

CID Main Canal Lining Project for Water Saving & Efficiency

Carlsbad Irrigation District, New Mexico

WaterSMART Grants: Small-Scale Water Efficiency Projects

FY2018

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Technical Proposal:

1.1. Executive Summary

Date: July 30, 2018

Applicant: Carlsbad Irrigation District, CID

Company Address: 5117 Grandi Rd.

City: Carlsbad **County:** Eddy **State:** New Mexico

Contact: Dale Ballard, CID Manager

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Photo 1: Existing condition of main canal within project area

For the last 40 years Carlsbad Irrigation District’s maintenance crews have cleaned and repaired the extensive network of cracks that have developed within the main canal with roofing tar. This form of repair has proven to have a short life cycle, having to be redone annually in some locations, making this repair labor intensive. This form of repair has also been ineffective, with visible seepage still occurring. CID has been interested in finding a material to rehabilitate our concrete lined canals that is economical, will result in a smooth surface, is relatively easy to apply, will not reduce channel capacity, and will last for many irrigation seasons. With the advancement of polymer technology CID believes that the application of a polyurea material to seal cracks will offer a more cost-effective, more efficient and longer-lasting solution. Aqualastic® is a polyurea coating that is spray applied onto a prepared surface to seal cracks in concrete canals. During the off season this past year, CID paid a contractor to apply Aqualastic® to rehabilitate the main canal on one of the historically worst sites. CID has been satisfied with the repair time and with the product performance over this irrigation season. Aqualastic® has been utilized in numerous canal rehabilitation projects across the country and has been the subject of multiple studies conducted by the Bureau of Reclamations Research and Development Office. The Final Report ST-2015-786-1 titled Aqualastic® Repair to Encapsulate Degraded RCC Lining in Canal completed by Reclamation in 2015 concludes “Aqualastic® appears to be a cost effective repair method that can reduce seepage without reducing channel capacity”.

Therefore, CID is requesting partnership with the Bureau of Reclamation (Reclamation) through the WaterSMART Small-Scale Water Efficiency Projects grant for Fiscal Year 2018 to provide CID the opportunity to continue to utilize a polyurea material to rehabilitate cracks within the proposed project area.

The timeline for the Main Canal Lining Project is four months. Rehabilitation will occur during the irrigation off season. Depending on the timeline of securing the grant funding, CID hopes to begin in November 2018 and expects to be done in March 2019.

This project is extensively connected to multiple Reclamation projects along the Pecos River both past and present. Reclamation is responsible for the operation, maintenance, and oversight of the Carlsbad Project (Project) reservoirs. However, CID, a political subdivision of the State of New Mexico, diverts and delivers irrigation water to its members. Refer to section 3.4 for more information on CID’s nexus to Reclamation.

1.2. Background Data

CID started as a private enterprise in 1887 during the territorial period. The federal government took it over in 1905, prior to statehood, and used the new power of the United States Reclamation Service to complete it. Even with statehood achieved in 1912, the federal government continued to manage the irrigation project, as

it did many others across New Mexico and the Southwest. Even though CID acquired all the land rights from the United States covering the distribution and drainage system in 2001, the Reclamation still remains involved in the ownership and operation of the facilities associated with the operation of the CID.

1.2.1. Source of Water Supply & Uses

The Pecos River Basin has a drainage area of approximately 15,220 square miles and extends over much of southeastern New Mexico. Beginning at an elevation of over 12,000 feet, the Pecos watershed extends from the north-central Sangre de Cristo Mountains and continues south and east traversing approximately 225 miles before reaching the New Mexico-Texas state line at an elevation of approximately 2,800 feet.

The Carlsbad Project stretches from northeastern New Mexico near Ft. Sumner to south of the city of Carlsbad. The Project's water supply comes from the Pecos and Black Rivers. The Project, by permit from the State Engineer, stores water in Santa Rosa (U.S. Army Corp of Engineers), Sumner (Reclamation), Brantley (Reclamation), and Avalon Dams (Reclamation) to provide water within the CID. The maximum combined storage is 176,500 acre-feet, which is governed by the Pecos River Compact and the New Mexico Office of the State Engineer storage permit, Filing Number 6.

Today, irrigated agriculture still accounts for 85% of the total regional Pecos River water use. The Project was originally designed as an irrigation project with features including a distribution and drainage system to irrigate 25,055 acres of land in the Project area. Many of the features used to deliver water throughout the Project were built in the early 1900s, including Avalon Dam, the main canal, laterals and sub-laterals. In addition to Project water storage, Sumner Dam (1937), Santa Rosa Dam (1981), and Brantley Dam (1989), are instrumental in controlling seasonal flooding along the Pecos River. Avalon Dam (1907), continues to serve as a distribution dam, providing water for irrigation and for urban and suburban, residential, and commercial, lands.

1.2.2. Water Rights

State law governs the appropriation of water in New Mexico. Under New Mexico law, a water right is a property right and cannot be taken without just compensation. With few exceptions, surface water rights in the Carlsbad Project are transferred automatically by CID upon conveyance of the land to which the water rights are appurtenant. New Mexico's State Engineer, who is appointed by the governor, maintains authority to supervise, measure, appropriate and distribute the state's water, including Project supplemental groundwater rights. Surface water rights of Project members have been the subject of a Settlement Agreement with the NM Interstate Stream Commission (ISC), the United States (U.S.) and the Pecos Valley Artesian Conservancy District (PVACD), signed in 2003. The Settlement is a landmark compromise of disputed water rights claims in the Pecos River Basin and successful resolution of a long-time water delivery issues between New Mexico and Texas. The final settlement identified operational elements necessary for delivery of water downstream through Project reservoirs to the Texas state line and further provisions to ensure a more reliable water supply to CID farmers. As part of this agreement, ISC purchased 4,661 acres within the Project to be "dried up." On a state level, the effects of the settlement agreement are already apparent in the 137,900 acre-feet water credit accrued by New Mexico for water deliveries to Texas.

CID Members receive a pro-rata share of surface water available in the Project that is distributed by CID among all of the 25,055 irrigated acres. The Partial Final Judgment and Decree on Surface Rights and Supplemental Rights in the Membership Phase of the CID section of the Pecos River Stream System Adjudication was entered on December 10, 2004. This adjudication outlined the following conditions applicable to every water right in the CID.

Priority Dates:

Carlsbad Project water has some of the most senior water rights along the Pecos River. The amounts listed below are for water diverted from the Pecos River and are not to be exceeded in any given year.

- July 31, 1888 - 101,283 acre feet (AF)
- April 10, 1915 - 22,625 AF
- June 24, 1919 - 1,292 AF

Amounts of Water for surface water only, for Black River Canal surface water, and for surface water with supplemental groundwater combined:

- Consumptive irrigation requirement: not to exceed 2.218 AF per water right acre per annum
- Farm delivery requirement: not to exceed 3.697 AF per water right acre per annum delivered at the farm headgate
- Project diversion requirement: not to exceed 4.997 AF per water right acre per annum

CID holds the Fourth Right on Black River. This right was adjudicated by The Black River Decree (aka U.S. v. Judkins) with a priority date of 1889. Under this right CID cannot divert more than 2,800 acre-feet between January 1 and December 31 of any given year.

1.2.3. Geographic Location Vicinity Map

CID is located in Eddy County in the southeastern corner of New Mexico. The Carlsbad Project area lies between the northern part of the City of Carlsbad and the Village of Malaga in the south. Refer to Attachment A-Figure 1 for a map of the location of CID in relation to the Pecos River Basin.

1.2.4. Current Water Demand

The water demand for CID varies annually and is set by the CID Board of Directors (Board) based on water supply. CID Members receive a calculated share of surface water available in the Project that is distributed by CID among all of the 25,055 irrigated acres. The Project serves more than 3,000 persons on 155 farms. Allotment for any given year cannot exceed 3.697 acre-feet of water at the farm headgate. Each year, at the beginning of the irrigation season, CID Board uses current storage information to determine the amount of water that will be initially allotted and available for irrigators within CID. Reservoir levels, weather events and conditions within the Settlement Agreement determine if additional allotments will be made. During years of water shortage (drought), the initial allotment can be set lower than 3.697 acre-feet. The current water status is reviewed at CID monthly Board meetings. For years when a full allotment can be made, the water demand for CID would be 92,628 acre-feet delivered at the farm headgates.

1.2.5. Major Crops and Total Acres Served

Located in the Chihuahuan Desert, the Project enjoys a number of sun-drenched days during the 212-day growing season. This long growing season, good soil, favorable markets, and irrigation facilities make intensive diversified farming practices attractive and profitable. Cotton and alfalfa are the principal crops, although wheat, barley, oats, pecans, and vegetables are produced in abundance. A majority of the farming is done utilizing crop rotation methods, therefore acres served by particular crops differs annually. Less than 4% of CID farms are planted in pecan trees.

1.2.6. Water Delivery System

CID serves Project lands through a delivery system of 212 miles of irrigation canals, laterals, sub-laterals and drains. There are 37 miles of main canal, 151 miles of laterals, and 24 miles of drains within the CID system. A majority of the delivery system was originally constructed by private developers beginning in 1889, including Avalon Dam, the original Pecos River Flume, the main canal, and distribution system. In 1967, CID entered into a Rehabilitation and Betterment Program (R&B Program) with Reclamation for concrete lining and improvement of the irrigation distribution system. This program resulted in concrete lining and improvements to some 90 miles of canal and laterals, which significantly reduced water losses and provided a more efficient delivery of water. This lining is now 50 years old and due to age the concrete lining is cracked and deteriorated. The leakage and seepage from the deteriorated canal results in water quality degradation and soil quality degradation.

There are a number of major and minor structures on the CID's main canal route, including wasteways, canal checks, and lateral turnouts. Most notably are the Pecos River Flume (1903) and the Dark Canyon Siphon, which are the most complex of these structures and have historic significance.

1.2.7. Energy Efficiency Elements

Funding received through a WaterSmart grant awarded in 2012 allowed CID to install a solar powered SCADA system and approximately 20 flow measurement sites were improved. This project was completed in 2015 and has aided in CID's ability to more adequately measure flow and identify areas of high water loss within the system. This system has allowed CID to identify and prioritize areas of water loss within the main canal. This past winter, CID hired a contractor to apply a polyurea material at one of the worst sites for seepage within the system. Refer to section 3.2 for more information on the 2018 Aqualastic project. With funds received from this grant CID will address the second worst seepage site within the system.

1.2.8. Shortfalls in Water Supply

The semi-arid conditions in the Lower Pecos River Basin pose extreme water management challenges to maximize surface water deliveries irrigated acres of the Project. CID has identified the following four areas as potential shortfalls in water supply.

Seepage: The only shortfall that CID has any control over is water loss through seepage. These losses have negatively impacted water delivery, caused damage to fields, and reduced crop yield for members. Conflicts over not being able to receive water allotments at the low end of the canal are threatening legal action against CID. Visual inspections show water seepage from the canal into the drainage ditch beside the canal. The project area of the main canal for consideration is concrete lined and is in very poor condition.

Drought: Droughts have impacted the current water supply. CID service area is home to some of New Mexico's highest producing farms that still rely solely on farming as their only income. As temperatures rise, drought conditions are likely to intensify. For example, in 2011, the vast majority of the Pecos River Basin recorded the hottest and driest year since records began in 1895. In 2011, the volume of water delivered to Santa Rosa Lake, the uppermost reservoir on the Pecos River, was 9,690 acre-feet, or less than 12% of the long-term average of its 83,500 acre-feet per year. Extreme drought conditions in the past have had economic impacts on CID's service area. During the 2011-2013 growing season CID service area experienced intense drought and was affected by both reduced water availability and economic impacts, including crop loss. During this period farmer's received allotments of 1.4 ac-ft per acre in 2011, 0.8 ac-ft per acre in 2012 and 2.0 ac-ft per acre in 2013. The lowest historical allotment on record was 0.35 ac-ft per acre in 1953. Conditions similar to 2012 may occur more frequently as climate change continues to affect the region.

Endangered Species: The extraordinarily dry conditions in the basin pose extreme water management challenges to maximize surface water deliveries to the 25,055 irrigated acres of the Project, while still meeting the flow targets in the critical habitat reaches of the Pecos Bluntnose Shiner. Additionally, the Texas Hornshell Mussel was listed in February 2018 as an endangered species with occupied habitat in Black River. Refer to Section 2.1 for more on endangered species.

Growth: Growth is also a potential shortfall. Over the past three years the CID service area has seen an increase in population. In a 2017, a study released by the financial consulting firm SmartAsset, showed Eddy County's business growth ranked number one in New Mexico for the second straight year. Eddy County topped New Mexico with a 10.3% business growth rate in 2017. Eddy County's industrial diversity has led this growth: nuclear, potash, manufacturing, retail, oil and gas, aviation and construction industries fuel the local market. The Delaware Basin, located around Carlsbad, has been leading oil production in the state of New Mexico for three years, and Eddy County continues to rank high in the nation for oil production. The oil industry has a high demand for water due to hydraulic fracking process. The impact of the oil industry is revealed by the need

to convert water from agriculture purposes to industrial purposes. Changes to consumptive industrial uses could have significant effects on CID's ability to provide water to members within the service area.

1.3. Proposed Project Description

1.3.1. Objectives

Over the 50 years, the main canal lining has deteriorated. The leakage and seepage from cracks in the concrete canal result in water quality degradation and soil quality degradation. CID has researched and completed a sample project to find a material that is economical, will result in a smooth surface, is relatively easy to apply, will not reduce channel capacity, and will last for many irrigation seasons (refer to section 3.2 for information on the sample project). The most prominent task of the Main Canal Lining Project is to improve water use efficiency. CID expects to decrease water loss due to seepage and thereby increase efficiency. Eliminating water seepage also avoids the potential of panel failure or collapse due to erosion of the soils behind the concrete panel. One of the best benefits from polyurea material applications is that of water conservation.

1.3.2. Location of Project Area

The CID Main Canal Lining Project for Water Saving and Efficiency project is located in Eddy County, New Mexico. The proposed project is located approximately 5.5 miles southeast of the City of Carlsbad and 2 miles west of the Village of Loving. The project is located within the central portion of CID's main canal system, which provides water to half of the members. The proposed project area is a 1.4-mile portion of the main canal that runs north between Jayders Rd (Co Rd 714) and London Rd (Co Rd 728), see Figure 2 to the right. The proposed project latitude is 32° 17' 20.62"N and longitude is 104° 8' 25.21"W, WGS84 datum.



Figure 2: Proposed Project Location Map

1.3.3. Detailed Project Description

CID plans to utilize Aqualastic or similar material on the 1.4 mile portion of main canal that runs north between Jayders Rd and London Rd. The canal lining near Jayders Rd is in very poor condition. For this reason, the project will begin at Jayders Rd. and continue north toward London Rd. Canal degradation and deterioration can be observed in five different areas in less than 300 feet of canal, as shown in this Google Earth image (refer to photo 2 in Attachment B). Photo 3, in Attachment B, shows the existing conditions near Jayders Rd. Note the network of cracks webbing across the canal and the accumulation of rubble and sediment where the concrete has settled. It is estimated that CID will be able to rehabilitate approximately 4,000 feet the main canal with the funding received from this grant.

1.3.4. Guidelines and Methods

As with many material coating applications, the application process starts with surface preparation. The concrete is media blasted with environmentally friendly 16 grit blast media to expose aggregate at an approximate depth of 1/16 to 1/8 inch. The area of rehabilitation is blasted to a width of approximately 8", 4"

on each side of the crack. Once a good aggregate profile has been achieved, the area is then high-pressure air blasted to remove any dust or particulates. Surface preparation is essential to application success. This cannot be overemphasized because the product is a chemical bonding product, not a mechanical bonding one.

Once surface preparation is complete, the polyurea material is applied. The material itself is a 1:1 ratio, plural component polyurea, which is purchased in 110 gallon sets (two 55-gallon drums.). The target for applied material thickness is 3 millimeters. The product has an exothermic reaction once it is applied, which lasts roughly 8 seconds. Once the reaction is complete, the canal is ready for service. Safety is always a high priority when applying this material. Full face respirators are required for the application process because they give an added level of protection when media blasting.

The Aqualastic material has specifications with an elongation of 867%, tensile strength of 3,400 psi, and a tear resistance to 400 PLI. The high combination of both elongation and strength allow this material to bridge the cracks that our concrete canals have. In addition, once a backer is applied, this material can bridge holes of various sizes in the concrete lining of the canal system. As technology advances, there is a need to evaluate and consider altering our canal rehabilitation procedures. The majority of CID's concrete lined canal is 50 years old. The old repair procedures of tar, grout, and tube application chemicals have been good, but they do not offer the potential longevity or the rapid completion time of the proposed project. At this time, there are several canal systems in the Washington state that have the early Aqualastic applications still holding well at 20 years of service. The expected service life of this material is still unknown; however, 25 years of service is currently not an unreasonable expectation.

1.3.5. Timeline

The timeline for the proposed project is four months. Depending on the timeline of securing the grant funding CID expects to begin in November 2018 and the project will be completed prior to the 2019 irrigation season. Given the mild desert winters, CID does not expect temperatures to be an issue. Refer to section 3.3 Project Implementation for the project schedule.

Environmental and Cultural Resources Compliance

2.1. Compliance

To allow the assessment of probable environmental and cultural resources impact, CID has answered questions posed by Reclamation in section D.2.2.6 of the FOA.

- *Will the proposed project impact the surrounding environment?*
There will not be any earth-disturbing work associated with the Main Canal Lining Project. Proposed project preparation will entail sand blasting a 4 inch wide strip on each side of the cracks in the concrete. The contractor then applies approximately 3 mm of polyurea material to the cleaned strips, bridging the cracks to create a water-tight seal to eliminate the water loss. This process is not expected to affect the air, water, animal habitat, or surrounding environment.
- *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?*
There are no known endangered species or designated critical habitat within the proposed project area. CID does coordinate with Reclamation on meeting the flow targets in the critical habitat reaches of the Pecos Bluntnose Shiner. This critical habitat is located in the Pecos River north of Brantley Lake, 25 miles north of the proposed project.

Additionally, the Texas Hornshell Mussel was listed as an endangered species by the US Fish and Wildlife Service (FWS) in February 2018. The occupied habitat for the Hornshell includes a portion in the Black River upstream from the CID Dam. The Black River CID Dam is located 3.5 miles due south from the proposed project. CID signed a Candidate Conservation Agreement with Assurances (CCAA) for the Texas Hornshell

and other Covered Species. The other covered species are the Rio Grande River Cooter, Gray Redhorse, Blue Sucker, and Pecos Springsnail. Once fully implemented, the CCAA will provide guidance for the conservation and management of these species and their habitat by reducing or eliminating threats to the species. One of the major threats to the Hornshell is salinity. The proposed project will aid in the reduction of salinity within the occupied habitat.

- There are no known wetlands or other surface waters inside the proposed project boundaries.
- *When was the water delivery system constructed?*
Early construction of the Carlsbad Project began in 1887 and continued into the turn of the century, this included a majority of the canals, laterals, drains and CID's main diversion dam (Avalon). Sumner Dam (formerly Alamogordo Dam) was authorized for construction by the President in 1935 and was completed in 1937. In 1967, the CID entered into the R&B Program with the Reclamation for concrete lining of some 90 miles of canals and laterals. Brantley Dam and Reservoir was authorized by Congress on October 20, 1972, and construction finally began in 1984 and was largely finished by 1989.
- *Will the proposed project result in any modification to individual features of an irrigation system?*
The main canal was originally constructed in the early 1900s. The project area portion of the main canal was concrete lined in 1968. Over the last 50 years the concrete has deteriorated. The proposed project will rehabilitate cracks within the concrete lined sections of the main canal that are over half a century old.
- *Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the NRHP?*
Carlsbad represents the evolution of American reclamation technology. Avalon and McMillan Dams exemplified the rockfill composite design popular at the turn of the century, and were among the first in the U.S. with an earthfill facing. Avalon's cylinder gates, first used in 1911, represent a technological application which would be used in subsequent dams across the West, including Hoover Dam. CID displays not only the transition from nineteenth to twentieth century technology, but also the evolution of private irrigation efforts into public-sponsored reclamation, and the creation of water districts. Many features of the Project are listed on the National Registrar of Historic Places, most notably the Pecos River Flume and Avalon Dam. The CID was designated a National Historic Landmark in 1975. Coordination with the New Mexico Historic Preservation Division will be required.
 - Historic American Engineering Record: HAER NM-4
 - National Register of Historic Places NRHP Number: 66000476
- There are NO known archeological sites in the proposed project area.
- The proposed project will NOT have a disproportionately high and adverse effect on low income or minority populations.
- The proposed project will NOT limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands.
- The proposed project will NOT contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area.

2.2. Required Permits or Approvals

The proposed project is located exclusively within maintained canal rights-of-way owned and operated by CID. Therefore, no easements and no federal, state or local permitting will be required for the proposed project. As mentioned previously, coordination with the New Mexico Historic Preservation Division will be required, but CID does not expect this to cause any issues with the proposed project.

3. Evaluation Criteria:

3.1. Evaluation Criterion A - Project Benefits

- *What are the benefits to the applicant's water supply delivery system?*

Rehabilitating CIDs aging infrastructure will help accomplish water conservation and deficiency within our system. The Main Canal Lining Project will minimize seepage losses. Measures which minimize seepage enable delivery of conserved surface water directly to water users. The proposed project will allow more surface water to be available to farmers at their head gates, generating better crop quality and sales. In addition to these advantages, the polyurea material significantly reduces vegetation growth and sediment build up in cracks where the material has been applied.

- *Extent to which the proposed project improves overall water supply reliability*

The most prominent task of this proposed project is to improve water use efficiency. The sealing process will help to retain the water volume of the canal by eliminating water loss through seepage, while maintaining a smooth surface. The proposed project will help to deliver more water to the lower end of the canal. Bringing subsidence to threats of legal action against CID from not receiving allotted water.

- *The expected geographic scope benefits from the proposed project (local, sub-basin, basin)*

The proposed project contributes to accomplishment of the State's strategies to meet future water demand, as defined in the Lower Pecos River Regional Water Plan (LPRRW), by reducing water loss through conveyance channels and conserving agricultural water. Refer to section 3.2 for more on the LPRRW.

New Mexico's lower Pecos River experiences high salinity due to brine intrusions near Malaga, NM. Approximately 450,000 tons of salt is estimated to enter the lower Pecos. A recently listed endangered species, the Hornshell, is particularly sensitive to salinity. One contributor to these saline conditions is high saline Pecos River water leaking and seeping out of CIDs water delivery system into occupied habitat within Black River system. The proposed project will decrease seepage, leakage, and salt intrusion into the shallow groundwater.

- *Extent to which the proposed project will increase collaboration among water managers in the region*

The CID manager has already been contacted by other regional managers regarding the Aqualastic project completed in March 2018. The managers of Arch/Hurley Conservancy District, Fort Sumner Irrigation District and Elephant Butte Irrigation District are interested to find out the benefits, costs, and quality of applying the polyurea material to seal cracks

- *Any anticipated positive impacts/benefits to local sectors and economies*

In addition to the agricultural benefits discussed, the proposed project will lead to more water stored. Brantley, Sumner, and Santa Rosa Lakes provide flood control, recreational benefits, and habitat for wildlife. Flood control provides the decreased potential for devastating floods to the downstream communities of Santa Rosa, Fort Sumner, Roswell, Artesia, Carlsbad, Loving, and Malaga. Recreational benefits provide wonderful outdoor opportunities, such as boating, fishing, swimming, kayaking, and bird watching. Project water stored at these three lakes host over 250,000 visitors per year. Flood control, recreational benefits and wildlife habitat are definitely assets to the local communities.

- *Extent to which the project will complement work done in coordination with NRCS in the area.*

Several CID farmers have utilized funding received through the NRC EQIP program to install pipelines to increase water efficiency during irrigation of their farm. The proposed project will complement the water efficiency of the completed EQIP projects.

3.2. Evaluation Criterion B- Planning Efforts Supporting the Project

The State of New Mexico Interstate Stream Commission, in conjunction with the CID, established a Lower Pecos Valley Regional Water Plan in December 2016. This plan identified key strategies to meet water

demand. Among these were agricultural water conservation by increasing efficiency and preserving agricultural rights. The plan also identified reduction in water losses as key program and policy recommendation. Stating that losses from conveyance channel are significant and should be addressed. The proposed project addresses agricultural water conservation and reduction in water loss.

Aging infrastructure has been identified as a major concern and is part of CIDs capital improvement goals. This proposed project will address rehabilitating a portion of the lined main canal that continues to have seepage issues. On top of ensuring water to members, CID acknowledges the need to conserve as much water as much as possible. Seepage and leakage have been a concern for the CID; the annual average water loss for the last decade is 32%. One of CIDs capital improvement goals is to address portions of the system that are major contributors to this water loss.

As part of CIDs capital improvement efforts CID hired a contractor to apply Aqualastic on one of the historically worst sites for seepage within CID. This past project was completed March 2018. The project site selected is locally referred to as Gyp Bend, known for its poor gypsum soil deposits and the standing water on the land surface adjacent to the canal. The gyp bend project was completed during this past winter, see photo 4 in Attachment B. Funding for this project was completed 100% by CID; with the intention that if satisfied with the product, CID would apply for a WaterSMART grant to complete more projects within the prioritized areas. CID believes that this type of product was economical, was relatively easy to apply, did not reduce channel capacity, and will last for many irrigation seasons. Aqualastic has been utilized in numerous canal rehabilitation projects across the country and has been the subject of multiple studies conducted by the Reclamations Research and Development Office. CID believes that Aqualastic or similar material is an economical solution for canal seepage losses.

3.3. Evaluation Criterion C- Project Implementation

After financial assistance is granted to fund the project, CID would then mobilize our crews to begin sandblasting the project area. The contractor mobilization task can coincide with CID crews’ sandblasting task. This will allow CID crews to get at least one month of sandblasting completed prior to the contractor being onsite. CID expects the sandblasting task to take 40 days to complete; however, the duration shown in Table 1: Proposed Project Schedule is 80 days. This is to allow for holidays, crew members taking vacation, and any unexpected delays. When the contractor begins the application of the polyurea material, CID will continue the sandblasting as the contractor applies the material on the surfaces already prepared. Overlapping these tasks will allow for the project to be completed prior to the 2019 irrigation season. This will also ensure project coordination, allowing CID crews and the contractor to discuss the project.

Table 1: Proposed Project Schedule

Project Schedule: CID Main Canal Lining Repair					
Project Lead: Dale Ballard					
WBS	Task Name	Entity Performing Work	Start	Finish	Duration
1	Mobilization	CID	Thu 08/Nov/18	Fri 09/Nov/18	2
2	Sandblasting	CID	Mon 12/Nov/18	Sat 02/Mar/19	80
3	Mobilization	Contractor	Mon 07/Jan/19	Fri 11/Jan/19	5
4	Polyurea Application*	Contractor	Mon 14/Jan/19	Fri 08/Mar/19	40
5	Demobilization	Contractor/CID	Mon 04/Mar/19	Fri 08/Mar/19	5

No design or engineering work will be needed for the proposed project. There are no new policies or administrative actions required for the proposed project. There will be no environmental compliance costs associated with the proposed project.

3.4. Evaluation Criterion D- Nexus to Reclamation

This project is extensively connected to multiple Reclamation projects along the Pecos River, both past and present. A majority of the conservation work done along the 1,000 mile Pecos River in the last century has been conducted by Reclamation directly or as a partner. Specifically, all but one of the dams located on the Pecos River in NM were constructed and are overseen by Reclamation.

The original Carlsbad Project was authorized by the Secretary of the Interior on November 28, 1905, with the formal purchase taking place December 18, 1905. Subsequently, a number of federally constructed features superimposed on the private irrigation works, the most notable of these include Avalon Dam (1907) and Avalon Dam cylinder gates (1911) and the Pecos River Flume (1903). Sumner Dam was authorized for construction by the President on November 6, 1935, under the Emergency Relief Appropriations Act of 1935. Section 7 of the Flood Control Act of August 11, 1939, declared Sumner Dam and Lake Sumner were to be used first for irrigation, then for flood control, river regulation, and other beneficial uses.

Brantley Dam and Reservoir of the Brantley Project was authorized on October 20, 1972, by Public Law 92-514, for the purposes of irrigation, flood control, fish and wildlife, recreation benefits, and to provide protection for Avalon Dam and as a replacement of McMillan Dam which was determined to be unsafe. McMillan Dam was breached in 1991, as it neared its hundredth birthday. See Attachment A-Figure 1 for a map showing the location of the Dams.

The transfer from federal to local control occurred on October 1, 1949, beginning a new chapter in the irrigation system's operation. However, title to the property remained in federal hands. Pursuant to an Act of Congress in 2001, CID acquired all the land rights covering the distribution and drainage system from the U.S. This transfer did not include the system's dams and reservoirs. CID is the fee owner of lands and easements that cover both canals and laterals. Today, Reclamation is responsible for the operation, maintenance, and oversight of the Carlsbad Project dams, reservoirs and river reaches. However, the CID, diverts and delivers irrigation water to its members. By contract with the Reclamation, the CID operates and maintains Sumner, Brantley, and Avalon Dams.

3.5. Evaluation Criterion E- Department of the Interior

The proposed project supports Department of Interior priorities listed below. To facilitate this assessment CID has addressed the applicable criteria listed in section E.1.5 of the FOA

1. *Creating a conservation stewardship legacy second only to Teddy Roosevelt*

a. Utilize science to identify best practices to managewater resources and adapt to changes in the environment; CID has utilized the solar panel SCADA system completed in 2015 to better manage water flow through the canals to meet delivery requirements, which means there is less water wasted. Additionally, CID has utilized this data to identify critical areas of water loss and develop areas of priority. This past winter CID paid a contractor to apply a polyurea material to one of the worst area for seepage. Given the success of this past project, CID plans to use grant funds to complete the second worst area, north of Jayders Rd.

e. Foster relationships with conservation organizations advocating for balanced stewardship of public lands; Recently, the Texas Hornshell Mussel was listed as an endangered species with an occupied habitat that includes a portion in the Black River upstream from the CID Dam. CID has been in contact with NM Game and Fish, CEHMM Conservation and Environmental Services, BLM, and FWS regarding project ideas to contribute to reduced salinity into Black River. Reduced salinity is of great importance to the survival of the Hornshell, as death occurs around 7.0 ppt.

2. Utilizing our natural resources*a. Ensure American Energy is available to meet our security and economic needs;*

The Delaware Basin is the source of the recent oil and gas boom that the area has experienced. Oil rigs have almost doubled in the last year alone, making New Mexico the third highest rig count in the country. In addition, Sendero Midstream recently completed a cryogenic natural gas processing plant near Loving, NM. In addition to the current plant, which is capable of processing more than 130 million cubic feet of gas per day, Sendero intends to add four more plants by 2022. As such, there have been and will continue to be a significant increase in oil and gas lines crossing CID's system. Failure of CID's infrastructure could result in land or water contamination and interrupted delivery of American Energy.

3. Restoring trust with local communities*a. Be a better neighbor with those closest to our resources by improving dialogue and relationships with persons and entities bordering our lands;*

CID is party to the Pecos River Settlement Agreement. One of the key pieces to this agreement was the identification of operational elements necessary for delivery of water to the Texas state line through Project reservoirs. To date, New Mexico has a 137,900 acre-feet credit accrued for water delivered to Texas. The Pecos River flows into the Rio Grande at Lake Amistad in Texas. The Rio Grande then forms the border between Mexico and the U.S. with the water being subject to the US-Mexico Treaty.

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

This project will expand lines of communication with FWS regarding the benefits to the Texas Hornshell.

5. Modernizing our infrastructure*a. Support White House Public/Private Partnership Initiative to modernize U.S. infrastructure.*

Public-private partnerships are seen as an effective way to capitalize on the relative strengths of the public and private sectors to address problems that neither could tackle adequately on their own. With the funds received from this grant, CID will utilize District employees and a private contractor to complete the Main Canal Lining Project. The proposed project will utilize a modern polyurea material to rehabilitate a portion of infrastructure that delivers water to farm land.

c. DOI infrastructure needs to highlight: Construction of infrastructure; Cyclical/Deferred maintenance.

The proposed project will prioritize DOI infrastructure needs by rehabilitating CID's existing infrastructure. This rehabilitation will extend the longevity of the existing 50 year old infrastructure. CID's past maintenance plan for repairing the main canal has proven to be short lived. This type of maintenance has just deferred the underlying issue and required CID to repair some areas on an annual basis. The application of a polyurea material offers an expected service life of at least 25 years.

4. Official Resolution, Unique Entity Identifier, and SAM

See Attachment C-Official Resolution signed by the CID Board of Directors in an open meeting on July 10, 2018. CID is registered and updated through March 23, 2019 with System for Award Management. CID's unique entity identifier is 068970342/60CS5. CID does not employ a lobbyist or fund lobbying activity. A certification letter regarding CIDs' lobbying activities is located in Attachment D.

5. Project Budget**5.1 Funding Plan**

CID is requesting the following funding support from Reclamation, in order to implement the proposed project as described in this proposal. Table 2 summarizes all funding sources and notes that CID proposes to utilize in-kind contributions to perform the project. CID proposes to use our personnel to prepare the surface and have

the contractor apply the polyurea material. Reclamation funding will be used to pay for the contractor and for the polyurea material. CID will also contribute monetary funds generated by permit fees from CID’s Right of Use and License Policy, adopted May 2010, to purchase materials needed to complete the project. This money is already in reserve for capital improvements within CID. There are no monetary or in-kind costs expected before the proposed project start date. No other Federal funding has been requested or received and there are no pending funding requests for this proposed project.

Table 2: Summary of Funding Sources

Funding Sources	Amount
Total funded by CID *	\$85,369
Total Requested from Reclamation	\$75,000
Proposed Project Total	\$160,369

* In-Kind contributions

5.2 Budget Proposal

CID recently experienced success in rehabilitating a section of main canal using a polyurea material to seal cracks in the canal’s concrete liner. The polyurea material has high tensile strength and superior adhesion allowing it to withstand the expansion and contraction of the concrete. In addition to these advantages, the material has all but eliminated vegetation growth and sediment build up in the cracks of the liner where the product has been applied. CID was able to rehabilitate ~ 1,700 feet of the canal and spent about \$85,000 on this project. The total cost of the project was for contracted services paid entirely by CID.

This process requires an enormous amount of time to prepare the surface before applying the polyurea material. CID proposes to use our personnel to prepare the surface and have the contractor apply the material. On the recent project the cost of rehabilitating the canal was about \$50 per foot. By teaming with a contractor the CID believes we can cut the cost per foot by \$10-\$15, allowing more of the canal to be rehabilitated. With the funds received from this grant the CID hopes to rehabilitate ~4,000 feet of the main canal. Table 3 summarizes the proposed budget to complete this project including in-kind services, noted by the asterisks.

Table 3: Project Budget Proposal

Budget Item	\$/Unit	Quantity	Recipient Funding	Reclamation Funding	Total Cost
Salaries and Wages					
District Workers *	20	1280	\$25,600		\$25,600
District Manager *	34.5	80	\$2,760		\$2,760
District Supervisor *	27.25	160	\$4,360		\$4,360
Administrative Employees *	27.25	160	\$4,360		\$4,360
Fringe Benefits					
Full Time Employee *	8.00	1680	\$13,440		\$13,440
Equipment (including fuel)					
Air Compressor *	48	320	\$15,360		\$15,360
Sandblaster *	28.91	320	\$9,251		\$9,251
Hvy Duty Pickup Truck *	25	40	\$1,000		\$1,000
Hvy Duty Pickup Truck *	19	40	\$760		\$760
Supplies and Materials					
Sand *	11.5	260	\$2,990		\$2,990
Polyurea material	48.5	880	\$2,910	\$39,770	\$42,680
Contractual/Construction					
Contractor A			\$2,578	\$35,230	\$37,808
TOTAL ESTIMATED PROJECT COSTS					\$160,369

5.3 Budget Narrative

The budget narrative provides an explanation for the items used to develop the project budget proposal shown in Table 3 above.

Salaries and Wages

Dale Ballard, CID District manager, will provide overall project management. Dane Williams will provide daily supervision of CID employees completing the sandblasting. Four District workers will make up the sandblasting crew. It is estimated it will take eight weeks to complete the surface preparation. CID will have an administrative assistant responsible for providing project-related administrative support and providing grant reporting assistance. Additionally, CID will have accounting staff responsible for tracking costs and maintaining financial records to administer project finances, including making all payments for contracted services and collecting monies from the Reclamation as required for meeting project cash-flow requirements. All labor rates included in this budget proposal are the actual labor rate of the personnel.

Fringe Benefits

All CID employees are provided health insurance, employee retirement contribution match, vacation and sick leave. An average of the cost to provide these benefits to CID employees was determined to be \$8 an hour.

Travel

CID will not be charging any travel expenses to the project.

Equipment

No equipment will be purchased to complete the proposed project. CID will be utilizing our equipment to prepare the surface. This will include a sandblaster and an air compressor. The hourly rate charged for the sandblaster is \$28.91 and the hourly rate for the compressor is \$40. These rates include hoses, nozzles, and fuel. CID will be using a heavy duty truck to tow the sandblaster and supplies, with an hourly rate charge of \$25. A light duty truck will be used to transport District workers is charged at \$19/hr. The rates for the trucks include fuel. The amount of hours charged for each truck is only 1 hour per day.

Materials and Supplies

Materials that will need to be purchased include sand to complete the sandblasting and the polyurea material to seal the cracks. The sand is budgeted at \$11.50 per 50 pound bag. The polyurea material is budgeted at \$48.5 per gallon. These quantities and cost were based on invoice paid for a similar project completed in March 2018. The polyurea material is a two part mixture that comes in 55-gallon drums. CID has budgeted that we will be able to use 16 drums for a total of 8 batches of material.

Contractual

In order to determine unit costs included in the budget proposal for this project, CID relied upon contract unit prices from a prior project completed last winter using a polyurea material. CID budgeted \$37,808 for the contractor to complete the application process. CID will bid the application portion of the project to several prequalified companies. The contractual costs shown are estimates for the contractor to place the polyurea material. Generally, the low bidder will be selected based on a determination of acceptable qualifications.

Environmental and Regulatory Compliance Costs

There are no environmental or regulatory compliance costs associated with the proposed project.

Other Expenses

No other expenses will be part of the proposed project.

Indirect Costs

No indirect costs are associated with the proposed project.

Proposed Total Costs

Refer to Table 2 above for a summary of non-federal and federal funding sources.

Attachment B: Photos



Photo 2: Main canal deterioration as shown in a Google Earth image. Note: 5 degraded areas over 300ft.



Photo 3: Existing conditions of main canal within the project area, near Jayders Rd. Note: cracks webbing across the canal and the accumulated rubble and sediment where the concrete has settled.



Photo 4: Aqualastic application on Gyp Bend Project completed March 2018.

Attachment C: Official Resolution – Carlsbad Irrigation District



Carlsbad Irrigation District
CO-OPERATING WITH DEPARTMENT OF INTERIOR
25,055 ACRES UNDER IRRIGATION
5117 GRANDI ROAD – PHONE 575/236/6390
CARLSBAD, NM 88220
FAX 575/236/6396
E-Mail – cid@plateautel.net

BOARD OF DIRECTORS
Gary Walterscheid, President
Coley Burgess, V.Pres.,
Charles Jurva, Director
Guadalupe Carrasco, Director
Mary Barnhart, Director

DALE BALLARD
Manager, Secretary-Treasurer
Assessor/Collector

Resolution 002-2018

A RESOLUTION authorizing the submittal of a grant application by the Carlsbad Irrigation District for the WaterSMART Grants Small Water Efficiency Projects for Fiscal Year 2018 (Funding Opportunity Announcement No. BOR-DO-18-F009) by the US Department of the Interior Bureau of Reclamation.

WHEREAS, the Carlsbad Irrigation District (District) has applied for WaterSMART Grant Financial Assistance; and

WHEREAS, a requirement of the assistance application requires the Board to commit to the financial and legal obligations associated with receipt of WaterSMART Grant Financial Assistance;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors for the Carlsbad Irrigation District, as follows:

Section 1. The Board hereby delegates authority to its Manager, Dale Ballard or Board Member, Mary Barnhart to enter into the agreement with the Bureau of Reclamation, if the District is awarded WaterSMART Grant Financial Assistance.

Section 2. The Board of Directors has reviewed and supports the WaterSMART Grant Financial Assistance application, as submitted by the Board on behalf of the District.

Section 3. The District has the capabilities to provide needed financial assistance and/or in-kind contributions, as specified in the District's application proposal.

Section 4. The Board, on behalf of the District, will work with the Department of the Interior's Bureau of Reclamation to meet deadlines established for entering into a cooperative agreement, if the District receives WaterSMART Grant Financial Assistance.

DATED this 10th day of July, 2018.

APPROVED BY:

Gary Walterscheid, Board of Directors President

Dale Ballard, Manager

Attachment D: Certification Letter Regarding Lobbying Activities



DALE A. BALLARD
MANAGER
SECRETARY/TREASURER
ASSESSOR/COLLECTOR

CARLSBAD IRRIGATION DISTRICT

CO-OPERATING WITH DEPARTMENT OF INTERIOR
25,055 ACRES UNDER IRRIGATION
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BOARD OF DIRECTORS
GARY WALTERSCHEID, PRESIDENT
COLEY BURGESS, VICE-PRESIDENT
CHARLES H. JURVA, DIRECTOR
GUDALUPE CARRASCO, DIRECTOR
MARY BARNHART, DIRECTOR

July 30, 2018

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents of all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, United States Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Dale Ballard, Manager