WaterSMART: Water & Energy Efficiency Grants
FY 2017

DAVIS & WEBER COUNTIES CANAL COMPANY

Large Piping & Solar Project

Applicant

Davis & Weber Counties Canal Company
Rick Smith, Manager
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Sunset, Utah 84015

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Executive Summary

Applicant Info

Date: January 16, 2017
Applicant name: Davis and Weber Counties Canal Company (DWCCC or Company)
City, County, State: Sunset, Davis, Utah
Project Manager:

- Name: Bryce Wilcox, P.E. DWCCC Engineer
- Title: Project Manger
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Project Funding Request: Funding Group II $1,000,000.00 total project costs $2,500,000.00

Project Summary

A one paragraph project summary that specifies the work proposed, including how project funds will be used to accomplish specific project activities and briefly identifies how the proposed project contributes to accomplishing the goals of this FOA

The project is being requested under Funding Group II and has been identified in the System Optimization Review (SOR) approved in 2013 and updated in 2016, as number one and two on the priority project list. This project will result in the conservation of approximately 733 acre-feet of water and the better management of approximately 7,305 acre-feet of water which flows through the project areas of Clearfield and Layton cities. The project will generate approximately 16,723 kWh of renewable energy that can be used by the Company to run their maintenance building and shops and the remaining power sold to Rocky Mountain Power for renewable energy benefits. The project consists of piping 3,220 feet of unlined canal with two 66-inch reinforced concrete pipe in Clearfield and piping 500 feet of earthen canal with a single 66-inch reinforced concrete pipe in Layton. Along with this, a 10.3 kW solar array will be installed at the DWCCC maintenance building and shops to generate 16,723 kilowatt hours (kWh) of energy per year. The DWCCC project is a positive step toward achieving the goals of the WaterSMART program by implementing methods and materials that have proven successful for water conservation and energy sustainability.

Schedule

State the length of time and estimated completion date for the project

The preliminary master planning for the piping component of the project has been completed as part of an approved System Optimization Review. The environmental report has been completed for this project area. The project is ready to prepare the final design as soon as the contracts are signed and estimated to take 4 to 6 months (October 2017 – March 2018). The piping portion of the project will need to take place outside of the irrigation season (April 15- October 15th) and will require six months each year. (October 2018 – April 2019 and October 2019 to April 2020). The project will be accomplished within the three-year allowance.

Estimated project schedule that shows the stages and duration of the proposed work, including yearly funding, major tasks, milestones, and dates:

SCHEDULE	Year 1 Reclamation Funding $300.000				Year 2 Reclamation Funding $500.000				Year 3 Reclamation Funding $200.000			
Milestone/Task	Sept –Oct 2017	Nov 2017 – J an 2018	Jan – April 2018	May – Sept 2018	Oct – Dec 2018	Jan – March 2019	April – May 2019	June – Sept 2019	Oct – Dec 2019	Jan –Mar 2020	April – May 2020	June – Sept 2020
Sign WaterSMART contracts												
Environmental Document prepared and approved by Reclamation	Completed											
Piping and Solar design and Construction, Project Bid/Award for Full Project Year 1												
Piping Project Year 2												
Piping Project Year 3												
Final reporting and project close-out												

Federal Facility

Whether or not the project is located on a Federal Facility

The project is not directly located on a federal facility, however, DWCCC receives water from Echo Reservoir, which is owned by Reclamation. This project will permit better management of DWCCC's water, allowing water to stay in the reservoir longer during the irrigation season which can benefit the habitats and recreational opportunities within the reservoir.

Background Data

The proposed project area of the canal for consideration is located in Clearfield and Layton Utah. The canal is surrounded on both sides by commercial, residential, industrial, senior, and multi-family housing. The 100-year-old unlined earthen canal is in very poor condition and has had many seepage issues over the years. The canal's surrounding land users create many maintenance access issues. Water is seeping through the canal embankment into residential and commercial properties and open fields along the canal.

Photo 1 Project Area Clearfield 2000 East

The weakened condition of the canal puts many of these surrounding properties at a high risk of flooding. The seeping water erodes the fine soils and increases vegetation growth. If enough soil material is lost, voids occur and can potentially breach the canal. The voids are also an invitation for rodents, and other small mammals build homes. In the past, DWCCC has tried to fill the voids with concrete or shotcrete to help seal the leaks, but it has not worked. A larger breach in this area would be devastating! Homes, water users, municipalities, and farmers would lose their water supply and the roads, intersection, and commercial businesses would have significant impacts and property damage. This breach would also place more demands on municipal water supplies beyond their capacities to deliver. The projects within this application are listed as a high priority for DWCCC.

Geographic Location/Map

The service area of DWCCC includes communities located in Weber, Davis, Summit, and Morgan Counties, including the cities of West Point, Clinton, Sunset, Layton, South Weber, Kaysville, Roy, Clearfield, West Haven, Riverdale, and Syracuse with a total population of over 370,000 residents. They also provide water to the Snyderville Basin Area, South Weber, Roy, Clinton, West Point, Syracuse, Layton, and Kaysville for irrigation and secondary water use. The project location is shown in an overview of the entire service area and is indicated in Attachment – A Geographic and Project Map.

Water Supply

Describe the source of water supply, the water rights involved, current water uses (i.e., agricultural, municipal, domestic, or industrial), the number of water users served, and the current and projected water demand. Also, identify potential shortfalls in water supply. If water is primarily used for irrigation, describe major crops and total acres served.

» ***Source of water supply**:* The source of water is from the direct flow rights of the Weber River, which is supplied from reservoir storage in Echo and East Canyon Reservoirs. Water is delivered through a series of canals, ditches, and low- and high-pressure pipelines from the main canal.

» ***Water rights involved***: Direct flow water rights from the Weber River based upon the flow of the river for direct use:

- Flood 433 cfs,
- High Water 216 cfs
- Low Water 133 cfs
- Storage rights of 57,154 acre-feet (28,000 from East Canyon Reservoir and 29,154 from Echo Reservoir)
- The 8-year average annual water rights available is 68,485 acre-feet. The average annual use delivered through the canal system is 53,590 acre-feet. The remaining portion (14,895 acre-feet) is directly diverted from the Weber River by other shareholders.

» ***Current water uses and number of water users served***: The majority of the water use (based on volume) is agricultural with over 40,790 acres irrigated. Secondary water uses for lawns and garden, parks, churches, and schools consists of over 31,439 connections within the DWCCC service area including water supplied to the sub-districts of Roy, South Weber, Syracuse, and Weber Basin Water Conservancy District.

» ***Current and projected water demand:*** Current demands are for approximately 70,000 acre-feet of water. The Company has seen significant changes in safety requirements and laws regarding water use and water rights. Local laws and policy changes, terrorist threats, and natural disasters, including potentials for residential property flooding have reminded the Company of the external risks and demands placed upon them and their water supply. Through extensive planning and evaluation, a list of potential water demands includes the following:

- Water to serve an additional 10,000 secondary water connections within the next ten years as growth and land use conversions continue throughout the DWCCC service area.
- Additional water to meet municipal and industrial (M&I) demands as communities and commercial areas continue to evolve and grow. Information from the 2010 census indicates that the DWCCC service area, which includes areas within Weber and Davis Counties, doubled in population in 10 years instead of 20 years as earlier projected. The Company also supplies water to areas within Morgan and Summit Counties. They have also experienced significant and intense growth according to the 2010 census. This population change has prompted DWCCC to plan and prepare for greater secondary water needs beyond what had been originally anticipated.

- Water to service the fast growing Summit County area. The Summit Water Distribution District has 303 shares of DWCCC water, and Weber Basin Water Conservancy District is currently leasing 5,000 acre-feet of water for the Park City/Snyderville Basin areas. Their thirst for water is growing at staggering rates and will be a significant impact on demands upon available existing DWCCC water supplies.

» ***Potential shortfalls in water supply:*** DWCCC faces potential shortfalls in three main areas:

1. The principal potential shortfall for the Company is water losses that could cause potential flooding to residents through the main canal. These losses have impacted water delivery in past drought years which has caused significant shortages. The previous four years (2012-16) have been considered drought years. With the amount of water losses in the system, many users downstream have been impacted. Water seepage and losses within this project area are estimated to be at least 733 acre-feet of water annually and possibly more. Visual inspections show water seeping from the canal banks and into the adjacent backyards and fields.

The project areas of the canal for consideration are unlined earthen canals that are in very poor condition. A larger breach in this area would have a significant impact on the water supply because these are sections of the main canal which deliver 48,804 acre-feet of water annually and transports all of the water to Clearfield, Layton, Syracuse, and Kaysville cities. If a breach in the canal occurred, the entire canal would have to be shut down and thus impacting all users. The roadways, intersection, and commercial businesses would be highly affected and would have a major financial affect to the economy of Clearfield and Layton City, not to mention the traffic flow impacts that will happen in the area.

2. Drought - DWCCC potential shortfalls from drought can and have had an impact on the current water supply. The State of Utah does not have a detailed drought management plan, but has made strides since the severe drought of the late 1990's and early 2000 years. However, extreme concerns exist in the DWCCC service area which caused them to redefine their drought mitigation plans and implementations on an annual basis. In 2012 - 2016, the snowpack was minimal at best which supplies reservoir storage. The Company was forced to start using their storage water much earlier than usual. In 2015, Utah had the hottest winter on record with the snow melt happening in March, three months earlier than usual cutting water to the lowest allocation in 30 years.

The irrigation season was cut short by fourteen days in 2013, 2014, and 2015. In 2012 the Company received only forty days of the natural flow of the Weber River for the season. This required the Company to request all users to limit their water usage very early in the season and throughout the year.

The Company evaluates its drought situations and operational procedures each year including its management decisions for existing water supply conditions. DWCCC gathers data and identifies potential areas of concerns by monitoring flow rates at various locations on a regular basis, which includes correlation with other entities. The amount of water available for delivery is determined each year by natural flow rights and storage rights.

The drought has severely impacted the amount of storage carryover water that has been available at the end of the irrigation season, and during the past few years of drought, the natural flow rights were limited or not available. The water losses from seepage, potential flooding, and drought conditions make this a high priority project on the lower main canal.

3. Growth - Within the past ten years, DWCCC's service area has seen significant population increases with many new residential housing developments, businesses, schools, and churches; some of which border next to the main canal's trunk line. Davis and Weber Counties are listed as two of the fastest growing counties in Utah. Both of these counties are served by DWCCC water. Further evidence of growth is shown in the conversion of water used for agriculture purposes to that of residential lawn and garden applications. In 1995, agricultural water usage was 80% of the total water used, whereas today the use is approximately 55% according to the Governor of Utah Water Task Force Committee. The 25% difference is water that has been converted from agriculture crop production to outdoor agriculture uses for lawns gardens, parks, schools and churches, municipal and commercial needs.

As the population increases in the service area, the need for more culinary and secondary water also increases. This demand could have significant impacts on the Company's ability to provide water to other new customer needs in their service areas which are running short of water based upon drought conditions, insufficient storage, and transmission water losses from unlined or unenclosed distribution systems.

Water Delivery System

Describe the applicant's water delivery system as appropriate. For agricultural systems, please include the miles of canals, miles of laterals, and existing irrigation improvements (i.e., type, miles, and acres). For municipal systems, please include the number of connections and/or number of water users served and any other relevant information describing the system.

Reservoirs

- East Canyon Reservoir storage 48,000 acre-feet capacity (DWCCC owns 28,000 acre-feet of this capacity)
- Echo Reservoir storage 74,000 acre-feet capacity (DWCCC owns 39.4% of this capacity)

Canal System

- River Diversion includes four 18-foot wide radial gates across the Weber River to divert water into the DWCCC forebay channel.
- Forebay channel includes trash racks, a canal gate, which controls the flow into the main canal, and an overflow crest gate structure that diverts excess water back into the Weber River which helps for control of deliveries as well as, fish flow protection.
- The DWCCC canal system consists of 17.22 miles of main canal which is defined as the upper main canal and the lower main canal sections which includes:
  - » No liner or Deteriorated 100 Year old liner – 3.64 miles
  - » 1980's and 1990's Non-Reinforced Concrete Open Canal Liner – 1.91 miles
  - » 2001 to 2011 Reinforced Concrete Open Canal Liner – 4.16 miles

» Enclosed Pipe or Box Culvert – 7.30 miles
» Box Culverts under Highways and Freeways – 0.21 miles
» 90 diversion gates and siphons servicing 100 different ditch companies

Pressurized Secondary System

- Approximately 36 miles of pressurized secondary water transmission trunk lines
- Sunset Secondary Water Reservoir with 34 acre-feet capacity
- Church Street Secondary Water Reservoir with 43 acre-feet water storage capacity
- Kaysville East Secondary Water Reservoir with 24 acre-feet water storage capacity
- 200 South West Point Secondary Water Reservoir with 12 acre-feet water storage capacity
- Roy Water Conservancy District with a 125 acre-feet water storage capacity
- 112.4 miles of secondary water distribution piping in the West Point/Clinton System
- 64.8 miles of pressurized secondary water distribution piping in the Kaysville/Layton System
- 3.2 miles of pressurized secondary water distribution piping in South Weber System
- Syracuse City with three water storage reservoirs that total 106 acre-feet water storage capacity

Energy Efficiency

If the application includes renewable energy or energy efficiency elements, describe existing energy sources and current energy uses.

The project will install a 10.3 kW solar panel array at the DWCCC maintenance building and shop. The proposes solar array will provide approximately 16,723 kWh per year that will be used offset energy demands. Within many other WaterSMART project, DWCCC has implemented hydropower as a source of renewable energy to run meters, automated headgates, and other equipment during the irrigation season. With the development the solar array DWCCC will now be able to utilize the power on-site of their maintenance building and shops reducing reliance on outside power sources throughout the entire year. It is estimated that the proposed solar project will offset approximately 34,000 lbs of CO2 per year when compared with coal plant generation reducing DECCC's carbon footprint. Over the life of the solar array system (20 year) the reduction of DWCCC's carbon footprint is equivalent to:

Planting 7,992 trees

Burning 334,227 lbs. of coal.

Driving reduced by 686,000 auto miles, or 34,986 gallons of gasoline.

Relationship with Reclamation

Identify any past working relationships with Reclamation. This should include the date(s), description of prior relationships with Reclamation, and a description of the projects(s).

DWCCC has had a number of projects in conjunction with Reclamation over the past years, starting in the 1930s with the construction of Echo Dam and in 1964 expansion of the East Canyon Dam. Reclamation facilities exist in the same Weber River Basin as this proposed

project. Some DWCCC stock is owned by Weber Basin Water Conservancy District (WBWCD) a Reclamation project. Some of their water is delivered through the DWCCC facilities, approximately 15,038 acre-feet.

In 2016, DWCCC received a WaterSMART Energy Efficiency Grants for $300,000. The project included piping 950 feet of 100-year-old deteriorated canal liner with an 8-foot wide by 7-foot high reinforced concrete box culvert and a 5kW small hydropower generation turbine at key locations to generate 21,600 kWh of power per year for each project. This project is under design now and will be completed by the winter of 2017.

In 2015, DWCCC received two WaterSMART Energy Efficiency Grants for $300,000 each. The projects included installing almost 700 secondary water meters and piping 2,000 feet of open, unlined canal. Both projects include small hydropower generation turbines at key locations to generate 48,600 kWh of energy per year.

In 2014, DWCCC received a WaterSMART Energy Efficiency Grant for $1 million towards a $3.05-million-dollar project. The project includes metering five turnouts, placing over 4300 feet of box culvert and large diameter RCP pipe in the main canal and the installation of two 10 kW small hydropower generation turbines at key locations to generate 86,400 kWh of energy per year.

In 2011, DWCCC received a WaterSMART System Optimization Review grant. This Plan was completed in 2013 and has identified the project priorities in canal water system. The SOR is reviewed and updated as needed. This canal project has been designated as a top priority in the completed SOR Plan and will assist in accomplishing the goals of the Plan.

In 2009, DWCCC received a $3.6 million matching “Challenge Grant” to replace the forebay channel, river diversion structure, and gates, and install 1,300 feet of box culvert located in Weber Canyon. The SCADA system was also upgraded to allow for remote operation of the new facilities. That project included 3,250 feet of two 66” diameter RCP pipes, 500 feet of three 66” diameter RCP pipes, and 1,650 feet of new open canal trapezoidal concrete liner with water stop to replace existing deteriorated concrete liner sections and areas with no liner at all. Many entities including Federal, State, County and City Governments, private property owners, water districts, and shareholders have participated in and worked toward the success of DWCCC’s infrastructure rehabilitation projects.

In 2005, the Company received a Water 2025 challenge grant for a water measurement and automation project. This measurement and automation project is highly successful in that it has identified areas of water savings, provided for more accurate measurements and better monitoring, established faster reaction times for emergency responses and implemented automation throughout DWCCC’s system.

Technical Project Description

Describe the work in detail, including specific activities that will be accomplished as a result of this project. This description shall have sufficient detail to permit a comprehensive evaluation of the proposal.

The proposed project will pipe 3,220 feet of the unlined earthen canal through Clearfield and Layton City with two 66" diameter reinforced concrete pipes and pipe an additional 500 feet of earthen canal in Layton with a single 66" diameter reinforced concrete pipe which will connect to the WaterSMART project being constructed as of December 2016. Installing this additional 500 feet of pipe will result in facilitating the last 9,000 feet of the canal to be completely enclosed thus reducing losses and improving safety.

The existing unlined earthen canal is elevated above the adjacent ground, and has many condition issues, has significant seepage losses, and is difficult to access and clean. This project will allow DWCCC to manage better approximately 7,305 acre-feet of water that flows through this portion of the canal and reduce seepage which will conserve 733 acre-feet of water. The project also includes placing a 10.3 kWh solar panel array at the DWCCC maintenance building and shops which will produce 16,723 kWh. This power production will provide DWCCC with the ability to power their maintenance building and shops.

This project is part of an approved SOR that was developed in 2013 and updated in 2016. See Attachments A, B, and C for maps for the project locations.

Evaluation Criteria

Evaluation Criteria A: Quantifiable Water Savings

Describe the amount of water saved. *For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations.*

- *Average annual acre-feet of water supply:*
  The average annual acre-feet of water supply for DWCCC is approximately 68,628 acre-feet (eight-year measured average). Nearly 15,038 acre-feet are diverted upstream from the Company's main canal, directly from the Weber River, in Summit and Morgan Counties. The main canal is located at the mouth of Weber Canyon and is 17.22 miles long. 53,590 acre-feet of the 68,485 acre feet travel through the main canal. This project is within the main canal and located in the lower area of the canal, through which, 48,804 acre-feet of DWCCC's water is transported annually.

- *Where is the water currently going ((e.g., back to the stream, spilled at the end of the ditch, seeping into the ground, etc.)?*

Water is seeping through the unlined canal into the ground and is also being taken up by vegetation. The soils around the canal are granular soils and allow the water to pass through very quickly.

- *Where will the conserved water go?*
  The conserved water will provide a more secure water right, be more available as a buffer during times of drought, be available for secondary use as agriculture lands convert to residential lawns and gardens, be made available for new customers and benefit the environment, fish and wildlife habitats on the Weber River through prolonged and better balanced stream flows of available water.

(1) Canal Lining/Piping

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

During the 2016 irrigation season, DWCCC monitored the inflow-outflow along the lower 7.7 miles of canal. There is a meter in the main canal, called the "Roy Flume." This meter was verified in the spring of 2013 by an outside company and was tested to be accurate within 5%. DWCCC currently has seven continuously recording metered turnouts and fourteen turnouts with flumes and/or weirs as measuring devices along the lower portion of the canal. DWCCC took daily readings and measurements on all the non-SCADA recording flow measurement turnouts. All of the flow measurements were compiled on a monthly basis showing the water used at each turnout and how much water entered the system. To determine project water losses, DWCCC used an inflow-outflow method. The total amount metered at all of the turnouts was subtracted from the Roy Flume measurements to calculate how much water was lost to the system.

The total that passed through the Roy Flume was 42,927 acre-feet. The total amount delivered through the turnouts was 39,035 acre-feet. From these measurements, we found that we lost 3,892 acre-feet through the 7.7 miles of the lower main canal system in 2016. The following table shows the results of the system monitoring for 2016.

Water Loss of the Canal Per-foot

Below the Roy Flume the main canal has 19,210 feet of unlined or deteriorating liner that the water has to pass through in order to be delivered to the DWCCC users. The water loss calculations on per-foot basis are being distributed equally across the main canal. Given these components the water loss per foot is as follows: **3,892/19,210 = 0.203 acre-feet per foot of canal**.

Project Water Losses

This project will enclose 3,720 feet of deteriorated and unlined canal within the main canal for a total water savings of 755 acre-feet (3,720 ft * 0.203 acre-feet per foot). Using a 3% loss for reinforced concrete pipe, the net water savings for the project will be 733 acre-feet per water season. The improvements to the canal will allow DWCCC to manage approximately 7,305 acre-feet of water better as it flows through the project area.

Table 1 Gates and System Monitoring

Gates	Water Delivered (Acre-Feet)
WBWCD Roy Pond	1,775
North Flume	546
Roy WCD	7,035
Sunset Res	6,678
Gate 03A	209
Gate 8	298
Gate 9	10
Gate 11	303
Gate 15	2,057
Gate 18	6,020
Gate 19	272
Gate 23E	2,408
Gate 23W	4,676
Gate 24A	117
Gate 25	43
Gate 27	1,377
Gate 30IF	1,213
Gate 33	283
Layton Res	3,344
West 05 Butler	127
West 05 Kapp	244
Totals	**39,035**
Total Water Delivered at Roy Flume	**42,927**
Difference or Water Lost to System	**3,892**

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

An inflow/outflow test was done over the entire 2016 irrigation season. A known quantity of water passed the Roy Flume at the start of the lower portion of the canal. The water used at each turnout was subtracted from the total that was passing through the Roy Flume giving the total water that was lost to the system. There are currently seven continuously metered turnouts on the canal and fourteen turnouts with weirs and flumes. DWCCC took daily measurements on all of the non-continuously recording turnouts, to quantify how much water was passing through each turnout. This information was taken each month to determine water lost within the system. These calculations were used to calculate the water lost in the system.

c) What are the expected post-project seepage/leakage losses and how were these estimates determined (e.g., can data specific to the type of material being used in the project be provided)?

Reinforced concrete pipe with sealed joints will be used which has an estimated loss factor of minus 3%. These losses will be minimal and have been noted in the calculations for the water loss savings. Data specific information is available if needed. This is a commonly used material with historical loss information that is often used by Reclamation in projects.

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

Annual transit losses are estimated to be an average of 3,892 acre-feet for 3.64 miles of deteriorated or unlined canal. This gives a loss of 1,070 acre-feet per mile per water season.

e) How will actual canal loss seepage reductions be verified?

The actual canal losses will be checked by using the same season long inflow/outflow test that was done to determine the initial losses. The Roy Flume provides a known quantity of water at the start of the lower portion of the canal. The water used at each turnout will be measured and then subtracted from the total passing through the Roy Flume. The remaining amount of water will be the total water lost to the system after the project has been completed.

DWCCC will take daily measurements on all of the non-recording water flow measurement devices to quantify how much water has passed through these turnouts. The information will be documented and calculated on a monthly basis. This will allow the Company to monitor and measure the benefits of the project to the water losses of the system.

f) Include a detailed description of the materials being used.

The canal will be enclosed with 66" diameter reinforces concrete pipe with gasketed joints to prevent water seepage. Pre-cast boxes will be used to join the new pipe to the existing pipes in the canal.

Evaluation Criterion B: Water Sustainability Benefits Expected to Result from the Project

Please describe in detail where the conserved water will go and how the conserved water is expected to increase water sustainability. Consider the following:

Will the project commit conserved water to instream flows?
Yes, DWCCC is willing to work with Utah Division of Wildlife Resources (UDWR) and other as they have in the past to dedicate instream flows at critical times of the irrigation season that will benefit the Weber River system.

If so, please address the following:

- *Provide a detailed description of the mechanism that will be used (e.g., collaboration with a state agency or nonprofit organization, or other mechanisms allowable under state law) and the roles of any partners in the process. Please attach any relevant supporting documents.*

  The development of this project will allow for more water to be saved and held in Echo and East Canyon Reservoirs and within the Weber River system. DWCCC has always worked closely with local, state, and federal agencies to do their part to make percentages of their conserved water available to instream flows within the Weber River system and will continue to do so. Working with Utah Division of Wildlife Resources, Weber Basin Water Conservancy District, and others DWCCC use conserved water to increase water sustainability within the Weber River. See Letters of Support.

- *Indicate the quantity of conserved water that will be committed to instream flows. Describe where conserved water will be committed to increase instream flows (indicate specific stream reaches if applicable).*

  DWCCC has indicated that it would negotiate releasing anywhere from 10% to 15% (73 to 110 acre-feet) of the water saved from this project. This commitment is over and above the previous committed conserved water from the past four WaterSMART projects. See letter of support from the UDWR and Trout Unlimited under Letters of Support.

- *Describe the benefits that are expected to result from increased instream flows. Will the increased instream flows result in benefits to fish and wildlife? If so, please describe the species and expected benefit of the project.*

  After talking with Clint Brunson, Aquatics Habitat Restoration Biologist with the Utah Department of Wildlife Resources, he indicated that if we could allow more water to run down the Weber River during the irrigation season, it would help the Bonneville Cutthroat Trout and Bluehead Sucker which are listed on the state's sensitive species list. As indicated before DWCCC is committed to working with the UDWR and establishing a percentage of the saved water to be released at critical times when the UDWR feels this could enhance the habitat for the Bonneville Cutthroat Trout and Bluehead Sucker.

- *Please describe the status of the species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular ecological, recreational, or economic importance), the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project.*

  The Bonneville Cutthroat Trout and Bluehead sucker are native fish species found in portions of the Weber River. Both species are covered by conservation agreements the State of Utah has entered into with the U.S. Fish and Wildlife Service and other parties. The population status of these two sensitive species warrants additional conservation effort to diminish the likelihood of future listings under the Endangered Species Act.

  UDWR's approach to aquatic species conservation and management in the Weber River, in part, focuses on reconnecting and maintaining connectivity of priority habitats by removing unnecessary barriers to fish migration, or by modifying existing barriers to allow upstream movement of these species, particularly for Bonneville Cutthroat Trout and Bluehead Sucker. Many of which have come about by the building diversion structures and installing culverts that reduce the ability of fish migration. Many of these barriers originate from the private canal and ditch companies as well as a project built by Reclamation over the years.

  Stable and connecting flows between Bonneville Cutthroat Trout and Bluehead Sucker habitats are a fundamental requirement for conservation actions to be successful. Therefore, most any project that enhances the continuity and maintenance of flows within the Weber River is a step in the right direction. As DWCCC and UDWR work

cooperatively to protect and conserve these native species, their habitats will be benefited.

- *Will the increased instream flows result in benefits to habitat or other ecological benefits? If so, describe these benefits. Will the flows specifically benefit federally designated critical habitat?*

  No known federally designated, critical habitats will be specifically targeted for this project. However, there are federally listed and endangered (E), threatened (T), and candidate (C) species that could be positively affected by additional water supply. The U.S. Fish and Wildlife Service identify these species as known and are believed to be in Davis, Weber, Morgan and Summit Counties.
  (C) Greater Sage-Grouse (Centrocercus urophasianus)
  (C) Yellow-Billed Cuckoo (Coccyzus americanus)
  (C) Least Chub (Lotichthys phlegethontis)
  (E) June Sucker (Chasmistes liorus)
  (T) Canada Lynx (Lynx canadensis)

  Stable and connecting flows in the Weber River system are a fundamental requirement for conservation actions to be successful. Therefore, most any project that enhances the continuity and maintenance of flows within the Weber River is a step in the right direction. As DWCCC and UDWR work cooperatively to protect and conserve the native species – Bonneville Cutthroat Trout and Bluehead Sucker – and their habitats other known federally listed habitats will be benefited.

- *Will the increased instream flows result in other benefits not discussed above, including recreational, social, or economic benefits? If so, please explain.*

  Within the Weber River Watershed Plan of 2014, it says that "The goal of this plan is to recognize both the human and ecological values that the watershed provides and develop strategies to protect and enhance those values." Allowing for more water to remain in the Weber River, Echo and East Canyon Reservoirs recreational opportunities will be benefited, water quality will be improved, recreation fishing will be sustainable and economic development will continue.

Evaluation Criteria C: Energy-Water Nexus

Subcriterion C.1: Implementing Renewable Energy Projects Related to Water Management and Delivery

Describe the amount of energy capacity. *For projects that implement renewable energy systems, state the estimated amount of capacity (in kilowatts) of the system. Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate.*

The project will install a 10.3 kW solar panel array at the DWCCC maintenance building and shop. The proposes solar array will provide approximately 16,723 kWh per year that will be used offset energy demands. Within many other WaterSMART project, DWCCC has

implemented hydropower as a source of renewable energy to run meters, automated headgates, and other equipment during the irrigation season. With the development the solar array DWCCC will now be able to utilize the power on-site of their maintenance building and shops reducing reliance on outside power sources throughout the entire year. It is estimated that the proposed solar project will offset approximately 34,000 lbs of CO2 per year when compared with coal plant generation reducing DECCC's carbon footprint. Over the life of the solar array system (20 year) the reduction of DWCCC's carbon footprint is equivalent to:

Planting 7,992 trees

Burning 334,227 lbs. of coal.

Driving reduced by 686,000 auto miles, or 34,986 gallons of gasoline.

The carbon footprint equivalent information above was provided by Master Electrical Service. The 10.3 kW solar array will operate year round and will generate 16,723 kWh per year of renewable power. The calculations are as follows for the CO2 evaluation.

Photo 4 Sample of a Solar Array

Carbon Tons X Pounds / Years = CO2 Per Year
343 tons X 2000 lbs /20 years = 34,000 lbs CO2

Describe any other benefits of the renewable energy project. *Please describe and provide sufficient detail on any additional benefits expected to result from the renewable energy project, including:*

• Expected environmental benefits of the renewable energy system

This project will reduce 34,000 lbs of CO2 per year. Utah has an inversion problem! Emissions from point sources are more abundant in the Davis and Salt Lake counties. It is unhealthy! It is dirty! It is ugly! When air sits stagnant, area sources of pollution have health impacts – respiratory ailments like temporary pneumonia or asthma. The balance of power generated not being used by DWCCC can be sold back to Rocky Mountain Power helping to reduce the need to use more fossil fuels to meet the demands of the Wasatch Front.

• Any expected reduction in the use of energy currently supplied through a Reclamation project

Electricity along the Wasatch Front comes from a variety of sources. One of those sources is the hydropower at Rockport Reservoir which is a Reclamation project. It is unlikely that this project will have any impact on hydropower generation from the Reclamation projects in the area.

•Anticipated beneficiaries, other than the applicant, of the renewable energy system

Benefits and beneficiaries:

- Reduced greenhouse gas emission a step in the right direction of combatting climate change. The proposed solar project will offset approximately 34,000 lbs of CO2 per year when compared with coal plant generation.
- The power generated will allow DWCCC to offset some of their electrical usage at their maintenance building and shops. In a small way this will reduce the peak usage that Rocky Mountain Power is required to deliver.

Photo 6 Thick inversion in Layton Utah January 2015

•Expected water needs of the renewable energy system

No additional water will be required to operate the solar panel array.

Subcriterion No. C.2: Increasing Energy Efficiency in Water Management

Describe any energy efficiencies that are expected to result from implementation of the water conservation or water management project (e.g., reduced pumping).

•Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.

DWCCC has always had a gravity-fed system, and this will still be the case with the development of this project. The completion of this project will reduce the time, energy, and money spent to monitor these critical sections of the canal. During the irrigation season, the DWCCC staff is required to drive the canal twice a day to monitor the canal and evaluate these critical areas. The development of this project will allow the DWCCC staff to reduce their 40 mile round trips from twice daily to only once daily. The savings will be in vehicle miles traveled, gasoline consumed, decreased CO2 pollutants released, and man hours saved.

•Please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements?

Due to the elevation of the canal, users are not required to pump to receive their allotment of water. However, the secondary irrigation system that provides pressurized water is pumped. These systems have several pumping stations: two pumps below the Kaysville East reservoir, five pumps in Clinton City and six pumps in West Point which are all part of the average annual kWh total of 464,366 kWh used by the DWCCC.

• Please indicate whether your energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.

The energy savings are based on miles of round trip from the current point of diversion.

• Does the calculation include the energy required to treat the water?

No. The system does not require treatment of the water. However, six large automated traveling screens remove large debris from the canal before entering pressurized pipes. The power generated would also help offset the costs of screening the water.

• Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations. Describe any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).

The completion of this project will reduce the time, energy, and money spent to monitor these critical sections of the canal daily during the irrigation season by incorporating these areas into the SCADA system. The savings will be in fewer vehicle miles traveled, reduced gasoline consumption, decreased CO2 pollutants released and more man hours saved. At 40 miles per round trip, checking the canal twice a day; the canal rider travels 560 miles per week over the 6-month irrigation season, which equates to 14,720 miles an irrigation season. If we can cut the trips by half (7,360 miles) per irrigation season we will realize savings that will consist of the following:

Traveling only once a day at 40 miles per round trip would equate to a savings of 7,360 miles per irrigation season. Calculation of CO2 and social cost of the Carbon based emissions on 3% discount rate per ton and price for gasoline that comes from information provided by FHWA Benefits Cost Analysis Resource Guide. Calculation and information for the CO2 metric tons saved comes from the "Carbon Foot Print" website located at
www.carbonfootprint.com/calculator.aspx
The following are the assumptions made:

» Assume 14 mpg for a 2004 Ford F150 four-wheel drive
» Assume fuel cost at 2.00 per gallon
» Assume a Social Cost of Carbon discounted at 3% per ton

Gasoline savings: Savings of $1,051.00

Pollution savings: Savings of 10.8 metric tons of CO2 per year, which equates to a Social Cost of Carbon per ton at $22.80 which equals savings of $246.00 per year saved. Discounted by 3% is $238.85. Not to mention fewer carbon emissions into the atmosphere and stratosphere. This analysis does not include the savings for monitoring the pump stations and automated traveling screens twice daily as well.

Evaluation Criterion D: Addressing Adaptation Strategies in a WaterSMART Basin Study

- *Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project, and how the proposed WaterSMART Grant project would help implement the adaptation strategy.*

Within the Colorado River Basin; Water Supply and Demand Study updated in 2013 there are 6 options submitted that related to agricultural water conservation measures listed to reduce demand in areas receiving Colorado River supply. They consist of Advanced irrigation scheduling, Deficit irrigation, On-farm irrigation system improvements, Controlled environment agriculture, Conveyance system efficiency improvements, and Fallowing of irrigated lands. Many of these options were related to specific agricultural conservation programs in two categories 1- implementation approaches which are incentive-based programs and 2 - water transfers that might provide additional opportunities for conservation in the Colorado River Basin as a whole.

The project is consistent with this study as well as the State Regional Water Plan for the Weber River Basin in that the project address metering, irrigation efficiency, leak detection, and loss control.

The Weber River Basin Plan of 2009 indicates, in Chapter 4 of the plan, several conservation goals that they would like to implement, most of which this project will help to satisfy. The specific goal that this project will contribute to implement is to help reduce outdoor use through monitoring and more efficient application and delivery of the water.

Weber River Waters Users association developed a “Water Management and Conservation Plan” in 2009 with a Reclamation grant, addressing the needs for the Weber River Basin. Within the Plan, Section 6, Issues and Goals; Issue 2, Condition of Existing Facilities, addresses aging water facilities and being proactive in caring for its facilities and encouraging those who carry Project water to upgrade their conveyance systems. This project helps to fulfill this goal by piping and lining 2000 feet pipe through the main delivery system.

This project will contribute to achieving Goal 5 in Section 7 of the plan. Within the Weber Water Users 2009 Water Management Plan, Goal 5 addresses the support of an upgrade of Davis & Weber Canal Facilities. This goal indicates that DWCCC has made significant strides over the past 10 years to do a number of “Capital Improvement” projects. The Plan suggests that the Association should work in cooperation with DWCCC to complete the rehabilitation of the canal. It also lists the primary objectives of the projects being to improve the safety of the structure, conserves water by reducing seepage losses and provide for more efficient operation and maintenance. With significant residential development occurring adjacent to the canal in recent year’s public safety has come to the forefront of the Association and DWCCC.

DWCCC completed a SOR for the 17.2-mile canal system in October 2013. A copy of the project priorities is included in Attachment D – Planning Documents. The proposed project is one and two on the SOR Highest Priority Project List.

DWCCC has a Conservation Plan which includes aspects of this project. They also have Emergency Action and Response Plans, and an Operation and Management Plan, which includes responses during drought or water shortage conditions. They also participated in developing a conservation plan with the Weber River Water Users Association, which has recently been updated. (Copies of these plans can be made available upon request)

Other plans this project is consistent with include the State Regional Water Plan for the Weber River Basin. In the "Weber River Basin Planning for the Future" document prepared in September 2009 it states:

> "*In order to meet future water needs, water planners and managers within the Weber River Basin must promote effective water conservation programs and measures. They must also ensure that agricultural water conversions are transferred to meet both indoor and outdoor urban water needs, and implement innovative water management strategies. This, along with carefully planned water developments, will secure sufficient water for the future.*"

The current DWCCC proposed projects help to fulfill these goals.

- *Describe how the adaptation strategy and proposed WaterSMART Grant project will address the imbalance between water supply and demand identified by the Basin Study.*
  From this measures previously mentioned the SOR has two implementation approaches which are incentive-based programs and water transfers. It is indicated that the water conservation programs should address the following issues:
  - Conserved water needs to be measurable by a reduction in demand, conservation measures need to be easily observable, and, where costs are not prohibitive, should be verified by volumetric water use measurement.
  - Legal mechanisms must be in place to protect conserved water in-stream for intended uses, especially in areas where insufficient stream flow currently limits downstream water users from exercising their full diversion rights.
  - Controls may be needed to prevent expansion of effectively irrigated areas associated with water conservation investments.
  - Continuing to maintain a healthy agricultural economy and development of associated policy.

  This project will focus on improvements in conveyance system efficiency through delivery and improved canals, ditches, and pipes. It will have measurable conservation and will help protect flows to help ensure that water users will be able to exercise their full diversion right which at present they are not always receiving their full right.

Within the 2009 Plan, it indicates that "as the basin's population grows, so will the demand for water." This project will help DWCCC reduce the extreme loss in their system that puts the safety of the surrounding properties and hinders DWCCC in their delivery of a full right of water to its users.

- *Identify the applicant's level of involvement in the Basin Study (e.g., cost-share partner, participating stakeholder, etc.).*
  DWCCC is a member of Weber River Water Users Association (WRWUA) who participate in this type of planning with Reclamation.

- *Describe whether the project will result in further collaboration among Basin Study partners.*
  This project will require the collaboration with WRWUA and WBWCD who are all major shareholders in Echo Reservoir and the Weber River. It will allow for the collaboration between all these parties and DWCCC as they design the project.

Evaluation Criterion E: Expediting Future On-Farm Irrigation Improvements

Include a detailed listing of the fields and acreage that may be improved in the future.

DWCCC provides water to approximately 100 different ditches and turnouts. The canal system is elevated so that anyone could connect on to the canal to provide sufficient pressure for an agricultural sprinkler system. This project will not change that ability to provide pressure irrigation to farms. This project will be a positive move toward ensuring that shareholders will receive their shares of water through a canal that is metered, piped, and lined, so that losses are minimal and conservation is maximized, hydropower is developed, the environment is protected, and the canal is made safe and water can be delivered efficiently.

The Company is aware of a few local farm projects that are being considered, most of which are ditch expansions, piping of ditches, and conversion of water deliveries from flood irrigation to sprinklers. The following is a list of those who have talked to DWCCC in the past about the opportunity to apply for AWP funds:

Name Ditch	Area	Location
Gale Flinders	15	1300 North Clearfield/Sunset/West Point
Jon Green	23 East Gate	2200 West Layton
Golden Waite	23 East Gate	2200 West Layton
Bill Day	23 East	West Layton

- *Describe in detail the on-farm improvements that can be made as a result of this project. Include discussion of any planned or ongoing efforts by farmers/ranchers that receive water from the applicant.*

  This project will help provide a safer, more reliable, and more efficient water delivery system for the canal. This will allow farmers to install pipes, sprinklers, and pivots to make their

irrigation systems more efficient and will also allow for higher crop yields and less flooding potentials in residential neighborhoods that are continual encroaching on the agricultural lands.

- *Provide a detailed explanation of how the proposed WaterSMART Grant project would help to expedite such on-farm efficiency improvements.*

  1- Less tail water wasting from flood irrigation
  2- Better metering and monitoring of system
  3- Innovation for better technologies such as sprinkler and drip irrigation methods

- *Fully describe the on-farm water conservation or water use efficiency benefits that would result from the enabled on-farm component of this project. Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.*

  Based upon calculation and information submitted already as part of this application returned savings in water for agriculture would be between 8 to 10% water savings, besides creation of additional water resources through conservation that will benefit future water development needs. Better use of the water will come about by reducing water wasting and losses due to seepage this request has outlined the water savings in detail.

- *Projects that include significant on-farm irrigation improvements should demonstrate the eligibility, commitment, and number or percentage of shareholders who plan to participate in any available NRCS funding programs. Applicants should provide letters of intent from farmers/ranchers in the affected project areas.*

  The four listed farm projects previously listed have expressed strong interest in participating in NRCS funding programs to accomplish similar goals as are contained in this application. These projects will allow for better safety and conservation.

- *Describe the extent to which this project complements an existing or newly awarded NRCS funded project or a project that either has been submitted or will be submitted to NRCS for funding.*

  There have been several canal lining and piping projects through WaterSMART grant awards that have been completed and which are proven examples in the accomplishment of goals similar, if not identical to the goals of this project.

Evaluation Criterion F: Implementation and Results

Subcriterion No. F.1: Project Planning

Does the project have a Water Conservation Plan, System Optimization Review (SOR), and/or district or geographic area drought contingency plans in place? Does the project relate/have a nexus to an adaptation strategy developed as part of a WaterSMART Basin Study)? Please self-certify, or provide copies of these plans where appropriate, to verify that such a plan is in place.

Provide the following information regarding project planning:

(1) Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Basin Study, drought contingency plan, or other planning efforts done to determine the priority of this project in relation to other potential projects.

DWCCC completed a SOR for the 17.2-mile canal system in October 2013 and updated the SOR in 2016. The SOR planning process allowed DWCCC to evaluate the entire delivery system and give them direction on priority projects that can allow for the highest water conservation renewable energy production. The proposed project is listed as number one and two within the SOR 2016 update.

Weber River Waters Users' Association developed a "Water Management and Conservation Plan" in 2009 with a Reclamation grant, addressing the needs for the Weber River Basin. The Weber River Basin Plan of 2009 indicates, in Chapter 4 of the plan, several conservation goals that they would like to implement, most of which this project will help to satisfy. The specific goal that this project will contribute to implement is to help reduce outdoor use through monitoring and more efficient application and delivery of the water.

DWCCC has a Conservation Plan which includes aspects of this project. They also have an Emergency Action and Response Plans, and an Operation and Management Plan, which includes responses during times of drought or water shortage conditions. They also participated in developing a conservation plan with the Weber River Water Users' Association, which has recently been updated. (Copies of these plans can be made available upon request)

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

The Weber River Water Users' Association has a number of goals and issues that this project will help to fulfill. They have been addressed previously and are listed in Criterion D. Other plans that this project is consistent with is the State Regional Water Plan for the Weber River Basin. In the "Weber River Basin Planning for the Future" document prepared in September 2009 it states:

> *"In order to meet future water needs, water planners and managers within the Weber River Basin must promote effective water conservation programs and measures. They must also ensure that agricultural water conversions are transferred to meet both indoor and outdoor urban water needs, and implement innovative water management strategies. This, along with carefully planned water developments, will secure sufficient water for the future."*

Subcriterion No. F.2: Support and Collaboration

Describe the extent to which the project garners support and promotes collaboration.

- *Does the project promote and encourage collaboration among parties? Is there widespread support for the project? What is the significance of the collaboration/support?*

This project has the support of all DWCCC water users, Clearfield City, Sunset City,

Syracuse City, West Point City, Layton City, Kaysville City, South Weber City, Riverdale City, West Haven City, Clinton City, Weber Basin Water Conservancy District, Roy Water Conservancy District, the Utah Board of Water Resources, Weber River Water Users Association, Weber River Water Rights Committee, UDWR, and the Utah State Engineer's Office.

The support of the Cities, State of Utah Conservancy Districts, and all water users will allow DWCCC to work quickly through the process to construct the project. The project will be completed on property owned by DWCCC.

- *Will the project help to prevent a water-related crisis or conflict?*

  Yes, as mentioned in the above section, canal deterioration causes seepage and could result in a breach which could have a significant impact on residential areas. It will disrupt services to many communities and agricultural users. This project will secure the mainline canal and reduce the seepage into backyards and fields.
- *Is there frequently tension or litigation over water in the basin?*

  There is always tension when it comes to water. Natural disasters, drought, and un-maintained canals and ditches seem to be the major factors in developing tension within any service area. DWCCC has had its share and, will continue to feel the tension especially as demands for more water come from expanding residential growth. However, in the past few years, there has been more tension than usual. Lack of water because of the drought situation (irrigation season shortened by 14 days), and seepage losses within the main canal have increased the tension levels from medium to high.

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

  Yes. This project will allow other users along this area of the canal to pipe their own ditches and/or install their own sprinkling systems. If they enhanced their own ditches and developed a sprinkling system, they could realize significant water savings as well as the potential for higher crop yields. Over the past five years, other irrigators have seen the improvements that DWCCC has made on their system and have made significant changes in their ditch systems that DWCCC delivers water to.

Subcriterion No. F.3: Performance Measures

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

There are two areas of this project where performance measures can be documented and quantified to show the actual benefits upon completion of the project. They include renewable energy that will be generated and water that is saved and/or better managed.

Energy Generated Performance Measures

The System Optimization Review included a feasibility report for hydroelectric power generation, and within this feasibility report, small hydropower generation was investigated. The report made some assumptions by estimating the power of free-flowing water and with the timeline (April – October) in which the turbines would be in operation to calculate the amount of kWh that would be generated. The performance measures will use these calculations to make a comparison of the actual number of kWh that will be recorded on the meter. A reading of the meter will be made monthly and recorded. Then a calculation and comparison will be established to show the performance measures. These monthly reports will be summarized annually in November and reported to the Board of Directors.

Water Savings and/or Better Water Management Performance Measures

The System Optimization Review identifies the water tracking and water usage procedures for the DWCCC canal. These are the same procedures that were followed to calculate the water losses in this application. The same procedures will be used to measure the actual water saved/better managed after the completion of this project.

A season long inflow and outflow summary of the lower portions of the canal will be taken: There is a meter on the main canal, called the "Roy Flume," at the start of the lower portion of the canal. DWCCC currently has 7 continuously reading meter turnouts and 14 turnouts with weirs and flumes along the lower part of the canal. Daily flow measurements at each turnout and flow measuring device readings are taken and recorded. Each month the flow measurements will be taken and used to determine how much water has passed the Roy Flume, how much water went down each turnout, and how much water was lost to the system for that month. The water lost for the entire irrigation season will be compared to the water savings calculations in this application. A portion of the gate usage tracking sheet is shown in Figure 1, Daily Turnout Measurement Sheet.

Figure 1 Summery Sheet

Gate	Estimated Water Delivered (Acre-Feet)	Water Allocated To Date (Acre-Feet)	Water Allocated For Year (Acre-Feet)	Difference Column 1-2 (Acre-Feet)	Total Remaining for Year Column 3-1 (Acre-Feet)
WBWCD Gateway					
WBWCD Roy Pond					
Byram Estates					
North Flume					
North 10					
North 11					
Roy WCD					
Sunset Res					
Gate 03A					
Gate 8					
Gate 11					
Gate 15					
Gate 16					
Gate 18					
Gate 19					
Gate 23E					
Gate 23W					
Gate 24A					
Gate 25					
Gate 27					
Gate 30IF					
Gate 30JS					
Gate 33					
Layton Res					
West 05 Butler					
West 05 Kap					
Totals					

Figure 2 Daily Turnout Measurements Sheet

Byram Estates	Measurements (CFS)	Estimated Delivery (CFS)	Total Estimated Delivered (Acre-Feet)		Flow Alotment (CFS per day)	Total Alotment (Acre-Feet)		Running Total Available (Acre-Feet)
April 15, 2013					-	-		-
April 16, 2013					4.64	9.19		9.19
April 17, 2013					4.64	18.39		18.39
April 18, 2013					4.64	27.58		27.58
April 19, 2013					4.64	36.78		36.78
April 20, 2013					4.64	45.97		45.97
April 21, 2013					4.64	55.17		55.17
April 22, 2013					4.64	64.36		64.36
April 23, 2013					4.64	73.56		73.56
April 24, 2013					4.64	82.75		82.75
April 25, 2013					4.64	91.95		91.95
April 26, 2013					4.64	101.14		101.14
April 27, 2013					4.64	110.34		110.34
April 28, 2013					4.64	119.53		119.53
April 29, 2013					4.64	128.73		128.73
April 30, 2013					4.64	137.92		137.92

The individual gates are combined into a summary of all gates on the lower canal. The sheet in Figure 2, Summary Sheet is a sample of how the information will be recorded. This summary sheet will be completed the 15th of each month and reviewed by the DWCCC Board of Directors

The water marketed as part of this project will be managed by tracking the amount of conserved water that is contracted to new customers and will be submitted in a report to the DWCCC Board of Directors semi-annually.

Evaluation Criterion G: Additional Non-Federal Funding

$1,500,000.00 Non-Federal Funding
$2,500,000.00 Total Project Cost **= 60%**

Evaluation Criterion H: Connection to Reclamation Project Activities

(1) How is the proposed project connected to Reclamation project activities?

Weber Basin Water Conservancy District is a major shareholder in DWCCC and supplies water to Reclamation projects. Water supplies for the DWCCC canal came from East Canyon and Echo Reservoirs which are both Reclamation projects.

(2) Does the applicant receive Reclamation project water?

Yes. DWCCC receives water from Echo and East Canyon Reservoirs, which are Reclamation projects.

(3) Is the project on Reclamation project lands or involving Reclamation facilities?

No.

(4) Is the project in the same basin as a Reclamation project or activity?

Yes, the project is located in the Weber River Basin where Echo and East Canyon Reservoirs are located.

(5) Will the proposed work contribute water to a basin where a Reclamation project is located?

Yes, the project will conserve water that can now be held up in Echo and East Canyon Reservoirs contributing to the storage and potential flow of the Weber River.

(6) Will the project help Reclamation meet trust responsibilities to Tribes?

No.

Environmental and Cultural Resources Compliance

1. *Will the project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.*

   DWCCC has an approved Environmental Report for this project. Impacts will be those associated with piping the canal. The proposed project improvements will take place entirely within the existing canal corridor. In the past, similar projects have had minimal impacts. This proposed area of the canal to be improved has an established access allowing work within the recognized easement of the project. The surface vegetation will be restored upon completion of the project.

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

   After having completed the Environmental Document and submitting it to Reclamation, DWCCC is not aware of any impacts concerning threatened or endangered species in this area.

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

   After having completed the Environmental Document and submitting it to Reclamation, DWCCC is not aware of any impacts to wetlands in this area.

4. *When was the water delivery system constructed?*

   The canal system was originally built in 1884 with concrete liner constructed around 1910 to 1920. Many improvements have been made over the years. As part of the completed environmental document the required historical documentation for the canal has been finalized.

5. *Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., head gates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.*

   Piping 3,220 feet of an earthen canal through Clearfield and Layton with two 66" diameter reinforced concrete pipes, 500 feet on earth canal with a single 66" diameter reinforced concrete pipe, and will add a 10.3 kW solar panel array at the DWCCC maintenance building and shops. The unlined canal was excavated in the 1920's and is difficult to maintain and in terrible condition, hence it needs to be piped. As part of the completed environmental document the required historical documentation for the canal has been completed.

6. *Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.*

   After having completed the Environmental Document and submitting it to Reclamation, DWCCC is not aware of any building, structures or features that would qualify. A cultural resource inventory was completed as part of the submitted environmental document.

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

   After having completed the Environmental Document and submitting it to Reclamation, DWCCC is not aware of any impacts to or locations of archeological sites.

8. *Will the project have a disproportionately high and adverse effect on low income or minority populations?*

   No. The project would not require a right-of-way or relocations from adjacent properties and would have no impact on residential properties or uses within the study area.

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

   No.

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

    No. In fact, the project will help with the control of noxious weeds and invasive trees. The projects will allow DWCCC to have better access to the canal for weed control.

Required Permits or Approvals

With the location of the Solar Array at the exiting maintenance building and shops will require a net metering agreement with Rocky Mountain Power and building permit from Sunset City.

Letters of Project Support

Utah Division of Wildlife Resources – Clint Brunson, Aquatics Habitat Restoration Biologist
Trout Unlimited – Paul Burnett, Weber River Project Coordinator

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Wildlife Resources
GREGORY SHEEHAN
Division Director

January 6, 2017

Richard D. Smith, P.E.
General Manager
Davis &Weber Counties Canal Company
138 West 1300 North
Sunset, Utah 84025

Subject: U.S. Bureau of Reclamation WaterSMART Water Efficiency Grant

Dear Mr. Smith:

As the Aquatics Habitat Restoration Biologist in Northern Utah for the Utah Division of Wildlife Resources (UDWR), I am pleased to write in support of the grant application you are submitting to the U.S. Bureau of Reclamation Water and Energy Efficiency Grants Program. I applaud your efforts to increase the efficiency of your system to conserve valuable water and energy. All water savings in the Weber River are valuable to ensure that we have adequate water for future generations.

The Bonneville cutthroat trout and bluehead sucker are native fish species found in portions of the Weber River. Both species are covered by conservation agreements the State of Utah has entered into with the U.S. Fish and Wildlife Service and other parties. The population status of these two sensitive species warrants additional conservation effort to diminish the likelihood of future listings under the Endangered Species Act. UDWR's approach to aquatic species conservation and management in the Weber River, in part, focuses on reconnecting and maintaining connectivity of priority habitats by removing unnecessary barriers to fish migration, or by modifying existing barriers to allow upstream movement of these species, particularly for Bonneville cutthroat trout and bluehead sucker. Naturally of course, stable and connecting flows between those habitats are a fundamental requirement for those conservation actions to be successful. Within that context, most any project that enhances the continuity and maintenance of flows within the Weber River is a step in the right direction, as we work cooperatively to protect and conserve these native species.

The Weber Basin Water Conservancy District has been a great partner and contributed to a graduate student project that is currently studying bluehead sucker in the Weber River. The outcome from this study will be to determine important spawning locations (including spawning habitat requirements) and the type of low velocity/backwater habitats needed for juvenile bluehead sucker survival and recruitment. The results from this study will guide future management of bluehead sucker in the Weber River into the future and will help guide future habitat restoration projects.

1594 West North Temple, Suite 2110, PO Box 146301, Salt Lake City, UT 84114-6301
telephone (801) 538-4700 • facsimile (801) 538-4709 • TTY (801) 538-7458 • *www.wildlife.utah.gov*

UTAH DNR WILDLIFE RESOURCES

The population of Bonneville cutthroat trout in the lower Weber River is quite unique in that they travel significant distances in the main stem Weber River and ultimately up into tributary streams to spawn. This life history attribute has been lost from almost all Bonneville cutthroat trout populations, but still persists in the Weber River! We are very excited regarding the objective in this grant application that specifically addresses two specific lengths of canal needing repair. Water saved by piping both reaches of canal will benefit both Bonneville Cutthroat Trout and bluehead sucker in the lower stretches of the Weber River. Both the UDWR and TU are fully committed to partner with the Davis and Weber Counties Canal Co. to ensure that the work on these two sections of canal is completed, thus allowing more water for fish use in the lower Weber River. This project will help ensure that Bonneville cutthroat trout and bluehead sucker do not become a federally listed species under the Endangered Species Act in the future.

Sincerely

Clint Brunson
Aquatics Habitat Restoration Biologist
Utah Division of Wildlife Resources

Trout Unlimited
1777 N Kent Street, Suite 100
Arlington, VA 22209
(703) 522-0200

January 9, 2017

Rick Smith, PE
General Manager
Davis and Weber Counties Canal Company
138 W 1300 N
Clearfield, UT 84015

Dear Mr. Smith:

Over the past several years, Trout Unlimited has had the great opportunity and privilege to be involved in a positive effort within the Weber River Watershed, known as the Weber River Partnership. We value the involvement and perspective that the Davis and Weber Counties Canal Company has brought to this partnership, which represents a broad and diverse array of interests within the basin. The Weber River Partnership has made great progress in the Weber River by providing a platform for communication, coordination and collaboration among the diverse stakeholders and we believe this diversity has brought considerable value to developing a cohesive vision that includes water security, agricultural interests, community development and natural resources values.

Trout Unlimited has been working on the ground with a number of partners throughout the Weber River Basin, including the Utah Division of Wildlife Resources, agricultural producers and water users to protect and restore populations of Bonneville cutthroat trout and bluehead sucker though habitat restoration, fish passage and water efficiency projects. The bluehead sucker and Bonneville cutthroat trout populations have declined and are considered to be in jeopardy and petitions for listing under the Endangered Species Act are possible. Understandably, all partners in the watershed benefit by preventing the listing of imperiled species, but beyond that, we believe that many watershed partners also greatly value the fact that these species still persist in the Weber River, a sign of the great resilience of these native species and a reflection of the rich economic vitality they bring to our communities. Nevertheless, these species need our help and a cohesive strategy through the Weber River Partnership broadens the scope of our actions on the ground to provide broad benefits to all stakeholders in the Basin.

Trout Unlimited is encouraged by and supportive of your proposed project to improve the water conveyance efficiency of your system under the WaterSMART water and energy efficiency program. We are encouraged by your consideration of leaving a portion of the saved non-consumptive water in-stream, as water demands at certain times of the year can leave

flows in the Weber River at critically low levels, a condition that continues to be the one of the most existential threats faced by native fish in the Weber River. We support your proposal and are committed to working with the Davis and Weber Counties Canal Company on this efficiency project if our assistance is needed. We look forward to the continued collective progress, working in partnership with your organization on the broader goals of improving communication, coordination and collaboration within the Weber River Basin.

With Kind Regards.

Paul Burnett - Weber River Project Coordinator
5279 South 150 East
Ogden, UT 84405
801-436-4062
pburnett@tu.org

Official Resolution

The Official Resolution will be submitted by February 18, 2017

Project Budget

Funding Plan and Letters of Commitment

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

   DWCCC will use money from their own Construction Reserve Account for their contribution. The only in-kind cost which will be included is the cost to prepare the WaterSMART application.

2. *Describe any in-kind costs incurred before the anticipated project start date that you seek to include as project costs. Include: What project expenses have been incurred*

   N/A

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

   No letters of commitment will be necessary as all cost sharing will come from the Davis and Weber Counties Canal Company Construction Reserve Account.

4. *Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards your 50 percent cost share unless otherwise allowed by statute.*

   N/A

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

   No other requests for financing have been made. DWCCC already has the funds for their cost-sharing portion for this project.

Funding Sources	**Funding Amount**
Non-Federal Entities	
Recipient Funding	1,500,000.00
Other Federal Entities	
Other Federal	0.00
Requested Reclamation Funding:	1,000,000.00
TOTAL PROJECT FUNDING	**2,500,000.00**

Budget Proposal Funding Group II

Funding Sources	**Percent of Total Project Cost**	**Total Cost by Source**
Recipient Funding	60%	$1,500,000
Reclamation Funding Group I	40%	$1,000,000
Other Federal Funding	0%	$0.00
TOTALS	100%	$2,500,000

Budget

Budget Item Description	Computation		Quantity Type	Total Cost
	$/Unit	Quantity		
Salaries & Wages	$0.00	-	-	$0.00
Fringe Benefits	$0.00	-	-	$0.00
Travel	$0.00	-	-	$0.00
Equipment	$0.00	-	-	$0.00
Supplies and materials	$0.00	-	-	$0.00
Contractual /Construction				
Mobilization	$84,100.00	1	EA	$84,100.00
Traffic Control	$11,000.00	1	EA	$11,000.00
Storm Water Pollution Prevention Plan (SWPPP)	$9,300.00	1	EA	$9,300.00
Clear and Grub	$12,300.00	1	EA	$12,300.00
Imported Fill Material	$12.20	7413.85	TON	$90,449.00
Imported Structural Fill Material	$17.05	14380	TON	$245,179.00
66" Diameter Class III RCP Materials (Two Pipes)	$310.00	3220	LF	$998,200.00
66" Pipe Installation (Two Pipes)	$80.00	3220	LF	$257,600.00
66" RCP Bend (Two Pipes)	$6,800.00	8	EA	$54,400.00
66" Diameter Class III RCP (Single Pipe)	$253.00	500	LF	$126,500.00
36"Dia. Access Manhole	$2,180.00	11	EA	$23,980.00
8'x16' Precast Concrete Cleanout Box	$13,700.00	3	EA	$41,100.00
8Ft x 8Ft Manholes	$10,200.00	2	Each	$20,400.00
Turnout Including Boxes	$26,200.00	2	EA	$52,400.00
Surface Restoration	$20,100.00	1	EA	$20,100.00
Pothole Utilities	$300.00	10	HR	$3,000.00
Exit Transition Structure	$34,600.00	1	EA	$34,600.00
1500 East, Traffic Control	$3,900.00	1	EA	$3,900.00
1500 East, Bridge demolition	$17,500.00	1	EA	$17,500.00
1500 East, Granular Borrow Backfill	$17.80	650	Tons	$11,570.00
1500 East, Untreated Base Course	$19.20	160	Tons	$3,072.00
1500 East, Hot-mix Asphalt	$169.00	60	Tons	$10,140.00
1500 East, Temporary Asphalt Patch	$239.00	30	Tons	$7,170.00
1500 East, Asphalt Painting	$800.00	1	EA	$800.00
Remove and Replace Curb and Sidewalk	$35.00	120	LF	$4,200.00
6' Chain Link Fence	25	120	LF	$3,000.00
Relocate 12' Wide Chain Link Fence Gate	660	2	EA	$1,320.00
Hydropower Generation	$40,000.00	1	EA	$40,000.00
Design Engineering		7%	LS	$153,110.00
Construction Engineering		7%	LS	$153,110.00
Environmental Document (Completed time to update as needed for Reclamation)	125.00	32	HR	$4,000.00
Other				
Reporting	$125.00	20	HR	$2,500.00
Total Direct Costs				$2,500,000.00
Indirect Costs	$0.00	-	-	$0.00
			Total Project Costs	**$2,500,000.00**

Budget Narrative

Salaries & Wages

No DWCCC Salaries or Wages will be included. All services will be contracted. DWCCC's staff time will be over and above the cost of the project and will not be counted toward the project cost.

Fringe Benefits

No fringe benefits will be required.

Travel

No travel will be necessary.

Equipment

Equipment will be part of the contracted portion of the project.

Materials and Supplies

Materials and Supplies will be part of the contracted portion of the project and will be documented as required.

Contractual

In order to determine unit costs which were included in the cost estimate for this project, DWCCC relied upon contract unit prices from a similar project bid in October in 2013 and October 2016. Items bid match the bid items from these projects.

DWCCC will bid the construction portion of the project to several prequalified construction companies. The contractual costs shown are estimates for each of the components to furnish and install all the equipment. Generally, the low bidder will be selected based on a determination of acceptable qualifications.

Contractual will include design approximately at 7% and construction observation approximately at 7%. The Contractor will be hired to perform mobilization, 3,220 feet of 66" two RCP, 500 feet of single 66" RCP, 14,380 tons of structural fill, 7,413 tons of backfill material, perform 3,720 feet of surface restoration, install of the solar power generation, and the other contractual items listed.

Environmental and Regulatory Compliance Costs

The environmental document for this project was included in a previously completed report and has been approved by Reclamation. Reclamation may require additional information so 32 hours of time at $125.00 = $4,000 will be included in this project.

Reporting

Reporting costs shown in the application are estimated charges from the project engineer. DWCCC is not requesting any credit or reimbursement for any in-house employee costs for

preparing or submitting the necessary reports. DWCCC is contributing their time to the project over and above the required match. Reports will be done by the project engineer for the DWCCC project. The cost is $2,500, and the project engineer has been allowed 20 hours to prepare all the reports at $125.00 per hour.

Other Expenses

None

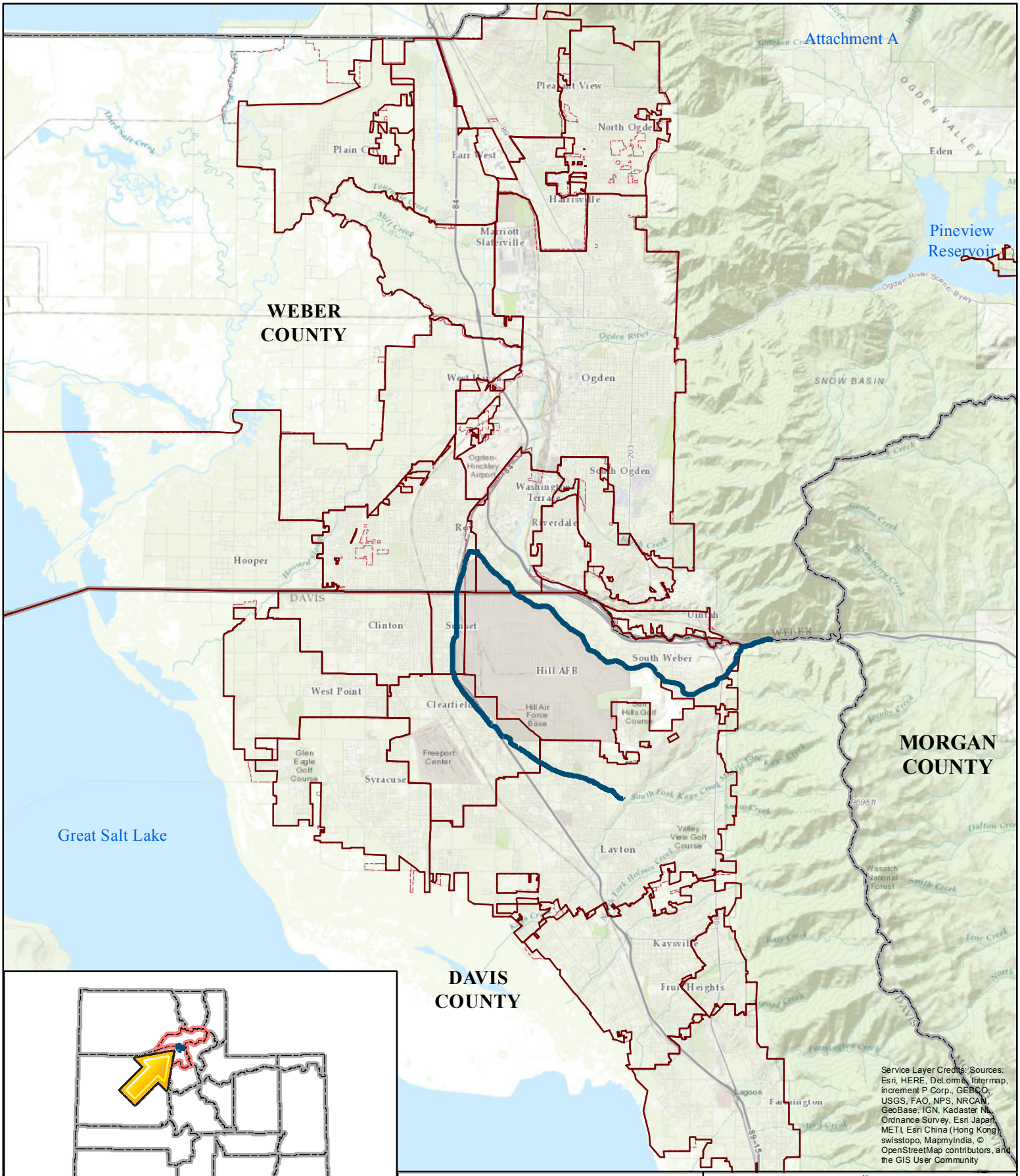
Indirect Costs

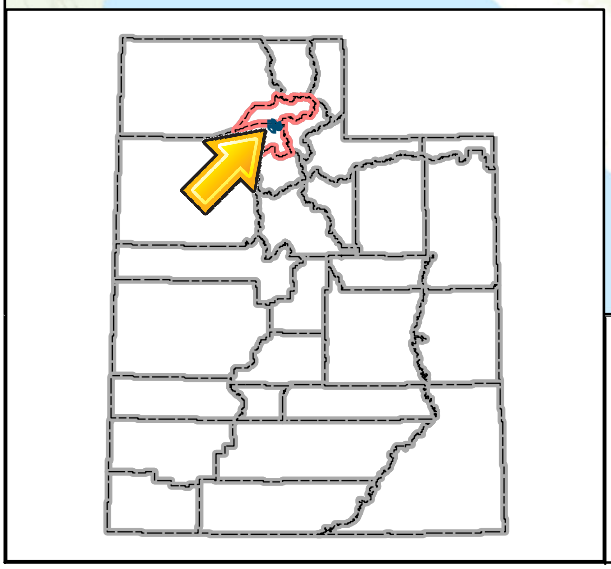
No indirect costs are included

Total Costs

DWCCC Portion	Fed Portion	Total
$1,500,000	$1,000,000	$2,500,000

Attachment A





Davis & Weber Counties Canal Company

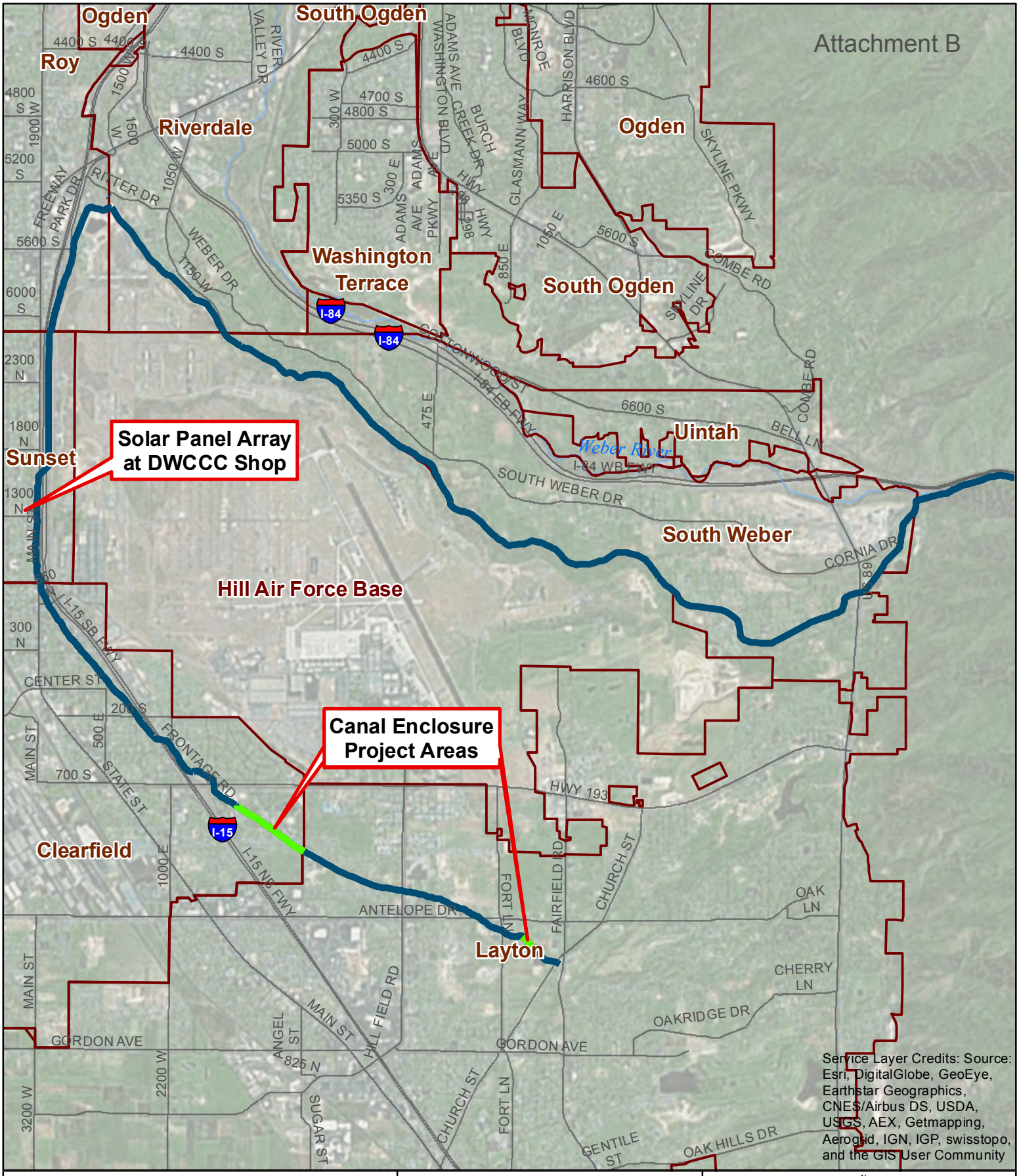
Vicinity Map

N
W E
S

0 15,000 30,000 Feet

J-U-B ENGINEERS, INC.

GATEWAY MAPPING INC.
a J-U-B Company



Legend

- Canal Enclosure Project Area
- Existing Canal
- City Boundaries

Davis & Weber Counties Canal Company

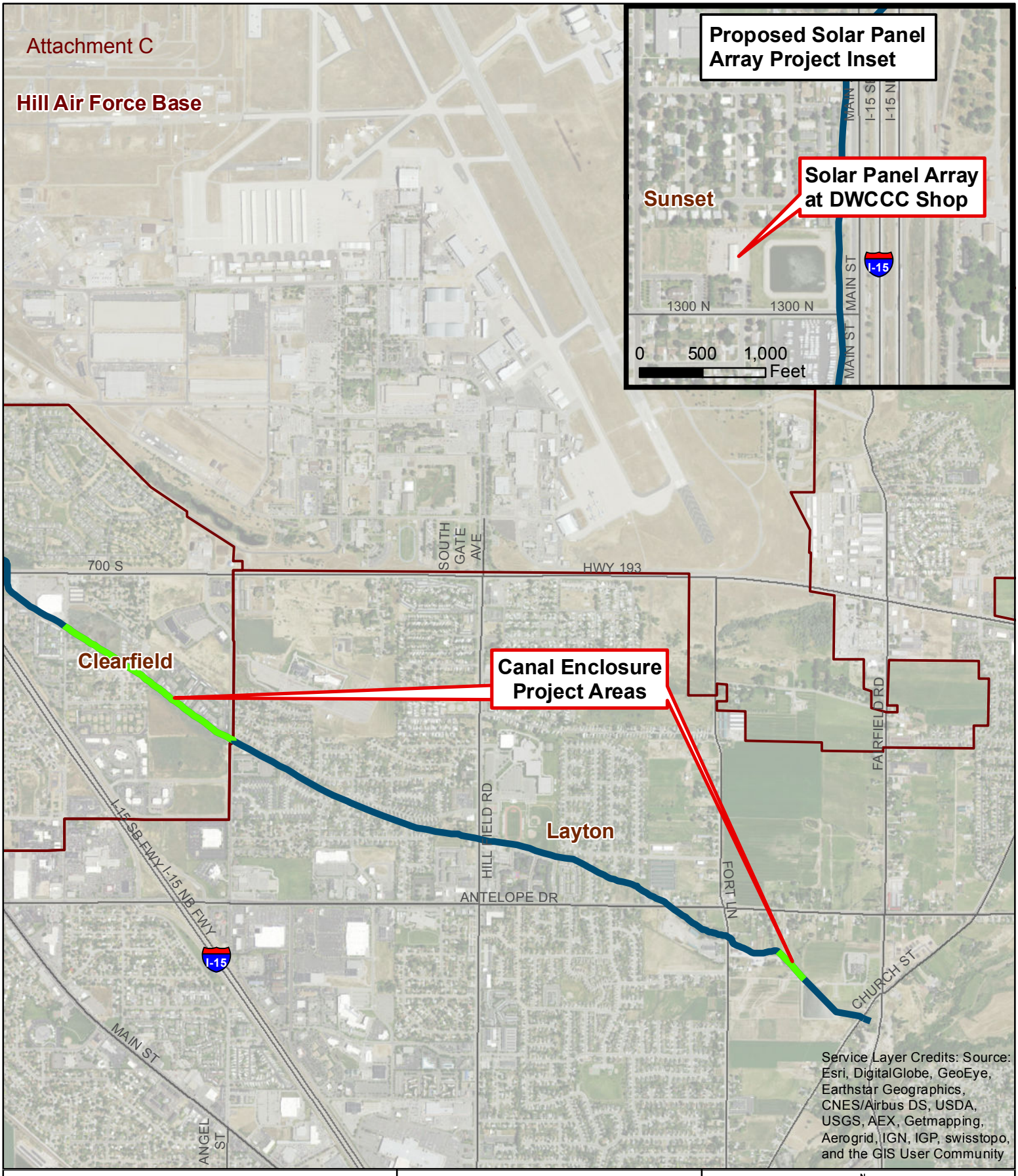
System Map

N W E S

0 5,000 10,000 Feet

J-U-B ENGINEERS, INC.

GATEWAY MAPPING INC. a J-U-B Company



Legend

- Canal Enclosure Project Area
- Existing Canal
- City Boundaries

Davis & Weber Counties Canal Company

Project Map

N W E S

0 2,000 4,000 Feet

J-U-B ENGINEERS, INC.

GATEWAY MAPPING INC. a J-U-B Company

Attachment D

Davis & Weber Counties Canal Company
Priority Projects
12/15/2016

High Priority Projects

Priority	Segment #	Stationing Start	Stationing End	Length (ft)	Current Condition	Proposed Improvement	Estimated Replacement Year	Estimated Replacement Cost	Location and Description
0	35	631+75	642+00	1,025	Open Liner	Box Culvert	2017	$ 1,088,256	Funded by WaterSmart by 650 North
1	50	873+75	891+00	500	No Liner	1-66" RCP		$ 225,810	Layton, Connection to Church St Reservoir
2	46	756+75	788+25	3,150	No Liner	2-66" RCP		$ 2,370,459	Clearfield, South/East of 1500 East
3	47	788+25	800+00	1,175	No Liner	1-66" RCP		$ 589,043	Layton, South/East of University Parkway
4	43	725+50	742+50	1,700	Open Liner	2-66" RCP		$ 1,342,744	Clearfield, Gate 23E to SR 193
5	33	619+75	630+25	1,050	Open Liner	3-66" RCP		$ 1,072,045	Sunset, Behind American Stone
6	30	604+75	611+25	650	Open Liner	3-66" RCP		$ 865,865	Sunset, South of 1300 North (Sierra RV)
7	48	800+00	852+40	5,240	2000 54" CMP/RCP	1-66" RCP		$ 2,519,231	Layton, Replace Existing 54" CMP
8	45	743+50	756+75	1,325	1999 84" Al. Steel	2-66" RCP		$ 1,008,618	Clearfield, Replace 84" at Tai Pan Trading
9	25	530+40	585+00	5,460	Open Liner	Box Culvert		$ 4,823,478	Roy, Railroad Crossing to I-15
10	42	714+25	725+50	1,125	Open Liner	2-66" RCP		$ 836,076	Clearfield, I-15 to Gate 23E
11	27	590+50	593+75	325	Open Liner	Box Culvert		$ 352,872	Sunset, Parallel SR126 by Sunset Pond
12	29	601+25	604+75	350	1993 Liner	Box Culvert		$ 481,793	Sunset, In front of Sunset Pond
13	28	593+75	601+25	750	2011 Open Liner	Box Culvert		$ 778,518	Sunset, By Sunset Pond
14	52	90130	90375	245	Open Ditch	1-48" RCP		$ 82,225	End of canal after Church Street Pond
15	23	471+00	497+00	2,600	1988 Open Liner	Box Culvert		$ 2,341,645	Roy, Breach Box Culvert to 5600 South Box
			Total	24,070			Total	$ 18,437,033	

Watch List

Priority	Segment #	Stationing Start	Stationing End	Length (ft)	Current Condition	Proposed Improvement	Estimated Replacement Year	Estimated Replacement Cost	Location and Description
16	8	140+84	144+68	384	1998 Open Liner	Open Liner		$ 210,319	South Weber, Open Liner
17	18	335+00	352+40	1,740	1995 Open Liner	Open Liner		$ 960,232	South Weber, Open Liner
18	14	282+25	293+80	1,155	1993 Open Liner	Open Liner		$ 678,184	South Weber, Open Liner
19	20	374+75	392+00	1,725	1992 Open Liner	Open Liner		$ 945,100	Riverdale, Open Liner
20	31	611+25	615+00	375	3-60" Al Steel Pipes	3-66" RCP		$ 404,781	Sunset, Replace 60" CMP at Sierra RV
21	37	643+00	652+00	900	2011 Open Liner	Box Culvert		$ 839,774	Clearfield, South of 650 N
22	38	652+00	666+75	1,475	1988 Open Liner	Box Culvert		$ 1,530,046	Clearfield, South of 650 N
			Total	7,754			Total	$ 5,568,437	

Total High Priorities and Watch List	31,824	Total High Priorities and Watch List	$ 24,005,469