Leasburg Canal Modernization:

EBID Small Scale System Improvements – Leasburg Canal Gate Actuators and Metering Station

WaterSMART Small-Scale Water Efficiency Projects

NOFO No. R22AS00195

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1.1. Executive Summary

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Elephant Butte Irrigation District, Doña Ana and Sierra Counties, New Mexico
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Elephant Butte Irrigation District is among the organizations in Category A for applicants eligible to receive an award under this NOFO. EBID is located in the state of New Mexico, one of the states listed as eligible to receiving the award.

Elephant Butte Irrigation District (EBID), located in the Mesilla and Rincon Valleys in southcentral New Mexico, is the New Mexico portion of the Rio Grande Project. EBID proposes an integrated set of system modernization measures on the Leasburg Canal to conserve water, improve delivery of surface water to EBID members, and stretch and maximize the benefits of the limited resources available to EBID. The proposed project is located near Radium Springs, New Mexico, just south of the Leasburg Dam in the Leasburg Main Canal at Station 63+46 and 71+10. The project consists of adding electric motor actuators to an existing check structure, known as the "Arguelles Check", and the construction of a new metering station consisting of a 30-foot-long concrete lining, stilling well, metering bridge, and an acoustic doppler sensor for accurate measurement of flow. The Leasburg Main Canal delivers water to roughly 31,600 acres of water righted land. Effective and efficient management of this critical main canal also impacts the water available to all of EBID's 90,640 water righted acres. Adding electric motor actuators to the Arguelles Check allows for the initial stretch of the Leasburg Main Canal to be improved significantly through eventual automation which will benefit all water users downstream on the Leasburg Canal. Automation will allow EBID to better control diversion flow rates, upstream water pressure, and downstream flow. A new concrete lining, metering bridge, and sliding rail system for an acoustic doppler sensor makes for a complete flow gauging and measurement site (metering station) that is essential to water management issues. The combination of the motorized, and eventually automated, check structure and complete metering site just downstream allows for significant improvement to the management and operations of the Leasburg Main Canal, which will be the first of many modernization projects throughout EBID's main canals.

All portions of the proposed projects are located on EBID property, which is held fee simple title EBID after transfer from the Bureau of Reclamation.

The proposed project will only require 13 months to complete. If the agreement is in place and the project begins in 2023, the anticipated completion will be in May 2024.

1.2. Background Data

1.2.1. The Rio Grande Project:

Elephant Butte Irrigation District (EBID) is the New Mexico portion of the Rio Grande Project, which was authorized in 1905. The major features of the Rio Grande Project are:

Elephant Butte Dam, a large storage dam completed in 1916 with a capacity of about 2.1 million acre-feet; Caballo Dam, a flood control and regulation dam completed in 1938 with a capacity of about 344 thousand acre-feet, but it is operated at much lower levels to re-regulate releases from Elephant Butte Dam to meet downstream demands;

- Elephant Butte Irrigation District in New Mexico, providing water to farmers on 90,640 acres of water-righted land in the Rincon and Mesilla Valleys;
- El Paso County Water Improvement District No. 1 (EPCWID) in Texas, providing water to 69,010 water-righted acres for irrigation in the Mesilla and El Paso-Juarez Valleys, including water supply to the City of El Paso;
- The Republic of Mexico receives its delivery of Rio Grande Project water pursuant to the 1906 Convention between the United States and Mexico - Equitable Distribution of the Waters of the Rio Grande at the Acequia Madre diversion from the Rio Grande on the international border between El Paso and Ciudad Juarez.

EBID is a legislatively authorized political subdivision of the State of New Mexico. The district operates under New Mexico statutes §73-10-1 through §73-10-47, Irrigation District Cooperating with United States under Reclamation Laws; Formation and Management, and §73-11-1 through §73-11-55 Irrigation Districts Cooperating with United States under Reclamation Laws; Fiscal Affairs; Local Improvements and Special Powers. As defined by New Mexico statutes, irrigation districts cooperate with the federal government on Bureau of Reclamation projects. These statutes generally state that irrigation districts are to:

- Serve as a contracting agency for water users to arrange to repay construction obligations to the government and furnish funds for operation and maintenance; and in connection with other matters that must be agreed to, in contract for, between the government and water users. (§73-10-1 paraphrase)
- Serve as an agency for the assessment and collection of operation, maintenance and construction charges and the payment of same, to the government in accordance with contractual arrangements. (§73-11-28 paraphrase)
- Provide a water users' organization that might later be expanded for the purpose of assuming control of operation and maintenance upon transfer by the Bureau of Reclamation. (§73-10-45 paraphrase)

EBID is governed by a board of nine elected members drawn from the district's constituents. The board meets monthly and has broad powers to set policies, which are implemented by district personnel, who are overseen by the District Manager.

1.2.2. Physical facilities:

EBID's lands are served by three primary diversion points – Percha, Leasburg, and Mesilla Dams. Mesilla Dam also delivers water to EPCWID's Mesilla valley lands in Texas. EBID has about 300 miles of canals and laterals, and the district is broken up into 13 operational units that are manned by ditch riders. About 30 miles of the laterals have been piped by EBID, mostly in cooperation with BOR WaterSMART grants, the rest remains unlined earthen channels. The district also has about 250 miles of drains that return subsurface drainage and storm water to the Rio Grande. Reclamation retains title to the diversion dams, and EBID operates and maintains them under contract with Reclamation. EBID owns the canal and drainage systems, along with associated land.

This project is centered around the beginning of the Leasburg Main Canal, the diversion from the Rio Grande at Leasburg Dam. This diversion from the Rio Grande into the Leasburg Canal, and its associated laterals, delivers surface water to roughly 13,600 water righted acres.

1.2.3. Hydrology and Water Supply:

Water for EBID, EPCWID, and Mexico is released from storage in Elephant Butte Reservoir and regulated through Caballo Reservoir. Orders for EBID, EPCWID, and Mexico are summed, and the release gates at Caballo Dam are adjusted to meet the specific demand, accounting for gains or losses in the system and lag times to the diversion points. Each district and Mexico have an allocation for diversion from the Rio Grande. The methodology for determining these diversions is described in the Operating Agreement and Operating Manual that the two districts and Reclamation negotiated and approved in 2008.

A "full allocation" for annual diversion to EBID is about 495,000 acre-feet. EBID has not had a full allocation since 2002 due to the persistent and increasingly severe drought in the area. The Rio Grande Project experienced a similar drought cycle from 1951 through 1978, with very short years interspersed with an occasional wet year of full supply. From 1979 through 2002, both districts and Mexico had full allocation on January 1 of every year. Having occurred for 24 consecutive years, full supply came to be considered a normal year, when in reality it is not. The last twelve years have reminded us that drought and shortage is more normal than full supply, making water conservation even more important.

Given its allocation for diversion, EBID's Board of Directors sets the allotment for delivery to constituents' farm gates by estimating the conveyance efficiency (delivery/diversion), and allotting water pro-rata to the district's 90,640 acres. During the full supply years of 1979-2002, with a three-foot allotment every year, the conveyance efficiency was about 65 percent. Of the 35 percent loss, about ten percent was attributed to losses in the main canal system and 25 percent was attributed to losses in the laterals.

In the seventeen years since 2002, the allotment has only been full twice, in 2005 and 2008. In 2003 and 2004, the allotment was only 9 inches per water righted acre. In 2011, it was 4 inches, and in 2012 it was 10 inches. 2013 saw the worst water supply in the nearly 100-year history of the Rio Grande Project, with an allotment to farmers of only 3.5 inches per water righted acre.

In 2014 EBID's members received 7.5 inches, in 2015 it was 11 inches, in 2016 it was 13 inches, in 2017 it was 24 inches, in 2018 it was 10 inches, in 2019 it was 14 inches, in 2020 it was 14 inches, in 2021 it was 4 inches, and 5 inches has been allocated thus far for the 2022 water delivery season.

Even though the 2017 allotment to EBID farmers of 24 inches was great news and relief compared to recent years, EBID and its constituents consider full allotment to be 36 inches. The average for the period 2011-2016 was only 8 inches and the average for the years 2003-2019 was 16 inches. While last year's improved supply has reduced aquifer decline, effects of the previous six years of hard drought are still quite evident. Since a significant portion of the losses are fixed, independent of flow rate, the conveyance efficiency gets lower in short supply years, and has generally been at or below 50 percent in the latest drought. The short supply compounded by higher relative losses makes drought particularly painful in EBID, and this has been much of the motivation for this project.

1.2.4. EBID Members:

EBID remains an agricultural water provider. About 4 percent of the district's water righted acreage is in parcels of less than two acres, known as small tract irrigators, operating on a fixed rotation that is scheduled based on available water. The other 96 percent is classified as farm rate, and those constituents schedule and order water on a demand basis.

The City of Las Cruces (CLC) holds about 1500 acres of EBID water rights. They acquired these water rights as a Special Water Users Association (SWUA). The statutory basis for the SWUA was jointly developed by EBID, CLC, and the New Mexico Office of the State Engineer to facilitate the transfer of agricultural surface water to municipal use. Unfortunately, the decade of drought has prevented CLC from developing the surface water treatment capacity to use the water, and until they do, the water allotted to CLC is leased on an annual basis to irrigators. Therefore, EBID has no current uses other than irrigation.

1.3. Project Location

The proposed project is in New Mexico inside of Dona Ana County approximately 16.5 miles northwest of Las Cruces just off Dona Ana Road. The Leasburg Main canal begins at the Leasburg Dam just east of Highway 185 near Fort Seldon on Leasburg Dam Road. Traveling south 1.2 miles and west another 0.15 miles along the Leasburg Main Canal, you will reach the proposed project area where the new metering station, including concrete lining, stilling well, metering bridge, and metering equipment will be placed. To be more specific, the project's latitude is 32°28'49.62" N and the longitude is 106°55'6.55" W. The Arguelles Check, where the electric motor actuators will be installed, is found 800 feet upstream. The map provided in Figure 1 provides a visual representation of the project location.

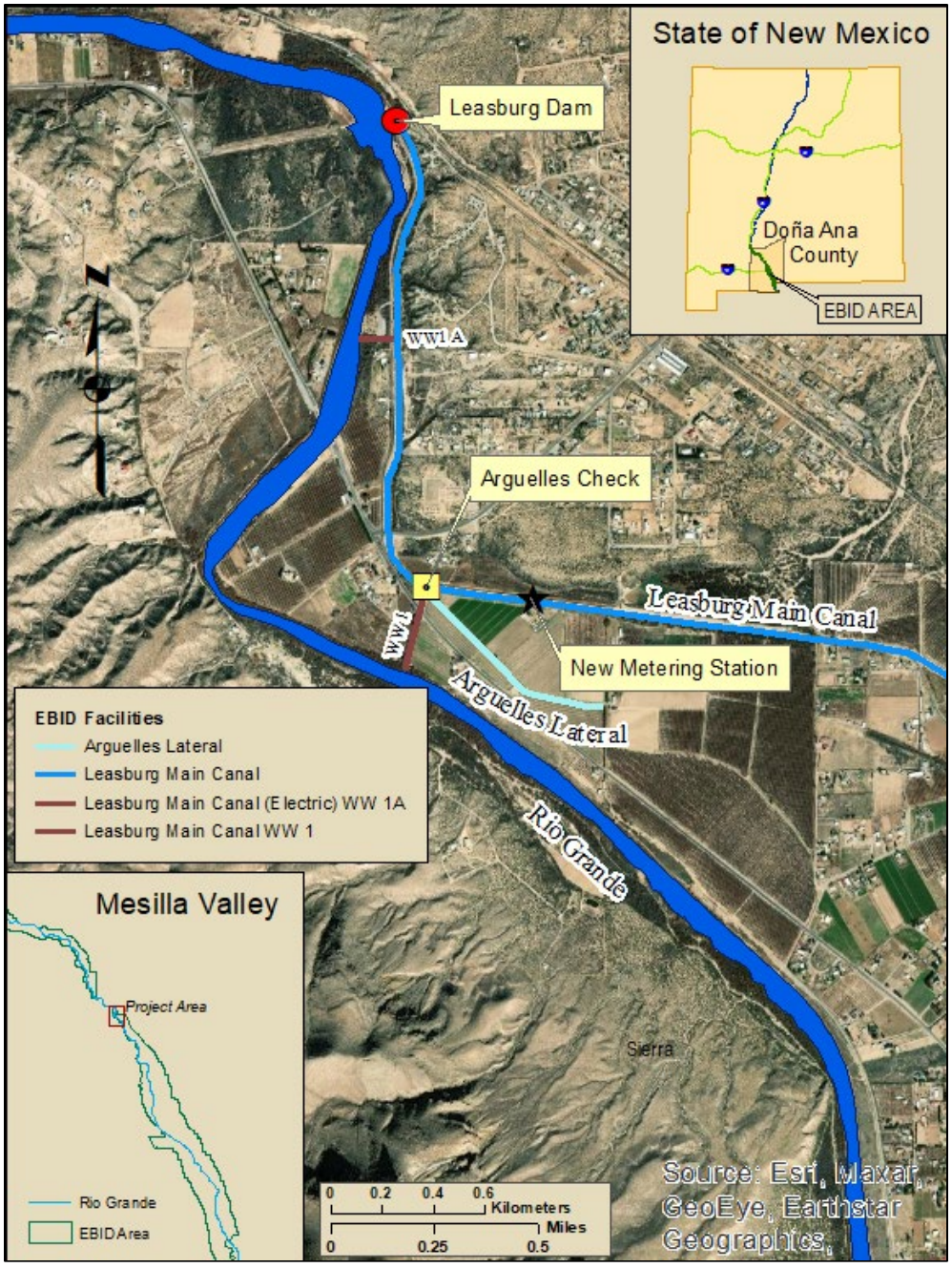

Figure 1. Project location map for proposed project site

1.4. Technical Project Description

1.4.1. Nature of the Problem

Open channel irrigation conveyance is one of the key technological developments that led to the rise of human civilization, and it has been a key feature of our species for at least 5,000 years. Long-distance conveyance of water in canals, particularly unlined ones, is inefficient due to bottlenecks, seepage, and evaporation losses. Modernization is a combination of technical, managerial, and organizational updating (as opposed to mere physical rehabilitation) of irrigation schemes with the objective of improving resource utilization and water delivery service to farms (Wolter and Burt, 1997). Computerized automation typically is implemented in later stages of modernization, after basic needs such as flow measurement and accounting procedures have already been completed (ASCE, 2014). Both the initial steps toward significant technological improvement to EBID's canal systems and the basic need for reliable, redundant, and accurate measurement are addressed by this proposed project.

EBID traditionally has a system efficiency, from the diversions at the Rio Grande to the delivery to EBID members, of 50-55%. This is partially due to seepage of the canal system and partially due to operational spills and tail-end losses. While it is difficult to quantify reductions in seepage and system losses due to automation, elimination of operational spills and tail-end losses will save hundreds of acre-feet of water each year, which is shared equally by EBID's 90,640 water righted acres.

Canal automation has the potential to improve system efficiency and reduce costs for operating Elephant Butte Irrigation District's irrigation infrastructure. EBID's aging water delivery system infrastructure, made up of over 330 miles of canals and laterals, is currently operated manually by limited EBID manpower known locally as "ditch riders". Along with other improvements to canals and laterals within EBID's system, including piping to reduce seepage, the large "main canals" have huge potential for reducing system losses through improved operational management. Within EBID's limited water delivery season, system infrastructure and operational challenges prevent EBID from meeting the demand of all its agricultural producers concurrently and supplying the water precisely when the farmer needs it. Inability to meet demand, both flow and pressure, limits the EBID system efficiency and eliminates the ability of farmers to optimize on-farm irrigation performance and water conservation. Frequent changes in water level within the canal system due to limited manual operation (there are too many checks and gate for a ditch rider to adjust all frequently) currently prevents an efficient collective system.

EBID is required by statute to allot water to its constituent's pro-rata. Each acre of water-righted land in the district receives the same allotment of water. To be able to distribute the limited water available to EBID equitably, the water must be measured in key locations. Specific sites and key measurement points are fitted with measurement stations where velocity and cross-sectional flow area and velocity are measured and flow rate and volume of water passing the site are calculated. Intentional placement of water measuring devices and their equipment at the main water intake points of EBID's irrigation system is critical for accounting for diversion

by EBID from the Rio Grande. Accurate flow measurement/metering is also required for accounting for water delivered to farmers, evaluating system efficiencies, and quantifying stormwater capture. Precise and accurate measurement of flows at each of EBID's headings is required for accounting for EBID diversion from the Rio Grande and ensuring appropriate flows are left in the river for delivery to the El Paso County Water Improvement District #1 and Mexico.

1.4.2. Adding Electric Actuators for Automation of the Leasburg Main Canal

EBID proposes to first add electric motor actuators to the Arguelles Check of the Leasburg Main Canal. EBID's check gates are water level and flow regulating structures fundamental to the control of water throughout EBID's system. Figure 2 below is a 3D representation of a two-bay radial gate style check structure similar to the Arguelles Check. Adding electric motor actuators with SCADA control systems and radio communication allows EBID eventually to fully automate the movements of the gates. By remote manual (locally or via radio) or truly automated control of the gates by computer algorithms, water levels can be maintained consistent with upstream pressure needs, flow can be regulated to allow for more consistent and safer controls downstream, and flow can be measured with the radial gate structure. Once automated, EBID's ditch riders can spend less time adjusting gates and more time serving farmers and patrolling canal banks for issues.

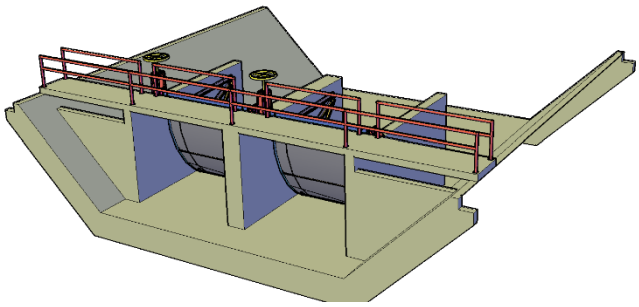

Figure 2. 3D rendition of a two bay radial gate check structure

In addition to reduced manpower, motorized, remotely controlled, and eventually computerized operations of EBID's canal system, all will improve the delivery efficiency of EBID's limited water supply and reduce operations losses. EBID already has extensive experience in remote telemetry and remote automation through its Supervisory Control and Data Acquisition (SCADA) Systems Department and an example of one site installed to both monitor and control a critical location within EBID's canals is shown as Figure 3.

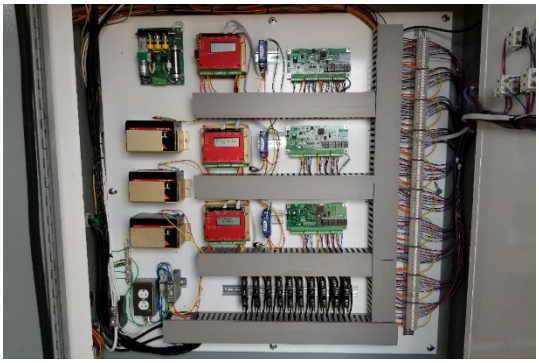

Figure 3. EBID SCADA electronic controls of the "Electric Wasteway" of the Leasburg Main Canal

Eventually EBID would like to automate all of the canal regulating structures of the Leasburg Main Canal. Improving operations of the Leasburg Main Canal will increase efficiency, reliability, and accountability for all the acres served by this major portion of EBID's system. Following these improvements, the suitability for the other three main canals will be evaluated for inclusion in the automated system.

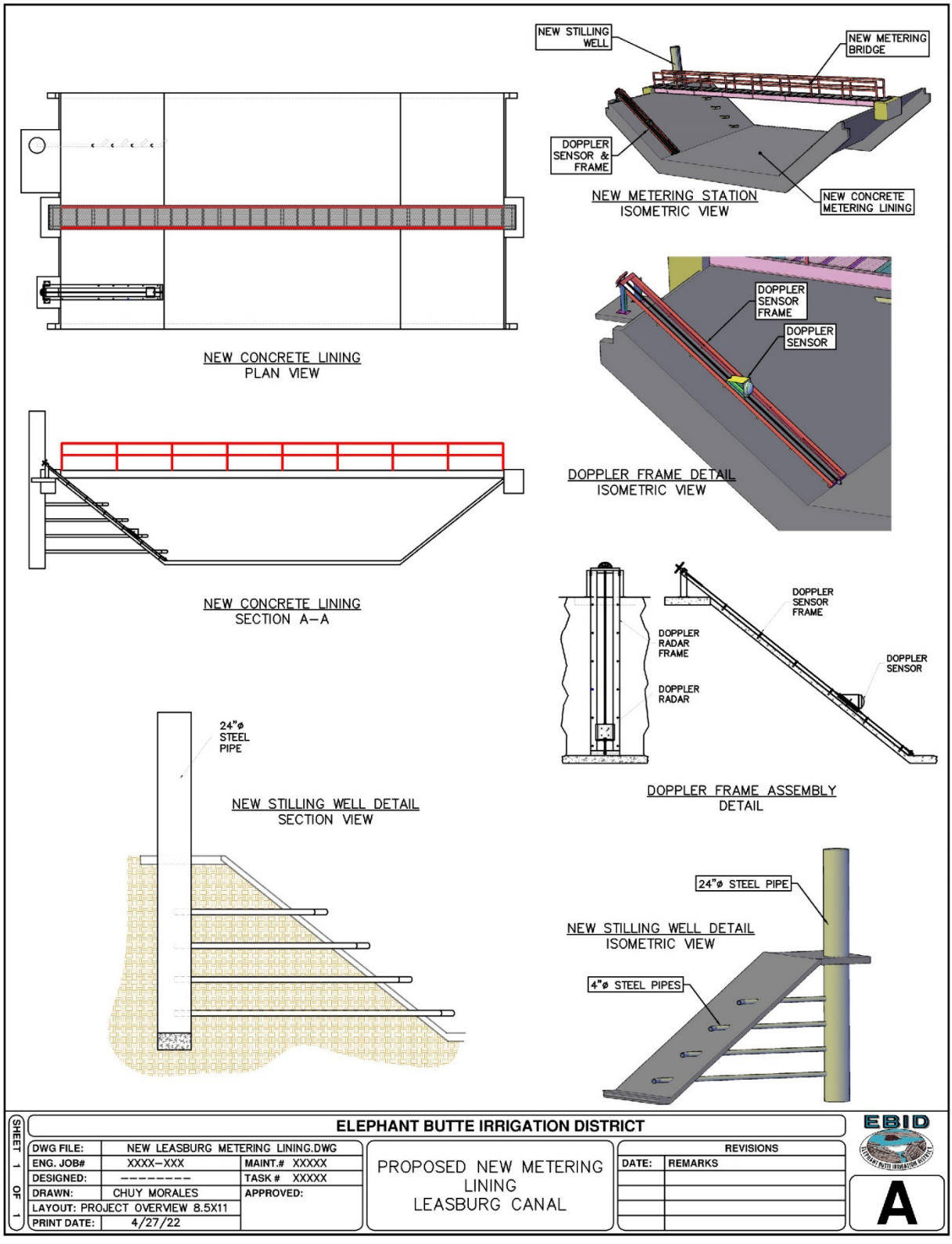

Figure 4. Design components of proposed Leasburg Canal metering site

1.4.3. Improvement of the Leasburg Main Canal Metering Station

This proposed project adds a 30-foot-long concrete lining along with a new metering bridge, stilling well, and sliding mount for the proposed acoustic doppler velocity and flow sensor to the Leasburg Main Canal at Station # 71+10. Concrete lining at a metering station such as proposed here is essential to ensuring a reliable channel cross section. Concrete lining will prevent scouring or degradation of the canal bed, allow for consistent removal of deposited silt if the canal aggrades, and prevents the growth of vegetation within the designated prism. Site selection was evaluated based on USGS Flow Measurement and Gaging Station recommendations (USGS, 2010). Thirty feet of concrete lining was selected for channel stability and consistency of measurement for any of the stream gauging techniques or technologies employed by EBID's SCADA Systems Department. Figure 4 above shows components of the proposed metering station.

Earthwork to prepare the site for the concrete lining, excavation for and backfill of the stilling well, and forming the concrete lining all must take place prior to placing the concrete. All construction will be designed by EBID's engineers and constructed by EBID Maintenance Department personnel and equipment. Members of EBID's maintenance crew and track-hoe excavator will be required to perform a reshaping of the section of canal where the lining and metering components will be located, as it is necessary since accurate metering requires uniformity in the channel and velocity profile not only at the lining, but also upstream and downstream. EBID's SCADA Systems Department will install the RTU (Remote Telemetry Unit) that will report field data to EBID's office every 30 minutes and install the RD Instrument Channel Master ADCP before the irrigation season.

EBID's SCADA Systems Department will utilize the improved facilities to measure the stage, velocity, discharge, and volume of water passing this upstream point on the Leasburg Canal.

Figure 5. Photo of existing metering bridge looking upstream

The existing metering bridge shown in Figure 5 above, currently upstream of the proposed lining and metering bridge, will be removed because it is unsafe and deflects excessively under a single person load, causing safety concerns for EBID employees. A metering bridge that deflects excessively also creates inaccuracies for metering purposes. The improved metering

bridge has been/will be engineered for a more conservative design live load for safety and metering purposes.

A doppler meter frame has been designed and will be fabricated to mount to the slope of the concrete lining allowing for the elevation of the acoustic doppler sensor to be adjusted occasionally based on depth of flow. Figure 6 below is a 3D representation of the sliding frame designed to mount the acoustic doppler sensor. An RD Instruments, horizontally orientated, Channel Master Acoustic Doppler Current Profiler, or similar, will be installed by mounting to this frame. This meter is designed to accurately measure water velocity, gauge height, and flow. In addition to these parameters, the Channel Master is also equipped with temperature, pressure, pitch and roll sensors and a vertical beam. The site will also include an RTU monitoring setup that will collect flow values and report field data to EBID's office every 30 minutes.

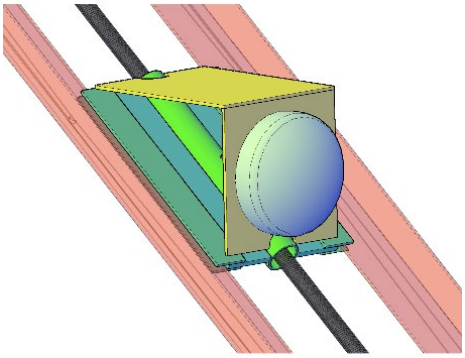

Figure 6. 3D representation of a sliding mount for an acoustic doppler sensor.

1.5. Evaluation Criteria

1.5.1. Evaluation Criterion A – Project Benefits

Due to the ongoing drought and the incremental nature of system modernization, the hydrology and quantification of water conservation due to single, small-scale project, becomes complicated. The primary driving force for the proposed project is the conservation of EBID's limited water supply and improvements to on-farm efficiencies due to improved timing and improved delivery flow. By automating canals, EBID will be able to provide more consistent water levels and pressure, reduce fluctuations in deliveries, reduce fluctuations in flow sent downstream from an automated check, and improve the consistency of diversion from the Rio Grande. More efficient deliveries to EBID's members and more effective and efficient transportation of water through EBID's canal system results in reducing losses and improving on farm efficiencies. Likewise, reducing losses and improving irrigation times leads to a reduction in the need to pump more water and minimized pumping costs.

Modernizing the system with real-time water level and flow measurements, electric motor actuators, and computer-controlled automation will promote improved water deliveries for maximizing crop production and can virtually eliminates operational spills and tail-end losses.

EBID diverts water from the Rio Grande at four main headings, the Arrey Main Canal at Percha Diversion Dam, the Leasburg Main Canal at Leasburg Diversion Dam, and the Eastside and Westside Canals at Mesilla Dam. Canal automation has the potential to stabilize river flows and deliveries to both Texas and Mexico downstream.

Improvements to measurements of canal stage and flow results in improved water management. It is said: "if you can't measure it, you can't manage it." EBID has historically monitored Leasburg Canal diversion flow by measuring gauge height and utilizing historic meter notes to develop a linear regression equation. To adjust for variations in canal conditions, a meter shift is applied each time flow is metered. These constant variations in downstream conditions and the potential unavailability of personnel for repetitive metering can cause drift in the correct flow amounts. To eliminate these issues, EBID would install a side-channel acoustic doppler meter that measures gauge height and utilizes canal lining measurements to accurately calculate the area of water passing through the structure. The doppler technology also measures increases and decreases in velocity across the channel in order to produce accurate flow measurements, eliminating the issues mentioned above.

The upgrading the flow measurement downstream of the Arguelles Check will result in more precise and accurate reporting of EBID's diversion from the Rio Grande. EBID's SCADA and metering equipment will provide real-time data output that can be accessed via EBID's website by the interested agencies and the public.

Projects such as the one proposed in this application are significant for water management as it will allow EBID personnel to monitor near real-time flow of surface irrigation water, increasing the accuracy and efficiency of water delivery to EBID's farmers. Due to prolonged drought conditions and water allotment shortages, accurate and reliable data is critical to maximizing reduced surface water allotment. Doppler technology, that accurately measures the area of water passing in front of the meter, while collecting average velocity over the entire area of water, eliminates the need for constant adjustment of flow through meter notes and applied meter shifts. This also allows EBID personnel to focus on downstream water delivery to farms by increased metering of individual turnouts that improves water delivery charges and the overall efficiency of allotment delivery.

From an agricultural perspective, the proposed project will assist in resiliency throughout climate change and prolonged drought that has left EBID in the predicament of delivering a fraction of surface water allotment compared to full allotment years. Efficiency is key to making sure what resources do exist are maximized to the fullest potential. Modernizing EBID's infrastructure and improving water monitoring is essential to accomplishing that goal.

1.5.2. Evaluation Criterion B – Planning Efforts Supporting the Project

Elephant Butte Irrigation District and its agricultural producer members began planning and implementing water stewardship measures over 100 years ago and continue to this day. When New Mexico's 50-Year Water Plan was first enacted in 1987, EBID was one of the first to submit and receive acceptance of their regional plan.

Similar improvements to EBID's delivery system were envisioned in the Lower Rio Grande Regional Water Plan, which was composed by the Lower Rio Grande Water Users Organization (LRGWUO, of which EBID is an active member) and accepted by the New Mexico Interstate Stream Commission in 2004. This type of system efficiency improvement project was also

included within the 2017 Regional Water Plan as a Strategy to Preserve Agriculture. Documentation of these existing planning efforts can be found at:

- https://www.ose.state.nm.us/Planning/rwp.php
- https://www.ose.state.nm.us/Planning/RWP/11_LRG/1999/LOWER-RIO-GRANDE-REGIONAL-WATER-PLAN.pdf

This proposed project implements a goal of improved efficiencies and addresses a problem identified in both plans listed above of maximizing the benefit of Rio Grande Project surface water. Both plans listed above include the priority of canal system improvements for conservation of water.

Natural aridity, extended drought, and climate change are nothing new to the District and residents of southern New Mexico. Planning ahead began long ago by monitoring everything from water use and delivery to irrigation efficiencies and many other measures through installing state of the art remote telemetry to collect data provided free to the public. The proposed project was developed in effort to further implement this plan by increasing the water discharge capacity and carefully monitoring that water as it flows down from Leasburg Dam.

The proposed project was not identified specifically in this water management plan, but it definitely addresses a problem identified in the existing planning effort. EBID has applied many efforts to thwarting the effects of increasing temperatures that are resulting from climate change. This proposed project has been chosen as a priority as opposed to other potential projects because this metering station in particular is located in the Leasburg Main Canal, one of the four major canals that are vital to EBID's water delivery system.

1.5.3. Evaluation Criterion C – Implementation and Results

Table 1. Project component timeline

Maintenance Season 2023-24						
Nov '23	Dec '23	Jan '24	Feb '24	March '24	Apr '24	Water Season
Procurement of materials, motors	Fabrication of components, connect to electrical power grid	Break ground and begin demolition	Install gate motors	Install wiring, electrical components, lining, stilling well	Install doppler frame, bridge, SCADA components, reshape canal	

Table 2. Project milestones

Project Milestones	**Completion**
Final design and construction drawings	3/31/2023
Environmental compliance documentation	3/31/2023
Permitting (N/A)	3/31/2023
Procurement of materials, motors	11/1/2023
Fabrication of stilling well, bridge, doppler frame, motor mounts	12/1/2023
Connection to Electrical power grid	12/29/2023
Break ground and begin demolition	1/8/2024
Installation of gate motors	2/9/2024
Installation wiring and electrical components	3/8/2024
Installation of metering lining and stilling well	3/8/2024
Metering bridge and doppler frame installation	4/5/2024
Installation of SCADA components	4/26/2024
Reshaping of canal to match new lining	4/26/2024

All portions of the proposed projects are located on EBID property, which is held by EBID by title after transfer from the Bureau of Reclamation or on land which EBID will receive ownership to construct, operate, and maintain the improvements which is being contributed to the project by EBID constituent farmers.

Only preliminary and scoping design work have taken place in support of the proposed project. Design and engineering of all project components will be performed by EBID under the direction and supervision of Zachary Libbin, PE, District Engineer. EBID's Engineering Department is experienced and qualified in the design and engineering required for all components of the project including modernization with electric actuators, earthwork, steel and concrete structures, mechanical components.

EBID is prepared to begin work immediately on notice to proceed since the work to be done is going to be on EBID property. No permitting is required beyond the environmental compliance documentation; no new policies or administrative actions are required to implement the project.

EBID plans to request assistance of the local BOR office with completion of the environmental and cultural compliance, along with review of the final design for the project by March 31, 2023. Timeline shall be discussed further upon awarding of funding.

1.5.4. Evaluation Criterion D – Nexus to Reclamation

EBID is the New Mexico portion of the Bureau of Reclamation's Rio Grande Project, which was authorized in 1905. The EBID owns, operates, and maintains the New Mexico portion of the Rio Grande Project. The Rio Grande Project furnishes a surface irrigation water supply for about 178,000 acres of land and electric power for communities and industries in the area. EBID

delivers Project water to 90,640 water righted acres of the Rio Grande Project in New Mexico. Project lands occupy the river bottom land of the Rio Grande Valley in south-central New Mexico and west Texas. Water is also provided for diversion to Mexico by the International Boundary and Water Commission to irrigate about 25,000 acres in the Juarez Valley. Physical features of the Project in New Mexico owned by EBID through Title Transfer in 1996 include roughly 300 miles of canals, laterals, and wasteways and roughly 250 miles of drains. The 3 diversion dams of the Rio Grande Project in New Mexico are Percha Dam, Leasburg Dam, and Mesilla Dam and are still owned by the Bureau of Reclamation, although they are operated and maintained by EBID. Federal input and coordination with EBID are provided by the Water and Land Division of the Bureau of Reclamation.

1.5.5. Evaluation Criterion E – Presidential and Department of the Interior Priorities

1.5.5.1. Sub-criterion No. E1. Climate Change

Irrigated agriculture is often limited by the availability of irrigation water. In many irrigated areas the distribution canals and on-farm irrigation systems are in poor shape, which causes substantial water losses. These problems are increasingly exacerbated by the impact of climate change causing a reduction of available irrigation water with higher temperatures and expansion of irrigated agriculture leading to higher irrigation water demand. The proposed project was meant to support this issue by creating an impermeable surface for the water to flow at higher velocity, reducing losses from evaporation through faster delivery times. This allows for more efficient use of water in a canal by regulating flows in a manner where less water is needed to accomplish a beneficial use. EBID's SCADA Systems Department will be monitoring field data that is reported to the main office every thirty minutes and is also available to the public. These real-time measurements are being used to support reservoir operations that can reduce total losses.

Additionally, EBID has made a concerted effort to capture stormwater into its facilities and divert this water into specified drains to aid in aquifer replenishment. As surface water allotment has decreased, groundwater pumping by farm irrigation wells have covered the losses, placing further strain on the aquifer. Accurate and reliable water monitoring on the Leasburg Canal is essential to efforts to divert and capture stormwater for this purpose. Approximately one mile downstream of the proposed Leasburg Canal lining site is the Selden Drain Reclamation project, which was designed to hold captured stormwater from the Leasburg Canal.

The RTU that will be installed by EBID's SCADA Systems Department will report the data collected back to the main office. That data is used to identify trends that can be used to determine any losses or gains in the water system. Improvements in the canals are the next step to conserving the limited water supply that came as a result of climate change.

As stated above, this project ties into a larger vision of EBID that utilizes water monitoring sites to divert and capture stormwater into EBID drains to aid in aquifer replenishment. Due to increased groundwater pumping, caused by shortages in surface water allotment, capture of

stormwater can offset groundwater discharge and losses. Climate change has directly affected snowpack levels in the upper and lower Rio Grande watershed, resulting in the issues we face today. Diverting stormwater into areas with elevated levels of groundwater pumping will strengthen water supply sustainability not only for farm purposes, but also homes that are dependent on groundwater pumps.

1.5.5.2. Sub-criterion No. E2. Disadvantaged or Undeserved Communities

EBID is responsible for surface water deliveries to its 6,700 farm members across a service area of 90,640 water righted acres in the Dona Ana and Sierra counties. New Mexico is now known as a majority-minority state, meaning that the majority of the constituents in EBID are racial or ethnic minorities. Though significant progress has been made in enhancing diversity in agriculture, minorities are still underrepresented in farming. EBID's efforts to improve efficiencies and more effectively deliver the limited water supply by automation, flow measurement, and generally improving infrastructure makes the proposed project beneficial to the disadvantaged communities. Improved flow measurement also increases fairness and equitable distribution of the limited water EBID has to deliver. By maximizing the efficiency and effectiveness of surface water deliveries, EBID is reducing the dependence on pumped groundwater, even if incrementally or only slightly, and therefore benefiting farmers struggling with the energy costs associated with pumped groundwater. Farmers are also encouraged to pursue debt relief when assistance is available, such as the American Rescue Plan provided by the USDA to help support farmers and ranchers of color during times of economic impact.

Climate change has caused a major disruption in the farming community by limiting the resources available for distribution. Limited water supply has resulted in farmers relying on pumping of groundwater resources. Those considered disadvantaged are living on low-income farms with persistently high energy bills. Their energy burden is not declining, and it remains persistently high in particular geographies such as the minority communities.

According to the 2017 Census of Agriculture written by the United States Department of Agriculture, there has been an 11% decrease in the number of farms in Dona Ana County alone. Nearly half of the total producers were of ethnic minorities and about a quarter were considered beginning farmers. While Doña Ana County has some large farms in terms of both sales and acreage, the U.S. Department of Agriculture (USDA) designates 95% of its farms as small, and 65% are very small, grossing less $20,000 annually. In spite of all its assets, limited access to land, water rights, and infrastructure for aggregation and processing create barriers for the county's beginning, small, and mid-sized farmers (USDA, 2016).

1.5.5.3. Sub-criterion No. E3. Tribal Benefits

The proposed project does not directly serve or benefit a tribe, as there are no tribal water users near the location of the project.

2. Overlap or Duplication of Effort Statement

EBID does not have any other active of other active or anticipated proposals for the proposed projects in terms of activities, costs, or commitment of key personnel. EBID does have active BOR WaterSMART grant funding including Drought Resiliency Implementation R21AP10035 and WaterSMART agreement R22AP00254 for unrelated projects.

The need for funding for modernization of EBID's Leasburg Canal and all of its Main Canals has been shared with several within the BOR and legislative delegation, but no specific proposals has been or will be submitted for funding consideration for this specific project.

EBID is not aware of any overlap or duplication of funding or requests for funding for this specific project.

3. Project Budget

3.1. Funding Plan and Letters of Funding Commitment

EBID's plan for funding includes a minimum 50% cost share. EBID's Board of Directors will approve a resolution committing to a minimum of 50% cost share throughout this project during their regularly scheduled monthly meeting on May 18th and a signed and notarized Resolution will be provided as required. EBID cost share funding will be available at the time of funding in forms of labor, equipment, and purchasing of materials.

The Budget Plan for this proposal is a 55.75% EBID cost share and request for $94,709.26 Federal funding to complete the proposed small scale water efficiency project as shown by Table 3.

Table 1. Summary of Non-Federal and Federal Funding Sources

FUNDING SOURCES	AMOUNT	%
Non Federal Entities		
1. EBID Cost Share	$ 119,340.75	
Non-Federal Subtotal	$ 119,340.75	55.75%
REQUESTED RECLAMATION FUNDING	$ 94,709.26	44.25%

3.2. Budget Proposal

Table 2. Total Project Cost Table

SOURCE	AMOUNT
Costs to be reimbursed with the requested Federal funding	$ 94,709.26
Costs to be paid by the applicant	$ 119,340.75
Value of third-party contributions	$ -
TOTAL PROJECT COST	**$ 214,050.01**

Table 3. Project Budget

BUDGET ITEM DESCRIPTION	COMPUTATION		Quantity Type	TOTAL COST
	$/Unit	Quantity		
Salaries and Wages				
Leo Barrett-Maint. Project Director	$ 9,984.00	0.500	months	$ 4,992.00
Zachary Libbin, P.E.	$ 9,984.00	0.150	months	$ 1,497.60
HE Operator	$ 2,936.00	0.750	months	$ 2,202.00
Maintenance Foreman-Central	$ 4,440.00	1.000	months	$ 4,440.00
HE Operator	$ 3,536.00	2.000	months	$ 7,072.00
HE Operator	$ 2,928.00	0.750	months	$ 2,196.00

Laborer	$ 2,240.00	0.750	months	$ 1,680.00
HE Operator	$ 2,744.00	0.750	months	$ 2,058.00
Carpenter	$ 3,480.00	0.400	months	$ 1,392.00
Carpenter	$ 3,368.00	0.400	months	$ 1,347.20
Carpenter	$ 2,736.00	0.400	months	$ 1,094.40
Carpenter	$ 2,896.00	0.400	months	$ 1,158.40
ISM Foreman-South	$ 4,840.00	0.250	months	$ 1,210.00
Carpenter	$ 3,040.00	0.400	months	$ 1,216.00
Laborer	$ 2,488.00	0.400	months	$ 995.20
Laborer	$ 2,152.00	0.400	months	$ 860.80
Laborer	$ 2,232.00	0.400	months	$ 892.80
Laborer	$ 2,232.00	0.400	months	$ 892.80
Patrick Lopez, SCADA Director	$ 9,984.00	0.030	months	$ 299.52
SCADA Supervisor	$ 4,392.00	0.030	months	$ 131.76
RTU Technician	$ 2,624.00	0.125	months	$ 328.00
RTU Technician	$ 3,472.00	0.125	months	$ 434.00
Field Survey Technician	$ 2,816.00	0.100	months	$ 281.60
Drafting Technician	$ 4,000.00	0.125	months	$ 500.00
Survey Technician	$ 2,240.00	0.100	months	$ 224.00
Project Engineer	$ 3,680.00	0.250	months	$ 920.00
Welder Laborer	$ 3,712.00	0.750	months	$ 2,784.00
Welder Supervisor	$ 3,808.00	0.750	months	$ 2,856.00
Welder Laborer	$ 2,608.00	0.750	months	$ 1,956.00
Welder Laborer	$ 2,152.00	0.750	months	$ 1,614.00
Total Labor				**$ 49,526.08**
Fringe Benefits				
Leo Barrett-Maint. Project Director	$ 4,992.00	40%	of salary	$ 1,996.80
Zachary Libbin, P.E.	$ 1,497.60	40%	of salary	$ 599.04
HE Operator	$ 2,202.00	40%	of salary	$ 880.80
Maintenance Foreman-Central	$ 4,440.00	40%	of salary	$ 1,776.00
HE Operator	$ 7,072.00	40%	of salary	$ 2,828.80
HE Operator	$ 2,196.00	40%	of salary	$ 878.40
Laborer	$ 1,680.00	40%	of salary	$ 672.00
HE Operator	$ 2,058.00	40%	of salary	$ 823.20
Carpenter	$ 1,392.00	40%	of salary	$ 556.80
Carpenter	$ 1,347.20	40%	of salary	$ 538.88
Carpenter	$ 1,094.40	40%	of salary	$ 437.76
Carpenter	$ 1,158.40	40%	of salary	$ 463.36
ISM Foreman-South	$ 1,210.00	40%	of salary	$ 484.00

Carpenter	$ 1,216.00	40%	of salary	$ 486.40
Laborer	$ 995.20	40%	of salary	$ 398.08
Laborer	$ 860.80	40%	of salary	$ 344.32
Laborer	$ 892.80	40%	of salary	$ 357.12
Laborer	$ 892.80	40%	of salary	$ 357.12
Patrick Lopez, SCADA Director	$ 299.52	40%	of salary	$ 119.81
SCADA Supervisor	$ 131.76	40%	of salary	$ 52.70
RTU Technician	$ 328.00	40%	of salary	$ 131.20
RTU Technician	$ 434.00	40%	of salary	$ 173.60
Field Survey Technician	$ 281.60	40%	of salary	$ 112.64
Drafting Technician	$ 500.00	40%	of salary	$ 200.00
Survey Technician	$ 224.00	40%	of salary	$ 89.60
Project Engineer	$ 920.00	40%	of salary	$ 368.00
Welder Laborer	$ 2,784.00	40%	of salary	$ 1,113.60
Welder Supervisor	$ 2,856.00	40%	of salary	$ 1,142.40
Welder Laborer	$ 1,956.00	40%	of salary	$ 782.40
Welder Laborer	$ 1,614.00	40%	of salary	$ 645.60
Total Fringe Benefits				**$ 19,810.43**
Travel				
Trip 1				$
Trip 2				$
Equipment Usage				
TANDEM DUMP TRUCK	$ 51.49	80.00	T50XX029	$ 4,119.20
CASE LOADER Mod CA621DBA	$ 60.34	80.00	L40CS012	$ 4,827.20
CAT D5GXL DOZER	$ 45.13	40.00	T15CA022	$ 1,805.20
2006 INTL 4200 WATER TRUCK 2,000 GAL	$ 7.24	40.00	T40RS001	$ 289.60
FREIGHTLINER 122 SD DUMPTRUCK	$ 51.49	80.00	T50XX029	$ 4,119.20
JOHN DEERE 410L BACKHOE	$ 35.10	80.00	L50CS008	$ 2,808.00
JOHN DEERE 350G EXCAVATOR	$ 91.12	320.00	H25CS027	$ 29,158.40
IT 4 X 2 FORD CREW CAB	$ 22.00	16.00	T50XX004	$ 352.00
2003 FORD F-550 TRUCK/UTILITY	$ 18.26	40.00	T50XX018	$ 730.40
FORD F-350 2006 WELDER/SPRAYER	$ 18.26	40.00	T50XX018	$ 730.40
FORD F150 PICKUP	$ 22.00	16.00	T50XX004	$ 352.00
CHEVY 3/4 T. EXT. CAB UTIL BED	$ 22.18	16.00	T50XX008	$ 354.88
1994 CHEVROLET C3500 1 T DUALLY	$ 22.36	16.00	T50XX009	$ 357.76
Total Equipment Usage				**$ 50,004.24**

Equipment/Property Acquisition				
Channel master	$ 15,087.50	1.00	each	$ 15,087.50
EIM electric actuators	$ 8,125.00	2.00	each	$ 16,250.00
Total Equipment/Property Acquisition				**$ 31,337.50**
Supplies and Materials				
Lumber 2" x 4" x 20'	$ 30.00	20.00	each	$ 600.00
Lumber 2" x 6" x 20'	$ 45.00	4.00	each	$ 180.00
Lumber 2" x 4" x 8'	$ 9.00	20.00	each	$ 180.00
Rebar #5	$ 18.25	200.00	each	$ 3,650.00
2" rebar chairs	$ 0.35	150.00	each	$ 52.50
Rebar tiie wire roll	$ 75.92	1.00	each	$ 75.92
Curing compound 5 gallon	$ 58.34	1.00	each	$ 58.34
Ready Mix Concrete/per yard	$ 140.00	52.00	each	$ 7,280.00
Concrete pumper	$ 212.50	4.00	each	$ 850.00
Enclosure-electric fuse box	$ 1,875.00	1.00	each	$ 1,875.00
Conduit and accessories	$ 1,250.00	1.00	each	$ 1,250.00
Metering bridge & stilling well materials	$ 22,320.00	1.00	each	$ 22,320.00
Total Supplies and Materials				**$ 38,371.76**
Contractual/Construction				
Contractor A	$ 12,500.00	1.00	each	$ 12,500.00
Contractor B	$ 12,500.00	1.00	each	$ 12,500.00
Total Contractual/Construction				**$ 25,000.00**
Third-Party Contributions				
Contributor A				$
Contributor B				$
Other				
Other				$
TOTAL DIRECT COSTS				**$**
Indirect Costs				
Type of rate	percentage	$base		**$**
TOTAL ESTIMATED PROJECT COSTS				**$ 214,050.01**

3.3. Budget Narrative

Project Manager for this proposed project will be Dr. Patrick Sullivan, Treasurer/Manager. Leo Barret, Maintenance Projects Director and Patrick Lopez, SCADA Systems Director, will also serve as essential Assistant Project Managers. Required personnel are listed by title within Table 5 of the Budget Proposal listed above. Many of EBID's maintenance season construction personnel are cross trained for construction in addition to their water season patrolman duties.

Salaries and wages, estimated hours, and rate of compensation are included. EBID certifies that the labor rates included in the budget proposal represent actual labor rates of the identified personnel and are consistently applied to Federal and non-Federal activities.

Fringe benefits for the employees assigned to this project are 40% of wages. This fringe is derived from the actual costs for personnel at EBID. The fringe benefit package includes medical, dental, vision, short- and long-term disability, life insurance retirement, annual, sick and holiday leave as well as FICA and workers compensation.

A portion of the time shown for EBID's District Engineer is estimated for compliance and reporting requirements including final performance report.

Heavy equipment and vehicles used to complete this project are owned by EBID. Equipment hourly rates are derived from the Army Corps of Engineers Ownership and Operating Expense Schedule Dist. VI.

Channel master and electric actuators prices are based on current price quotes.

The materials and supplies that will be used for this project are required for the project construction to improve delivery and conservation. The costs are determined by quotes received from applicable vendors providing these materials.

Contractors will provide services to assist EBID in electrical connections required as a component of this project.

4. Environmental and Cultural Resources Compliance

EBID has extensive experience with all aspects of the project and surrounding areas. The project will not be a detriment to the surrounding environment, but rather an enhancement. Earth disturbing activities include placing concrete lining for the metering station and stilling well. Efforts will be taken to reduce effects to air and water quality, including water trucks constantly on site for dust control and suspending work on windy days or days with noteworthy precipitation. EBID is not aware of any species listed, or proposed to be listed, as a federally threatened or endangered species or as a designated critical habitat within the project area. This understanding was also verified by USFWS information available online. EBID is not aware of any wetlands or of other surface waters inside the project boundaries that qualify as "Waters of the United States".

EBID's system was constructed by the Bureau of Reclamation as part of the Rio Grande Project in the early 1900's. Although exact dates for construction of these canals is not readily available, it is known that much of EBID's canal system was constructed by the Bureau of Reclamation following contracting in 1917-1918. EBID's facilities are designated as a historically significant resource. As a result, EBID routinely works with the State Historical Preservation Office (SHPO) before any action is taken. The canals and drains are not sensitive, and EBID is not

aware of any structures that are assigned historical significance. A search of the Archaeological Records Management Section at New Mexico Historical Preservation Division and a cultural resource survey for Leasburg Main Canal improvements will be contracted or performed by the Bureau of Reclamation.

5. Required Permits or Approvals

EBID is not aware of any permits or outside approval other than NEPA environmental

6. Official Resolution

EBID's Board of Directors will approve the commitment of a minimum of 50% cost share throughout this project during their regularly scheduled monthly meeting on May 18th and a signed and notarized Resolution will be provided as required.

References

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