{60 \text{ sec}}{\text{min}} \right| \frac{60 \text{ min}}{\text{hr}} \left| \frac{24 \text{ hr}}{\text{day}} \right| \frac{30 \text{ day}}{\text{mo}} \left| \frac{12\text{mo}}{\text{yr}} \right| \frac{5280 \text{ ft}}{1 \text{ mile}} \Bigg| = 3{,}047.75 \text{ af/mile/yr}$$

Water savings estimated were rounded down for ease of use. These estimates are consistent with estimates used in the preparation of the 2009 Finding of No Significant Impact (FONSI) and Final Environmental Assessment for the Riverside Canal Improvement Project by Reclamation, of which the proposed project is a portion. The FONSI and Final Environmental Assessment can be referenced in Appendix A.

These water loss estimates are also consistent with historical inflow-outflow measurements in studies performed by Reclamation, the United States International Boundary and Water Commission (IBWC), the Texas Water Development Board, and the United States Geological Survey. Additional inflow-outflow seepage studies were performed by Texas A&M University across the District's system in 2002, 2003, 2009, and 2013, further demonstrating consistency throughout the different testing sites. References to these studies are shown in Appendix E.

A.4. ***Additional questions on the type of infrastructure – Canal Lining/Piping:***

How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.

The seepage losses in the proposed project will be reduced by 3998 acre feet of water per year by concrete lining 1.36 miles of earthen lined canal. Although concrete lining provides excellent hydraulic properties, it is estimated that 81.60 acre-feet of water per year will be lost due to seepage in the project area.

Project Area		ac-ft/mile/year	Estimated seepage losses	Acre-feet
1.36 miles	*	3000	earthen-lined canal	= 4,080.00
1.36 miles	*	60	concrete lined canal	= 81.60 (-)
			Total Water Savings	**= 3998.40**

An additional 88.68 acre feet of water per year currently lost to evaporation will be saved due to a reduction of width in the Riverside Canal. The existing surface width of the Riverside Canal varies from 40-60 feet. The proposed canal cross-section reduction will have a 14 feet bottom width, 1.5:1 side slopes, and an average depth of 11 feet. The canal will remain an open channel that is susceptible to some evaporation.

Project Area		ft/acre/year	Estimated Evaporation	Acre-feet
17.37 acres	*	6	current canal width	= 104.22
2.59 acres	*	6	proposed canal width	= 15.54 (-)
			Total Water Savings	**= 88.68**

The overall project annual acre-feet savings resulting from the proposed project are 4,087 acre-feet.

Water Conserved from Seepage		Water Savings from Evaporation	**Total Water Savings**
3398.40	+	88.68	**= 4,087.08**

How have average annual canal seepage losses been determined? Have ponding and/or inflow/outflow tests been conducted to determine seepage rates under varying conditions? If so, please provide detailed descriptions of testing methods and all results. If not, please provide an explanation of the method(s) used to calculate seepage losses. All estimates should be supported with multiple sets of data/measurements from representative sections of canals.

As previously stated, the estimated average annual water savings were determined by previous hydrostatic testing on sections of the Riverside Canal bearing its original design. Inflow-outflow tests were also performed across different sites and are comparable to the proposed project. These tests can be referenced in Appendix B. These same estimates were used by Reclamation in the preparation of the 2009 Riverside Canal, Structure, and Improvements Project FONSI and Final Environmental Assessment, which can be referenced in Appendix A.

The District has recently made improvements to the Riverside Canal Project in collaboration with the International Boundary and Water Commission (IBWC), the Texas Water Development Board (TWDB). Approximately 4,000 feet have been concrete lined at the start of the Riverside Canal up to the start of the proposed lining project with financial support from the TWDB. The District concrete lined an additional 4,000 feet of the Riverside Canal and upgraded the Partidor Check Structure located at the end of the proposed project. In collaboration with the IBWC, the District made upgrades to the Riverside Waste Way 1 and lined an additional 100 feet of the Riverside Canal. Benefit-cost analyses were performed using the same estimated conserved water estimates of 3,000 acre feet per year per mile to secure support from both the TWDB and IBWC.

What are the expected post-project seepage / leakage losses and how were these estimates determined?

Concrete lining provides a durable canal surface with excellent hydraulic properties that is stable and easier to maintain than earth-lined canals. The District currently has 4 telemetry sites at the 3-mile section of the Riverside Canal from the start of the Riverside Canal up to Waste Way 1. These sites are located only in canal sections that have been previously concrete lined. Consequently, the District is able to estimate seepage losses by comparing meter readings from one site to a second site. It is estimated that 60 acre-feet of water per mile per year are lost to seepage in concrete-lined sections of the Riverside Canal based on observations of meter readings, which were generally below 0.1 cubic feet per second (cfs) per mile. The estimated average post-project seepage losses are 0.08 cfs per mile and the following formula was used to determine post-project seepage losses for the proposed project:

0.08 cfs/mile = ~0.159 acre-feet/day/mile → 0.159 * 365 (year) = 58.04 acre feet/year/mile

Estimated seepage losses were rounded up to 60 acre-feet per mile per year for ease of use. This approach was determined to produce similar results compared to actual water savings reported in post-project seepage tests to the Texas Water Development Board in 2014.

What are the anticipated annual transit loss reductions in terms of acre-feet per mile for the overall project and for each section of canal included in the project?

It is anticipated that 3998.40 acre-feet of water will be conserved as a result of concrete lining the proposed 1.36 mile portion of the Riverside Canal. This estimate is consistent with estimated water savings from 1.65 miles of concrete lined sections of the Riverside Canal located immediately upstream and downstream of the proposed project.

How will actual canal loss seepage reductions be verified?

At the close of the project, the District will perform a seepage test to determine actual water savings. This data will then be analyzed and compared to evaluate the provided water loss estimates. Results will be included in the final project report submitted to Reclamation.

Include a detailed description of the materials being used.

The proposed project will reconstruct a 7,190 feet section of the Riverside Canal using similar materials and construction techniques used when concrete lining the canal sections immediately upstream and downstream of the proposed project. This involves the movement and compaction of approximately 153,777 cubic yards of canal bank and sealing 7,190 with a 4 inch layer of fiber-reinforced shotcrete.

B. Evaluation Criterion B: Water Supply Reliability

Please address how the project will increase water supply reliability. Proposals that will address more significant water supply shortfalls benefitting multiple sectors and multiple water users, will be prioritized. General water supply reliability benefits (e.g., proposals that will increase resiliency to drought) will also be considered. Please provide sufficient explanation of the project benefits and their significance. These benefits may include, but are not limited to, the following:

B.1. Does the project promote and encourage collaboration among parties in a way that helps increase the reliability of the water supply?

Is there widespread support for the project?

Water stakeholders, municipalities, and elected officials in El Paso have formed strong partnerships to ensure the sustainability of El Paso's water resources. To this same end, the District proactively seeks to form partnerships with water stakeholders and inform them of planned conservation projects.

U.S. Representative Will Hurd (TX-023) and U.S. Representative Beto O'Rourke (TX-016) have formally expressed their support of the proposed project via letters of support, which can be referenced in Appendix C. Both Congressman Hurd and Congressman O'Rourke have a history of involvement in regional water issues.

Texas State Senator Jose Rodriguez and Texas State Representative Mary Gonzalez supported a funding request to the Texas Water Development Board for additional improvements to the Riverside Canal located downstream from the proposed project area. Although a letter of support was not requested from these officials for the proposed project, they are aware of the Riverside Canal Project as a whole and have expressed their support in the past. The letters of support used in the funding request to the Texas Water Development Board are available for reference in Appendix C.

The project is also supported by the Region E Far West Texas Water Planning Group (FWTWPG), the designated entity that works with the Texas Water Development Board (TWDB) to develop the *Texas State Water Plan*. The FWTWPG is composed of appointed members representing 15 water interest categories, including municipal, agricultural, environmental, and economic development interests. Other public members include the U.S. Bureau of Reclamation and the International Boundary and Water Commission (IBWC). A letter of support is available for reference in Appendix C.

The District holds quarterly public meetings with local farmers and agricultural producers detailing irrigation water supplies, ongoing and planned conservation and improvement projects, and other information relevant to agricultural operations. The farming community has expressed continuous support of the District's conservation projects, especially projects that mitigate water deficits during drought conditions. Being the largest farming community in El Paso County, the City of Socorro issued a Resolution of Support for the project, available for reference in Appendix C.

As part of its 2018 Resilience Strategy, the City of El Paso emphasized the need to develop systems and infrastructure necessary to increase the region's resilience to drought. Citing uncertainties around water, rising temperatures, and rapid urbanization, the *2018 Resilience Strategy* describes projects such as canal lining that can conserve water to be used in periods of drought and diversify the region's water sources.

The proposed project complements existing and planned water reuse and advanced purification projects by the El Paso Water Utilities (EPWU). The District and the City of El Paso have a history of collaboration on multiple water, wastewater, and stormwater projects. As previously stated, the Riverside Canal lies within a water infrastructure and services "hub" located in the El Paso Lower Valley, which can be referenced in Figure 3. This cluster of water infrastructure permits collaborations between the District and the City of El Paso via EPWU such as the delivery of surface water at the head of the Riverside Canal for municipal and industrial use at the Jonathan W. Rogers Water Treatment Plant. EPWU also discharges up to 30,000 acre feet of treated waste water each year from the Roberto R. Bustamante Wastewater Treatment Plant at a release structure approximately 1,000 feet upstream of the proposed project. These collaborations have made more efficient by concrete lining the Riverside Canal at the water intake and release points.

What is the significance of the collaboration / support?

Water demand in the El Paso region exceeds current water supplies, and there are limited local, state, and federal resources available for projects to meet such demand. Consequently, water stakeholders in El Paso have formed strong partnerships that have led to increases in water efficiency, conservation, and reuse. The proposed project is one of such efforts and will mitigate water shortages during periods of drought by diversifying the District's water supply outside of the Rio Grande Project.

Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?

The Riverside Canal Project Complements the Construction of a Purified Treatment Plant
Concrete lining the proposed 1.36 mile section of the Riverside Canal would further enhance collaborative efforts between the District and the City of El Paso. EPWU is planning to construct an Advanced Purified Treatment Plant (APTP) located at the adjacent Roberto R. Bustamante Wastewater Treatment Plant by 2020. In Fiscal Year 2015, Reclamation funded a feasibility study under the WaterSMART Title XVI, Water Reclamation and Reuse Program (*FOA No. R14AS00030*) titled *Collection, Storage, Recharge, and Recovery Source Waters for Advanced Purified Treatment (APT) of Reclaimed Water*. EPWU's planned Advanced Purified Treatment Plant would supplement the region's potable water supply by approximately 15,000 acre-feet per year, which is equivalent to about 10% of annual municipal water demand. Planned infrastructure includes a discharge structure at the Riverside Canal located within the proposed project area. Figure 9 shows the proposed construction area of the Advanced Purification Treatment Plant and possible discharge areas at the Riverside Canal..

The Riverside Canal Serves to Distribute New Water Collection and Diversion Sources
Also described in EPWU's aforementioned submission to Reclamation is a collaborative project between the District and EPWU to jointly utilize available and possibly new water diversion collection features, including the use of the Socorro Ponds adjacent to the Rio Bosque Wetlands Park. The Socorro Ponds can be used for the collection and temporary storage and distribution of a combination of agricultural drain waters, treated water, stormwater runoff, and overflow of surface Rio Grande Project water. The District owns and jointly operates portions of the drainage system with EPWU that captures much of the stormwater within the boundaries of the City of El Paso, which can be drained during storm events at a waste structure approximately 1,100 feet above the head of the Riverside Canal. The combination of these water sources could amount to as much as 20,000 acre-feet per year, which could be divided mutually between the District and EPWU for agricultural, municipal, and other shared uses.

The District's portion of such collected and stored water is hydraulically dependent on the Riverside Canal, as shown in Figure 10. As such, concrete lining the proposed section of the Riverside Canal would increase the project's efficiency, reduce maintenance costs, enhance the area of the Riverside Canal that can be used to install water intake and discharge infrastructure, and reduce water turbidity from erosion from the currently earthen-lined banks.

B.2. Will the project make water available to address a specific water reliability concern?

Explain and provide detail of the specific issue(s) in the area that is impacting water reliability, such as shortages due to drought, increased demand, or reduced deliveries.

Water demand in the El Paso region exceeds current water supplies, and there are limited local, state, and federal resources available for projects addressing such demand. The Texas State Water Plan estimates that there are 53,202 acre-feet of annual unmet water needs for irrigation in El Paso County. Prolonged drought conditions continue straining the area's limited groundwater and surface water supplies. Please refer to Section II.E in this document for additional details on El Paso's potential shortfalls in water supply as they relate to prolonged drought conditions and Section II.D.1 for additional details on unmet water demands in El Paso County.

A *2013 Review of Observed and Projected Climate Changes* by the U.S. Bureau of Reclamation noted that projected reductions in snowpack, declines in snow water equivalence, and advanced snowmelt will lead to a 10% to 30% reduction of water flow in the Rio Grande in the next 50 to 70 years. The Rio Grande at El Paso observed flows for 2001 through 2010 that were about 23% lower than the period from 1941 through 2000. Consequently, water stakeholders within the Rio Grande watershed will need to continue making investments in water conservation to mitigate projected reductions in surface water supply.

According to the *Texas State Water Plan*, the population in El Paso County is expected to nearly double to over 1.5 million by 2070. EPWU will continue relying on surface river water to meet increasing demand for the next 50 years, and gradually more water currently used for irrigation is projected to be used for municipal and industrial purposes.

As previously stated, the westernmost part of Texas, as well the headwaters of the Rio Grande in Colorado and New Mexico from which the District's water supply originates, have been experiencing drought conditions for much of the past two decades, with only 1997, 2005, 2008, 2016, and 2017 experiencing average or above-average spring runoff into Elephant Butte Reservoir. According to the U.S. Bureau of Reclamation El Paso Office, Elephant Butte Reservoir has been near or below 20% of the combined storage capacity of 2.23 million acre-feet since 2010, reaching only three percent capacity in 2013. Refer to Figure 11 for a comparison using Landsat 8 of the water levels in Elephant Butte Reservoir during the drought of 2013 versus reservoir levels in 1994, which were at about 89%. As previously stated, current weather events show the prolongation of drought conditions as evidenced in minimal accumulated precipitation and issued Drought Disaster Declarations in the Rio Grande watershed.

As previously stated, prolonged drought conditions and unmet water demands have significant negative socioeconomic impacts. Please refer to Section II.E.2 in this document for additional information on actual and projected economic impacts of unmet water demands in El Paso County.

Describe where the conserved water will go / how it will be used.

Conserved water will be stored in Elephant Butte and Caballo Reservoirs and used as needed to meet future agricultural, municipal, and industrial water needs in El Paso County.

Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth?)

As previously stated, water demands in El Paso County currently exceed water supplies, and conservation via concrete lining is a more cost effective option to meet future agricultural and municipal water demands compared to other projects proposed in the *Texas State Water Plan*, including desalination, advanced purification, and the importation of water from outside El Paso County. The *Texas State Water Plan* estimates that there are 53,202 acre-feet of annual unmet water needs for irrigation in El Paso County, and prolonged drought conditions continue straining the area's limited groundwater and surface water supplies. The proposed project is well accepted by District members as the next logical step for the District to continue providing the water necessary to sustain farming operations and provide additional water to the City of El Paso under its contracts with the District.

Regional population growth is expected to further strain groundwater supplies. Per capita water use in El Paso County can be impacted by the swift arrival of new missions in Fort Bliss as a result of the Army's Base Realignment and Closure (BRAC) program, which from 2008 to 2011 brought 13,700 additional military personnel and over 20,000 dependents. As previously stated, the City of El Paso shares the Hueco Bolson aquifer with Ciudad Juarez, Mexico. Ciudad Juarez is 100% dependent on groundwater to meet municipal and industrial water needs and has overtime continued to pump larger amounts of groundwater from the Hueco Bolson. Please refer to Section II.D in this document for additional details on El Paso County's current, projected, and unmet water demands.

Describe how the project will address the water reliability concern?

The proposed project will lead to the conservation of limited water supplies. As water demand is met by a more efficient system, the District will not require using as large of an annual allocation of Rio Grande Project water, thereby allowing storage in Elephant Butte and Caballo Reservoirs to accumulate and provide critical water in drought years when unmet water demands are highest.

Will the project help to prevent a water-related crisis or conflict? Is there frequently tension or litigation over water in the basin?

The District is located in an area considered by the Bureau of Reclamation to be of Substantial Potential for Conflict as defined in Reclamation's 2011 Technical Memorandum 86-68251-11-01. Allocated water from the Rio Grande Project has been the subject of frequent litigation in the last two decades. The District is involved in the following pending litigation pertaining to Rio Grande Project water:

- *New Mexico Lower Rio Grande Water Rights Adjudication No. CV-96-888-SSI 97-104/107*

- *State of Texas v State of New Mexico and State of Colorado, no. 22O141 Original in the United States Supreme Court and Intervention by the United States*

Litigation involving Rio Grande Project water is linked to unmet agricultural and municipal demands in the Rio Grande Basin, which currently exceed available supplies. Water supply deficits are further perpetuated by prolonged drought conditions, depletions in groundwater supplies, and projected decreases in Rio Grande Project water due to climate change. The proposed project will lead to the conservation of limited water supplies which can be used as needed to meet future agricultural, municipal, and industrial needs in El Paso County.

Indicate the quantity of conserved water that will be used for the intended purpose.
The proposed project will lead to 4,087 acre-feet of conserved water. Please refer to Section V.A.1 in this document for additional details on estimates of water savings resulting from the proposed project.

B.3. Will the project benefit Indian tribes?

A federally-recognized Native American Tribal Reservation of the Ysleta del Sur Pueblo Tribe is located approximately 7,000 feet downstream from the proposed project area, which includes approximately 200 acres of farmland irrigated with Rio Grande Project water. The Riverside Canal is used to deliver irrigation water to the Tribe's farmland. Although the proposed project is not a cultural asset of the Ysleta Del Sur Pueblo Tribe, the project is located in an area of cultural significance to the Tribe. As an additional benefit, the proposed project will lead to reduced future maintenance operations in the greater project area, including the compaction of earthen banks and clearing of vegetation using heavy machinery.

The Riverside Canal is also used to deliver water for the Tribe's ceremonial processions at the Rio Grande. Specifically, the District provides water from the Rio Grande Project every year to the Ysleta del Sur Pueblo Tribe for two of the Tribe's most important processions: St. Anthony of Padua Feast Day and Dia de Los Santos Reyes. The proposed project will lead to water savings that will assist the District in meeting water demand for all water users, including the Ysleta del Sur Pueblo. Additional details are available in correspondence with the Ysleta del Sur Pueblo Tribe in the FONSI and Final Environmental Assessment for the proposed project, available for reference in Appendix A.

B.4. Will the project benefit rural or economically disadvantaged communities?

Water conserved from the proposed project will benefit the rural and agricultural communities in the El Paso County Lower Valley, including Socorro, San Elizario, Clint, and Fabens. The economic impact of unmet irrigation water demands directly contributes to the slowing or reversal of job growth in areas where the economy benefits from agricultural revenues, including these communities. Estimates from Texas A&M University in 2015 determined that $150 million in agricultural sales in El Paso County were lost due to irrigation water reductions from drought

conditions in 2011-2015. El Paso County is considered economically disadvantaged compared to median household income (MHI) levels and poverty rates in the United States and Texas. Rural communities in El Paso County are considered significantly economically disadvantaged, according to estimates from the 2012-2016 U.S. Census Bureau American Community Survey 5-Year Estimates. A breakdown of economically disadvantaged communities relevant to the proposed project is described in Table 2.

Table 2

	Median Household Income	MHI % Compared to U.S.	MHI % Compared to Texas	Poverty Rate
United States	$55,322	100.0%	101.1%	15.1%
Texas	$54,727	98.9%	100.0%	16.7%
El Paso County	$42,075	76.1%	76.9%	22.5%
Socorro	**$32,185**	**58.2%**	**58.8%**	**29.9%**
San Elizario	**$24,970**	**45.1%**	**45.6%**	**42.3%**
Clint CDP	**$31,625**	**57.1%**	**57.8%**	**30.2%**
Fabens CDP	**$24,612**	**44.5%**	**45.0%**	**48.8%**

B.5. Will the project benefit species?

Please describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project.

The United States Department of the Interior Fish and Wildlife Service determined that there are no anticipated impacts to threatened and endangered species by the proposed project as part of Consultation #02-15-03-I-0364. A letter from Fish and Wildlife Service is available for reference in the 2009 FONSI and Final Environmental Assessment for the proposed project in Appendix A.

B.6. Will the project address water supply reliability in other ways not described above?

In an effort to expand the District's water delivery capacity and mitigate risks to the continued delivery of agricultural and municipal water supplies at the El Paso County Lower Valley Water Infrastructure and Services "hub," the District is planning to construct a bypass using the existing Riverside Intercepting Drain Extension and the Rio Intercepting Drain. Please refer to Section V.B.1 in this proposal for additional details on the water infrastructure and services cluster where the proposed project is located. A map of the planned bypass path and relevant infrastructure can be referenced in Figure 12.

The planned bypass intersects the Riverside Canal at approximately 2,100 feet from the start of the proposed project length. It would be necessary for the planned bypass to carry a maximum flow of 1,590 cubic feet per second (cfs), comparable to the existing capacity of the Riverside Canal. Successful implementation of the proposed concrete lining project is necessary for the continued development of the planned bypass and confluence infrastructure.

Strategy 3.3.9 in the *2015 El Paso County Multi-Hazard Mitigation Plan (HMP)* describes dam and levee failures at the Rio Grande El Paso Flood Plain. Strategies in the HMP are approved by the Federal Emergency Management Agency (FEMA) Region VI and comply with the requirements of Title 44 of the Code of Federal Regulations Section 201.6. The representative scenario used for Strategy 3.3.9 in El Paso County is the 2006 Storm, a 500-year flooding event that received a Federal Disaster Declaration with damages exceeding $300 million. In the 2006 Storm, the banks of the Rio Grande nearly broke due to large amounts of stormwater runoff draining into the Rio Grande from across the basin. The District's canal and drainage system was used to partially dissipate stormwater runoff during the 2006 Storm.

The planned bypass would increase the District's capacity to mitigate large quantities of floodwater and possible dam and levee failure in case of a storm event similar to Storm 2006. A stormwater drainage waste way flume is located approximately 4,000 feet upstream of the proposed project at the American Canal Extension, which eventually feeds into the Riverside Canal. The bypass would permit excess water flows in the American Canal Extension to be rerouted and released from Riverside Wasteway 1 while protecting the hydraulic connectivity essential to municipal water supplies at the Jonathan W. Rogers Water Treatment Plant and the Roberto R. Bustamante Wastewater Treatment Plant. As previously stated, successful implementation of the proposed concrete lining project is necessary for the continued development of the planned bypass and confluence infrastructure.

C. Evaluation Criterion D: Complementing On-Farm Irrigation Improvements

C.1. Describe any planned or ongoing projects by farmers/ranchers that receive water from the applicant to improve on-farm efficiencies.

The District has a history of collaboration with the Natural Resources Conservation Service (NRCS) program and periodically hosts local work group management meetings at the District offices. The Environmental Quality Incentives Program (EQIP) 2018 Texas Local Resource Team Priorities for El Paso County include practices that can enhance water availability and efficient irrigation systems. This is due to insufficient water available for irrigation. The District has provided technical and financial assistance in previous years for the installation of headwalls, low-cost telemetry units, and on-farm soil moisture sensors. This type of improvement is eligible for NRCS assistance.

As part of the proposed project, the District must adjust the location of a headwall currently used to deliver water from the Riverside Canal into a private irrigation ditch, shown in Figure 13. This private irrigation ditch provides water to approximately 30 acres of farmland. The District has informed the office of the local NRCS District Conservationist of the proposed canal lining project and recommended approaching the owners of these agricultural operations to consider applying to the NRCS EQIP program. Eligible projects include installing turnout flow meters, upgrading the headwall, concrete lining the irrigation ditch, or installing low-cost soil moisture sensors to conserve water. The proposed project will already lead to reduced turbidity in the delivered irrigated water caused by the erosion of the Riverside Canal's earthen lined banks and eliminate possible operational spills due to the breaks in the existing embankment, and support from the NRCS EQIP program would further increase efficiency.

Provide a detailed description of the on-farm efficiency improvements.

From 2010 to 2012, the District successfully completed a pilot program consisting of installing and monitoring on-farm measurement systems at five farms with financial support from the Texas Water Development Board (TWDB) Agricultural Water Conservation Program. The pilot program included installing turnout flow meters, on-farm soil moisture sensors, telemetry and internet programming, and working directly with farmers for training and field days. Figure 14 shows the installation of headwalls and low-cost telemetry units that were part of this project. The District provided technical assistance to farmers interested in integrating this low-cost soil moisture measurement system into their operations during the project period. At the end of the pilot project, the District halted the program due to prolonged drought conditions from 2011 to 2015.

Have the farmers requested technical assistance or financial assistance from NRCS on the on-farm efficiency projects, or do they plan to in the future?

As previously stated, the District has informed the office of the local NRCS District Conservationist of the proposed canal lining project and recommended approaching the owners of these agricultural operations to consider applying to the NRCS EQIP program. The District has technical information available for farmers that choose to implement soil moisture sensors into their operations.

C.2. Describe how the proposed WaterSMART project would complement any ongoing or planned on-farm improvement.

Will the proposed WaterSMART project directly facilitate the on-farm improvement? If so, how?

The proposed project can facilitate the improvement of the aforementioned private irrigation ditch and can be used by impacted farmers to increase the competitiveness of an application for NRCS EQIP funding. As stated previously, the proposed canal lining project will require making an adjustment to the existing turnout and the construction of a new headwall. Currently, a regularly-maintained embankment is currently used to deliver irrigation water using this irrigation ditch, as shown in Figure 13. As previously stated, the proposed project will already lead to reduced turbidity in the delivered irrigated water caused by the erosion of the Riverside Canal's earthen lined banks and eliminate possible operational spills due to the breaks in the existing embankment.

C.3. Describe the on-farm water conservation or water use efficiency benefits that would result from the on-farm component of this project.

Farmers have the option to request financial assistance from NRCS EQIP to make upgrades to this particular conveyance structure, including installing the aforementioned turnout flow meters, concrete lining the irrigation ditch, or integrating soil moisture measurement systems into their operations. These upgrades can make these particular farming operations more water efficient.

Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.

Results from the District's aforementioned pilot program varied on a farm by farm basis and were negatively impacted by prolonged drought conditions. The amount of water conserved by farmers depends on the District's total diversion rights for that particular year. There is insufficient information available on the impacted agricultural operations at this time to estimate on-farm water savings.

D. Evaluation Criterion E: Department of Interior Priorities

D.1. (1) Creating a conservation stewardship legacy second only to Teddy Roosevelt

Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment

Concrete lining is a best-practices approach to water conservation and that provides a durable canal surface with excellent hydraulic properties that is stable and is easier to maintain than earth-lined canals. Most of the water lost to seepage from earthen canals can be saved by concrete lining. Like all other District lining operations, the proposed project conforms to standards and procedures developed by the United States Bureau of Reclamation for use in the lining of irrigation canals which have proven effective for over 70 years.

Water conservation is especially important in areas with limited water resources. A 2013 Review of Observed and Projected Climate Changes by the U.S. Bureau of Reclamation noted that projected reductions in snowpack, declines in snow water equivalence, and advanced snowmelt will lead to a 10% to 30% reduction of water flow in the Rio Grande in the next 50 to 70 years. Please refer to Section V.B.2 in this proposal for additional information on the proposed project benefits El Paso's limited water resources and mitigates the impact of prolonged drought in the Rio Grande Basin.

As a best-practices water conservation improvement, the proposed canal lining project will lead to conserved water which can be stored in Elephant Butte and Caballo Reservoirs and used in drought years when unmet water demands are highest.

Review DOI water storage, transportation, and distribution systems to identify opportunities to resolve conflicts and expand capacity

The westernmost part of Texas, as well the headwaters of the Rio Grande in Colorado and New Mexico from which the District's water supply originates, have been experiencing drought conditions for much of the past two decades. Prolonged drought conditions in the headwaters of the Rio Grande in Colorado and New Mexico have led to low storage levels at Elephant Butte and Caballo Reservoirs - infrastructure operated by the United States Department of Interior. According to the U.S. Bureau of Reclamation El Paso Office, Elephant Butte Reservoir has been near or below 20% of the combined storage capacity of 2.23 million acre-feet since 2010, reaching only three percent capacity in 2013. As previously stated, climate change predictions

are projecting reductions of up to 30% of water flow in the Rio Grande in the next 50 to 70 years. Consequently, water stakeholders within the Rio Grande watershed, including the Department of Interior, will need to continue making investments in water conservation to mitigate projected reductions in surface water supply.

As further described in Section V.B.2, The District and the proposed project are located in an area considered by the Department of Reclamation to be of Substantial Potential for Conflict, and allocated water from the Rio Grande Project has been the subject of frequent litigation in the last two decades. Litigation involving Rio Grande Project water is linked to unmet water demands in the Rio Grande Basin, which currently exceed available supplies. Water supply deficits are further perpetuated by prolonged drought conditions, depletions in groundwater supplies, and projected decreases in Rio Grande Project water due to climate change. The proposed project has been identified by the District as the most beneficial improvement needed to conserve water in it its distribution system.

D.2. (3) Restoring trust with local communities

Expand the lines of communication with Governors, state natural resource offices, Fish and Wildlife offices, water authorities, county commissioners, Tribes, and local communities.

Water stakeholders, municipalities, and elected officials in El Paso have formed strong partnerships to ensure the sustainability of El Paso's water resources and also understand that continued support from the Department of Interior is necessary to address El Paso's water challenges. The Bureau of Reclamation maintained the dams, reservoirs, canals and drains of the Rio Grande Project until 1980, when the maintenance responsibilities in Texas were assumed by the District and subsequent ownership 1996. As further described in Section V.B.1, the proposed project is supported by congressional and state representatives, the regional water planning group, local communities, other water stakeholders, and farmers. Letters of support for the project can be referenced in Appendix C.

D.3. (5) Modernizing our infrastructure.

Prioritize DOI infrastructure needs to highlight: [1] construction of infrastructure, [2] cyclical maintenance, and [3] deferred maintenance.

The District has a long-standing and productive relationship with the United States Bureau of Reclamation. The District shares Reclamation's goals and objectives and over the years much of the District's infrastructure has been built in collaboration with Reclamation. As part of the Rio Grande Project, the District relies on Reclamation's storage and conveyance infrastructure, including Elephant Butte and Caballo Reservoirs. Because the proposed project will lead to water efficiency and conservation, the District will not require using as large of an annual allocation of Rio Grande Project water, thereby allowing storage in Elephant Butte and Caballo Reservoirs to accumulate and be used as needed, especially during periods of drought.

Remove impediments to infrastructure development and facilitate private sector efforts to construct infrastructure projects serving American needs.

The successful completion of the proposed project will facilitate the future development of the Texas 375 Loop and a planned extension to the Border Highway East, a project by the Texas Department of Transportation (TXDOT). Many major transportation projects in Texas are financed by toll revenue backed by private investments. Recent local toll projects include a lane expansion in the Texas 375 Loop and the construction of the new Border West Expressway. According to the El Paso Metropolitan Planning Organization's *Destino 2045 Metropolitan Transportation Plan Transportation Conformity Report*, $50 million in toll revenue is expected to be generated from the first 10 years of operation of the Border West Expressway.

The construction of the 4-lane Border Highway East is projected to begin in 2028 at a cost of $711.6 million, and will likely require right-of-way access in the Riverside Canal section currently being proposed for lining improvements. A reference map is available in Figure 15.

Starting in 2017, the District also supported an expansion of Texas 375 Loop in Downtown El Paso which required the piping and concrete lining of sections of the Franklin Canal, another District waterway. The successful completion of the proposed project will likewise facilitate the development of the Border Highway East by reducing the width of the Riverside Canal, enhancing the durability of canal banks, and reducing operational and maintenance costs.

E. Evaluation Criterion F: Implementation and Results

E.1. Subcriterion F.1 - Project Planning

Does the applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place?

The District's *2016 Water Conservation Plan* is available at https//www.epcwid1.org.

Identify any district-wide, or system-wide, planning that provides support for the project.

EPCWID 2016 Water Conservation Plan
The proposed project is listed as a top priority in the 2016 Water Conservation Plan. The District has limited sources of revenue and currently cannot fund the majority of proposed water conservation projects.

EPCWID 2017 Drought Contingency Plan
The proposed project mitigates the impact of drought periods by making more water available through conservation and storage in Elephant Butte Reservoir. District-level planning and investments are considered in the District's *2017 Drought Contingency Plan*, available at https//www.epcwid1.org.

2016 Region E Far West Texas Water Plan
The proposed project is included as a recommended water management strategy in the *2016 Region E Far West Texas Water Plan*, which is developed by the Far West Texas Water

Planning Group (FWTWPG). Additional information on the FWTWPG's role in meeting regional water demand is discussed in Section V.B.1. A letter of support from the FWTWPG is available in Appendix C.

2017 Texas State Water Plan
The proposed project is listed under Water Management Strategy (WMS) E-45 in the *2017 Texas State Water Plan*. Improvements in the District's conveyance system in WMS E-45 are estimated to conserve an aggregated 50,000 acre-feet of water per year.

Describe how the project conforms to and meets the goals of any applicable planning efforts, and identify any aspect of the project that implements a feature of an existing water plan

The District obtains water by annual allocation from the Bureau of Reclamation's Rio Grande Project. The District's diversion right of water during a full allocation year during the primary irrigation season is limited to 376,860 acre-feet per year. The District is unable to increase its water allocation from the Rio Grande Project and has limited options to increase water supplies from other sources to make available for irrigation and municipal users. As a result, the District aims to conserve as much of its water supply as possible – especially in preparation of and in response to periods of drought. These are goals established in the District's *2016 Water Conservation Plan* and *2017 Drought Mitigation Plan.*

As previously discussed in Section II.D.1, there are 53,202 acre-feet of annual unmet water needs for irrigation in El Paso County. The proposed project is a recommended water management strategy in both the *2017 Texas State Water Plan* and the *2016 Region E Far West Texas Water Plan* that, once implemented, will help meet unmet water demands in El Paso County.

E.2. Subcriterion F.2 - Performance measures

Provide a brief summary describing the performance measure that will be used to quantify actual savings upon completion of the project (e.g., water saved or better managed)

At the close of the project, the District will perform a seepage test to determine actual water savings/ This data will then be analyzed and compared to evaluate the provided water loss estimates provided in Section V.A.1. Results will be included in the final project report to Reclamation calculated in acre-feet per year (AFY) and cubic feet per second per mile of canal (cfs/mile), or as otherwise required.

F. Evaluation Criterion G: Nexus to Reclamation Project Activities

F.1. Is the proposed project connected to Reclamation project activities? If so, how?

Does the applicant receive Reclamation project water?
The District obtains water by annual allocation from the Rio Grande Project, a Reclamation project. The District's diversion right of water during a full allocation year during the primary irrigation season is 376,860 acre-feet per year.

Is the project on Reclamation project lands or involving Reclamation facilities?
The proposed project is used to deliver Rio Grande Project water to users in El Paso County. The water used by the District is stored at Elephant Butte and Caballo Reservoirs, which are Reclamation facilities.

Is the project in the same basin as a Reclamation project or activity?
The proposed project is located in the Upper Rio Grande Basin, which is part of Reclamation's Rio Grande Project.

Will the proposed work contribute water to a basin where a Reclamation project is located?
The proposed project will contribute water to the Rio Grande Basin by conserving water lost to seepage and evaporation. Although water lost to seepage remains hydrologically linked to the Rio Grande Basin, water lost to evaporation is lost.

F.2. Will the project benefit any tribe(s)?

The proposed project will benefit the Ysleta del Sur Pueblo, a federally-recognized Native American tribe. Although the proposed project is not a cultural asset of the Ysleta Del Sur Pueblo, the project is located in an area of cultural significance to the Tribe. Specifically, the project will conserve water that can be used for irrigating tribal lands approximately 7,000 feet downstream of the proposed project area, will reduce maintenance operations in the greater project area, and will enhance the District's capacity to deliver water to the Ysleta del Sur Pueblo's ceremonial processions at the Rio Grande. Additional details are available in Section V.B.3 of this document.

G. Evaluation Criterion H: Additional Non-Federal Funding

Up to 4 points may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided using the following calculation:

$$\frac{\text{Non-Federal Funding}}{\text{Total Project Funding}} \quad \frac{\$1{,}000{,}000}{\$2{,}000{,}000} = 50\%$$

VI PROJECT BUDGET

A.1. Funding Plan and Letters of Commitment

How will you make your contribution to the cost-share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant.

The District has sufficient revenues and staff to provide a 50% cost share for the project. The District's funding commitment is established via Resolution from the District Board of Directors. There are no additional funding partners for this project.

Describe any donations or in-kind costs incurred before the anticipated project start date that you seek to include as project costs.

There are no donations or in-kind costs incurred before the anticipated proposed project start date.

Table 3. Summary of Non-Federal and Federal Funding Sources

FUNDING SOURCES	AMOUNT
Non-Federal Entities	
El Paso County Water Improvement District No. 1*	**$ 1,000,000**
Non-Federal Subtotal	**$ 1,000,000**
Other Federal Entities	
N/A – Not Applicable	
REQUESTED RECLAMATION FUNDING	**$ 1,000,000**
TOTAL PROJECT COSTS	**$ 2,000,000**

A.2. Budget Proposal

Table 4. Budget Proposal

Table 2. Budget Proposal							
BUDGET ITEM DESCRIPTION	COMPUTATION		Quantity	Recipient	Reclamation	TOTAL COST
	$/unit	Quantity	Type	Funding	Funding	
Salaries and Wages						
Maintenance Supervisor	$39.48 /hour	1200	Labor	$ 47,376	$ -	$ 47,376
Equipment Operator I / Labor	$11.93 /hour	2400	Labor	$ 28,627	$ -	$ 28,627
Equipment Operator II	$14.04 /hour	2400	Labor	$ 33,696	$ -	$ 33,696
Equipment Operator III	$17.02 /hour	1200	Labor	$ 20,419	$ -	$ 20,419
Equipment Operator III (2)	$19.28 /hour	1200	Labor	$ 23,141	$ -	$ 23,141
Warehouse Parts Specialist	$18.28 /hour	160	Labor	$ 2,924	$ -	$ 2,924
Welder	$19.54 /hour	160	Labor	$ 3,126	$ -	$ 3,126
					Subtotal	**$ 159,309**
Fringe Benefits						
Maintenance Supervisor	$9.98 /hour	1200	Labor	$ 11,981	$ -	$ 11,981
Equipment Operator I / Labor	$3.00 /hour	2400	Labor	$ 7,200	$ -	$ 7,200
Equipment Operator II	$3.56 /hour	2400	Labor	$ 8,554	$ -	$ 8,554
Equipment Operator III	$4.31 /hour	1200	Labor	$ 5,170	$ -	$ 5,170
Equipment Operator III (2)	$4.85 /hour	1200	Labor	$ 5,818	$ -	$ 5,818
Warehouse Parts Specialist	$4.60 /hour	160	Labor	$ 735	$ -	$ 735
Welder	$4.91 /hour	160	Labor	$ 785	$ -	$ 785
					Subtotal	**$ 40,242**
Equipment (Rates from 2016 US-ACE USACE EP1110-1-8 District VI Expense Schedule)						
Pickup (5 each)	$25.20 /day	450	Equipment	$ 11,340	$ -	$ 11,340
Dump Truck	$113.46 /day	90	Equipment	$ 10,211	$ -	$ 10,211
Excavator	$720.26 /day	90	Equipment	$ 64,823	$ -	$ 64,823
Welder	$46.16 /day	90	Equipment	$ 4,154	$ -	$ 4,154
Dozer	$345.36 /day	90	Equipment	$ 31,082	$ -	$ 31,082
Grader	$623.64 /day	90	Equipment	$ 56,128	$ -	$ 56,128
Sheeps Foot Roller	$822.80 /day	90	Equipment	$ 74,052	$ -	$ 74,052
Water Truck	$497.12 /day	90	Equipment	$ 44,741	$ -	$ 44,741
Rubber Tire Excavator	$723.88 /day	90	Equipment	$ 65,149	$ -	$ 65,149
Compactor	$134.70 /day	90	Equipment	$ 12,123	$ -	$ 12,123
Loader	$347.64 /day	90	Equipment	$ 31,288	$ -	$ 31,288
Shotcrete Machine (2 each)	$259.38 /day	180	Equipment	$ 46,688	$ -	$ 46,688
Compressor (2 each)	$330.78 /day	180	Equipment	$ 59,540	$ -	$ 59,540
Telescopic Boom (2 each)	$950.50 /day	180	Equipment	$ 171,090	$ -	$ 171,090
					Subtotal	**$ 682,411**
Supplies and Materials						
Concrete - 4000psi shotcrete mix with 3 lb fiber	$130.00 /cy	5516	cubic yards	$ -	$ 717,080	$ 717,080
Curing Compound	$63.00 /5 gal	450	5 gallons	$ -	$ 28,350	$ 28,350
Steel (Tie in and Transitions)	$0.90 /lb	25000	lb/pound	$ -	$ 22,500	$ 22,500
GeoFabric	$0.40 /sf	430000	square feet	$ -	$ 172,000	$ 172,000
Form Lumber, Ties, and Misc. Construction Items	$60,070.00 /lot	1	varies	$ 48	$ 60,070	$ 60,118
					Subtotal	**$ 1,000,048**
Contractual/Construction						
Field Engineering	$200.00 /hr	65	hours	$ 13,000	$ -	$ 13,000
Construction Surveying	$120.00 /hr	65	hours	$ 7,800	$ -	$ 7,800
Construction Services Geotechnical and Lab	$200.00 Test	100	Cylinders	$ 20,000	$ -	$ 20,000
Construction Services Geotechnical Density	$75.00 Test	100	Tests	$ 7,500	$ -	$ 7,500
QA/QC Monitoring	$120.00 /hr	112	hours	$ 13,440	$ -	$ 13,440
Travel (airfare, 2 nights hotel and per diem)	$750.00 /hr	3	Trips	$ 2,250	$ -	$ 2,250
					Subtotal	**$ 63,990**
Other						
Contract Compliance - Reporting	$45.00 /hr	600	Other	$ 27,000	$ -	$ 27,000
Adminstration and Management	$45.00 /hr	600	Other	$ 27,000	$ -	$ 27,000
					Subtotal	**$ 54,000**
TOTAL ESTIMATED PROJECT COSTS					**$ 1,000,000**	**$ 2,000,000**

A.3. Budget Narrative

Salaries and Wages (in-kind)

The following District personnel will be involved in this project. The perspective roles and value of their in-kind services is described as follows:

Pete Rodriguez is the District Maintenance Supervisor and has successfully led the construction of dozens of District canal concrete lining projects, including concrete lining more than 8,000 feet of the Riverside Canal located immediately upstream and downstream of the proposed project. Mr. Rodriguez will be responsible for the oversight of all construction work personnel under Task 1 – Canal Lining. It is expected that Mr. Rodriguez will contribute 1200 hours to the project at a rate of $39.48.

The Equipment Operator I will be responsible for the operation of construction equipment necessary for the completion of Task 1 – Canal Lining. The Equipment Operator I will contribute 2400 hours to the project at a rate of $11.93.

The Equipment Operator II will be responsible for the operation of construction equipment necessary for the completion of Task 1 – Canal Lining. Each Equipment Operator II will contribute 2400 hours to the project at a rate of $14.04.

The Equipment Operator III will be responsible for the operation of construction equipment necessary for the completion of Task 1 – Canal Lining. The Equipment Operator III will contribute 1200 hours to the project at a rate of $17.02.

The Equipment Operator III (2) will be responsible for the operation of construction equipment necessary for the completion of Task 1 – Canal Lining. The Equipment Operator IV will contribute 1200 hours to the project at a rate of $19.28.

The Warehouse Parts Specialist will be responsible for the distribution and delivery of supplies and material necessary for the completion of Task 1 – Canal Lining. The Warehouse Parts Specialist will contribute 160 hours to the project at a rate of $18.28.

The Welder will be responsible for metalwork necessary for the completion of Task 1 – Canal Lining. The Welder will contribute 160 hours to the project at a rate of $19.54.

Fringe Benefits (in-kind)

The in-kind fringe benefits for District personnel involved in this project were computed on a "Fringe" basis and were derived by subtracting the hourly salary rate for designated District personnel from the loaded value per hour. These numbers are used for application purposes only.

Travel

No travel will be necessary.

Equipment

The District owns all of the equipment that will be used in the proposed project. The District is proposing to use equipment rates that are based on estimated lining costs based on actual costs of similar projects. The proposed usage rates are representative of costs from concrete lining projects similar to the proposed project and are on average lower compared to rates outlined by the United States Army Corps of Engineers (USACE) with their Construction Equipment Ownership and Operating Expense Schedule (EP1110-1-8) for District VI, which includes the State of Texas. Equipment cost rates can be compared in Table 5.

Table 5. Equipment Costs

Equipment	Category Number	Horsepower/ Specification	EP1110-1-8 Rates (daily)
Pickup	Section III.2.7	Section III.2.7	$25.20
Dump Truck	T45	22.5 CY	$113.46
Excavator	H25	320EDL	$720.26
Welder	W35	23 HP	$46.16
Dozer	T15	70 HP / D-3	$345.36
Grader	T15	185 HP / 770G	$623.64
Sheeps Foot Roller	R45	145 HP / D-off	$822.80
Water Truck	T40	2,000 gal + 28,000 GCW Truck	$497.12
Rubber Tire Excavator	H30	174 HP	$723.88
Compactor	C10	10 HP	$134.7
Loader	L40	95 HP	$347.64
Shotcrete Machine	P45	60 HP / 50 CY/HR	$259.38
Compressor	A15	173 HP	$330.78
Telescopic Boom	C75	173 HP / 80 feet	$950.50

The sum of average (10 hours) and standby (14 hours) hourly rates is used to determine daily costs from the USACE EP1110-1-8 District VI Expense Schedule.

Materials and Supplies

The proposed costs for materials and supplies are representative of costs and quantities from concrete lining projects similar to the proposed project.

Contractual

The purpose of the contracted engineering services is to provide planning, preliminary engineering services, construction, and reporting services necessary for the completion of Task 1 – Concrete lining. The District uses the Qualifications-based method for selection of a qualified and experienced engineering firm to perform evaluations and assemble the required documents. Budgeted costs are representative of costs from concrete lining projects similar to the proposed project.

Other / Environmental and Regulatory Compliance Costs

The proposed costs for materials and supplies are representative of costs from concrete lining projects similar to the proposed project. Costs for any additional environmental compliance activities will be determined pursuant to subsequent agreement with Reclamation.

Indirect Costs
Indirect costs are not included as part of the project.

Total Amount of Project Costs
The total cost of the project is $2,000,000. The Bureau of Reclamation share is $1,000,000. The District contribution will be $1,000,000 as in-kind services and costs.

VII ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

On May 12, 2009, Reclamation issued a Finding of No Significant Impact based on the Environmental Assessment submitted for the 2003 Riverside Canal Phase I project. The document is available for reference in Appendix A. This document is also available in Reclamation's website at https://www.usbr.gov/uc/albuq/envdocs/ea/epcwid1/index.html.

Will the proposed project impact the surrounding environment? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.

Post-construction environmental impacts will be positive. There will be a reduction in wind-borne dust from the earth-lined channel, which will be concrete-lined over a 1.36 mile reach adjacent to residential areas. District maintenance activities will be reduced by approximately 80%, thereby reducing dust generation, equipment noise and fuel consumption.

Special attention will be given to the following items during the construction phase:

- Dust abatement
- Noise impacts
- No clearing except brush within right-of-way
- Earth movement within exiting District right-of-way

Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?

The United States Department of the Interior Fish and Wildlife Service determined that there are no anticipated impacts to threatened and endangered species by the proposed project as part of Consultation #02-15-03-I-0364. Additional details are available for reference in the project FONSI and Final Environmental Assessment in Appendix A.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States?" if so, please describe and estimate any impacts the proposed project may have.

There are no surface waters inside the project boundaries that fall under CWA jurisdiction. The project is located near the emergent Rio Bosque Wetlands Park which was planted with riparian vegetation. Little vegetation exists within the project site as a result of being disturbed from the operation and maintenance of the Riverside Canal. Lining the Riverside Canal with concrete would eliminate existing vegetation. However, after construction, plants are expected to be rapidly and naturally reintroduced to open soil areas from adjacent undisturbed plants. Additional details are included as part of the project FONSI and Final Environmental Assessment in Appendix A.

When was the water delivery system constructed?
The Riverside Canal was constructed in 1928.

Will the proposed project result in any modification of or effects to individual features of an irrigation system? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.

Construction work that is part of the proposed project will occur at the end of the irrigation season (typically from March 15 to October 15). An 18 inch turnout will be modified as a result of the proposed project. The project is expected to not limit or reduce the delivery of water.

Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?

The El Paso County Water Improvement District Number One is listed in the National Register of Historic Places under National Register Information System ID 97000885. The Texas Historical Commission determined that the proposed project will have no adverse effect on features listed in the National Register of Historic Places. Additional information is available for reference in the FONSI and Final Environmental Assessment for the proposed project in Appendix A.

Are there any known archeological sites in the proposed project area?

There are no known archeological sites in the proposed project area.

Will the proposed project have a disproportionally high and adverse effect on low income or minority population?

The proposed project would not have a negative impact on minority populations or low-income communities. As previously stated in Section 5.B.4, the proposed project will have a beneficial impact on the economy of agricultural communities. Further clarification is available in the project FONSI and Final Environmental Assessment in Appendix A.

Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

The proposed project would not limit access to and ceremonial use of Indian sacred sites or adversely impact tribal lands. Additional information is available in the project FONSI and Final Environmental Assessment in Appendix A.

Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

The proposed project would not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species.

VIII REQUIRED PERMITS OR APPROVALS

The project activities will be confined to existing District right-of-way. No conflicts with existing utilities or facilities requiring City or County approval are anticipated. A Storm Water Pollution Protection Plan (WPPP) will be prepared and filed with the Texas Commission on Environmental Quality (TCEQ). It is not expected that any other Environmental permits or approvals will be necessary for the project as proposed.

IX LETTERS OF SUPPORT

Letters of support for the proposed project are available for reference in Appendix C.

X OFFICIAL RESOLUTION

RESOLUTION OF THE BOARD OF DIRECTORS

El Paso County Water Improvement District No.1

El Paso County Water Improvement District No. 1 resolves to authorize the General Manager or the District Engineer to submit and take any Administrative Action required to complete an application to the United States Bureau of Reclamation WaterSMART Water and Energy Efficiency Grants program for a Grant totaling $1,000,000 to conserve water and improve the District's water use efficiency by concrete lining a portion of the Riverside Canal.

Whereas, the El Paso County Water Improvement District No.1 (the District) is a political subdivision of the State of Texas and was organized under Chapter 59, Article 16 of the Texas Constitution and operates under Chapter 55 and Chapter 49, in part, of the Texas Water Code;

Now Therefore, the Board of Directors of the District hereby resolve to support the District's application for a Grant and authorizes the General Manager or the District Engineer to submit and take any administrative action required to complete applications to the United States Bureau of Reclamation and if the District is selected to receive a Grant, to negotiate an agreement to be approved by the District's Board of Directors. The District shall fund 50% of the Project Costs with the total Project Cost not to exceed an amount of $2,000,000.

El Paso County Water Improvement District No.1

By: Johnny Stubbs, President

XI FIGURES

List of Figures

FIGURE 1
EPCWID Boundary Map

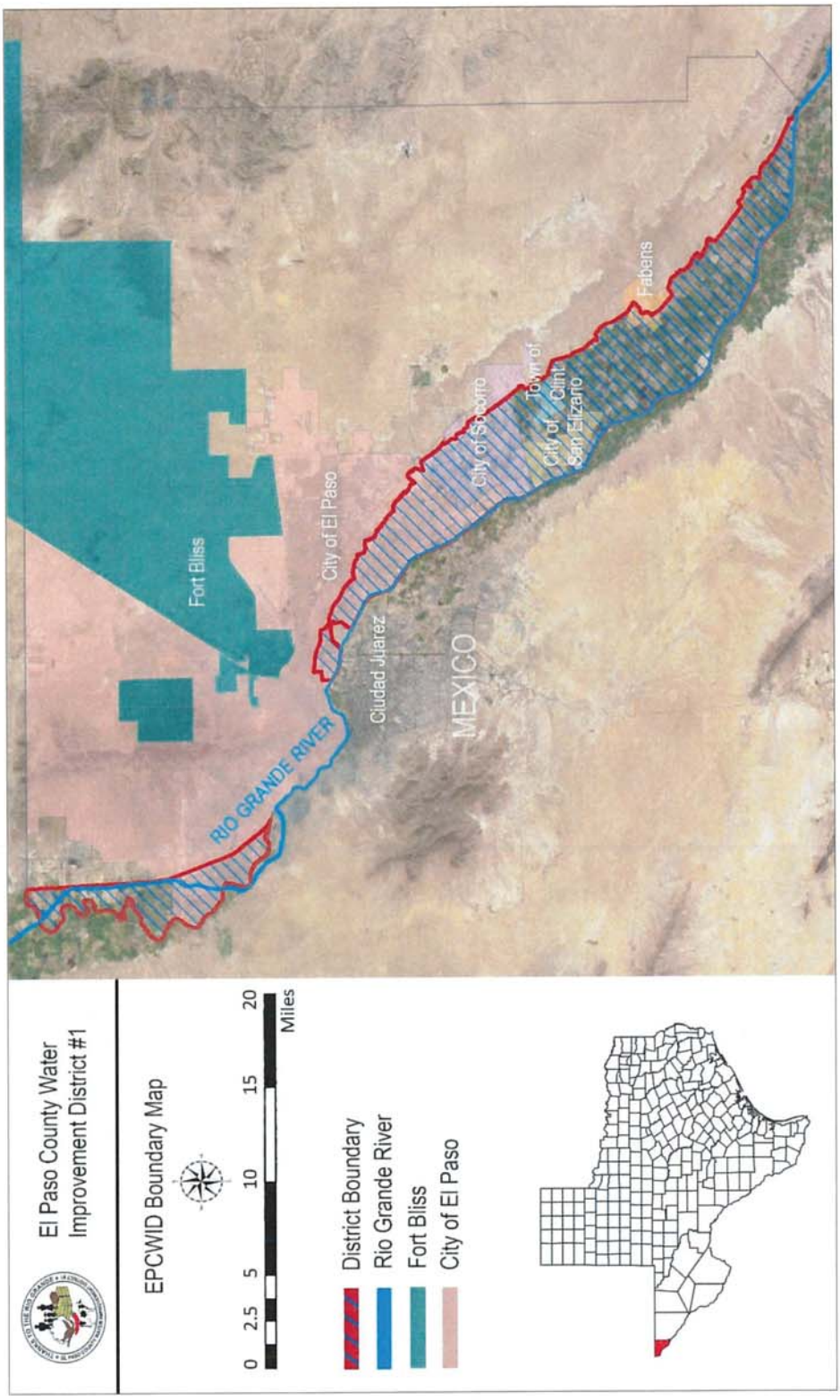


FIGURE 2
Project Location Map

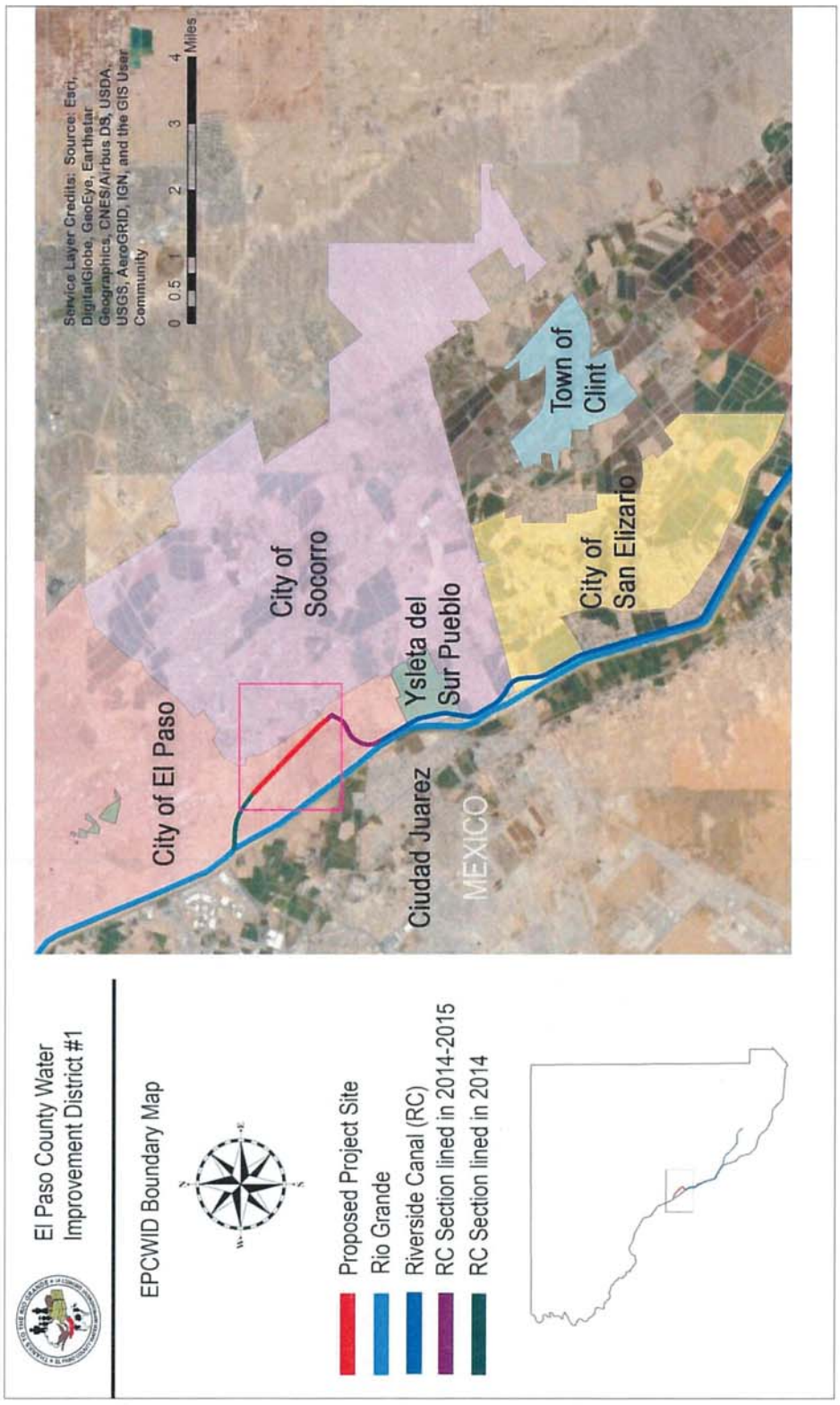


FIGURE 3
Water Infrastructure "Hub" in the El Paso County Lower Valley

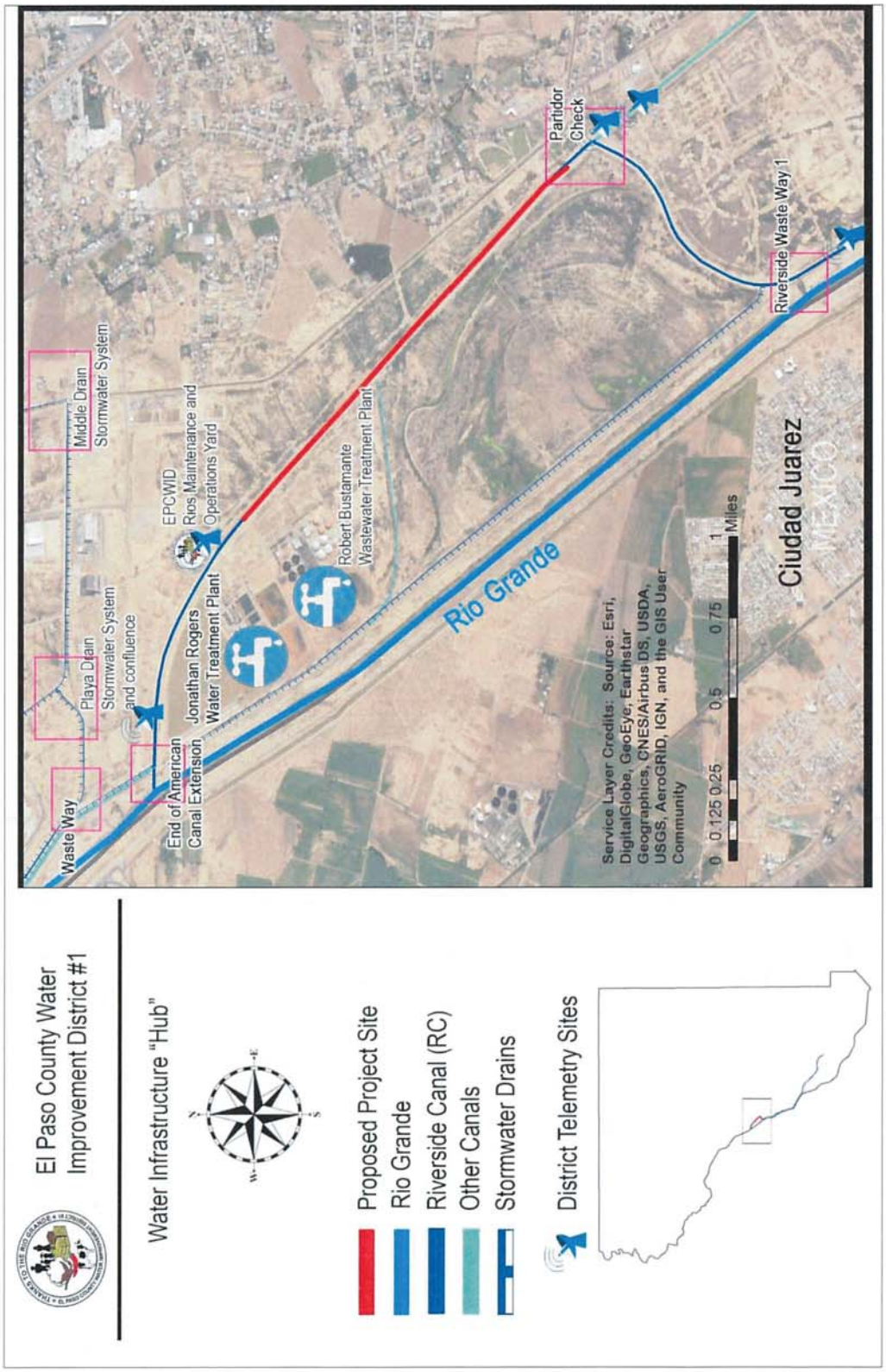


FIGURE 4
Typical Construction of Shotcrete-Lined Canal

FIGURE 5
Typical Equipment for Shotcrete Application

FIGURE 6
Phase 1 Drawing For Reach 1 (Typical Canal Lining Section)

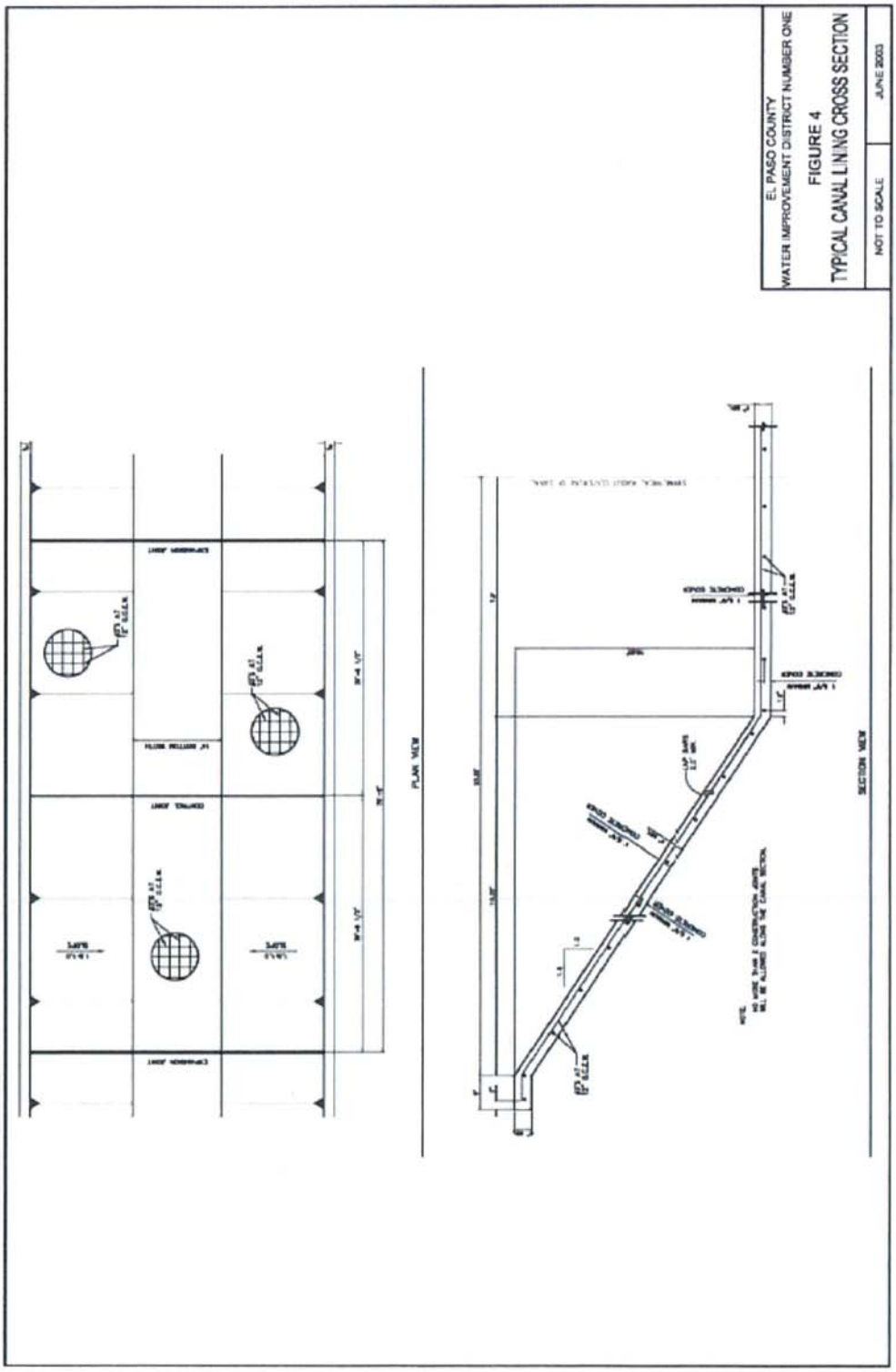


FIGURE 7
Project Schedule

FIGURE 8
Damages to Concrete Joints at the Riverside Canal

FIGURE 9
Possible Location of Advanced Purification Treatment Plant

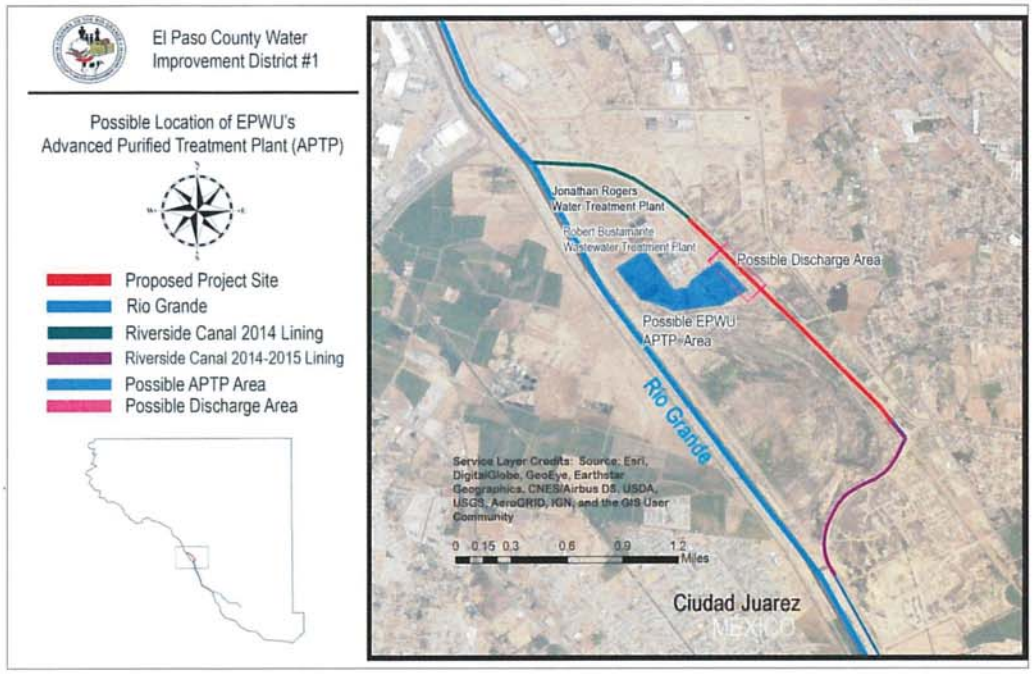


FIGURE 10
Riverside Canal and Socorro Ponds

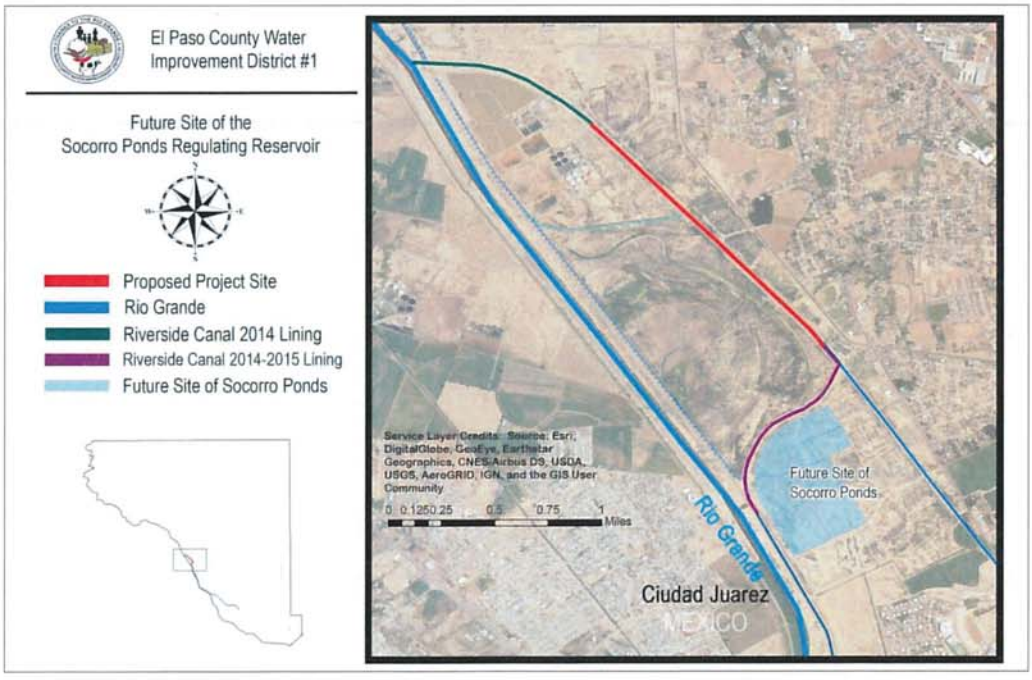
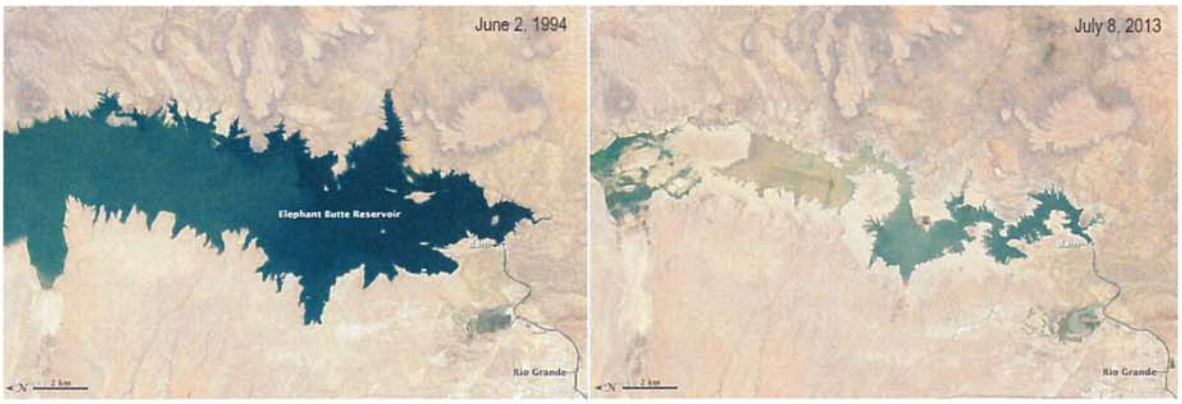


FIGURE 11
Landsat 8 Images of Elephant Butte Reservoir in 1994 and 2013



NASA Earth Observatory image by Jesse Allen and Robert Simmon, using Landsat data from the U.S. Geological Survey

FIGURE 12
Planned Riverside Canal Bypass

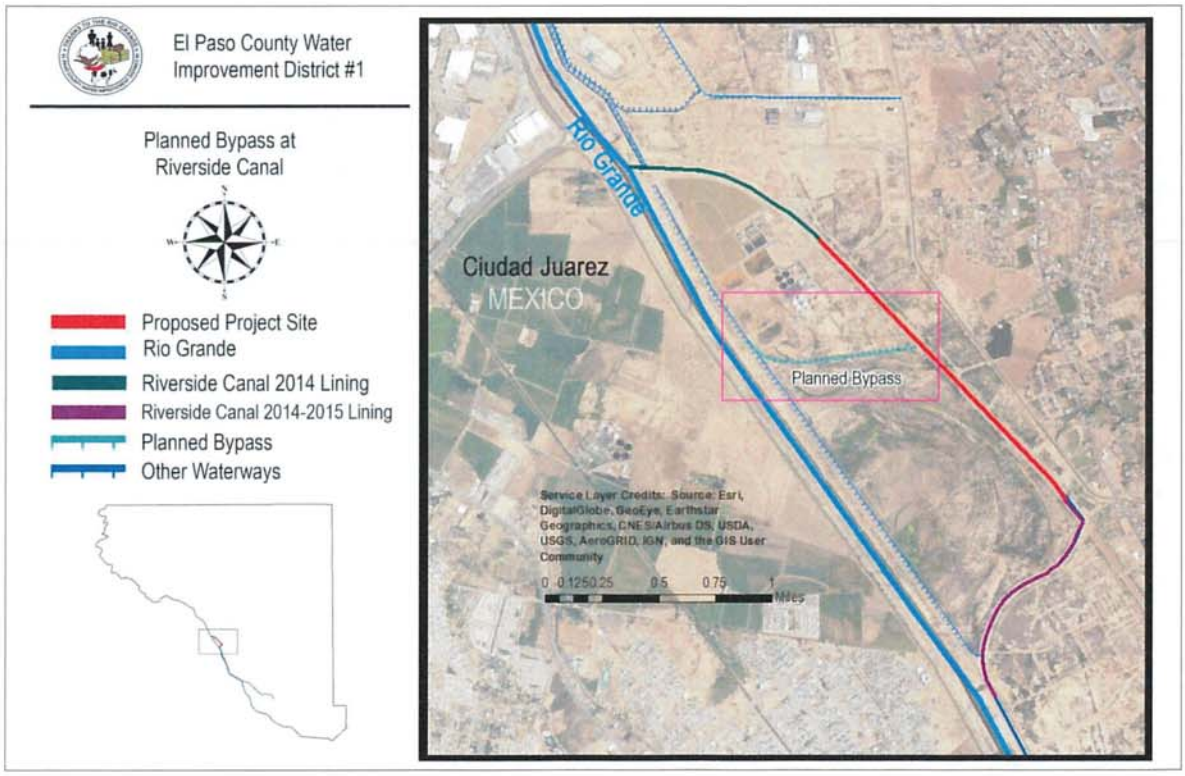
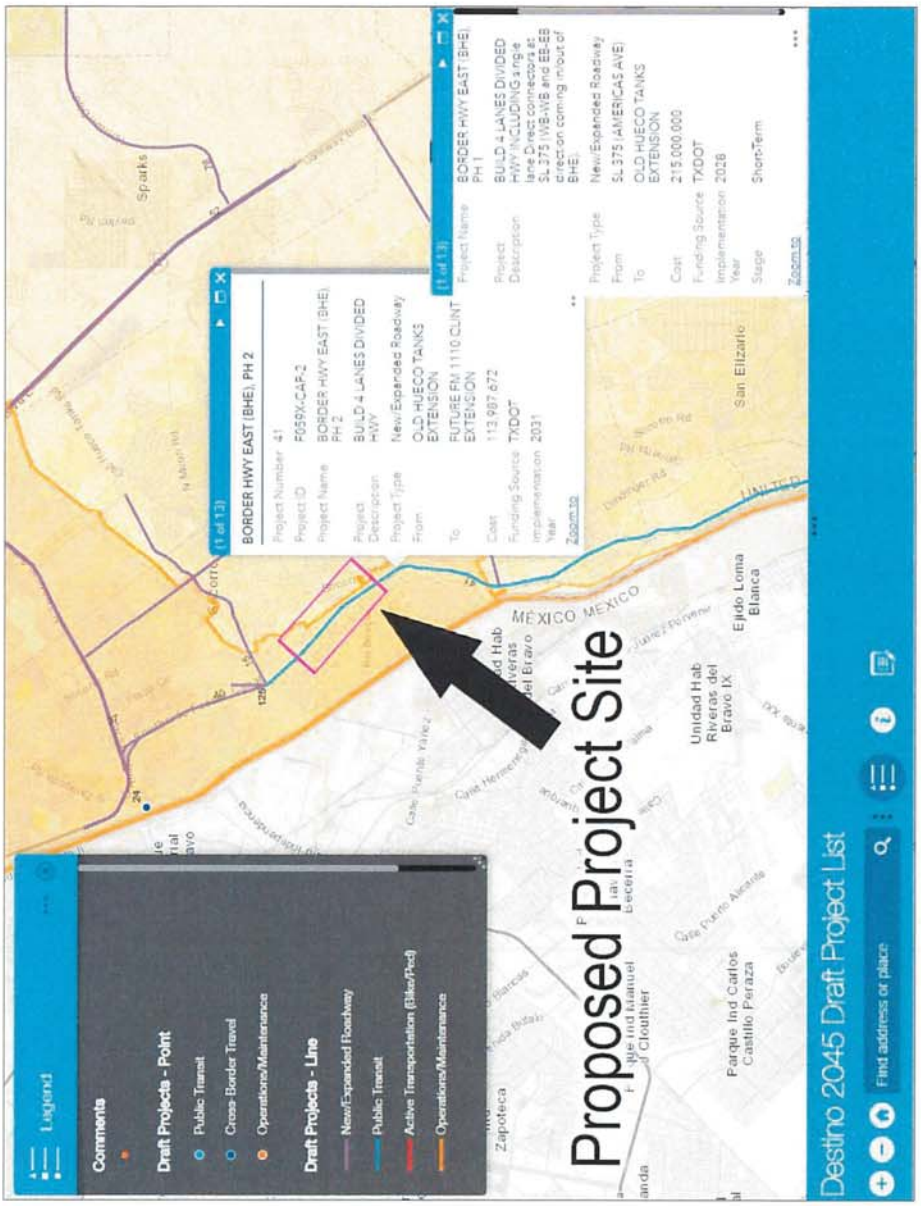


FIGURE 13
Riverside Canal and Irrigation Ditches

FIGURE 14
2012 Project: Installation of Headwalls and Telemetry Units

FIGURE 15
Border Highway East and Riverside Canal



The Destino 2045 Draft Project List is part of the Destino 2045 Metropolitan Transportation Plan which will be adopted by the El Paso Metropolitan Planning Organization in May of 2018. Additional information is available at http://www.elpasompo.org/.

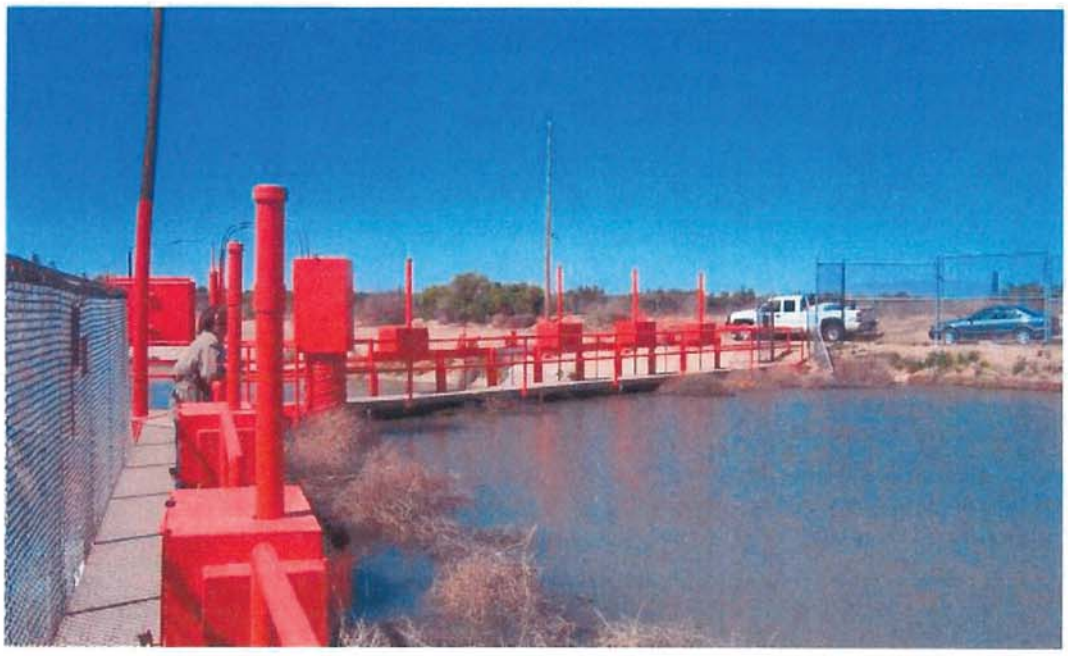
XII APPENDIX

List of Appendices

Appendix A
Project FONSI and Excerpt from Final Environmental Assessment (pages 58-60)

RECLAMATION
Managing Water in the West

FINDING OF NO SIGNIFICANT IMPACT
AND
FINAL ENVIRONMENTAL ASSESSMENT
FOR
El Paso County Water Improvement District Number One, Canal, Structure, and Improvements Project



U.S. Department of the Interior
Bureau of Reclamation
Albuquerque Area Office
Environment Division
Albuquerque, New Mexico

May 2009

BACKGROUND

The El Paso County Water Improvement District Number One (District) of Texas established in 1917, provides water by way of the Riverside Canal (Canal) to approximately 50% of the raw water supply of the City of El Paso (City) and to supply irrigation water to over 45,000 acres of irrigable land. An evaluation of the Canal was performed to identify weaknesses that could be corrected. These weaknesses include seepage and evaporation losses, and excess bypass waste flows from check structures. The proposed work would be partially federally funded in cooperation with Reclamation under a Memorandum of Agreement (MOA, see appendix A). In addition, authorization and requirements for funding the project are written in the Lower Rio Grande Valley Water Resources Conservation and Improvement Act of 2000 (P.L. 106-576) (The Act).

SUMMARY OF THE PROPOSED ACTION

Due to excessive water losses found in the Canal as a result of evaluations, the District proposes to reconstruct and then concrete line the first 3 miles of the canal, hereinafter referred to as the Project. In addition, the District proposes to replace leaky gates, and check structures which would and correct inefficient deliveries.

The proposed Project lies within El Paso County, Texas as indicated in Figure 1 (Page 2 of the EA). The existing components of the segment of the Canal include approximately 16,000 feet of earthen-lined canal with bottom widths varying from 45 to 90 feet. The proposed Canal (see Figure 2, section A, B, and C on Page 9 of the EA) begins at the downstream end of the existing American Canal. The Project is divided into three segments: A, B, and C. Reach B connects to the middle of Reach, A at a point just downstream of the Wastewater Treatment Plant Bridge. Reach A terminates at the Partidor Check Structure. Reach C extends from the Partidor Check structure to the Wasteway One Check Structure.

Canal sections A, B, and C would be concrete lined with side slopes of 1:5:1 and a depth of about 11 feet. Each is designed to carry a maximum flow of 1590 cfs while maintaining about 4 feet of total freeboard. Section A would have a length of 7630 feet and a bottom width of 14 feet. Section B would have a length of 4000 feet and a bottom width of 18 feet. Section C would have a length of 4370 feet and a bottom width of 28 feet. The Partidor Check, Franklin Check, and the Wasteway One Check Structures would be replaced with new efficient Structures.

No additional roads would be required; therefore construction would occur with in the existing right-of-way.

ENVIRONMENTAL IMPACTS RELATED TO THE RESOURCES OF CONCERN

As a result of analyzing the effects of the proposed action in the EA, the following summarizes the reasons why there would be a Finding of No Significant Impact:

Wildlife

The U.S. Fish and Wildlife Service (Service) has stated in a letter (see attached Appendix A) that habitat for federally listed threatened and endangered wildlife species is not known to exist on or near the proposed project site, and impacts to the species by the proposed Project are not anticipated (Service letter page 36 of Appendix A).

The Pecos River Muskrat known to exist in canals similar to the Canal was listed by the Texas Parks and Wildlife (TPW) as a species of concern. The Pecos River Muskrat is not federally listed as threatened or endangered. A presence or absence survey was conducted by the TPW within the proposed Project area and the adjacent Rio Bosque Wetlands Park (Park). The survey identified muskrat fecal matter in the Canal and the Park, however, the fecal matter was not specifically identified with the Pecos River Muskrat. Construction activities would only temporarily displace muskrat within the proposed Project site. After construction, the species would return to areas of the canal not lined with concrete or relocate to the adjacent Park, the Rio Grande or nearby unlined canals.

Although construction activities may scare existing wildlife away temporarily, most animal species in the Project area would be able to return after completion. Like the Pecos River Muskrat, other wildlife species would likely relocate to other easily accessible habitat nearby in the Park, the Rio Grande or nearby unlined canals.

Cultural Resources

The Canal is included on the National Register of Historic Places (NRHP). However, the Texas Historical Commission (THC) determined that the proposed improvements to the Canal would cause no adverse effects.

The Ysleta del Sur Pueblo (Pueblo) has designated the Park as a Traditional Cultural Resource. The resources are traditional plants that are necessary for the Pueblo to carry on their cultural events. The lining of the canal would not affect the traditional plants in the Park because there are other sources of water to help sustain the vegetation in the Park. The District has made provisions to enhance the establishment of wetland species in the Park, which include drilling a well for year round use, providing a turnout at the Bustamante Wastewater Treatment Plant and helping the "Friends of the Bosque (Friends)" acquire water rights. Water rights would provide the Friends an opportunity to apply for an additional turnout for water during the irrigation season that would benefit the Park.

Water Resources

The groundwater level of the area under the Park is controlled by the elevation of the bottom of the Rio Grande, the Riverside Intercepting Drainage Canal, and the River Intercepting Drainage Canal. Currently, the groundwater level is greater than the bottom elevation of the drainage canals, and therefore the groundwater level is not controlled by the amount of seepage from the Canal. As long as these drains have flow, the elevation of the bottom of the drains controls the groundwater level in the Park area.

Furthermore, when excess water is available the District has voluntarily made treated effluent water available to University of Texas El Paso (UTEP) for application on the lands of the Park. Typically, approximately 45 cfs of water is provided to the Park from October to February of each year. This equals a volume greater than 10,000 acre-feet per year which exceeds by several times the amount of water that recharges the alluvium aquifer as a result of seepage from the portion of the Canal adjacent to the Park. Any decrease in the seepage from the Canal is more than offset by the application of water in excess to the plant needs during the winter. Much of this excess water infiltrates into the alluvium aquifer and will offset any reduction in seepage.

The UTEP operates the Park. UTEP or any other entity has several options for obtaining water during the summer months to help address plant sustainability. The City owns the land and the associated water rights associated with the Park. The City can on a temporary or permanent basis assign rights that would allow UTEP to order and receive irrigation water during the summer months. The construction of the proposed conservation project will have no effect or impact on status of the water rights associated with the park. In addition to obtaining water or water rights from the City, UTEP has received donations towards construction and operation of an irrigation well in the alluvium aquifer. During the drought of 2003 and 2004 many of the alluvium wells were operated with little decline in the water levels in the alluvium aquifer. The proposed Project will have no impact on UTEP alternatives for obtain irrigation water for use in sustaining plant life during the summer.

As mentioned in the Axiom-Blair report (See Appendix B) and above, the groundwater level in the region of the Park is controlled by elevation of the water flowing in the nearby drainage canals and not by the amount of water that seeps from the Canal. The amount of water that recharges the Hueco Bolson Regional Aquifer (Hueco) must flow through the clay confining layer at the bottom of the alluvium aquifer, and varies from location to location. However, in general the amount of recharge to the Hueco from the alluvium aquifer in the flood plain of the Rio Grande is small. Furthermore, because of the fluvial origins of the alluvium aquifer, the vertical conductivity is estimated to be only 1 to 5% of the horizontal conductivity. Any decrease in the groundwater elevation in the Park will have minimal effect on recharge (vertical flow of water) and cause water to flow horizontally towards the Park from the surrounding portions of the alluvium aquifer. UTEP's recharging of the alluvium aquifer using treated effluent offsets any possible reduction in recharge to the Hueco by keeping the groundwater levels in the alluvium aquifer greater than the bottom elevation of the nearby drainage canals. The proposed conservation Project will have no or negligible reduction in the recharge of the Hueco from the alluvium aquifer in the vicinity of the Park.

Wetlands

The emergent wetland and the Park was planted with riparian vegetation that is being enhanced by water donated by the District during the non-irrigation season from a wastewater treatment plant nearby. The Project has been identified as a source of water (contingent upon water rights) to enhance the establishment of the emergent wetland. In addition, the District has made provisions for the Friends and the UTEP to acquire water rights so that they may apply for a turn out for additional water during the irrigation season.

If seepage were to be eliminated or significantly reduced as a result of lining the Canal with concrete, the Park would not be affected. Even though seepage would be reduced, the aquifers would maintain the groundwater level much the same as before lining of the Canal. Pump tests have shown that the rate of recovery from pumping wells installed within a few feet of the Canal is very high (Axiom-Blair, 2007). Since recovery rate of water is very high, this shows that the aquifers would rapidly replace any water lost from Canal seepage.

The emergent wetland and the Park were planted with riparian vegetation that is being enhanced by water donated by the District during the non-irrigation season. In addition, District has made provisions to enhance the establishment of wetland species in the Park, which include drilling a well for year round use, providing a turnout at the Bustamante Wastewater Treatment Plant, and helping the Friends acquire water rights. Water rights would provide the Friends an opportunity to apply for an additional turnout for water during the irrigation season that would enhance riparian and emerging wetland species.

The Park is identified by the Pueblo as a Traditional Cultural Resource.

Vegetation

With in the proposed Project site, little vegetation exists as a result of being disturbed from the operation and maintenance of the Canal. Lining the Canal with concrete would eliminate existing vegetation. However, after construction, plants are expected to be rapidly and naturally reintroduced to open soil areas from adjacent undisturbed plants.

Environmental Justice

The Proposed Action would result in a variety of environmental effects that do not disproportionately affect minority populations or low-income communities. The Pueblo is concerned about potential effects that the Project may have on the Park, which is a Traditional Cultural Resource of special significance to the Pueblo. If the Project were to impact the Park, then that would be considered a disproportionate impact to a minority population. However, because water level within the Park is influenced by groundwater level which is not affected by canal seepage, the loss of seepage will have no effect on the Park. Thus, no environmental justice implications are anticipated.

Indian Trust Assets

Although these are resources of special significance to the Pueblo, there are no ITAs (Assets held in trust by the Federal Government) within the Project area or within the vicinity to be affected.

Air Quality and Noise

During the reconstruction of the Canal and the placement of the new check structures, the construction equipment, as trucks and bulldozers, will cause an increase to the existing dust (PM10) and noise levels: dust from the unlined Canal and noise from nearby industrial facilities.

Nearby houses and others will be impacted by this increase in dust and noise, which will return to normal levels after construction ends.. During the Project, the times of construction would be restricted to avoid interference with religious ceremonies of the Pueblo.

ENVIRONMENTAL COMMITMENTS

- Construction activities would be scheduled to avoid conflicts with religious ceremonies of the Pueblo.

- Reclamation is committed to ongoing government to government relations with the Pueblo.

- A letter from the THC can be found at Appendix A. The letter lists a few conditions if the project were to be implemented.

  The THC requires that the section of the Canal that would be lined should be the same width (or as close to the same width as possible) as the current historic canal. In addition, the THC requires that a representative section of the canal shall be maintained in its original appearance and condition in the event of any future improvements to the Canal.

- Should evidence of possible scientific, prehistorical, historical, or archeological data be discovered during the course of this action, work shall cease at that location and the Area archaeologist shall be notified by phone immediately, with the location and nature of the findings. Care shall be exercised so as not to disturb or damage artifacts or fossils uncovered during operations, and the proponents shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the Government.

  Any person who knows or has reason to know that he or she has inadvertently discovered human remains on Federal or tribal lands, must provide immediate telephone notification of the inadvertent discovery, with written confirmation, to the responsible Federal agency official with respect to Federal lands, and, with respect to tribal lands, to the responsible Indian tribe official. The requirement is prescribed under the Native American Graves Protection and Repatriation Act (P.L. 101-601; 104 Stat. 3042) of November 1990 and National Historic Preservation Act, Section 110(a)(2)(E)(iii) (P.L. 102-575, 106 Stat. 4753) of October 1992.

COORDINATION

Consultation took place with the U.S. Army Corps of Engineers, TPW, the Service, Friends, Pueblo, THC, UTEP, District, and several private individuals who attended the public meeting.

A public meeting was held September 10, 2003 to present the proposed Project and receive comments from those who attended.

Additional meetings have taken place with the Friends, to share Project information, identify their concerns about the Project, and describe how the Project would not affect groundwater or the Park's vegetation.

The following is a series of technical and formal meetings undertaken with the Pueblo as part of the government to government process:

- September 25, 2003, to brief the Governor and his staff regarding the proposed Project. During that time, the Pueblo provided their concerns regarding air quality and noise during religious ceremonies, and impacts of lining the Canal. They requested that construction be scheduled to avoid conflicts with religious ceremonies.

- May 24, 2004, follow-up meeting in the field with the War Captain to discuss sacred plants.

- July 28, 2004, to continue government to government consultation with the Governor. This discussion included sacred plants and issues regarding potential impacts to the Park.

- August 1, 2007, to continue government to government consultation with the Governor. It had been three years since communication took place regarding the proposed Project, and therefore helped to reconfirm the Pueblo's concerns and issues. Several informal field trips were conducted with the Pueblo to consult further and understand their needs.

- March 19, 2008, a meeting to brief Governor Paiz and his staff regarding the proposed Project. The Lt. Governor, War Captain, and Environmental Manager were present.

- May 22, 2008, to continue government to government consultation with the new Governor Paiz and his staff. The meeting centered around Pueblo consultation policies and the draft EA.

- February 28, 2009, a meeting with Governor Paiz, the District, and Reclamation personnel to update the progress of the Project and EA.

- Previous issues and letters submitted by the Pueblo since 2003 have been addressed through all the meetings listed above and in the final EA for the Project.

- April 15, 2009, letter from the Governor to Reclamation listing comments after additional review of another draft revision of the EA (see Appendix C in the letter addressing comments).

CONCLUSION

In accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, and based on the analysis in the EA, Reclamation has determined that the Proposed Action would not result in a significant impact on the human environment and does not require the preparation of an Environmental Impact Statement.

1.0 Purpose of and Need for Action

1.1. Introduction

The El Paso County Water Improvement District Number One (District) of Texas proposes to reconstruct a portion of the Riverside Canal (Canal) system (see map page 2). The project would be in cooperation with Reclamation under a Memorandum of Agreement (MOA, see appendix B). In addition, authorization and requirements for funding the project are written in the Lower Rio Grande Valley Water Resources Conservation and Improvement Act of 2000 (P.L. 106-576), hereinafter referred to as "The Act". This environmental assessment will analyze the potential impacts of the proposed action on canal reaches A, B, and C. A more detailed description of the Proposed Action will appear in Chapter 2.

1.2. Proposed Action

Due to excessive water losses found in the Canal as a result of evaluations, there is a proposal to reconstruct the first 3 miles of the Canal. The following four alternatives were considered for correcting the identified weaknesses:

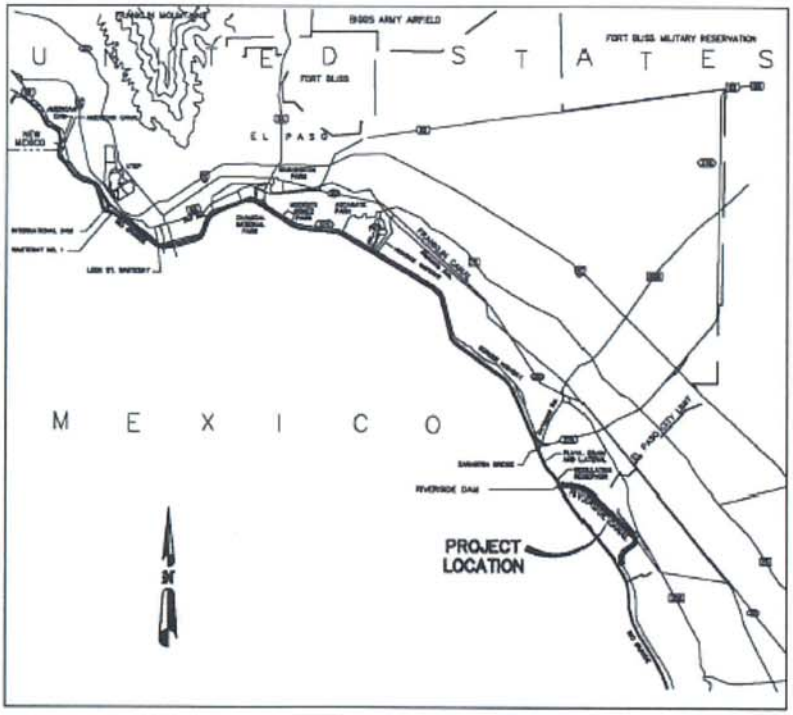
1. Elimination of the canal
2. Reconstruction of the earthen canal
3. Concrete line the canal, replace leaky gates, check structures, and correct inefficient delivery
4. Replacement of canal with large diameter pipe

Lining the canal with concrete, replace leaky gates, and check structures which would correct inefficient deliveries has been subsequently identified as the proposed action, which would be partially Federally funded through Reclamation.

1.3. Need for the Action

In the lower Rio Grande Valley, the Rio Grande has been severely impacted by prevalent drought conditions. A portion of the lower Rio Grande Valley includes the District and the City of El Paso (City) in far west Texas. Water demands in this region are increasing each year dramatically as a result of population increases (EPA 1997). Waters of the Rio Grande are distributed in accordance with the Congressional Authorizations of Reclamation's Rio Grande Project. The District has primacy use of these surface waters during an eight month irrigation season. The Canal is used to deliver approximately 50% of the raw water supply to the City, and to supply irrigation water to over 45,000 acres of irrigable land.

Since 1941, the City has obtained about 43 percent of its water supply from the Rio Grande by way of contracts with the District authorized by the Act of February 25, 1920 (Sale of water for miscellaneous purposes other than for irrigation). The City also obtains 40 percent of its water from the Hueco Bolson Regional Aquifer (Hueco), and 17 percent from the Mesilla Bolson groundwater aquifer (New Mexico-Texas Water Commission (Commission) 1998, 1999). However, according to the United States Geological Survey (USGS), these aquifers will begin to



EL PASO COUNTY
WATER IMPROVEMENT DISTRICT NUMBER ONE

FIGURE 1
PROJECT LOCATION MAP

NOT TO SCALE	JUNE 2003

run dry and will be severely depleted by 2025. As a result, depleted groundwater will also increase the demand for surface water in the Rio Grande. Therefore, irrigation system improvements, water conservation projects and increased efficiencies are critical to meet this region's growing need for water.

Limited options exist which would satisfy the need to increase the water supply. Of these options, conservation holds the greatest advantage over other potential approaches. Conservation programs allow previously developed, higher quality water sources to be extended, effectively creating new, "good" water sources.

Each year the Canal loses approximately 3,000 acre feet of water per mile through seepage and 55 acre feet per mile due to evaporation (District project report 2003). Therefore, the Canal loses approximately 7,000 to 9,000 acre feet of water per year in the Project area. In addition, diversion, check, and bypass structures along the Project leak water and need to be replaced. As a result, inefficient withdrawal scheduling and excess bypass waste flows exist. Improvements to the Canal would help the District reduce the need to pump water from the Hueco Bolson groundwater aquifer to provide irrigation water.

1.4. Purpose of the Action

In an effort to conserve water, the District proposes to correct weaknesses identified in the Canal. These weaknesses were identified in evaluations of the first 2.25 miles of the Canal (District project report 2003). The following summarizes these weaknesses:

- Seepage of water and evaporation losses from existing earthen canals.
- Excess bypass of water and waste flows resulting from limitations of existing check structures.
- Inefficient withdrawal scheduling in the system.

Therefore, the purpose and objectives of reasonable alternatives to overall increase the water supply, the proposed action would:

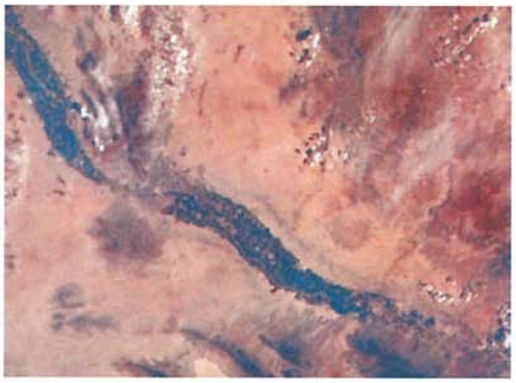
1.4.1. Reduce or eliminate seepage losses to the groundwater
1.4.2. Reduce evaporation losses due to the current surface area of the canal
1.4.3. Correct inefficient delivery due to leaky diversion and check structures

1.5. Laws, Regulations, and Environmental Impact Statement (EIS) that affect this EA

The referenced MOA, the Act, and the El Paso-Las Cruces Regional Sustainable Water Project 2001 EIS , dated January 16, 2001, affect this EA. Under the MOA dated June 11, 2003, Reclamation agreed to prepare an EA for the project plan to comply with the National Environmental Policy Act (NEPA). The Act requires that a project plan approved by Reclamation be prepared by the District to qualify for federal funds required for the proposed action. According to the 2001 EIS (see page 4 and 6 of the Record of Decision), the Project or the preferred alternative will strive to deliver water efficiently. In addition, the Project will

Appendix B
Salvage of Water in EPCWID Canal System (Pages 1, 9, 12 of 18 in the document)

Salvage of Water in El Paso County Water Improvement District No. 1 Canal System



Prepared for
El Paso County Water Improvement District No. 1
Draft Report
January 26, 2000

THANKS TO THE RIO GRANDE
EL PASO COUNTY WATER IMPROVEMENT DISTRICT # 1

STATE OF TEXAS
ALLIE W. BLAIR
63707
REGISTERED PROFESSIONAL ENGINEER

AWBLAIR ENGINEERING
P.O. 1090 Dripping Springs, Texas 78620
Phone: 512-858-1997 Fax: 512-942-8025
Email:awblair@texas.net

Table 3 - Meter Calibration Trials

Meter	Meter ID	Run	Trial	Iteration A	Iteration B	Iteration C	Run Average	Run Average	Ratio Meter A/B
A	AF-0338	1	1	1.603	1.680	1.622	1.635		
A	AF-0338	1	2	1.583	1.615	1.664	1.621		
A	AF-0338	1	3	1.638	1.505	1.550	1.564	1.607	
A	AF-0338	2	1	5.889	5.834	5.805	5.843		
A	AF-0338	2	2	5.820	5.928	5.859	5.869		
A	AF-0338	2	3	5.657	5.777	5.780	5.738	5.817	
A	AF-0338	3	1	6.415	6.377	6.345	6.379		
A	AF-0338	3	2	6.437	6.415	6.383	6.412		
A	AF-0338	3	3	6.307	6.415	6.415	6.379	6.390	
B	S00676	1	1	1.650	1.684	1.584	1.639		
B	S00676	1	2	1.600	1.660	1.646	1.635		
B	S00676	1	3	1.569	1.672	1.638	1.626	1.634	0.983
B	S00676	2	1	5.643	5.874	5.712	5.743		
B	S00676	2	2	5.712	5.889	5.780	5.794		
B	S00676	2	3	5.751	5.672	5.737	5.720	5.752	1.011
B	S00676	3	1	6.345	6.415	6.399	6.386		
B	S00676	3	2	6.399	6.361	6.421	6.394		
		3	3	6.383	6.399	6.415	6.399	6.393	1.000
								Ratio Average A/B	**0.998**

Table 4 - ACE Inflow-Outflow Seepage Test

Date	Time	Location	Flow	Meter
11-Apr-99	8:05	ACE Ascarate	366.04	AF-0338
11-Apr-99	8:50	ACE Ascarate	367.64	AF-0338
11-Apr-99	9:40	ACE Ascarate	365.20	AF-0338
11-Apr-99	10:20	ACE Ascarate	368.82	AF-0338
11-Apr-99		Average	**366.93**	AF-0338
		Depth Correction Ratio	0.993	
		Corrected Flow	**364.36**	AF-0338
11-Apr-99	11:20	JR WTP	**62.04**	AF-0338
11-Apr-99	8:40	Riverside Heading	295.95	S00676
11-Apr-99	9:25	Riverside Heading	298.87	S00676
11-Apr-99	10:15	Riverside Heading	300.43	S00676
11-Apr-99	11:10	Riverside Heading	298.50	S00676
11-Apr-99	12:15	Riverside Heading	299.76	S00676
11-Apr-99		Average	298.70	S00676
11-Apr-99		Meter Correction Ratio	0.998	
11-Apr-99		Corrected Flow	**298.10**	S00676

operational capacity of the canal is approximately 250 cfs and thus a relatively small concrete canal or conduit would be required to replace the earthen canal. However, because the first 10 miles of the Franklin Canal parallels highly urbanized portions of EPCWID, construction cost for lining the canal would be expensive. At the current value of water and based on the potential amount of salvaged water, it is uneconomical to concrete line the Franklin Canal. However, the land occupied by the canal has significant value. Replacing portions of the Franklin Canal with buried conduit would allow joint land use and may generate benefits worth the cost of the project.

G. Riverside Canal

In November 1998, EPCWID performed a hydrostatic test on approximately the first 2.25 miles of the Riverside Canal between Riverside Dam and the Partidor Check. The results of the test indicated that annually, approximately 3,000 acre-feet/mile (year-round) and 2,000 acre-feet/mile (February 15 to October 15), could be salvaged by lining the canal with concrete. Additional hydrostatic tests need to be performed towards the middle and terminus of the Riverside Canal.

H. Riverside Regulating Reservoir

The Riverside Dam is the last diversion dam in the Rio Grande Project. The travel time for water released from Caballo Dam is approximately 3 days. Release from Caballo Reservoir and return flow from numerous canal and lateral spillways, agricultural drains, and wastewater treatment plant discharges contribute to the total flow at Riverside Canal Heading. Reclamation attempts to keep the flow steady and equal to the quantity ordered for the Riverside Canal Heading. Unfortunately, significant flow fluctuations do occur at the Riverside Canal Heading. During 1997, approximately 60,000 acre-feet of flow above order arrived at the Riverside Canal Heading. Approximately half of this flow was captured and used by EPCWID. The remaining 30,000 acre-feet flowed downstream in the Rio Grande. Approximately 20,000 acre-feet of the 30,000 acre-feet could be temporarily stored in a regulating reservoir located near the

Appendix C
Letters of Support

Congressman Beto O'Rourke, US TX-016

BETO O'ROURKE
16TH DISTRICT, TEXAS

COMMITTEE ON
ARMED SERVICES

COMMITTEE ON
VETERANS' AFFAIRS

Congress of the United States
House of Representatives
Washington, DC 20515

1330 LONGWORTH BUILDING
WASHINGTON, DC 20515
(202) 225-4831

303 N. OREGON, SUITE 210
EL PASO, TX 79901
(915) 541-1400

orourke.house.gov

May 1, 2018

Mr. Darren Olson
Financial Assistance Support Section
United States Bureau of Reclamation
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Dear Mr. Olson,

I am writing on behalf of the El Paso County Water Improvement District No. 1 (EPCWID) request for funding under the WaterSMART Water and Energy Efficiency Grants program for Fiscal Year 2018. I understand the EPCWID is proposing to make improvements to the Riverside Canal System that will help the District conserve significant quantities of water lost to seepage and evaporation.

The El Paso region has an arid climate and receives an average annual rainfall of about 8 inches. Irrigation, municipal, and industrial water use as well as international and interstate treaties all place significant demands on the limited water resources in the area. The City of El Paso meets approximately 50% of its water demand using water from the Rio Grande River. To meet the increasing demand of water for the next 50 years, additional water supplies are being developed in the area in projects that are increasing in cost, including water desalination, the importation of water, and advanced purification. Conservation is a more viable and cost-effective approach to meet the area's growing water demand.

I appreciate your full, fair, and prompt consideration of the El Paso County Water Improvement District No. 1 for this important grant program. Should you have additional questions, please feel free to contact my office at 202-225-4831.

Sincerely,

Beto O'Rourke.

Beto O'Rourke
Member of Congress

Congressman Will Hurd, US TX-023

WILL HURD
23RD DISTRICT, TEXAS

PERMANENT SELECT COMMITTEE ON INTELLIGENCE
SUBCOMMITTEE ON EMERGING THREATS
SUBCOMMITTEE ON DEPARTMENT OF DEFENSE INTELLIGENCE AND OVERSIGHT ARCHITECTURE

COMMITTEE ON HOMELAND SECURITY
VICE CHAIRMAN, SUBCOMMITTEE ON BORDER AND MARITIME SECURITY
SUBCOMMITTEE ON COUNTERTERRORISM AND INTELLIGENCE

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM
CHAIRMAN, SUBCOMMITTEE ON INFORMATION TECHNOLOGY

Congress of the United States
House of Representatives
Washington, DC 20515–4323

317 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225–4511

17721 ROGERS RANCH PARKWAY
SUITE 120
SAN ANTONIO, TX 78258
(210) 921-3130

TEXAS A&M SAN ANTONIO PATRIOTS' CASA
ONE UNIVERSITY WAY, SUITE 202A
SAN ANTONIO, TX 78224
(210) 784-5023

1104 WEST 10TH
DEL RIO, TX 78840
(830) 422-2040

124 SOUTH HORIZON
SOCORRO, TX 79927
(915) 235-6421

100 SOUTH MONROE STREET
EAGLE PASS, TX 78852
(210) 784-5023

PECOS COUNTY COURTHOUSE, 1ST FLOOR
103 WEST CALLAGHAN
FORT STOCKTON, TX 79735
(210) 249-1548

April 17, 2018

Mr. Darren Olson
Financial Assistance Support Section
United States Bureau of Reclamation
U.S. Department of the Interior
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Dear Mr. Olson,

I am writing to express my support for the El Paso County Water Improvement District No. 1 (EPCWID) request for funding under the WaterSMART Water and Energy Efficiency Grants program for Fiscal Year 2018. With this funding, EPCWID would make improvements to the Riverside Canal System to conserve significant quantities of water lost to seepage and evaporation.

The El Paso region has an arid climate and receives an average rainfall of about 8 inches. Irrigation, municipal, and industrial water use place significant demands on the limited water resources in the area. The City of El Paso meets approximately 50% of its water consumption using water from the Rio Grande River. To meet the increasing demand for water over the next 50 years, additional water supplies are being developed in the area, including water desalination, the importation of water, and advanced purification. Conservation of this water through improvements to the Riverside Canal System is a viable and cost-effective approach to meet the area's growing water demand.

I appreciate your swift and thoughtful consideration of the El Paso County Water Improvement District No. 1 for this important grant program. Should you have additional questions, please feel free to contact my office at 202-225-4511.

Sincerely,

Will Hurd

WILL HURD
Member of Congress

PRINTED ON RECYCLED PAPER

Far West Texas Water Planning Group (FWTWPG)

April 25, 2018

Mr. Darren Olson
Financial Assistance Support Section
United States Bureau of Reclamation
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Letter of Support for Proposal to Make Improvements to the Riverside Canal System

Dear Mr. Olson,

The El Paso County Water Improvement District No. 1 (EPCWID) is seeking to apply for funding under the WaterSMART Water and Energy Efficiency Grants program for fiscal year 2018. EPCWID is proposing to make canal lining improvements to the Riverside Canal System that will help the District conserve significant quantities of water lost to seepage and evaporation.

The Far West Texas Water Planning Group (WPG) pursuant to the State of Texas Water Code §16.05 is designated to develop the Region E Far West Texas Regional Water Plan with support from the Texas Water Development Board (TWDB). The Far West Texas WPG is composed of voting members from 7 counties in West Texas representing 15 water use interest categories and non-voting representatives of public stakeholder agencies, including the U.S. Bureau of Reclamation.

The Region E Far West Texas Regional Water Plan includes water management strategies that, when implemented, would develop, deliver, or treat additional water supply volumes or conserve water. The project proposed by EPCWID is a recommended water management strategy in the Water Plan and can be referenced using 2016 Strategy ID E-45. As such, the Far West Texas Water Planning Group supports the water conservation project proposed by the El Paso County Water Improvement District No. 1 and recommends its funding.

Scott Reinert, P.E., P.G.
Vice-Chair
Far West Texas Water Planning Group

Resolution of Support from the City of Socorro, Texas

Elia Garcia
Mayor

Rene Rodriguez
At Large

Cesar Nevarez
District 1

Ralph Duran
District 2

Victor Perez/Mayor Pro Tem
District 3

Yvonne Colon-Villalobos
District 4

Adriana Rodarte
City Manager

RESOLUTION # 539

WHEREAS, El Paso County has an arid climate, only receives an average rainfall of about 8 inches, and irrigation, municipal, and industrial water use place significant demands on the limited water resources in the area; and

WHEREAS, The City of Socorro supports projects that conserve water, mitigate drought, and support the local agricultural economy; and

WHEREAS, The El Paso County Water Improvement District Number One (EPCWID) will be seeking funding from the United States Bureau of Reclamation WaterSMART Water and Energy Efficiency Grants Program for Fiscal Year 2018; and

WHEREAS, The project proposed by EPCWID for improvements to the Riverside Canal will lead to water conservation, drought mitigation, and will benefit the residents and agricultural businesses of the City of Socorro.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Socorro supports the water conservation project proposed by the El Paso County Water Improvement District Number One to the United States Bureau of Reclamation WaterSMART Program.

PASSED and APPROVED this 3rd day of May, 2018.

CITY OF SOCORRO

Elia Garcia
Mayor

ATTEST:

Olivia Navarro
City Clerk

JOSÉ RODRÍGUEZ
STATE SENATOR
SENATE DISTRICT 29
EL PASO, CULBERSON, HUDSPETH, PRESIDIO & JEFF DAVIS COUNTIES

January 12, 2018

Cameron G. Turner
Manager, Agricultural Water Conservation
Texas Water Development Board
1700 N. Congress Ave.
Austin, Texas 78711-3231
CC: Phyllis Thomas, TWDB Contract Administration

RE: Letter of Support for Proposal to Make Design Improvements to the Riverside Canal System

Dear Mr. Turner:

The El Paso County Water Improvement District No. 1 (EPCWID1) is seeking funding under the TWDB Agricultural Water Conservation Program for FY2018. EPCWID1 is proposing to make design improvements to the Riverside Canal System that will help the District conserve significant quantities of water now lost to seepage and evaporation.

The El Paso region has an arid climate and receives an average rainfall of about 8 inches. Irrigation, municipal, and industrial water use as well as international and interstate treaties all place significant demands on the limited water resources in the area. The City of El Paso meets approximately 50 percent of its water demand using water from the Rio Grande River. To meet the demand for water over the next 50 years, additional supplies are being developed in projects that are increasingly expensive, including desalination, importation, and advanced purification. Conservation presents a viable and cost-effective approach to meet demand.

Water is critical to the economy of Texas State Senate District 29. If not met, the socioeconomic impacts of projected water shortages in El Paso County are approximately $3.45 billion by 2070 and include almost 25,000 jobs lost (TWDB 2015). Investments now will help secure El Paso's future. As such, I support the water conservation project proposed by the El Paso County Water Improvement District No. 1 and recommend its funding.

Sincerely,

José Rodríguez

CAPITOL OFFICE
ROOM E1.610
P.O. BOX 12068
AUSTIN, TEXAS 78711
(512) 463-0129
(512) 463-7100 FAX

EL PASO OFFICE
100 N. OCHOA ST., SUITE A
EL PASO, TEXAS 79901
(915) 351-3500
(915) 351-3579 FAX

MISSION VALLEY OFFICE
206 S.E. 8TH ST., SUITE 201
FABENS, TEXAS 79838
(915) 765-2000
(915) 764-1555 FAX

MARFA OFFICE
300 W. COLUMBIA, ROOM 102
ELEMENTARY BLDG.
P.O. BOX 1105
MARFA, TEXAS 79843
(432) 729-4800
(432) 729-4803 FAX

Mary Gonzalez, State Representative for Texas District 75

TEXAS HOUSE *of* REPRESENTATIVES

Mary E. González
State Representative, District 75

January 12, 2018

Cameron G. Turner
Manager, Agricultural Water Conservation
Texas Water Development Board
1700 N. Congress Ave.
Austin, Texas 78711-3231
CC: Phyllis Thomas, TWDB Contract Administration

RE: Letter of Support for Proposal to Make Design Improvements to the Riverside Canal System

Dear Mr. Turner,

First off, I'd like to extend my appreciation for the work that Texas Water Development Board achieves - your dedication to both the conversation and responsible development of water sources is truly a model for other state agencies. The El Paso County Water Improvement District No. 1 (EPCWID1) is seeking to apply for funding under the TWDB Agricultural Water Conservation Program for FY2018. Now more than ever, the conservation of water and other natural resources is critically important. EPCWID1 is proposing to make design improvements to the Riverside Canal System that will help the District conserve significant quantities of water lost to seepage and evaporation during each irrigation season (after subsequent construction).

The El Paso region has an arid climate and receives an average rainfall of about 8 inches. Irrigation, municipal, and industrial water use as well as international and interstate treaties all place significant demands on the limited water resources in the area. In order to meet the increasing demand of water for the next 50 years, additional water supplies are being developed in projects that are increasingly expensive, including water desalination, the importation of water, and advanced purification. Conservation is a more viable and cost-effective approach to meet the area's growing water demand.

Agriculture and water are especially important to the economy and livelihood of residents of Texas State House District 75. If not met, the socioeconomic impacts of projected water shortages in El Paso County are approximately $3.45 billion by 2070 and include almost 25,000 jobs lost (TWDB 2015). Making investments to secure El Paso's limited water resources now is more important than ever.

As such, I support the water conservation project proposed by the El Paso County Water Improvement District No. 1, and recommend its funding. Please contact my office should you have any questions, or require additional information.

Thank you,

Mary E. González

Mary E. González
Texas Representative
House District 75

Appendix D
April 19, 2018 USDA Weather Report (P1, 2)

USDA

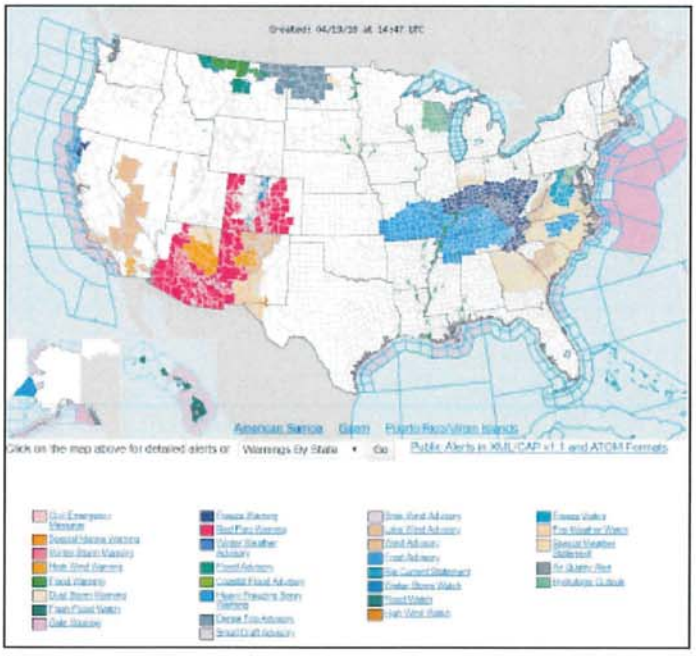
United States Department of Agriculture

Water and Climate Update

April 19, 2018

The Natural Resources Conservation Service produces this weekly report using data and products from the National Water and Climate Center and other agencies. The report focuses on seasonal snowpack, precipitation, temperature, and drought conditions in the U.S.

Snowstorms continue in the Midwest; Wildfire potential increases in the Southwest



This past week has seen severe weather affecting large areas of the country, and these conditions are continuing.

Winter storm Xanto deposited record snowfalls in the Midwest and Great Lakes. Tornados touched down in Arkansas and North Carolina. And a large wildfire is burning in Oklahoma.

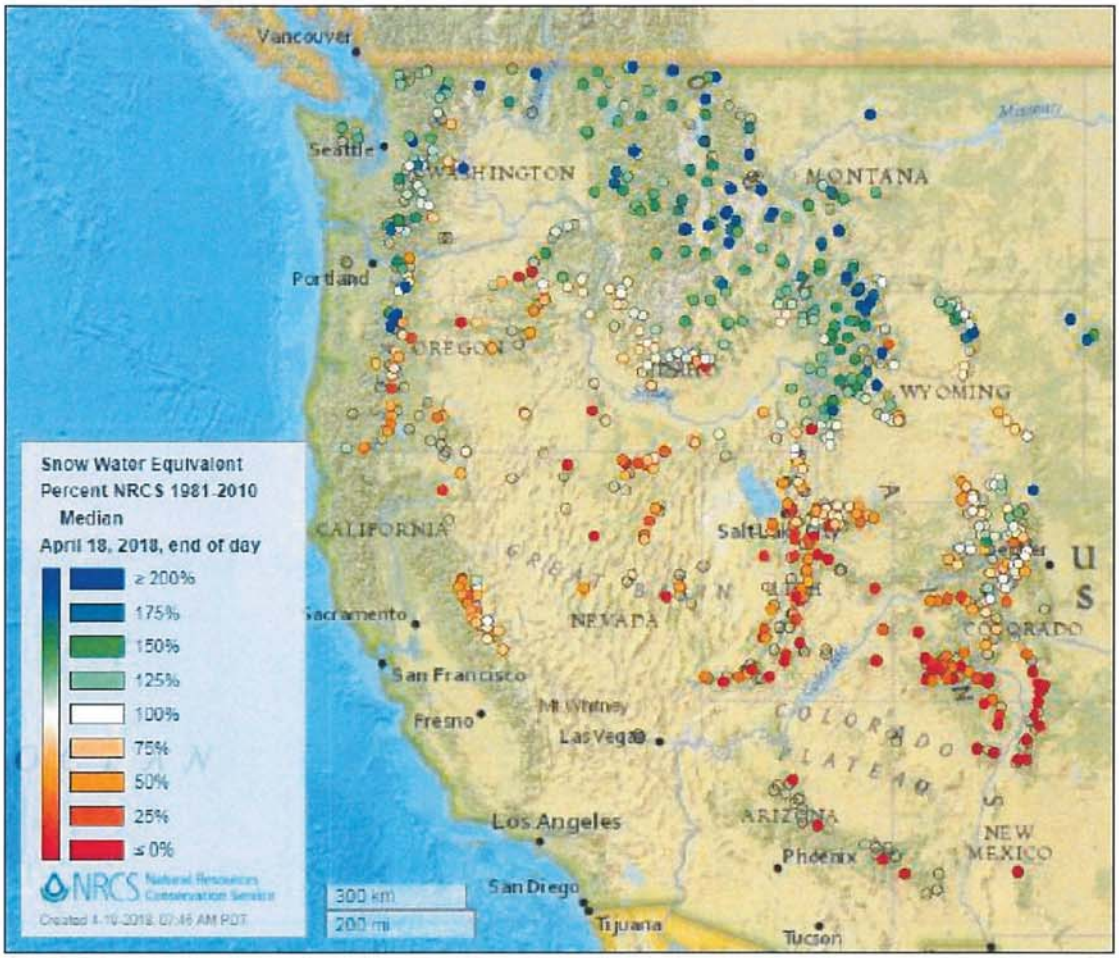
According to the National Weather Service, the outlook for the coming week includes more snow in the Midwest and continued fire danger in the southern Plains and into the Southwest.

Related:

NOAA Storm Prediction Center Fire Weather Outlook
National Weather Service Short Range Forecast Discussion
Gusty winds spread wildfires in Plains as storm moves east - ABC News

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

Current Snow Water Equivalent, NRCS SNOTEL Network



Appendix E
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