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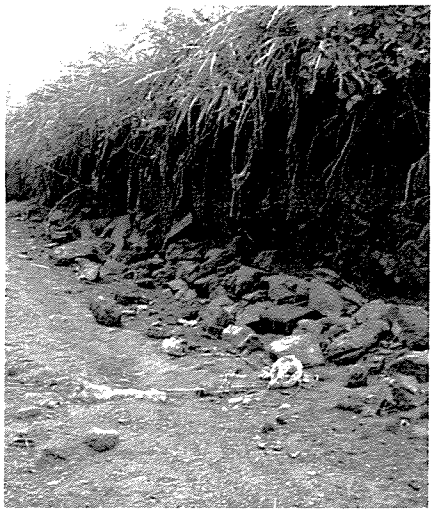
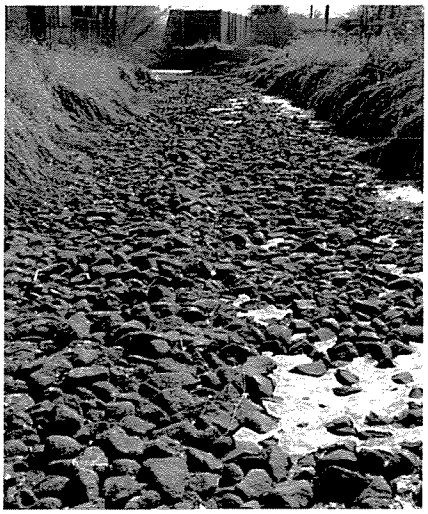


WaterSMART:
Water & Energy Efficiency Grant
FY 2014
FOA No. R14AS00001

DAVIS & WEBER COUNTIES CANAL COMPANY
Main Canal Piping & Small Hydro Project

APPLICANT

Davis & Weber Counties Canal Co.
Ivan Ray, Manager
138 West 1300 North
Sunset, Utah 84015

PROJECT MANAGER

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466 North 900 West
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Technical Proposal and Evaluation Criteria

Executive Summary

Date, Applicant Name, City, County and State

- » Date: January 2, 2014
- » Applicant name: Davis and Weber Counties Canal Company (DWCCC)
- » City, County, State: Sunset, Davis, Utah
- » Project Manager:
  - · Name: Bryce Wilcox, P.E.
  - · Title: Project Manger
  - · Telephone: 801-547-0393
  - · E-mail: bkw@jub.com
- » Project funding request:**$1,000,000.00 total project cost is $3,050,210.00**

Project Summary and Task Areas

One paragraph project summary that specifies the Task Area and briefly identifies how the proposed project contributes to accomplishing the goals of the FOA. How project funds will be used to accomplish specific project activities.

The project consists of metering 5 turn-outs on the main canal using Ultrasonic Flow meters on turn-out pipes ranging from 18" to 36" in diameter. This will allow for improved measurement accuracy which will result in reduced spills and over deliveries. The project also includes replacing 1,000 feet of unlined, open canal with a 66-inch reinforced concrete pipe (RCP) and piping 3,430 feet of a deteriorating concrete lined, open canal with two 72-inch reinforced concrete pipes (RCP). All of this will result in better management and conservation of water. Along with this the project will place two 10kW small hydro power generation turbines on the main canal allowing the Company to generate 86,400 kilowatt hours (kWh) of power per year. The project is being requested under Funding Group II. The three year estimated project cost is $3,050,210.00 and the funding request from WaterSMART is $1,000,000. The DWCCC project is a positive step toward achieving the goals of the WaterSMART program by implementing methods and materials that have proven successful in water conservation and energy sustainability. This project falls under Task A – Water Conservation Canal Lining/Piping and Irrigation Flow Measurement and Task B – Energy-Water Nexus for Implementing Renewable Energy Projects Related to Water Management and Delivery and has been identified within the approved 2013 System Optimization Review (SOR). **The development of this project will result in better management of 44,267 acre-feet of water which flows through the project area of the lower main canal, the conservation of 2,680 acre-feet of water, and the generation of 86,400 kWh of renewable energy** that can be used by the Canal Company to run their main river diversion structure. The remaining power will

be sold to Rocky Mountain Power. The outcome of this three-year project will be a quantifiable and sustainable improvement for water management and renewable energy.

Length of Time and Estimated Completion Date

The canal piping project will be completed over a series of years because of the need to construct during non-irrigation time (October-April). The small hydro power portion of the project will be developed in year 3 because of the timeline for the FERC permitting. The estimated completion of FERC permit is fall/winter of 2015/2016. The entire project will be fully completed by August/September of 2017. The project is located on private land belonging to DWCCC and is not within a Reclamation project. The permits for the small hydro power and the power sales agreement have been investigated and an understanding of the timeline and possible licensing exemption for "Qualifying Conduit Hydropower Facility" and "Conduit Exemption" for small hydro have been noted. The Qualifying Conduit Hydropower Facility is regulated under the Hydropower Regulatory Efficiency Act of 2013 if we qualify it could only take 3 months to get permitted through FERC. It is anticipated that it will take approximately 3 to 12 months to receive an approved FERC permit and approximately two to four months to fully negotiate and finalize the power sales agreement.

The preliminary master planning and hydraulic analysis of the project have been completed and the project is ready to start the environmental and prepare the final designs. The final designs will begin as soon as draft environmental documents have been submitted for review. The following is a schedule for each year.

Year 1 September 2014- September 2015 Cost $280,439.00

The Year 1 project will request from Reclamation $100,000.00 will include:

- Preparation and approval of the environmental document for the entire project
- Prepare the FERC Permits and Power Sales Agreement
- Design, bid , and construct meters affecting 4 turn-outs along the main canal
- Design and bid the year 2 piping project which includes 2,000 feet of two 72-inch RCP and one meter location

Years 2 October 2015- September 2016 Cost $1,486,278.00

Year 2 project will request from Reclamation $450,000.00 will include:

- Constructing 2,000 feet of two 72" RCP and one meter location
- Design and bid year 3 piping projects and the small hydro project. The piping project will include 1,430 feet of two 72" RCP and 1,000 feet of 66-inch RCP and placing two small hydro turbines and the required connections.

Year 3 October 2016 – September 2017 Cost $1,283,493.00

The Year 3 project will request from Reclamation $450,000.00 will include:

- Constructing 1,430 feet of two 72" RCP and 1,000 feet of 66-inch RCP and the placing of two small hydro turbines and the required connections.
- Preparing all final and close-out reports

Background Data

Geographic Location

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 population totaling over 370,000 residents. They also provide water to the Snyderville Basin Area for irrigation and secondary water use. The project location is indicated within an overview of the entire service area and is indicated in Attachment A, Geographic & Project Location Map.

Source of Water Supply, Water Rights, Current Water Users

» ***Source of water supply:*** The source of water is from the direct flow 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 water rights claimed, using the Weber River based on the flow of the river for direct use:

- Flood 433 cfs,
- High Water 216 cfs
- Low Water 133 cfs
- Storage rights of 57,553 acre-feet (28,000 from East Canyon Reservoir and 29,553 from Echo Reservoir)
- Average annual water right available is 70,508 acre feet. The average annual use delivered through the canal system is 55,628 acre-feet. The remaining portion (14,880 acre-feet) is directly diverted off 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 21,530 acres irrigated. Secondary water use consists of over 30,357 connections within the DWCCC service area including water supplied to the sub-districts of Roy, Syracuse, and Weber Basin Water Conservancy District.

» ***Current and projected water demand:*** Current demands are for more than 70,000 acre-feet of water. The Company has seen major changes in safety requirements and laws regarding water use and water rights. Local laws and policy changes, terrorist threats, and natural disasters have reminded the Canal 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 as growth and land conversions continue throughout the DWCCC service area.
- Water to meet municipal and industrial (M&I) demands as communities and commercial areas continue to 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 also saw 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 anticipated.

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

» ***Potential shortfalls in water supply:*** DWCCC faces potential shortfalls in four main areas:
1. The biggest potential shortfall for the Canal Company is water losses through the main canal. These losses are an issue in water delivery during drought years. This past years (2012-13) have been considered to be a drought years and with the amount of losses in the system, many users downstream were impacted. Water seepage and losses within this project area are estimated to be approximately 3,440 acre-feet annually. Visual inspection shows water seeping from the canal into the adjacent residential backyards because of the condition of the canal liner. The projects (canal piping and turn-outs) within this application are considered to be the most critical sections of the canal because they transports all of the water needed for the lower 7.7 miles of the canal (44,267 acre-feet). These sections impact water conservation and are a potential risk of flooding residential homes along the canal.

The project areas include failing concrete liner or unlined canal. These areas are significantly deteriorated, with water seeping through the canal embankment into fields and backyards, which are lower in elevation than the canal. The seeping water erodes the fine soils and if enough soil material is lost, voids will occur and potentially breach the canal – soils with voids are also an invitation for rodents and other small mammals to set up housekeeping. A potential breach in this area would be devastating! Homes, water users, farmers, and cities would lose their water supply and be significantly impacted. If there was a break in the canal, the water would need to be shut-off at the headworks, it would take six hours to dewater the canal in the lower eight miles. Water would still be in the canal within these project areas and would flood a significant number of homes over a large area. Many water users below the headworks in this project area (this area includes eight miles of canal, a 22" diameter pressure pipe system, and at least three pressure irrigation reservoirs) would not have access to any water until the breach could be repaired. This would impact thousands of water users.

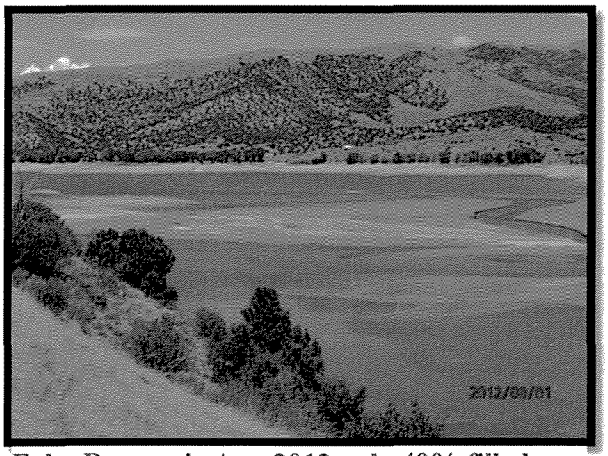
Residential Areas Adjacent to Canal

Similar circumstances led to a disastrous incident in July 1999 when DWCCC's main canal breached in Riverdale, Utah sending thousands of cubic yards of mud and water into a densely populated

residential neighborhood. This event was distressing for the affected community and for water users in DWCCC's service area and devastating for seventy- eight homeowners who were completely flooded by water, mud, and debris. The clean-up effort was extensive, expensive, and the public relations extremely difficult, leaving the Canal Company facing serious financial liabilities. Since that time, the Canal Company has been proactive by implementing its Capital Facilities Plan and rehabilitating its canal system which satisfies the Utah State requirements.

Drought affects in Echo Reservoir September 2012

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 90's and early 2000's. However, extreme concerns exist in the DWCCC service area which causes them to constantly redefine their drought situation on an annual basis. In 2012 and 2013, the snowpack was very light and the Canal Company was forced to start using their storage water as early as May 20th of that year. They received only 40 days of natural flow from the river for the season. This required the company to request that users limit their use very early in the season. At the end of the season in 2013, the Canal Company had only 7,200 AF of storage left. In 2013 the Company cut the irrigation season by 14 days. If the area is in a similar drought situation this year, and the natural flow rights are not available, the Company cannot provide enough water to its users, due to transmission losses.



Echo Reservoir Aug 2012 only 40% filled because of BOR work on the dam

The Canal Company evaluates its drought situations and operational procedures each year which includes its operational procedures. DWCCC gathers data and identifies potential 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 each year comes from natural flow rights, as well as storage rights.

3. Bureau of Reclamation on Echo Reservoir –From June of 2012 to 2014, the Bureau of Reclamation is doing extensive modification work on Echo Reservoir and dam as part of the safety of the dam (SOD). During this work, the Reservoir has been kept to just half of its capacity and the Company's

storage right is reduced by 50% to 90%. This past year the Company felt the impact due to the drought and if it had been a normal water year the work on the Dam would have also been an impact.

Work on the Echo Dam 2012

4. Growth - Within the past 10 years, DWCCC's service area has seen a significant population increase. Davis and Weber Counties are listed as two of the fastest growing counties in Utah. Both of these counties are served by DWCCC. Further evidence of growth is shown in the transition of water used for agriculture purposes to that of residential lawn and garden uses. In 1995, agricultural use was 80% of the water, whereas today the use is 50%. This difference of 30% is converted into outdoor agriculture uses as lawn and garden residential. 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 lease water to others in the service areas which are running short of water based upon drought conditions and water losses from deteriorated liners.

Water Delivery System

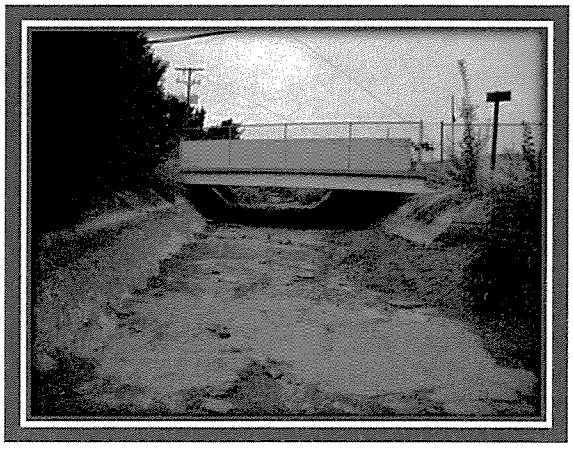
Reservoirs

- East Canyon Reservoir storage 48,000 acre-feet capacity (DWCCC owns 28,000 acre-feet)
- Echo Reservoir storage 74,000 acre-feet capacity (DWCCC owns 40% of this capacity)

Canal System

(See Attachment A for a map of the main canal system)The headworks, river control gates and overflow gates divert water from the Weber River into the DWCCC canal.

- 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.
- The DWCCC canal system consists of 17.2 miles of main canal which is defined as the upper main canal and the lower main canal:


Section of Open Canal in Project Area

» Open Channel – 12.5 miles of trapezoidal concrete-lined channel

» Enclosed – 4.7 miles of pipe or box culvert

» 90 diversion gates and syphons 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 water storage 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 Sub-District with a 125 acre-foot storage reservoir
- 112.4 miles of secondary water distribution piping in the West Point/Clinton System
- 64.8 miles of secondary water distribution piping in the Kaysville/Layton System
- 3.2 miles of secondary water distribution piping in South Weber
- Syracuse Sub-District with three water storage reservoirs that total 106 acre-feet

Renewable Energy and Energy Efficiency

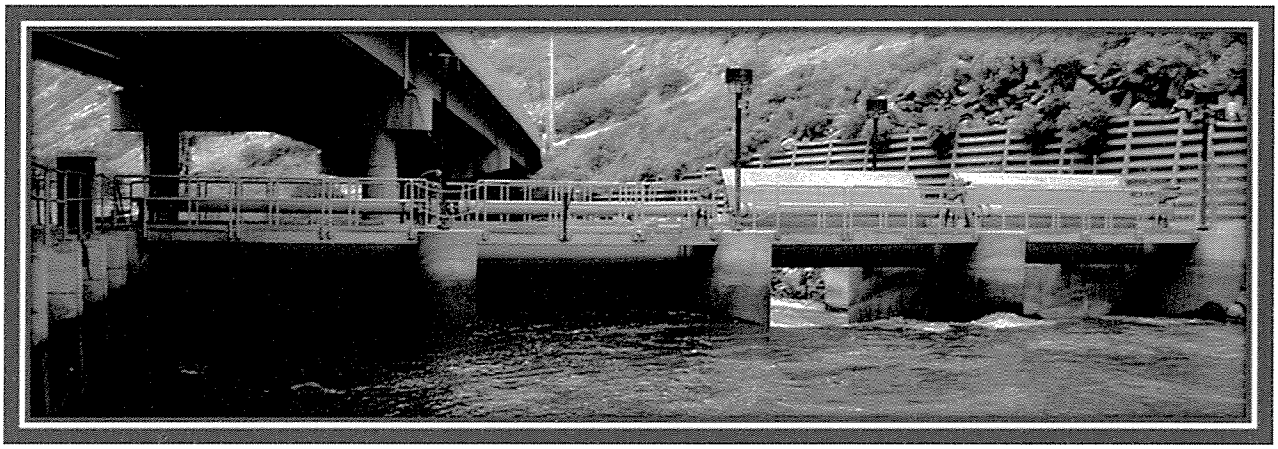
The Canal Company currently has no renewable energy components in its system. The main use of energy is at the office and shop, located in Sunset, Utah, with a power usage of 3,229 kWh at the office and 10,828 kWh at the shop annually. The main river diversion uses 7,440 kWh per annually during the irrigation season. With the development of this project a renewably energy component will be part of the overall DWCCC's system to run the main river diversion.

Relationship with Reclamation

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 of the East Canyon Dam. Reclamation facilities exist in the same Weber River Basin as the 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 14,880 acre-feet.

In 2011, DWCCC received a WaterSMART System Optimization Review (SOR) grant. This Plan was completed earlier this year and has identified the project priorities in their water system. This canal project has been designated as a top priority of the SOR Plan and will assist in accomplishing the goals of the Plan.

In 2009, DWCCC received a $3.6 million matching Challenge Grant in 2009 to replace the forebay channel, river diversion structure and gates, and install 1,300 feet of box culvert in Weber Canyon. The SCADA system was also upgraded to allow for remote operation of the new facilities. That project also included 3,250 feet of two 66" diameter RCP pipes, 500 feet of triple 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 projects.



New Headworks Structure Funded with Challenge Grant Funds

In 2005 the Company received a Water 2025 challenge grant on a water measurement and automation project. This measurement and automation project is highly successful in that it has identified water savings, more accurate measurements and better monitoring, and established faster reaction times and automation in the Canal Company's system.

Technical Project Description

The technical project description should 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 project consists of metering 5 turn-outs on the main canal using Ultrasonic Flow meters or magnetic meter on turn-out pipes ranging from 18" to 36" in diameter. This will allow for improved measurement accuracy which will result in reduced spills and over deliveries. The project also includes replacing 1,000 feet of unlined, open canal with a 66-inch reinforced concrete pipe (RCP) and piping 3,430 feet of a deteriorating concrete lined, open canal with two 72-inch reinforced concrete pipes (RCP). All of this will result in better management and conservation of water. Along with this the project will place two 10kWh small hydro power generation turbines on the main canal allowing the Company to generate 86,400 kilowatt hours (kWh) of power per year.

This project will result in better management of 44,267 acre-feet of water which flows through the project area of the lower main canal, the conservation of 2,680 acre-feet of water, and the generation of 86,400 kWh of renewable energy that can be used by the Canal Company to run their main diversion structure with

the remaining power being sold to Rocky Mountain Power. The outcome of this three-year project will be a quantifiable and sustainable improvement for water management and renewable energy. This project is part of an approved SOR that was approved in October of 2013. Within the SOR a feasibility report was conducted for the Small hydro portion of the project. The FERC permit is estimated to take 3 to 12 months and the company has researched the possibility of qualifying for exemptions from licensing by falling under either the Qualifying Conduit Hydro Power Facility of a Conduit Exemption. The Qualifying Conduit Hydropower Facility is regulated under the Hydropower Regulatory Act of 2013 and is the one DWCCC's project will fall under. The Conduit exemption is authorized for generating capacities 15 megawatts or less for non-municipal and 40 megawatts or less for a municipal project. The conduit has to have been constructed primarily for purposes other than power production and be located entirely on non-federal lands. The conduit/canal was constructed for irrigation purposes and is entirely on non-federal lands. Nor is it within a Reclamation project area. It will be placed within a private canal and the land and canal is owned by DWCCC. See Attachment A, B, and C for maps for the project locations and see Attachment F, SOR Hydro Feasibility information.

The three year estimated project cost is $3,050,210.00 and the funding request from WaterSMART is $1,000,000. The project will begin in September of 2014 and includes the following:

The following is a schedule for each year.

Year 1 September 2014- September 2015

The Year 1 project will include:

- Preparation and approval of the environmental document for the entire project
- Prepare the FERC Permits and Power Sales Agreement
- Design, bid , and construct meters affecting 4 turn-outs along the main canal
- Design and bid the year 2 piping project which includes 2,000 feet of two 72-inch RCP and 1 meter location

Years 2 October 2015- September 2016

Year 2 project will include:

- Constructing 2,000 feet of two 72" RCP and 1 meter location
- Design and bid year 3 piping projects and the small hydro project. The piping project will include 1,430 feet of two 72" RCP and 1,000 feet of 66-inch RCP and placing two small hydro turbines and the required connections.

Year 3 October 2016 – September 2017

The Year 3 project will include:

- Constructing 1,430 feet of two 72" RCP and 1,000 feet of 66-inch RCP and the placing of two small hydro turbines and the required connections.
- Preparing all final and close-out reports

EVALUATION CRITERIA

Evaluation Criterion A - Water Conservation

A.1 Water Conservation

Subcriterion A.1 (a) - Quantifiable Water Savings

Describe the amount of water saved. Estimated amount of water to be conserved (acre feet/year) as a direct result of this project.

The project area within the main canal has 44,267 acre-feet of water that flows through it. It is an open unlined and 90-year old deteriorated concrete lined canal that experience significant water losses due to seepage, root uptake, and failing side walls. With the construction of this project DWCCC will conserve 2,680 acre-feet of water and better manage 44,267 acre-feet of water every year.

» *What is the applicant's average annual acre-feet of water supply?*

The average annual acre-feet of water supply for DWCCC is approximately 70,508 acre-feet (Five-year measured average). Approximately 14,880 acre-feet is 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 eight miles long. Through the main canal 55,628 acre-feet of the 70,508 acre feet travels through the main canal. This project is within the main canal and located in the lower 7.7 miles of canal, through which, 44,267 acre-feet of DWCCC's water travels though.

» *Where is that 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 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, and be made available for new customers and also benefit the fish habitat within the Weber River.

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.*

2013 Water Loss

During the 2013 irrigation season DWCCC monitored the inflow and 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 is within 5% accuracy. DWCCC currently has 4 metered turnouts and 17 unmetered turnouts along the lower portion of the canal. DWCCC purchased portable meters and took daily measurements of all the unmetered turnouts. On monthly intervals these measurements were taken to determine how much water passed through the Roy Flume, how much water went down each turnout, and how much water was lost to the system. The total acre-feet that passed through the Roy Flume in 2013 was 42,389. The amount delivered through each metered gate was 39,687. From these meters we found that we were losing 2,752 acre-feet through the 7.7 miles of the main canal system. The following table shows the results of the system monitoring for 2013.

Table 1 Gate Monitoring 2013

Gates	Water Delivered (Acre-Feet)
WBWCD Roy Pond	1,017
North Flume	690
Roy WCD	7,880
Sunset Res	6,005
Gate 03A	192
Gate 8	259
Gate 11	396
Gate 15	2,031
Gate 16	22
Gate 18	5,142
Gate 19	199
Gate 23E	3,951
Gate 23W	4,084
Gate 24A	136
Gate 25	38
Gate 27	1,405
Gate 30IF	1,558
Gate 30JS	802
Gate 33	181
Layton Res	3,287
West 05 Butler	129

West 05 Kap	233
Totals	**39,637**
Total Water Delivered at Roy Flume	**42,389**
Difference or Water Lost to System	**2,752**

Drought Consideration in Developing the Actual Water Loss

In 2013 the State of Utah was in a major drought and DWCCC and its users were significantly impacted. The irrigation season was cut short by 14 days and the water users were delivered approximately 20% less water in 2013. During the 2013 irrigation season 2,752 acre-feet of water was lost within the system however to get an accurate water loss for a normal irrigation season the drought needs to be take into account.

The normal irrigation season is 183 days. In 2013 it was 169 days or 7.65% shorter. The water losses should be increased by 7.65% to account for the shorter season which gives 2,963 acre-feet for a normal irrigation season. The 2013 drought meant that the shareholders had less water to use.

To better understand the actual water losses of the system a five-year average of water passing through the Roy Flume needs to be considered. The following information needs to be reflected in the account of the water losses to truly understand the genuine water losses:

- Average over five years – 52,852 acre-feet
- In 2013, that amount was 42,389 acre-feet or 19.80% less
- Therefore, the water losses should be increased by 19.80% to account for the drought
- Giving an actual water loss of 3,550 acre-feet for a normal water year

Water Loss of the Canal Per-foot

Below the Roy Flume the main canal has 23,510 feet of unlined or deteriorating liner that the water has to pass through in order to deliver to the DWCCC users. The water loss calculations on a per-foot bases is being distributed equally across the main canal. Given these components the water loss per-foot is as follows: **3,550/23,510 = 0.151 acre-feet per foot**.

Project Water Losses

This project will enclose 4,340 feet of unlined and deteriorated canal within the main canal for a total water savings of 655 acre-feet for the piping portion of this project. **Using a 3% loss for reinforced concrete pipe, the net water savings for the piping portion of the project will be 635 acre-feet.**

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 2013 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 that was lost to the system. There are currently 4 metered turnouts on the canal and 17 unmetered turnouts. DWCCC took daily measurements on all of the unmetered turnouts, using temporary meters, 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 in preparing the calculation of potential water saving in the DWCCC's System Optimization Review that was completed in October 2013.

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 gasket joints will be used which has a loss factor of 3%. Therefore it is determined that the losses will be minimal and have been noted in the calculation for the water loss savings. Data specific information is available if needed however, this is a commonly used material with historical loss information often used by BOR 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?*

Anticipated annual transit loss reductions are estimated to be an average of 3,550 acre-feet for 4.45 miles. This gives a loss of **798 acre-foot per mile**.

e. *How will actual canal loss seepage reductions be verified?*

The actual canal losses will be verified by using the same 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 will be the total lost to the system after the project has been completed. DWCCC this winter will be adding four new permanent meters to the main canal and, as in 2013, all of the other turnouts without a permanent meter will be measured using a portable metering system.

DWCCC will take daily measurements on all of the unmetered turnouts to quantify how much water was passing through these turnouts and the information will be documented and calculated on a monthly bases. This will allow the Company to monitor and measure the impact of the project to the water losses of the system.

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

The pipe for the project will be a 66-inch and 72-inch reinforced concrete pipe with o-ring gasket at each joint to prevent water seepage. Concrete manholes will be used at the connection points as the pipe is connected to exiting pipes within the project area.

3. Irrigation Flow Measurement: *Irrigation flow measurement improvements can provide water savings when improved measurement accuracy results in reduced spills and over-deliveries to irrigators. Applicants proposing municipal metering projects should address the following:*

a. *How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data.*

From 2009 to 2012 DWCCC had an average water loss in their system of 10,507 acre-feet. This is based on a measured inflow at the Roy Flume, 4 permanent meter locations, and 17 unmetered turnouts as shown in the table below.

Table 2 Average Water Loss 2009-2012

	Annual Measurements (Ac-Ft)				
Location	**2009**	**2010**	**2011**	**2012**	**4-Year Average**
Main Canal					
River Diversion	56,219	55,135	56,131	67,656	58,785
Roy Flume Meter	54,791	52,794	51,283	63,423	55,573
Turnouts					
Roy Water Reservoir Turn-out (Meter)	8,547	8,331	8,030	9,433	8,585
Sunset Reservoir Turn-out (Meter)	7,654	6,602	6,863	9,086	7,551
23 East Turn-out (Meter)	4,375	4,270	4,578	5,356	4,645
Church St. Reservoir Turn-out (Meter)	4,620	3,328	3,481	5,715	4,286
All other Turn-outs (Un-metered*)	20,586	20,151	19,893	19,365	19,999
Total all Turn-outs	45,782	42,682	42,845	48,955	45,066
Water Losses					
Main Canal (Roy Flume Meter)	54,791	52,794	51,283	63,423	55,573
Total all Turn-outs	45,782	42,682	42,845	48,955	45,066
Total Lost Water	9,009	10,112	8,438	14,468	10,507

***Un-metered turn-outs are assumed to divert 6 acre-feet per share.**

These losses were due to seepage, root uptake, evaporation, over allocation at turnouts, etc. In 2013 DWCCC purchased a portable meters to help determine the amount of water delivered to the users. Daily measurement of all unmetered turnouts was taken and these turnouts were restricted to the correct flow amounts based in the water share distribution. The seepage and other water losses in 2013 were determined to be to 3,550 acre-feet for a normal water year. Of the 10,507 acre-feet of the 4-year average 3,550 acre-feet is attributed to seepage, root uptake, evaporation, etc. The remaining 6,957 acre-feet is a tribute to an over allocated at the turnouts.

Given that there were 17 unmetered turnouts, this averages to 6,957/17= 409 acre-feet per turnout per year. DWCCC is in the process of adding permanent meters to their turnouts. This project

will fund the construction of 5 meters on existing unmetered turnouts. The water savings with these new meters would be 5 meters x 409 acre-feet per turnout = 2,045 acre-feet per year.

b. *Are flows currently measured at proposed sites and if so what is the accuracy of existing devices? How has the existing measurement accuracy been established?*

Prior to 2013 no measurements were taken at the unmetered turnout locations. During the 2013 irrigation season DWCCC used portable metering devices to measure daily flow distribution. The accuracy of the portable meter is between 10-20% as stated by the manufacturer.

c. *Provide detailed descriptions of all proposed flow measurement devices, including accuracy and the basis for the accuracy.*

Ultrasonic flow meters will be used at the existing turnouts. The turnout configuration will be modified to accept the magnetic meter. The accuracy of the magnetic flow meter is between 1 and 5% depending on manufacturer and installation.

d. *How will actual water savings be verified upon completion of the project?*

The magnetic flow meters will have data loggers that will track the volume of water passed through the meter each day. These flow measurements will be take monthly to calculate the amount of flow passing through the flow meter. These flow volumes will then be compared to the 2009-2012 flow average to verify the actual water savings.

Subcriterion A.1 (b) - Improved Water Management

Describe the amount of water better managed. *For projects that improve water management but which may not result in measurable water savings,* ***state the amount of water expected to be better managed, in acre-feet per year and as a percentage of the average annual water supply.*** *Please use the following formula:*

The Company's average annual water supply is 70,508 acre-feet however the water coming down the main canal, where this project will be located, is 55,628 acre-feet. It was previously indicated that 14,880 acre-feet of the 70,508 annual water supply is diverted directly out of the Weber River to the Summit and Morgan Counties before entering the main canal. Therefore the average annual supply for the main canal is estimated at 55,628 acre-feet.

With these improvements to the canal, DWCCC will successfully better manage approximately 44,267 acre-feet of water that flows through the project area within the lower section of the main canal. Because of the amount of water that flows through this section of canal, DWCCC will see significantly better water management and savings. The improvements will also shorten the time it takes for flows diverted at the river to reach the turn-outs along the canal.

$$\frac{\text{Estimated Amount of Water Better Managed}}{\text{Average Annual Water Supply}}$$

$$\frac{\textbf{44,267 acre-feet}}{\textbf{55,628 acre-feet}} = \textbf{79.6\%}$$

Subcriterion No. A.2.—Percentage of Total Supply

Provide the percentage of total water supply conserved: *State the applicant's total average annual water supply in acre-feet. Please use the following formula:*

$$\frac{\text{Estimated Amount of Water Conserved}}{\text{Average Annual Water Supply}}$$

$$\frac{\textbf{635 acre-feet (piping) + 2,045 acre-feet (meters)}}{\textbf{55,628 acre-feet}} = \textbf{4.8\%}$$

Subcriterion No. A.3.—Reasonableness of Costs

Please include information related to the total project cost, annual acre-feet conserved (or better managed), and the expected life of the improvement. Use the following calculation:

- **Total project cost:**
  $ 3,050,210.00
- **Annual acre-feet conserved (or better managed):**
  44,267 acre-feet will be better managed and 2,680 acre-feet conserved (635 acre-feet for piping and 2,045 acre-feet for meters)

For all projects involving physical improvements, specify the expected life of the improvement in number of years and provide support for the expectation (e.g., manufacturer's guarantee, industry accepted life-expectancy, description of corrosion mitigation for ferrous pipe and fittings, etc.).

- **Expected life of the improvement:** 80 years
- **Support for expectation:**
  The U.S. Army Corps of Engineers in manual No. 1110-2-2902 dated October 31, 1997 gives reinforced concrete pipe a 70 to 100 year life. We have used an improvement life of 80 years. This matches the improvement life use in System Optimization Review that was recently completed on the canal. (Please see Attachment D Product Technical Support)

$$\frac{\text{Total Project Cost}}{\text{(Acre-Feet Conserved, or Better Managed x Improvement Life)}}$$

$$\frac{\textbf{\$3,050,210 (total project cost)}}{\textbf{44,267 acre-feet (better managed) x 80 years (Improvement Life)}} = \textbf{0.86}$$

$$\frac{\textbf{\$3,050,210 (total project cost)}}{\textbf{2,680 acre-feet (conserved) x 80 years (Improvement Life)}} = \textbf{14.2}$$

Evaluation Criteria B: Energy-Water Nexus

Subcriterion No. B.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 approved System Optimization Review for the Davis & Weber Canal included a feasibility study for hydropower generation along the canal. The SOR reviewed two location scenarios for power generation. The one that will be part of this project will include the installation of small hydro power generation in the main canal. These small hydro power generation sites will provide a good source of renewable energy. The two small hydro sites as part of this project is estimated at 20kWh. The calculations are included as part of the SOR and can be found in Attachment E SOR Hydro Feasibility for the small hydro.

Describe the amount of energy generated. *For projects that implement renewable energy systems, state the estimated amount of energy that the system will generate (in kilowatt hours per year). Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate.*

The SOR identified that the small hydro power generation could operate the entire time that the canal in is use from April 15th to October 15th. The turbine would operate for 4,320 hours during this time. The small hydro generator produces 10kW. Each site would generate 43,200 kilowatt hours per year and with two turbines 86,400 kWh will be generated per year. This project is part of an approved SOR that was approved in October of 2013. Within the SOR a feasibility report was conducted for the Small hydro portion of the project. The FERC permit is estimated to take 3 to 12 months and the company has researched the possibility of qualifying for exemptions from licensing by falling under either the "Qualifying Conduit Hydropower Facility" or "Conduit Exemption". The full calculation are included as part of Attachment E SOR Hydro Feasibility for the Small hydro.

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 renewable energy source will operate during the months of the peak electrical energy use and could be used to power DWCCC's river diversion and what is left can be sold back to Rocky Mountain Power. This facility will help reduce the need to use more fossil fuels to meet the energy demands of the Company.

» *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 in Rockport Reservoir which is a Reclamation project. It is unlikely that this project will have any impact in power generation from the Reclamation projects in the area.

» *Anticipated beneficiaries, other than the applicant, of the renewable energy system*

Although this is a small amount of power in the overall scheme of things, the power generated will allow the Company to run its main river diversion gates and have plenty of power to spear so that it can sale it back to Rocky Mountain Power, thus benefiting on a small scale the Wasatch Front. But the old saying "every little bit helps" is true in this case, because it is just the beginning of opportunities for renewable energy for the Company.

» *Expected water needs of the renewable energy system*

The small hydro generator will sit in the main canal and will be operated by the water that flows through the canal to the users. No additional water would be needed to operate the generator and the generator would not use any water.

Subcriterion No. B.2.—Increasing Energy Efficiency in Water Management

If the project is not implementing a renewable energy component, as described in Subcriterion No. B.1 above, up to 4 points may be awarded for projects that address energy demands by retrofitting equipment to increase energy efficiency and/or through water conservation improvements that result in reduced pumping or diversions.

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 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 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 CO^2 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.

» *Please indicate whether you 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 upon 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 there are 6 large automated travelling screens that remove large debris from the canal before entering pressurized pipes. The power generated would help defray 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.*

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. The savings will be in vehicle miles traveled, gasoline consumption, decreased CO^2 pollutants released and 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 CO^2 and social cost of the Carbon based on 3% discount rate per ton and cost of gasoline come from information provided by FHWA Benefits Cost Analysis Resource Guide. Calculation and information for the CO^2 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 3.39 per gallon

  » Assume a Social Cost of Carbon discounted at 3% per ton

  Gasoline savings: Savings of $1,782.00

  Pollution savings: Savings of 10.8 metric tons of CO^2 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 less 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 C: Benefits to Endangered Species

For projects that will directly benefit federally-recognized candidate species, please include the following elements:

1. *What is the relationship of the species to water supply?*

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. After talking with Ben Nadolski from the Utah Department of Wildlife Resources (UDWR), 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. The Company has committed to working with the UDWR and establishing a percentage of the saved water to be released at the critical times when the UDWR feels this could enhance the habitat for the Bonneville Cutthroat Trout and Bluehead Sucker. The Company has indicated that it would negotiate releasing anywhere from 5% to 10% of the water saved

from this project. As they continue to fix the rest of the lower canal they would also work with the UDWR to release a portion of the other water saved. See a letter of support from the UDWR under Letters of Support

Losses within the lower main canal equate to 3,550 acre-feet per irrigation season. The ability to reduce these losses will allow the Company to save the water within the reservoirs and river. This project will lower the losses and will strengthen a working relationship with UDWR, U.S. Fish and Wildlife (USFWS), Utah Division of Natural Resources (UDNR), DWCCC, and Weber River Waters Users Association by following guidance and requirements to allow more water to stay within the Weber River, Echo Reservoir and East Canyon Reservoir allowing for better and beneficial water quality within the each of these.

Based upon information obtained from UDWR, there are recent documented occurrences of the Bonneville Cutthroat Trout within a 2 mile radius of the Weber River in the area near Echo Reservoir. As well as recent occurrences for the bald eagle and bluehead sucker within ½ mile of the Echo reservoir all of which are included on the Utah Sensitive Species List. Although this project does not directly enhance the habitats for the species listed above, it is proven and documented that by allowing for more available water to stay within the habitat areas the species are benefited.

The following are the 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 or 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)

2. *What is the extent to which the proposed project would reduce the likelihood of listing or would otherwise improve the status of the species?*

Low stream flows affect many aspects of the Weber River and Echo reservoir, whether above the headworks of DWCCC or below them. Over the past several years major improvements to the canal system has allowed increased flows and higher water quality within the Weber River. This allows for increased benefits to all listed and non-listed fish species. While it is unknown the effect this project will have on other species besides the Bonneville Cutthroat Trout and the Bluehead Sucker the ability to conserve water and make it available in the Weber River and Echo Reservoir will allow for better flows and take the steps in the right direction to protect and conserve native species. With our relationship with the UDWR we will be establishing a percentage (5% to 10%) of water, saved form this project, which can be deliver to the river at the most critical times or of the year.

For projects that will directly accelerate the recovery of threatened or endangered species or address designated critical habitats, please include the following elements:

(1) How is the species adversely affected by a Reclamation project?

N/A

(2) Is the species subject to a recovery plan or conservation plan under the Endangered Species Act?

Both species are covered by a conservation agreements the State of Utah has entered into with the U.S. Fish and Wildlife Services and the population status of these two sensitive species warrants additional conservation efforts to diminish the likelihood of future listings under the endangered Species Act.

(3) *What is the extent to which the proposed project would reduce the likelihood of listing or would otherwise improve the status of the species?*

This project alone will not reduce the likelihood of listing but it is a step in the right direction. The Company and UDWR are willing to work together to allow for more water to flow at some of the most critical times of the year. This alone could improve the habitat and enhance the continuity of the Weber River.

Evaluation Criterion D: Water Marketing

Briefly describe any water marketing elements included in the proposed project. Include the following elements:

(1) *Estimated amount of water to be marketed*

DWCCC will set aside 10% of the 638 water conserved from the piping project, which is 64 acre-feet of water for new customers. The remaining conserved water will be used to back-up the water right in times of drought with a portion (5% to10%) being used to benefit habitats negotiated with UDWR.

(2) *A detailed description of the mechanism through which water will be marketed (e.g., individual sale, contribution to an existing market, the creation of a new water market, or construction of a recharge facility)*

DWCCC provides pressure irrigation to 5 cities. When development comes in they are required to bring in irrigation water. If waters is not available these properties have the option of purchasing shares, if available for purchase, or contracting for wholesale water through the Weber Basin Water Conservancy District. DWCCC will offer a portion of the conserved water to make available to those property owners located within DWCCC's existing area of service to contract for delivery through the pressure irrigation system. These property owners would all be new customers to DWCCC.

Currently, there is approximately 98 acre-feet of Weber Basin wholesale water delivered to users through the DWCCC system and by making a portion of this conserved water available Weber Basin (Reclamation Project) can then free up water for other uses within their system.

(3) *Number of users, types of water use, etc. in the water market*

The 64 acre-feet could supply lawn and garden irrigation water to approximately 70 new customers. All the water would still be agricultural water and supplied to users through the pressure irrigation system.

(4) *A description of any legal issues pertaining to water marketing (e.g., restrictions under Reclamation law or contracts, individual project authorities, or State water laws)*

Utah State law does not currently allow for water marketing. However, marketing this water to new customers within the existing service areas as described above does not violate any state laws.

(5) *Estimated duration of the water market*

There would be no time limit on the duration of the water market. This conserved water would be treated just as the Weber Basin wholesale water and remain in the system as long as it can be beneficially used.

Evaluation Criterion E: Other Contributions to Water Supply Sustainability

Proposals that thoroughly discuss how a project is addressing an adapatation strategy identified in a Basin Study (i.e., a strategy to mitigate the impacts of water shortages resulting from climate change, drought, increased demands, or other causes) may receive maximum points under this criterion. Applicants should provide as much detail as possible about the relationship of the proposed project to the adaptation strategy identified in the Basin Study, including, but not limited to, the following:

1. *Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project. Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe the water supply or water management issue that this adaptation strategy will address.*

   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 help 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 one addresses Accurate Water Measurement and Accounting. Within this issue the Association has a goal to improve flow measurements and the accounting of water that flows through the system. This project addresses this by implementing metering of all the major turn-outs along the lower canal. This goal also addresses connecting these flow measurements to the existing SCADA systems. DWCCC will also be helping to fulfill this goal by adding all the turn-outs that are being metered as part of the project to its existing SCADA system.

   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. Again this project will help accomplish this by piping and lining an additional miles of pipe through the main canal.

   This plan addresses DWCCC specifically, in supporting the upgrade of DWCCC facilities. It indicates the replacement of the canal within the project areas that this application addresses.

This project will help to fulfill Goal 5 in Section 7 of the plan. (See Attachment F Planning Documents) Within the Plan Goal 5 addresses the support of an upgrade of Davis & Weber Canal Facilities. This goal indicates that DWCCC has made big strides over the past 10 years to do a number of "Capital Improvement" projects. The Plan indicates 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, conserve 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.

Along with this study this project will help meet the challenge of "The Presidents Climate Action Plan" in at least three specific areas that can be designated as "directly meeting the challenge." They are – Conserving Land and Water Resources, Maintaining Agricultural Sustainability, and Leading in Clean Energy.

In the area of Conserving Land and Water Resources the project enhances and implements a strategy that will promote conservations of fresh water resources. This project will conserve 264 acre-feet of water that could then be used in other areas of the system, reservoirs, and Weber River. This will help promote resilience in the fish and wildlife populations as well as implement climate-adaption strategies. This project has a very small impact in the overall scheme of things, but if everyone made even a small change to conserve the nation's natural resources it would begin to make a big difference. The other area that the project will address is maintaining agriculture sustainability. This project directly helps to conserve water resources and develop a better water efficient practice for the Company and its users in the face of drought times and for long term climate changes. This project by conserving the water – again be it small to the overall scheme of things – will make a big difference to the farmers on this system in the drought years.

This project has a clean energy component that will be just the beginning of what DWCCC has planned for their canal system. By placing the small hydro turbines in the canal they will be producing enough energy to run their main headworks and have enough left over to sale to the local power company. This may look like a little fix to a major problem, but again, every little bit helps. As the Company continues to develop hydro power along the entire canal system the final product will be hundreds of thousands of kilowatt hours that will be produces to reduce our nation's dependency on fossil fuels.

Provide a detailed explanation of how the proposed WaterSMART Grant project would help implement the adaptation strategy identified in the Basin Study.

» *Fully describe any other benefits to water supply sustainability that are not described elsewhere in your proposal that will result from this WaterSMART Grant project, for example, if the project will result in further collaboration among Basin Study partners, or demonstrate a new or innovative approach, among other benefits.*

This project will continue to have a relationship with Park City/Snyderville Basin and with Weber Basin Water Conservation District by allowing them to continue to lease water from the

Company. Within the Weber River Basin Plan it indicated that Park City/Snyderville Basin has several water systems that are operating at or near capacity with little or no room to endure emergencies, let alone accommodate new growth. As a result, several independent proposals to import water into the Snyderville Basin and Park City area have been investigated in recent years. One of these proposals is to lease more water. The DWCCC has been leasing to Weber Basin Water Conservancy District 5,000 acre-feet of water for the Park City/Snyderville Basin area and plans to continue to do so.

2. *May be awarded for projects that will help to expedite future on-farm irrigation improvements, including future on farm improvements that may be eligible for NRCS funding. Please address the following:*
   a. *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 especially during times of drought and water shortages. This is also the next big step toward running pressurized secondary pipe lines from the main canal to agriculture lands that can be sprinkler irrigated as opposed to flood irrigated. Some of this is happening already in the laterals from the canal. This project will greatly enhance that effort and increase more efficiency and conservation.

The Company is aware of a few local on 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 about the opportunity to apply for AWP funds:

Name	Ditch	Area
Gail Flinders	15	1300 North Clearfield/Sunset/West Point
Lynn Kirkman	18 & 15	West Point
John Green	23 East	Layton
Golden Waite	23 East	2200 West Layton
Vernon Flint	30	Layton/ Kaysville
Cleve Dibble	23 East	West Layton

   b. *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 potential for the residential neighborhoods that are continually encroaching on the agricultural lands.

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

N/A

d. *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.*

N/A

e. *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.*

N/A

f. *Describe the extent to which this project complements an existing or newly awarded AWEP project.*

N/A

(3) Points may be awarded for projects that include **other benefits** to water supply sustainability.

Projects that do not address a need/adapatation strategy identified in a Basin Study or do not help expedite future on-farm irrigation improvements, may receive maximum points under this criterion by thoroughly explaining additional project benefits. Please provide sufficient explanation of the additional expected project benefits and their significance. Additional project benefits may include, but are not limited to, the following:

a. **Will the project make water available to address a specific concern? For example**:

i. Will the project address water supply shortages due to climate variability and/or heightened competition for finite water supplies (e.g., population growth or drought)? Is the river, aquifer or other source of supply over-allocated?

Utah Division of Water Rights website indicates that Surface waters are generally considered to be fully appropriated in Davis and Weber Counties. New diversions and consumptive uses in these areas must be accomplished through change applications filed on existing rights. Non-consumptive use applications, such as hydroelectric power generation, will be considered on their individual merits.

There is a limited ground-water resource available. New appropriations from the principal aquifer are limited to 1.0 acre-foot per year for fixed-time periods in areas not served by a public supply system. These filings are to connect to public supply systems when they are available. Large projects must be accomplished by change applications on existing rights. Changes from surface to underground sources,

and vice versa, are also considered on their individual merits, with emphasis on their potential to interfere with existing rights and to ensure that there is no enlargement of the underlying rights.

Therefore the Basin is closed for new available rights. This makes it difficult for growing communities in the Basin where DWCCC supplies water. The 2010 Census provides some interesting insights into population growth in Utah and the Weber River Basin water area. According to the Census, two of the four most highly populated counties in Utah are Davis and Weber Counties. Davis County population saw an increase of 28.2% between 2000 and 2010 and Weber County increased by 17.7%.

ii. Will the project market water to other users? If so, what is the significance of this (e.g., does this help stretch water supplies in a water-short basin)?

DWCCC provides pressure irrigation to 5 cities. When development comes in they are required to bring in irrigation water. If waters is not available these properties have the option of purchasing shares, if available for purchase, or contracting for wholesale water through the Weber Basin Water Conservancy District. DWCCC will offer a portion of the conserved water to make available to those property owners located within DWCCC's existing area of service to contract for delivery through the pressure irrigation system. These property owners would all be new customers to DWCCC.

Currently, there is approximately 98 acre-feet of Weber Basin wholesale water delivered to users through the DWCCC system and by making a portion of this conserved water available Weber Basin (a Reclamation Project) can fee up water for other uses in their system.

DWCCC leases water, to other Basins and will continue to do so. Currently the Company leases 5,000 acre-feet of water to the Park City/Snyderville Basin Area, which has a continual water shortage due to excessive growth and a substantial tourism industry. The proposed project will allow more water to be diverted to current users in rapidly growing areas and will allow DWCCC to have the ability to lease additional water to areas that are dealing with shortages such as Park City/Snyderville Basin area that is located in Summit County, which is the 10th largest county in Utah. Summit County is in heightened competition for water and has been over the past decade, as their growth rates have hit all-time highs. Even in the current economic slowdown, this area maintains a high rate of tourism and is considered one of the top ski resort destinations in the world. Summit County ski resorts demand a large amount of water to create a snow-base at the start of each season.

iii. Will the project make additional water available for Indian tribes?

N/A

iv. *Will the project help to address an issue that could potentially result in an interruption to the water supply if unresolved? (e.g., will the project benefit an endangered species by maintaining an adequate water supply)? Are there endangered species within the basin or other factors that may lead to heightened competition for available water supplies among multiple water uses?*

Yes an interruption of water supply could happen due to the deterioration of the current canal. The current lining in these project areas are deteriorated and water is seeping through the canal embankment into backyards and basements of residents which are 5 to 10-feet lower in elevation than the canal. The

seeping water carries fine soils with the water. If enough soil material is lost, voids will occur and potentially breach the canal. A potential breach in this area would be devastating to the water users, farmers, and cities, not to mention the significant impacts to the water supply. If there was such a disruption, DWCCC would be required to reduce the flow to all users, including municipalities, and could not deliver water to the lower eight miles of canal and would not be able to supply water to at least six pressure irrigation reservoirs. There was such an occurrence in the lower portion of the canal in 1999, resulting in heavily damaged property and homes, lost agricultural crops, which caused DWCCC to face serious financial liabilities, and individual liability actions brought on by the impacted local residents.

The Bluehead Sucker is continually in competition for water within the Weber River during the irrigation season. After talking to Ben Nadolski with UDWR he indicated that this last year, with the severe drought conditions, the Bluehead Sucker's habitat was in extreme danger.

v. Will the project generally make more water available in the water basin where the proposed work is located?

Yes, the water savings of 2,680 acre-feet will be available to users in the Weber Basin Drainage.

b. Does the project promote and encourage collaboration among parties?

i. Is there widespread support for the project?

This project has the support of all DWCCC water users, Clearfield City, Sunset City, Syracuse City, West Point City, Layton, Kaysville, South Weber, Riverdale, West Haven, Clinton City, Weber Basin Water Conservancy District, Roy Water Conservancy District, the Utah Board of Water Resources, Weber River Water Users Association, UDWR, and the Utah State Engineer's Office.

ii. What is the significance of the collaboration/support?

The support of the City, State Conservancy District, and the users, the DWCCC can work quickly through the process to construct the project. The project will be completed on property owned by DWCCC.

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

Yes, as mentioned previously, canal deterioration causes seepage and could result in a breach which could flood residential areas and disrupt services. This project will pipe or reconstruct open canal to prevent water losses and a potential breach.

iv. 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, this past two years there has been more tension than usual. Lack of water because of the work at Echo Reservoir, the drought situation (irrigation season shorten by 14 days), and seepage losses within the main canal have brought the tension levels from medium to high.

The tension this year stems from three issues 1) the drought, 2) seepage and other losses, and 3) work on the Echo Reservoir. All of these contributed to limited water availability to the users. This tension will continue and could be far worse if DWCCC does not move forward with this project.

v. 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 or set up sprinkling systems. If they were to enhance their own ditches or develop a sprinkling system they would see their own water savings as well as a potential for a higher crop yield.

c. Will the project increase awareness of water and/or energy conservation and efficiency efforts?

i. Will the project serve as an example of water and/or energy conservation and efficiency within a community?

Yes. The small hydro power generation can be used as an example to other canal companies in the region that do not have a large drop component within their system. They can see that power can be generated within their current canal.

ii. Will the project increase the capability of future water conservation or energy efficiency efforts for use by others?

Yes. DWCCC has plans to incorporate many of these small hydro turbines within their canal system that could produce enough energy to run some of the local farms i.e. pumps, out building, etc.

iii. Does the project integrate water and energy components?

Yes. The project has both a water conservation of 2,680 acre-feet and a renewable energy component of 86,400 kWh.

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, 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. A copy of the project priorities is included in Attachment F Planning Documents. The proposed project is number 2 and 4 on the SOR High Priorities project list. Project number1 is being constructed this winter.

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)

(2) *Identify and describe any engineering or design work performed specifically in support of the proposed project.*

Hydraulics modeling and master planning of this area has been done with the SOR. The project is ready for final design and plan production.

(3) 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 that this project will help to fulfill they have been addressed previously listed in Criterion E.

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.

Subcriterion No. F.2.—Readiness to Proceed

Describe the implementation plan of the proposed project. Estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.

Table 3 Project Schedules for Year 1 - 3

SCHEDULE Year 1 September 2014 –September 2015 *Milestone/Task*	April – Aug 2014	September 2014	October 2014	November 2014	December 2014	January 2015	February 2015	March 2015	April 2015	May 2015	June 2015	July 2015	Aug – Sept 2015
FERC Permit Application/ Power Sales Agreement													
Sign WaterSMART contracts													
Environmental Document													
Metering Design													
Metering Bid													
Metering Award													
Construction													
Piping Project Design													
Piping Project Bid/Award													
Reporting													

SCHEDULE Year 2 October 2015 –September 2016 *Milestone/Task*	October 2015	November 2015	December 2015	January 2016	February 2016	March 2016	April 2016	May 2016	June 2016	July 2016	Aug 2016	September 2016	
Construct Piping Project Designed in Year 1													
Design Piping Project													
Piping Bid													
Piping Award													
Reporting													

SCHEDULE Year 3 October 2016 –September 2017 *Milestone/Task*	October 2016	November 2016	December 2016	January 2017	February 2017	March 2017	April 2017	May 2017	June 2017	July 2017	Aug 2017	September 2017	October 2017
Construct Piping Project Designed in Year 2													
Small Hydro Project													
Final reporting and project close out													

Please explain any permits that will be required, along with the process for obtaining such permits.

A FERC permit will be required for the small hydro generator. An application will be submitted and is expected to take 3 to 12 months to obtain. The Company is anticipating a Qualified Conduit Hydropower Facility permit. No other permits will be required.

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). For more information calculating performance measure, see Section VIII.A.1. "FY2013 WaterSMART Water and Energy Efficiency Grants: Performance Measures".

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 hydro power generations was investigated. The report made some assumptions to estimate the power of free flowing water and on the timeline (April – October) in which the turbines would spin to calculate the amount of kWh that would be generated. The performance measures will use these calculation 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.

Water Savings and/or Better Water Management Performance Measures

The recently completed 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.

Water Savings and/or Better Water Management Performance Measures

Figure 1
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

will be used to measure the actual water saved/better managed after the completion of this project.

An 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. On the 15th of each month 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 Measurements Sheet.

The recently completed 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

Figure 2
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 30IS					
Gate 33					
Layton Res					
West 05 Butler					
West 05 Kap					
Totals					

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

Evaluation Criterion G: Additional Non-Federal Funding

$2,050,210.00 Non-Federal Funding
$3,050,210.00 Total Project Cost

= 67.3%

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 that supplies the canal are 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.

Environmental and
Cultural Resources

Environmental and Cultural Resources

(1) Will the project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)?

Impacts will be those associated with piping the canal and trenching for the conduit for the Small Hydro turbines. 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?

DWCCC is not aware of any issues 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.

DWCCC is not aware of any wetlands in this area however as part of the environmental document, a field survey will be conducted

(4) When was the water delivery system constructed?

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

(5) Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, 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.

This project will placing 5 meters, piping 4,430 feet of a concrete lined and unlined open canal with 66-inch and 72-inch diameter reinforced concrete pipe (RCP) and will adding two 10kW small hydro turbines in the existing canal. The concrete liner and the unlined canal was excavated in the 1920's and both are in very bad condition and need to be piped.

(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.

DWCCC is not aware of any building, structures or features that would qualify. A cultural resource inventory will be conducted as part of the environmental process.

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

DWCCC is not aware of any archeological sites. As part of the environmental document process an archeological inventory will be completed.

(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 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

Required Permits or Approvals

A FERC permit will be required for the small hydro turbines and a power sales agreement will need to be developed and approved with Rocky Mountain Power to sale them the power being produces. From past experience, it is anticipated that it will take 3 to 12 months to obtain the FERC permit. As soon as the awards have been announced DWCCC will prepare the documentation and begin the submission. The forms have been obtained and information gathered to complete the application for the FERC in a timely manner. After talking to Bob Bell with FERC it is anticipated that the Company will be able to file for a "Qualifying conduit hydropower facility" regulated under the Hydropower Regulatory Efficiency Act of 2013" or "Conduit Exemption.

Documents for the power sales agreement have been obtained and information required to complete these will be assembled over the next few months.

Letters of Project Support

Utah Department of Wildlife Resources Ben Nadolski

GARY R. HERBERT
Governor
GREGORY S. BELL
Lieutenant Governor

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

January 16, 2014

Ivan Ray, Manager
Davis & Weber Counties Canal Company
138 West 1300 North
Sunset, Utah 84015

Subject--U.S. Bureau of Reclamation Water and Energy Efficiency Grant

Dear Mr. Ray:

As an Aquatic Habitat Restoration Biologist for the Utah Division of Wildlife Resources, I am pleased to write in support of the grant application you are submitting to the 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 and to work with your partners to identify the best way to use the water savings as a result of this project. Those savings can be used to benefit flows in the Weber River during critical times of the year.

The Bonneville cutthroat trout and the 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. The conservation agreements and strategies stipulate how those measures should be implemented.

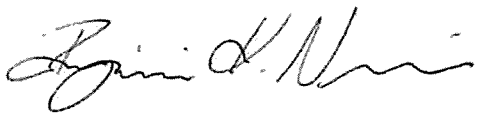
UDWR's approach to aquatic species conservation and management in the Weber River, in part, focuses on reconnecting and maintaining connectivity of priority habitats by removing unnecessary barriers to fish migration, or by modifying existing barriers to allow upstream movement of these species, particularly 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.

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

Thank you for considering the benefits of your actions on these species, and for the opportunity to collaborate with you on this proposal. If you have any questions, please feel free to contact me at (801) 643-4953.

Sincerely,



Benjamin K. Nadolski
Aquatic Habitat Restoration Biologist
Assistant Regional Aquatics Program Manager
UDWR Northern Regional Office

BKN

Official Resolution

Official Resolution

OFFICIAL RESOLUTION

RESOLUTION NO. 2014 - 02

Davis & Weber Counties Canal Company

WHEREAS, The Davis & Weber Counties Canal Company must maintain, provide for, and service the Water System,

WHEREAS, The Company is in need of piping the canal to conserve and better manage the water in its system,

WHEREAS, The Company desires to obtain grant funding from the Bureau of Reclamation through the WaterSMART: Water and Energy Efficiency Grant program

NOW THEREFORE, BE IT RESOLVED that the Board of Directors, agrees and authorizes that:

1. **The WaterSMART: Water and Energy Efficiency Grant application prepared by J-U-B Engineers, Inc. has been reviewed by the Board of Directors and supports the contents therein;**
2. **The Davis and Weber Counties Canal Company is capable of providing the amount of funding specified in the funding plan; and**
3. **If selected for a WaterSMART: Water and Energy Efficiency Grant, the Company will work with the Bureau of Reclamation to meet established deadlines for entering into a cooperative agreement.**

DATED: 1/15/2014

Authorized Signature(s)

ATTEST:

Kaylee Meikle

Project Budget

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:

(a) What project expenses have been incurred?

DWCCC expenses include the cost to prepare the WaterSMART application.

(b) How they benefitted the project

Preparations for application included the water loss analysis and mapping to help prepare the WaterSMART application.

(c) The amount of the expense

$ 3,900.00 Grant Preparation

(d) The date of cost incurrence

December 1, 2013 to January 23, 2014

(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 funding requests 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	**2,050,210.00**
Non-Federal Subtotal	
Other Federal Entities	
N/A	
Other Federal Subtotal	0.00
Requested Reclamation Funding:	**1,000,000.00**
TOTAL PROJECT FUNDING	**3,050,210.00**

Budget Proposal

Funding Sources	Percent of Total Project Cost	Total Cost by Source
Recipient Funding	67%	$ 2,050,210.00
Reclamation Funding	33%	$ 1,000,000.00
Other Federal Funding		$ 00.00
TOTALS	100%	$ 3,050,210.00

Funding Group II			
	Year 1 (FY 2014)	*Year 2 (FY 2015)*	*Year 3 (FY 2016)*
Funding Request	$100,000	$450,000	$450,000

Budget Narrative

Salaries and 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 required.

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

J-U-B Engineers Inc. has been the consultant on this project preparing the cost estimate and grant application. All the services for this project will be on contractual bases. J-U-B has been the designated engineer for DWCCC for over 23 years and has extensive knowledge of the DWCCC canal system. They have been heavily involved and completed the design in all 25 of the canal reconstruction projects that have taken place on the canal since the canal breached in 1999. J-U-B has created the long term capital facilities plan and updates the plan regularly and have already created concept design for this project. An estimated breakdown of the consultant's project costs is below.

Year 1

Design Engineering				$82,140.00
Project Principal		$151.00/HR	16	$2,416.00
Project Manager		$151.00/HR	200	$30,200.00
Project Engineer		$105.00/HR	120	$12,600.00
QA / QC Manager		$199.00/HR	16	$3,184.00
Designer		$82.00/HR	200	$16,400.00
CAD Technician		$82.00/HR	120	$9,840.00

Surveyor		$125.00/HR	60	$7,500.00
Construction Engineering				$5,170.00
Project Principal		$151.00/HR	0	$0.00
Project Manager		$151.00/HR	10	$1,510.00
Designer		$82.00/HR	0	$0.00
CAD Technician		$82.00/HR	10	$820.00
Surveyor		$125.00/HR	0	$0.00
Construction Observer		$71.00/HR	40	$2,840.00

Year 2

Design Engineering				$76,100.00
Project Principal		$151.00/HR	16	$2,416.00
Project Manager		$151.00/HR	160	$24,160.00
Project Engineer		$105.00/HR	120	$12,600.00
QA / QC Manager		$199.00/HR	16	$3,184.00
Designer		$82.00/HR	200	$16,400.00
CAD Technician		$82.00/HR	120	$9,840.00
Surveyor		$125.00/HR	60	$7,500.00
Construction Engineering				$65,496.00
Project Principal		$151.00/HR	16	$2,416.00
Project Manager		$151.00/HR	120	$18,120.00
Designer		$82.00/HR	40	$3,280.00
CAD Technician		$82.00/HR	40	$3,280.00
Surveyor		$125.00/HR	80	$10,000.00
Construction Observer		$71.00/HR	400	$28,400.00

Year 3 This year the only engineering required would be construction engineering because all of the design for this year's project was done in year 2.

Construction Engineering				$77,216.00
Project Principal		$151.00/HR	16	$2,416.00
Project Manager		$151.00/HR	160	$24,160.00
Designer		$82.00/HR	40	$3,280.00
CAD Technician		$82.00/HR	40	$3,280.00
Surveyor		$125.00/HR	80	$10,000.00
Construction Observer		$71.00/HR	480	$34,080.00

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.

In order to determine unit costs which were included in the cost estimate for this project, DWCCC relied upon contract unit prices from their 2009 Challenge Grant that they received from Reclamation. The project was Agreement No. R09AC40R13 for Canal Lining and Forebay Channel and Headworks Replacement-American Recovery and Reinvestment Act of 2009 (Public Law 111-11) (ARRA) and was constructed during 2010 and 2011. The Challenge Grant project included similar canal lining and piping as in this application. This documentation is available upon request.

Environmental and Regulatory Compliance Costs

JUB Engineers will be preparing the following documents: Environmental report, FERC permit, Power sales agreement. The following is the breakdown of the costs:

Year 1

Environmental Compliance				$54,924.00
Project Principal		$151.00/HR	4	$604.00
Project Manager		$151.00/HR	80	$12,080.00
Environmental Scientist		$108.00/HR	300	$32,400.00
Designer		$82.00/HR	80	$6,560.00
CAD Technician		$82.00/HR	40	$3,280.00
FERC Licensing / Power Sale Agreements				$17,560.00
Project Principal		$151.00/HR	20	$3,020.00
Project Manager		$151.00/HR	80	$12,080.00
CAD Technician		$82.00/HR	30	$2,460.00

Year 2 and 3 will not have any cost associated with environmental and permitting.

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 each year for the DWCCC project. **The cost is $3,150.00 per-year and the project engineer has been allowed 30 hours per-year to prepare all the reports at $105.00 per hour. The total over three years for reporting would be $9,450.**

Other Expenses

Legal Counsel to review the contracts, power sales agreement, and advice on the bid process for the entire project is a total of $6,300.

Year 1 – 20 hr. x $175 = $3,500

Year 2 – 8 hr. x $175 = $1,400

Year 3 – 8 hr. x $175 = $1,400

Grant application preparation in only in Year 1 – 30 hr. x $130 hr. = $3,900

Indirect Costs

No, indirect cost will be part of the project.

Total Costs

	DWCCC Portion	Fed Portion
Year 1	$280,439.00	$100,000.00
Year 2	$1,486,278.00	$450,000.00
Year 3	$1,283,493.00	$450,000.00
Total	**$3,050,210.00**	**$1,000,000.00**

BUDGET FORM

Year 1

Budget Item Description		Computation		Total Cost
		Unit	Quantity	
SALARIES AND WAGES		None		
FRINGE BENEFITS		None		
TRAVEL		None		
EQUIPMENT		None		
SUPPLIES/MATERIALS		None		
CONTRACTUAL/CONSTRUCTION				
ENGINEERING				
Design Engineering				$82,140.00
Project Principal		$151.00/HR	16	$2,416.00
Project Manager		$151.00/HR	200	$30,200.00
Project Engineer		$105.00/HR	120	$12,600.00
QA / QC Manager		$199.00/HR	16	$3,184.00
Designer		$82.00/HR	200	$16,400.00
CAD Technician		$82.00/HR	120	$9,840.00
Surveyor		$125.00/HR	60	$7,500.00
Construction Engineering				$5,170.00
Project Principal		$151.00/HR	0	$0.00
Project Manager		$151.00/HR	10	$1,510.00
Designer		$82.00/HR	0	$0.00
CAD Technician		$82.00/HR	10	$820.00
Surveyor		$125.00/HR	0	$0.00
Construction Observer		$71.00/HR	40	$2,840.00
CONSTRUCTION				
MOBILIZATION				$ 6,147.00
Materials				
Bond		1.50%	$100,000.00	$1,500.00
Labor	#			
General Contractor	1	$53.96/HR	20.00	$1,079.00
Senior Project Manager	2	$53.96/HR	20.00	$2,158.00

Truck Driver	2	$22.31/HR	10.00	$446.00
Equipment Operator	1	$41.39/HR	10.00	$414.00
Equipment	#			
Equipment Delivery Truck	1	$55.00/HR	10.00	$550.00
Meters				$103,948.00
Materials				
Concrete		$130.00/CY	14.0 CY	$1,820.00
Reinforcing Steel		$1.20/lb	2,000 lb	$2,400.00
Headgate		$1,800.00/EA	5 ea	$9,000.00
Meter		$5,000.00/EA	5 ea	$25,000.00
Pipe		$50.00/ft	150 ft	$7,500.00
Manhole		$4,000.00/EA	5 ea	$20,000.00
Form Materials		$2.50/ft^2	200 ft^2	$500.00
Foundation Material		$7.50/Ton	20 ton	$150.00
Labor	#			
Senior Project Manager	1	$53.96/HR	20.00	$1,079.00
Excavator Operator	1	$41.39/HR	40.00	$1,656.00
Loader Operator	1	$41.39/HR	40.00	$1,656.00
Hauling Truck Driver	2	$22.31/HR	40.00	$1,785.00
Specialized Labor	4	$22.31/HR	60.00	$5,354.00
General Labor	4	$11.68/HR	80.00	$3,738.00
Equipment	#			
Excavator	1	$88.00/HR	40.00	$3,520.00
Front End Loader	1	$88.00/HR	40.00	$3,520.00
Hauling Truck	2	$55.00/HR	40.00	$4,400.00
Backhoe	1	$55.00/HR	80.00	$4,400.00
Skid Loader	1	$52.00/HR	40.00	$2,080.00
Pick-up Truck	3	$22.00/HR	40.00	$2,640.00
Other	#			
Dumping Fee	1	$12.50/CY	140.0 CY	$1,750.00
ENVIRONMENTAL AND REGULATORY COMPLIANCE				
Environmental Compliance				$54,924.00
Project Principal		$151.00/HR	4	$604.00
Project Manager		$151.00/HR	80	$12,080.00
Environmental Scientist		$108.00/HR	300	$32,400.00
Designer		$82.00/HR	80	$6,560.00
CAD Technician		$82.00/HR	40	$3,280.00
FERC Licensing / Power Sale Agreements				$17,560.00
Project Principal		$151.00/HR	20	$3,020.00
Project Manager		$151.00/HR	80	$12,080.00
CAD Technician		$82.00/HR	30	$2,460.00

REPORTING				$3,150.00
Project Engineer		$105.00/HR	30	$3,150.00
OTHER				$7,400.00
Legal Counsel		$175.00/HR	20	$3,500.00
Grant Preparation		$130.00/HR	30	$3,900.00
TOTAL DIRECT COSTS				**$280,439.00**
INDIRECT COSTS - _%				
TOTAL PROJECT COSTS YEAR 1				**$280,439.00**

Year 2

Budget Item Description		Computation		Total Cost
		Unit	Quantity	
SALARIES AND WAGES				$ -
FRINGE BENEFITS				$ -
TRAVEL		None		
EQUIPMENT		None		
SUPPLIES/MATERIALS		None		
CONTRACTUAL/CONSTRUCTION				
ENGINEERING				
Design Engineering				$76,100.00
Project Principal		$151.00/HR	16	$2,416.00
Project Manager		$151.00/HR	160	$24,160.00
Project Engineer		$105.00/HR	120	$12,600.00
QA / QC Manager		$199.00/HR	16	$3,184.00
Designer		$82.00/HR	200	$16,400.00
CAD Technician		$82.00/HR	120	$9,840.00
Surveyor		$125.00/HR	60	$7,500.00
Construction Engineering				$65,496.00
Project Principal		$151.00/HR	16	$2,416.00
Project Manager		$151.00/HR	120	$18,120.00
Designer		$82.00/HR	40	$3,280.00

CAD Technician		$82.00/HR	40	$3,280.00
Surveyor		$125.00/HR	80	$10,000.00
Construction Observer		$71.00/HR	400	$28,400.00
CONSTRUCTION				
MOBILIZATION				$ 30,133.00
Materials				
Bond		1.50%	$1,100,000.00	$16,500.00
Labor	#			
General Contractor	1	$53.96/HR	60.00	$3,238.00
Senior Project Manager	2	$53.96/HR	60.00	$6,475.00
Truck Driver	2	$22.31/HR	20.00	$892.00
Equipment Operator	1	$41.39/HR	20.00	$828.00
Equipment	#			
Equipment Delivery Truck	2	$55.00/HR	20.00	$2,200.00
REINFORCED CONCRETE PIPE				$1,137,765.00
Materials				
72" Class III RCP		$330.00/FT	2,000.00	$660,000.00
72" Class III RCP Bends		$450.00/FT	48.00	$21,600.00
D&L Supply C-2670		$200.00/EA	3.00	$600.00
Foundation Material		$9.50/Ton	7800 ton	$74,100.00
Pre-Cast Boxes		$14,000.00/EA	3.00	$42,000.00
Labor	#			
Senior Project Manager	1	$53.96/HR	360.00	$19,426.00
Excavator Operator	2	$41.39/HR	360.00	$29,801.00
Loader Operator	1	$41.39/HR	360.00	$14,900.00
Hauling Truck Driver	2	$22.31/HR	360.00	$16,063.00
Specialized Labor	4	$22.31/HR	360.00	$32,126.00
General Labor	6	$11.68/HR	360.00	$25,229.00
Equipment	#			
Excavator	2	$88.00/HR	360.00	$63,360.00
Front End Loader	1	$88.00/HR	360.00	$31,680.00
Hauling Truck	2	$55.00/HR	360.00	$39,600.00
Backhoe	1	$55.00/HR	360.00	$19,800.00
Skid Loader	1	$52.00/HR	360.00	$18,720.00
Pick-up Truck	3	$22.00/HR	360.00	$23,760.00
Other	#			
Dumping Fee	1	$12.50/CY	400.0 CY	$5,000.00
PIPE BACKFILL				$58,144.00
Materials				
Import Backfill Material		$4.50/Ton	2400 ton	$10,800.00
Seed		$4.00/lb	1200 lb	$4,800.00

Labor	#			
Excavator Operator	1	$41.39/HR	80.00	$3,311.00
Loader Operator	1	$41.39/HR	80.00	$3,311.00
Hauling Truck Driver	1	$22.31/HR	100.00	$2,231.00
General Labor	2	$11.68/HR	100.00	$2,336.00
Equipment	#			
Excavator	1	$88.00	80.00	$7,040.00
Front End Loader	1	$88.00	80.00	$7,040.00
Hauling Truck	1	$55.00	100.00	$5,500.00
Skid Loader	1	$52.00	100.00	$5,200.00
Hand Compactors	2	$12.50	100.00	$2,500.00
Pick-up Truck	1	$22.00	100.00	$2,200.00
Seed Spreader	1	$75.00	25.00	$1,875.00
Other	#			
TRANSITION STRUCTURES				$114,090.00
Materials				
Concrete		$130.00/CY	160.0 CY	$20,800.00
Reinforcing Steel		$1.20/lb	24,000 lb	$28,800.00
Water stop		$3.70/ft	500 ft	$1,850.00
Form Materials		$2.50/ft²	500 ft²	$1,250.00
Foundation Material		$7.50/Ton	4 ton	$30.00
Labor	#			
Senior Project Manager	1	$53.96/HR	100.00	$5,396.00
Excavator Operator	1	$41.39/HR	80.00	$3,311.00
Loader Operator	1	$41.39/HR	80.00	$3,311.00
Hauling Truck Driver	1	$22.31/HR	80.00	$1,785.00
Specialized Labor	2	$22.31/HR	160.00	$7,139.00
General Labor	2	$11.68/HR	160.00	$3,738.00
Equipment				
Excavator	1	$88.00/HR	80.0 HR	$7,040.00
Front End Loader	1	$88.00/HR	80.0 HR	$7,040.00
Hauling Truck	1	$55.00/HR	80.0 HR	$4,400.00
Backhoe	1	$55.00/HR	80.0 HR	$4,400.00
Skid Loader	1	$52.00/HR	120.0 HR	$6,240.00
Pick-up Truck	2	$22.00/HR	160.0 HR	$7,040.00
Other	#			
Dumping Fee	1	$6.50/CY	80.0 CY	$520.00
ENVIRONMENTAL AND REGULATORY COMPLIANCE				
REPORTING				$3,150.00

Project Engineer		$105.00/HR	30	$3,150.00
OTHER				$1,400.00
Legal Counsel		$175.00/HR	8	$1,400.00
TOTAL DIRECT COSTS				$1,486,278.00
INDIRECT COSTS - _%				
TOTAL PROJECT COSTS YEAR 2				**$1,486,278.00**

Year 3

Budget Item Description		Computation		Total Cost
		Unit	Quantity	
SALARIES AND WAGES		None		
FRINGE BENEFITS		None		
TRAVEL		None		
EQUIPMENT		None		
SUPPLIES/MATERIALS		None		
CONTRACTUAL/CONSTRUCTION				
ENGINEERING				
Construction Engineering				$77,216.00
Project Principal		$151.00/HR	16	$2,416.00
Project Manager		$151.00/HR	160	$24,160.00
Designer		$82.00/HR	40	$3,280.00
CAD Technician		$82.00/HR	40	$3,280.00
Surveyor		$125.00/HR	80	$10,000.00
Construction Observer		$71.00/HR	480	$34,080.00
CONSTRUCTION				
MOBILIZATION				$ 31,212.00
Materials				
Bond		1.50%	$1,100,000.00	$16,500.00
Labor	#			
General Contractor	1	$53.96/HR	80.00	$4,317.00
Senior Project Manager	2	$53.96/HR	60.00	$6,475.00
Truck Driver	2	$22.31/HR	20.00	$892.00

Equipment Operator	1	$41.39/HR	20.00	$828.00
Equipment	#			
Equipment Delivery Truck	2	$55.00/HR	20.00	$2,200.00
REINFORCED CONCRETE PIPE				$1,023,460.00
Materials				
72" Class III RCP		$330.00/FT	1,240.00	$409,200.00
72" Class III RCP Bends		$450.00/FT	36.00	$16,200.00
66" Class III RCP		$142.00/FT	1,000.00	$142,000.00
66" Class III RCP Bends		$300.00/FT	36.00	$10,800.00
D&L Supply C-2670		$200.00/EA	4.00	$800.00
Foundation Material		$9.50/Ton	6710 ton	$63,745.00
Pre-cast Manholes		$6,000.00/EA	2.00	$12,000.00
Pre-Cast Boxes		$14,000.00/EA	2.00	$28,000.00
Labor	#			
Senior Project Manager	1	$53.96/HR	360.00	$19,426.00
Excavator Operator	2	$41.39/HR	360.00	$29,801.00
Loader Operator	1	$41.39/HR	360.00	$14,900.00
Hauling Truck Driver	2	$22.31/HR	360.00	$16,063.00
Specialized Labor	4	$22.31/HR	360.00	$32,126.00
General Labor	6	$11.68/HR	360.00	$25,229.00
Equipment	#			
Excavator	2	$88.00/HR	360.00	$63,360.00
Front End Loader	1	$88.00/HR	360.00	$31,680.00
Hauling Truck	2	$55.00/HR	360.00	$39,600.00
Backhoe	1	$55.00/HR	360.00	$19,800.00
Skid Loader	1	$52.00/HR	360.00	$18,720.00
Pick-up Truck	3	$22.00/HR	360.00	$23,760.00
Other	#			
Dumping Fee	1	$12.50/CY	500.0 CY	$6,250.00
PIPE BACKFILL				$65,150.00
Materials				
Import Backfill Material		$4.50/Ton	2488 ton	$11,196.00
Seed		$4.00/lb	1500 lb	$6,000.00
Labor	#			
Excavator Operator	1	$41.39/HR	80.00	$3,311.00
Loader Operator	1	$41.39/HR	100.00	$4,139.00
Hauling Truck Driver	1	$22.31/HR	100.00	$2,231.00
General Labor	2	$11.68/HR	120.00	$2,803.00
Equipment	#			
Excavator	1	$88.00	80.00	$7,040.00
Front End Loader	1	$88.00	100.00	$8,800.00

Hauling Truck	1	$55.00	100.00	$5,500.00
Skid Loader	1	$52.00	120.00	$6,240.00
Hand Compactors	2	$12.50	120.00	$3,000.00
Pick-up Truck	1	$22.00	120.00	$2,640.00
Seed Spreader	1	$75.00	30.00	$2,250.00
Other	#			
TRANSITION STRUCTURES				$27,629.00
Materials				
Concrete		$130.00/CY	30.0 CY	$3,900.00
Reinforcing Steel		$1.20/lb	4,500 lb	$5,400.00
Water stop		$3.70/ft	200 ft	$740.00
Form Materials		$2.50/ft²	200 ft²	$500.00
Foundation Material		$7.50/Ton	4 ton	$30.00
Labor	#			
Senior Project Manager	1	$53.96/HR	40.00	$2,158.00
Excavator Operator	1	$41.39/HR	20.00	$828.00
Loader Operator	1	$41.39/HR	20.00	$828.00
Hauling Truck Driver	1	$22.31/HR	20.00	$446.00
Specialized Labor	2	$22.31/HR	40.00	$1,785.00
General Labor	2	$11.68/HR	40.00	$934.00
Equipment				
Excavator	1	$88.00/HR	20.0 HR	$1,760.00
Front End Loader	1	$88.00/HR	20.0 HR	$1,760.00
Hauling Truck	1	$55.00/HR	20.0 HR	$1,100.00
Backhoe	1	$55.00/HR	20.0 HR	$1,100.00
Skid Loader	1	$52.00/HR	40.0 HR	$2,080.00
Pick-up Truck	2	$22.00/HR	40.0 HR	$1,760.00
Other	#			
Dumping Fee	1	$6.50/CY	80.0 CY	$520.00
Small Hydro Power Generation				$54,276.00
Materials				
10kW Turbine Generator		$20,000.00/EA	2 ea	$40,000.00
Copper Wire		$2.00/ft	300 ft	$600.00
2" Conduit		$6.00/ft	300 ft	$1,800.00
Electrical Meter		$2,000.00/EA	1 ea	$2,000.00
Labor	#			
Senior Project Manager	1	$53.96/HR	20.0 HR	$1,079.00
Loader Operator	1	$41.39/HR	10.0 HR	$414.00
Hauling Truck Driver	1	$22.31/HR	10.0 HR	$223.00
Specialized Labor	2	$22.31/HR	20.0 HR	$892.00

General Labor	2	$11.68/HR	20.0 HR	$467.00
Electrician	2	$42.39/HR	40.0 HR	$3,391.00
Equipment				
Hauling Truck	1	$55.00/HR	10.0 HR	$550.00
Backhoe	1	$55.00/HR	20.0 HR	$1,100.00
Pick-up Truck	2	$22.00/HR	40.0 HR	$1,760.00
ENVIRONMENTAL AND REGULATORY COMPLIANCE				
REPORTING				$3,150.00
Project Engineer		$105.00/HR	30	$3,150.00
OTHER				$1,400.00
Legal Counsel		$175.00/HR	8	$1,400.00
TOTAL DIRECT COSTS				**$1,283,493.00**
INDIRECT COSTS - _%				
TOTAL PROJECT COSTS YEAR 3				**$1,283,493.00**

Attachment A

Davis and Weber Canal Company

Geographic Location & Project By Year
Attachment A

Riverdale
Roy
Washington Terrace
South Ogden
Uintah
Sunset
South Weber
Hill Air Force Base
Clearfield
Layton

Year 2 Canal Piping
Year 1 3A Install New Metered Turnout
Year 3 Canal Piping
Year 3 Hydropower Location
Year 1 19 Install New Metered Turnout
Year 1 24A Install New Metered Turnout
Year 1 27 Install New Metered Turnout
Year 3 Canal Piping
Year 1 33R Install New Metered Turnout

Legend

Project year

- Year 1
- Year 2
- Year 3
- Existing Pipe
- City Boundaries

Feet
0 3,500 7,000

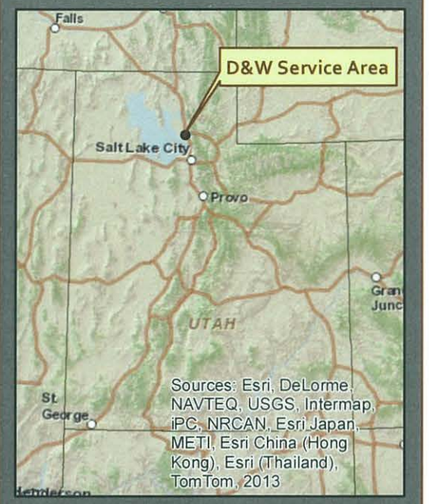
J·U·B ENGINEERS, INC.

GATEWAY MAPPING INC.
a J·U·B Company

Davis and Weber Canal Company

Piping Project Location Map

Attachment B



Year 2 Canal Piping Project Area

Year 3 Canal Piping Project Area

IROQUOISE ST

GUM ST

2ND ST

N ASPEN AVE

S 1550 W

NB 15 5600 S

S I15

5600 S SB 15

S NB 15

S SB 15

N NB 15

N SB 15

S 1900 W

N MAIN ST

W 5600 S

W 6000 S

W 2650 N

W 2575 N

W 2525 N

N 100 W

N 140 W

N 160 W

N 175 W

Legend

- Year 2 - Canal Piping Project Area
- Year 3 - Canal Piping Project Area
- Existing Canal
- STREET
- City Boundaries

0 400 800 Feet

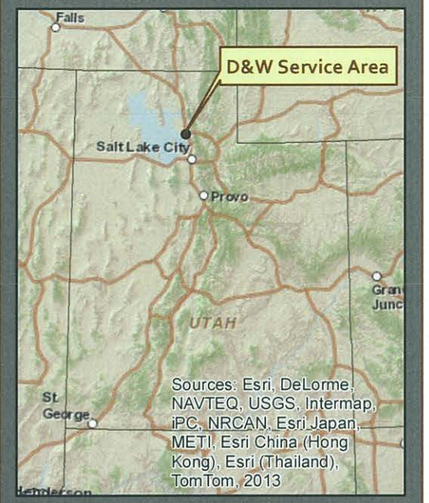
J·U·B ENGINEERS, INC.

GATEWAY MAPPING INC.
A J-U-B Company

Davis and Weber Canal Company

Piping Project Location Map

Attachment B1



Year 3 Canal Piping Project Area

W 2475 N
W 2450 N
E 2450 N
W 2400 N
W 2350 N
E 2350 N
N 125 W
W 2350 N
N 10 W
W 2300 N
E 2300 N
N 75 E
W 2250 N
N 50 W
E 2250 N
W 2200 N
E 2200 N
W 2150 N
E 2150 N
N 5 E
N FORT LN
N HILLFIELD RD
N EVANS COVE LOOP
W 2000 N
E 2000 N
N 200 W
N 150 W
N 50 W
E 1930 N
N 80 E
W 1900 N
N 350 W
W 1925 N
W 1900 N
N 25 E
N 285 W
W 1850 N
N 225 W
N 75 E
N 350 W
N CLARK DR
E 1800 N
N 175 E
N 225 E
W 1775 N
N 250 W
E 1770 N
W PAUL AVE

Legend

- STREET
- Year3 - Canal Piping Project Area
- Existing Canal
- City Boundaries

0 400 800 Feet

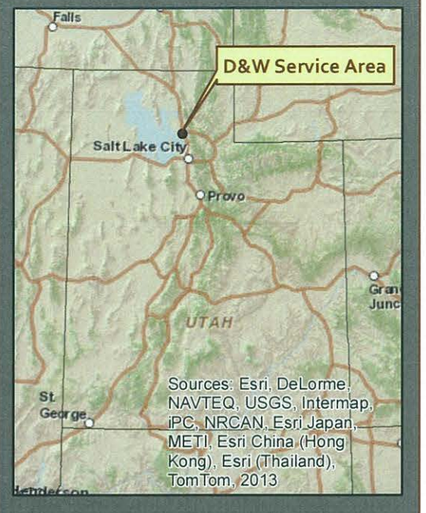
J·U·B ENGINEERS, INC.

GATEWAY MAPPING INC.
a J-U-B Company

Davis and Weber Canal Company

Hydropower Project Location Map

Attachment C



Legend

- 3 Phase Power Line
- Existing Canal

0 100 200 Feet

J·U·B ENGINEERS, INC.

GATEWAY MAPPING INC.
a J-U-B Company

Attachment D

Chapter 1
Introduction

1-1. Purpose and Scope

This manual provides (a) guidance on the design and construction of conduits, culverts, and pipes, and (b) design procedures for trench/embankment earth loadings, highway loadings, railroad loadings, surface concentrated loadings, and internal/external fluid pressures.

1-2. Applicability

This manual applies to HQUSACE elements and USACE commands, districts, laboratories, and field operating activities having civil works responsibilities.

1-3. References

The references listed in Appendix A contain accepted methods to design conduits, culverts, and pipes which may be used when specific guidance is not provided in this manual. Related publications are also listed in Appendix A.

1-4. Life Cycle Design

a. General. During the design process, selection of materials or products for conduits, culverts, or pipes should be based on engineering requirements and life cycle performance. This balances the need to minimize first costs with the need for reliable long-term performance and reasonable future maintenance costs.

b. Project service life. Economic analysis used as a part of project authorization studies usually calculates costs and benefits projected for a 50- or 75-year project life. However, many USACE projects represent a major infrastructure for the Nation, and will likely remain in service indefinitely. For major infrastructure projects, designers should use a minimum project service life of 100 years when considering life cycle design.

c. Product service life. Products made from different materials or with different protective coatings may exhibit markedly different useful lives. The service life of many products will be less than the project service life, and this must be considered in the life cycle design process. A literature search (Civil Engineering Research Foundation 1992) reported the following information on product service lives for pipe materials. In general, concrete pipe can be expected to provide a product service life approximately two times that of steel or aluminum. However, each project has a unique environment, which may either increase or decrease product service life. Significant factors include soil pH and resistivity, water pH, presence of salts or other corrosive compounds, erosion sediment, and flow velocity. The designer should investigate and document key environmental factors and use them to select an appropriate product service life.

(1) Concrete. Most studies estimated product service life for concrete pipe to be between 70 and 100 years. Of nine state highway departments, three listed the life as 100 years, five states stated between 70 and 100 years, and one state gave 50 years.

(2) Steel. Corrugated steel pipe usually fails due to corrosion of the invert or the exterior of the pipe. Properly applied coatings can extend the product life to at least 50 years for most environments.

(3) Aluminum. Aluminum pipe is usually affected more by soil-side corrosion than by corrosion of the invert. Long-term performance is difficult to predict because of a relatively short history of use, but the designer should not expect a product service life of greater than 50 years.

(4) Plastic. Many different materials fall under the general category of plastic. Each of these materials may have some unique applications where it is suitable or unsuitable. Performance history of plastic pipe is limited. A designer should not expect a product service life of greater than 50 years.

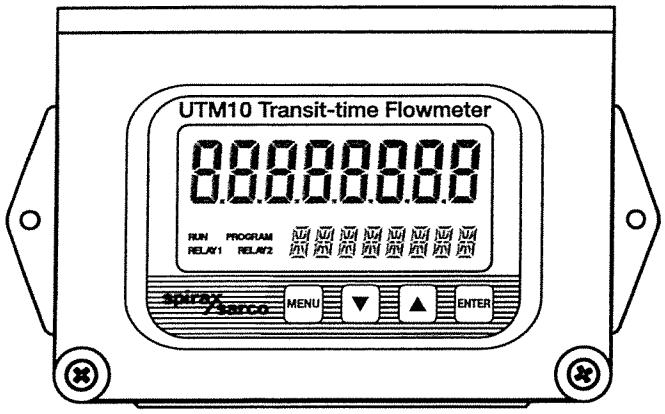
d. Future costs. The analysis should include the cost of initial construction and future costs for maintenance, repair, and replacement over the project service life. Where certain future costs are identical among all options, they will not affect the comparative results and may be excluded from the calculations. For example, costs might be identical for normal operation, inspection, and maintenance. In this case, the only future costs to consider are those for major repairs and replacement. Where replacement will be necessary during the project service life, the designer must include all costs for the replacement activities. This might include significant costs for construction of temporary levees or cofferdams, as well as significant disruptions in normal project operations.

Clamp-On Ultrasonic Flow and Energy Meter for Liquids

Description

UTM10 ultrasonic flow and energy meters clamp onto the outside of pipes and do not contact the internal liquid. The technology has inherent advantages over alternate devices including: low-cost installation, no pressure head loss, no moving parts to maintain or replace, no fluid compatibility issue, and a large, bi-directional measuring range that ensures reliable readings even at very low and high flow rates. UTM10 is available in a variety of configurations that permit the user to select a meter with features suitable to meet particular application requirements.

The UTM10 is available in two versions: a stand-alone flow meter, and an energy flow meter used in conjunction with dual clamp-on RTDs. The energy flow meter measures energy usage in BTU, Tons, kJ and Wh and is ideal for retrofit, chilled water and other HVAC applications.



Features

- May be used to measure clean liquids as well as those with small amounts of suspended solids or aeration (e.g., surface water, sewage).
- Bi-directional flow measurement system. Totalizer options include forward, reverse and net total.
- Modbus RTU over RS485 communications; Ethernet connection includes BACNet®/IP, EtherNet/IPTM and Modbus TCP/IP protocols.
- Large, easy-to-read digital display.
- Rugged, aluminum enclosure ensures a long service life in harsh environments.
- Certified for hazardous area installation in North America and Europe.

Benefits

- Reduced material costs: clamp-on sensor eliminates the need for in-line flanges, pipe fittings, strainers, and filters.
- Reduced installation time: the UTM10 may be installed and fully operational within minutes.
- Reduced maintenance costs: with no moving parts, there is nothing on the UTM10 to wear down – no repair kits or replacement parts are needed.
- No need to shut down the process for installation or maintenance due to clamp-on sensor design.

Clamp-On Ultrasonic Flow and Energy Meter for Liquids

Specifications

System

Liquid Types	Most clean liquids or liquids containing small amounts of suspended solids or gas bubbles
Velocity Range	Bi-directional to 40 FPS (12 MPS)
Flow Accuracy	UTT10-050S/050L/050H: ± 1% of rate at flows > 1 FPS; ± 0.01 FPS (0.003 MPS) at flows < 1 FPS (0.3 MPS) UTT10-025S - UTT10-040S:1" (25 mm) and larger ± 1% of rate from 4 to 40 FPS (1.2 to 12 MPS); ± 0.04 FPS (0.012 MPS) at rates < 4 FPS (1.2 MPS) UTT10-015S - UTT10-020S: ± 1% Full Scale
Temperature Accuracy (Energy Meters Only)	Option 1: 32-122 °F (0-50 °C); Absolute: 0.22 °F (0.12 °C) Difference: 0.09 °F (0.05 °C) Option 2: 32-212 °F (0-100 °C); Absolute: 0.45 °F (0.25 °C) Difference: 0.18 °F (0.1°C) Option 3: -40-350 °F (-40-177 °C); Absolute: 1.1 °F (0.6 °C) Difference: 0.45 °F (0.25 °C)
Sensitivity	**Flow:** 0.001 FPS (0.0003 MPS) **Temperature:** Option 1: 0.03 °F (0.012 °C); Option 2: 0.05 °F (0.025 °C); Option 3: 0.1 °F (0.06 °C)
Repeatability	0.5% of reading
Installation Compliance	General Safety: UL 61010-1, CSA C22.2 No. 61010-1 and EN 61010-1 Hazardous Location: Class I Division 2 Groups C,D; Class II and III, Division 2, Groups C, D, F, and G for US/CAN; ATEX II 2 G Ex nA II T4: UL 1604, CSA 22.2 No. 213, EN 60079-0 and EN 60079-15 CE: EN61326-1:2006 on meter systems with integral flow transducers, transducers constructed with twinaxial cable or remote transducers with conduit

Transmitter

Power Requirements	AC: 95-264 VAC 47-63 Hz @ 17 VA max. DC: 10-28 VDC @ 5 VA max. Protection: auto resettable fuse, reverse polarity and transient suppression
Display	Two line LCD, LED backlit; Top row 0.7 inch (18mm) height, 7-segment; Bottom row 0.35 inch (9 mm) height, 14-segment Icons: RUN, PROGRAM, RELAY1, RELAY2 Flow rate indication: 8-digit positive, 7-digit negative max.; auto decimal, lead zero blanking Flow accumulator (totalizer): 8-digit positive, 7-digit negative max. (reset via keypad press, USP, network command or momentary contact closure)
Enclosure	Type 4 (IP65) Construction: powder-coated aluminum, polycarbonate, stainless steel, polyurethane, nickel-plated steel mounting brackets Size (electronic enclosure only): 6.0" W x 4.4" H x 2.2" D (152 mm W x 112 mm H x 56mm D) Conduit Holes: (2) ½" NPT female; (1) ¾" NPT female; Optional Cable Gland Kit
Temperature	-40 °F to +185 °F (-40 °C to +85 °C)
Configuration	Via optional keypad or PC running USP software (Note: not all configuration parameters are available from the keypad – i.e. flow and temperature calibration and advanced filter settings)
Engineering Units	**Flow Meter:** Feet, gallons, cubic feet, million gallons, barrels (liquor and oil), acre-feet, lbs., meters, cubic meters, liters, million liters, kg **Energy Meter:** BTU, MBTU, MMBTU, Tons, kJ, kWh, MWh and the Flow Meter list from above
Inputs/Outputs	**USB** 2.0: for connection of a PC running USP configuration utility **RS485:** Modbus RTU command set **10/100 Base-T:** RJ45, communication via Modbus TCP/IP, EtherNet/IP™ and BACnet®/IP **4-20mA:** 12-bit, internal power, can span negative to positive flow/energy rates **Flow Meter Model Only:** 0-1,000 Hz:open-collector, 12-bit, can span negative to positive rates; square-wave or turbine meter simulation outputs **Two Alarm Outputs:** open-collector, configure as rate alarm, signal strength alarm or totalizer pulse

Transducers

Type	Compression mode propagation, clamp-on
Construction	UTT10-050S/050L: NEMA 6 (IP 67), CPVC, Ultem®, Nylon cord grip, PVC cable jacket; -40 to 250°F (-40 to 121°C) UTT10-015S - UTT10-040S: NEMA 6 (IP 67), CPVC, Ultem®, Nylon cord grip, PVC cable jacket; -40 to 250°F (-40 to 121°C) UTT10-050S/050L: NEMA 6P (IP 68) option, CPVC, Ultem®, Nylon cord grip, Polyethylene cable jacket; -40 to 250°F (-40 to 121°C) NEMA6: Submersible to a depth of 3ft (1m) for 30 days max. NEMA6P: Submersible to a depth of 100ft (30m) indefinitely
Frequency	UTT10-015S - UTT10-040S: 2 MHz UTT10-050S/050H: 1 MHZ UTT10-050L: 500 KHz
Cables	RG59 Coaxial, 75 ohm or Twinaxial, 78 ohm (optional armored conduit)
Cable Length	990 feet (300 meter) max. in 10 ft. (3 m) increments
RTDs	**Energy Meters Only:** Platinum 385, 1,000 ohm, 3-wire; PVC jacket cable
Installation	**DTT10-050S (S option)/050L/050H:** General and Hazardous Location (see Installation Compliance) **DTT10-050S and IS Barrier (F option):** "Class I Div I, Groups C&D T5 Instrinically Safe Exia;" "CSA C22.2 No.'s 142 & 157, UL 913 & 916"

Software Utilities

USP	Utilized to configure, calibrate and troubleshoot Flow and Energy meters. Connection via USB A/B cable; software is compatible with Windows 95, Windows 98, Windows 2000, Windows XP, Windows Vista® and Windows® 7
EnergyLink	Utilized to monitor a network of Flow and Energy meters. Connection via RS485. Operates within Microsoft Excel®2003 and Microsoft Excel®2007.

Attachment E

EXECUTIVE SUMMARY

As an important part of the SOR Master Plan for the Davis and Weber Counties Canal Company (DWCCC), J-U-B ENGINEERS, Inc. (J-U-B) has been investigating the hydroelectric power generation potential and financial feasibility for sites along the upper 9-mile segment of the canal system. One site studied was the existing Riverdale Penstocks location. The other "site" studied was not so much a study of a specific "site" as it was a study of a specific emerging hydroelectric technology which could be applied to several sites along the canal. Each case study is described in greater detail within this Report.

For the Riverdale Penstocks site, gross and net head were developed based upon best available elevation data or upon project design data from past canal improvement projects. River flow information was gathered from the USGS Stream Gauging Station at Gateway just a couple of miles upstream from the DWCCC Canal Headworks Structure. The river flow information included daily flow data for the period from 1921 to 2012, with 25th, 50th, 75th and 95th percentile calculations of daily flows for each day of the year. Minimum canal flow requirements were provided by DWCCC records and staff.

Using the calculated maximum canal flow available for power generation for two-week periods at a time throughout the year and the net head available at the site, power generation estimates were calculated.

Once the power generation estimates were calculated for this site, feasibility-level Opinions of Probable Costs were prepared, expected utility rates were identified as published by Rocky Mountain Power Company, and the expected annual gross revenue from power sales was calculated. The gross revenue was then reduced by the estimated annual debt service on a loan to pay 100% of the capital costs of the project and the estimated annual operation and maintenance (O&M) costs for the facility. This resulted in a feasibility-level estimated net revenue for the project and an anticipated return-on-investment period.

The existing Riverdale Penstocks location appears to have excellent hydroelectric power generation feasibility. This seems like an obvious conclusion for a site which functioned as a hydroelectric generation site for Utah Power and Light for several decades. Although there are still a few questions to be answered, the feasibility-level projected net revenue for this site is estimated to be $234,000 per year with a return-on-investment period of approximately 14½ years. While this return-on-investment period may not be short enough to satisfy private energy investors, it does present the positive potential for an additional revenue stream to DWCCC to help offset the power costs throughout their canal system.

The other case study involved the study of micro-hydro power potential along the canal, which is referred to in this report as "Small Hydro and/or Hydrokinetic" power potential. Small Hydro and/or Hydrokinetic power is energy that is available in fast-flowing, open channel water such as rivers and canals. The energy potential increases exponentially as the velocity of the water increases. Thus, faster currents have much more power generating potential.

Following the development of power generation estimates and associated Opinions of Probable Cost, the use of Small Hydro and/or Hydrokinetic generation along the DWCCC Canal does not appear to be a profitable investment. The annual costs for debt service and O&M are estimated to be slightly greater than the estimated annual gross revenue from power generation.

This is an emerging technology. As more and more sites are developed, more manufacturers will become part of the industry and the costs for the equipment will eventually come down. In the meantime, Small Hydro and/or Hydrokinetic power equipment appears to be most applicable to sites with much higher flow velocities than those available on the DWCCC Canal.

It is recommended that DWCCC continue the detailed analysis of the Riverdale Penstocks site with the intent that this site will become a functioning hydroelectric power generation facility, barring any currently unforeseen, insurmountable obstacles.

BACKGROUND

The intent of this Feasibility Report is to evaluate and present the technical, financial, and permitting feasibility for potential hydroelectric power generation along the Davis and Weber Counties Canal Company (DWCCC) canal system in northern Utah.

The canal system for DWCCC originates near the mouth of Weber Canyon near the city of South Weber in Davis County, Utah. The construction of the canal began in Weber Canyon in 1881 by the Central Canal Company. DWCCC was founded in 1884 and took over the construction, operation, maintenance and ownership of the canal from the Central Canal Company. DWCCC has successfully managed the canal up to the present day. DWCCC provides irrigation water for agricultural and residential use in portions of Davis and Weber Counties. Irrigation water for the system is diverted from the Weber River in Weber Canyon and is transported to water users all along its 17.22-mile main canal route.

The two sites included in this study are identified as:

- Existing Riverdale Penstocks Site
- General Sites along the Canal for Small Hydro and/or Hydrokinetic Power Generation

The primary objectives of the Feasibility Study were as follows:

1. Develop a feasibility-level gross head assessment for each site.
2. Research and verify probable annual average river and canal flow rates at each site.
3. Identify permits and agreements that must be completed with the Federal Energy Regulatory Commission (FERC), Rocky Mountain Power (RMP), and other stakeholders.
4. Determine probable penstock size and materials for each site.
5. Evaluate project head-loss for each site and develop estimated net head at the turbine for each site.
6. Size a feasibility-level turbine and generator for each site.
7. Request/obtain equipment cost estimates from reputable manufacturers.
8. Develop feasibility-level opinions of probable cost for each site.
9. Evaluate financing options for the facilities.
10. Develop feasibility-level energy production estimates for each site.
11. Develop revenue expectations given a typical power purchase agreement.
12. Determine a feasibility-level "return-on-investment" period for each site.
13. Compile the above information for each site and provide recommendations.

1. General Sites along the Canal for Small Hydro and/or Hydrokinetic Power Generation

Over the past few years, DWCCC has been learning about other canal companies that have taken advantage of the available head differentials (10 feet or so) at existing drop structures to generate power. In order to use the available potential kinetic energy, the canal companies have piped their canals around the drop structures and run the canal flow through fabricated micro turbines to produce on-site power. It appears that this has proven to be successful where these types of head and flow configurations are available at a drop structures. Unfortunately, the DWCCC canal does not have drop structures like the ones where micro turbines are being used most effectively.

As part of this Feasibility Study, J-U-B was tasked with investigating the micro hydro power potential along the canal. Due to the limited available head along the canal system, J-U-B has studied the possibility of power generation using "Small Hydro and/or Hydrokinetic" power. Small Hydro and/or Hydrokinetic power is energy that is available in fast-flowing, open channel water such as rivers and canals. The energy potential increases exponentially as the velocity of the water increases. Thus, faster currents have much more power generating capabilities.

For much of the information used in this study, J-U-B has relied upon published data from a company named "Hydrovolts" which appears to be one of the current leaders in the development of this emerging technology. Hydrovolts literature includes formulas for calculating the power potential for given site conditions as well as estimated capital costs and maintenance costs for their specific equipment.

Power Potential

J-U-B studied two possible locations for Small Hydro and/or Hydrokinetic power generation along the canal. One location would be inside of the concrete box culvert near the mouth of Weber Canyon where velocities are highest and access to the existing power grid is close by. The second location would be just downstream of the box culvert in the same location, but in the open canal channel. Again, the power grid is easily accessible.

From the Hydrovolts literature, to estimate the power of free flowing water at any site, the following information is needed and calculations performed:

Estimate the cross-sectional Area (A) of the flow in square meters
Estimate the Velocity (V) in meters per second
The Total Stream Power (TSP) in kilowatts = $A \times 0.5 \times V^3$
Generation Power = TSP x 60% (for a general estimate of the power available)

According to Hydrovolts, not more than 15% to 30% of the power in an open stream can be extracted without significantly affecting the whole stream for some distance in the flow. If it is a canal and most of the flow can go through the turbine, the efficiency can reach 60%. We have assumed 60% efficiency in our study.
For the box culvert location where velocities reach 6 feet per second, the Total Stream Power (TSP) is calculated to be 12.5 kW. 60% of that figure yields power generation of 7.5 kW.

For the open channel locations with velocities around 3 feet per second, the Total Stream Power (TSP) is calculated to be 5 kW. 60% of that figure yields power generation of 3.0 kW.

Revenue Annual Power Generation
In order to determine the annual power generation from these sites, we have assumed that the turbines would spin continuously from April 15th through October 15th. This represents 4,320 hours. As noted previously in this study, the rates for avoided cost purchases paid by Rocky Mountain Power for this generated power include $0.0477 per kilowatt-hour for production and $10.35 per kilowatt per month for the generating "capacity" that is available at the site.

Because the only data available from Hydrovolts on the cost for the Small Hydro and/or Hydrokinetic equipment is for a 10kW unit, we have used that size of a turbine/generator in order to determine the estimated annual gross revenue for the most productive site in our study, the box culvert site. For the box culvert site, the estimated gross revenue from power generation is $2,716 per year.

Period	Total Power Output kW	Period Generator Output kWh	Levelized Capacity $10.35 /kW-mont	Energy Price $0.0477 $/kWh
January			$0	$0
February			$0	$0
March			$0	$0
April 16 - April 30	10	3,600		$172
May 1 - May 15	10	3,600	$104	$172
May 16 - May 31	10	3,840		$183
June 1 - June 15	10	3,600	$104	$172
June 16 - June 30	10	3,600		$172
July 1 - July 15	10	3,600	$104	$172
July 16 - July 31	10	3,840		$183
Aug. 1 - Aug. 15	10	3,600	$104	$172
Aug. 16 - Aug. 31	10	3,840		$183
Sept. 1 - Sept. 15	10	3,600	$104	$172
Sept. 16 - Sept. 30	10	3,600		$172
Oct. 1 - Oct. 15	10	3,600	$104	$172
November			$0	$0
December			$0	$0
		Sub-Totals	$621	$2,095
Total Estimated Revenue from Power Sales				**$2,716**

Capital Costs

There are several things to consider in the capital costs associated with a Small Hydro and/or Hydrokinetic power facility. These are listed in the table below, along with assumptions regarding several of the estimated costs. It should be noted that this is for a standalone site. If this is incorporated into a project that has an approved environmental document, the licensing may be much less. Also the FERC and power sales are onetime costs and do not increase if multiple turbines are added.

Item Description	Estimated Cost	Assumption
10kW Turbine-Generator	$ 20,000	Note 1
Site Prep and Unit Installation	$ 1,000	Note 2
Electrical Connection to Grid	$ 3,000	Note 3
Engineering, Legal, Admin and Start-up	$ 4,000	
FERC Licensing	$ 10,000	
Power Sales Agreement	$ 5,000	
TOTAL CAPITAL COSTS	**$43,000**	

Note 1 – Price listed in Hydrovolts literature.
Note 2 – Cable attachments to existing concrete.
Note 3 – Nearby connection to existing power grid.

The up-front investment does not seem to be substantial. Hydrovolts estimates the life of the equipment to be 15 years. Assuming that this investment will be made with DWCCC funds rather than with borrowed funds, the annual cost of the capital investment spread over 15 years is $2,867.

Maintenance Costs

Hydrovolts considers these units to be nearly maintenance-free. They estimate the cost for maintenance to be $1,000 per year.

Summary

Constructing a standalone site may not be cost effective. Small Hydro and/or Hydrokinetic power generation should be considered an addition to other projects that are completed along the canal. Completing the environmental document and permitting with other projects may make the Small Hydro and/or Hydrokinetic power generation much more cost effective and a viable option. Multiple turbines should be considered at the same time to produce more energy for the same permitting costs. Potential grants to assist in the construction and permitting are also available and will increase the return on investment.

As this emerging technology develops, other manufacturers will become part of the industry and the costs for the equipment should come down. Small Hydro and/or Hydrokinetic power generation technology should be monitored to determine when it is appropriate to install on the canal.

Attachment F

Davis & Weber Counties Canal Company
Priority Projects
9/30/2013

High Priority Projects

Priority	Segment #	Stationing Start	Stationing End	Length (ft)	Current Condition	Proposed Improvement	Estimated Replacement Year	Estimated Replacement Cost
1	40	699+00	712+00	1,300	Open Liner	2-66" RCP	2014	$ 911,755.00
2	24	497+00	530+40	3,340	Open Liner	Open Liner	2018	$ 1,763,112.00
3	35	631+75	642+00	1,025	Open Liner	3-66" RCP	2020	$ 973,999.00
4	49	852+40	873+75	2,135	No Liner	1-66" RCP	2023	$ 1,008,709.00
5	50	873+75	891+00	1,725	No Liner	1-66" RCP	2025	$ 823,608.50
6	46	756+75	788+25	3,150	No Liner	2-66" RCP	2031	$ 2,141,347.00
7	47	788+25	800+00	1,175	No Liner	1-66" RCP	2032	$ 577,759.00
8	43	725+50	742+50	1,700	Open Liner	2-66" RCP	2035	$ 1,219,491.00
9	42	714+25	725+50	1,125	Open Liner	2-66" RCP	2037	$ 756,606.50
10	33	619+75	630+25	1,050	Open Liner	3-66" RCP	2039	$ 957,489.00
11	30	604+75	611+25	650	1993 Liner	3-66" RCP	2041	$ 743,392.00
12	29	601+25	604+75	350	1993 Liner	Open Liner	2042	$ 193,700.00
13	27	590+50	593+75	325	Open Liner	Box Culvert	2042	$ 352,872.00
14	25	530+40	585+00	5,460	Open Liner	Open Liner	2046	$ 2,850,068.00
15	45	743+50	756+75	1,325	84" Steel	2-66" RCP	2047	$ 911,755.00
16	52	90130	90375	245	Open Ditch	1-48" RCP	2048	$ 80,028.00
							Total	$ 16,265,691.00

Watch List

Priority	Segment #	Stationing Start	Stationing End	Length (ft)	Current Condition	Proposed Improvement	Estimated Replacement Year	Estimated Replacement Cost
17	8	140+84	144+68	384	1998 Open Liner	Open Liner	2038	$ 210,319.20
18	18	335+00	352+40	1,740	1995 Open Liner	Open Liner	2035	$ 960,232.00
19	14	282+25	293+80	1,155	1993 Open Liner	Open Liner	2033	$ 678,184.00
20	20	374+75	392+00	1,725	1992 Open Liner	Open Liner	2032	$ 945,100.00
21	23	471+00	497+00	2,600	1988 Open Liner	Open Liner	2050	$ 1,401,400.00
22	31	611+25	615+00	375	3-60" Aluminized Steel Pipes	3-66" RCP	2040	$ 361,296.00
23	37	643+00	652+00	900	2011 Open Liner	3-66" RCP	2052	$ 822,198.00
24	38	652+00	666+75	1,475	1988 Open Liner	3-66" RCP, 2-66" RCP	2055	$ 1,414,055.50
25	48	800+00	852+40	5,240	2000 54" CMP and RCP	1-66" RCP	2060	$ 2,470,403.00
							Total	$ 9,263,187.70

PROPOSED CANAL IMPROVEMENTS

Based on the water model and the needs of each segment of the canal, a list of current infrastructure conditions and projects has been generated. This table assumes the life of concrete liner is 40 years and the life of pipe/box culverts is 80 years. This is longer than the typical 30-year life expectancy of concrete liner and 50-year life for most pipes and box culverts. These timelines are only estimates and will vary depending upon construction techniques, maintenance activities, exposure to the elements, abrasion, root intrusion, freeze/thaw conditions, etc.

Projects that have been completed on the canal since 1999 do not have replacement cost estimates associated with them. However, the cost for installation when the improvements were installed is shown in the table. These projects should have at least a 30-year design life. Given the current replacement needs on the canal system, and anticipated available funding, definitive planning for replacement of those recently installed improvements was not considered feasible at this time. The total costs incurred from 1999 to 2012 for these recent replacements could be used to establish a template for future replacement costs.

The Overall Canal System Summary showing the stationing, flow rates, existing conditions, proposed canal improvements, and construction costs for each segment is contained in Appendix E. Maps showing the Long Term Plan are contained in Appendix I.

PROJECT PRIORITIES

The project segments have been prioritized based on the hydraulic model, visual inspections, DWCCC staff, and current conditions. These priority projects were broken down into two groups:

1. High Priorities List: This list consists of projects that are considered to be possible safety concerns, indicate high losses of water, or are so deteriorated that replacement is the only option. The order for the high priorities list should be reviewed regularly, at least annually. Projects may move up the list in importance based on adjacent development along the canal, maintenance of vegetation, ability to clean, energy development opportunities, better conservation, prevention of water seepage, protection of the environment, and other factors.

2. Watch List: The watch list consists of projects that will be needed either when the existing facilities have reached the end of their useful life, which may be out 30 years or longer, or when extra capacity in the canal is needed. Within the projects on this list there are several segments with aging concrete liner that are currently in satisfactory condition. The watch list will be evaluated on a bi-yearly basis to document deterioration, seepage losses, and hillside or slope movement along the canal and if needed the projects could be moved to the priorities list.

The Project Priorities List showing the High Priorities List and Watch List is contained in Appendix F. A detailed Engineer's Opinion of Probable Cost for each segment on the Project Priorities is included in Appendix G.

Funding

The projected construction years set with each project are based on DWCCC being able to fund an average of $400,000 per year for infrastructure replacements. This funding would consist of funds collected from assessments, loans, private partnership participation, or grants. DWCCC will continue to seek grants wherever possible to complete the projects on the priorities list. If future evaluation of the condition of facilities indicates that the anticipated time frames are not going to provide needed service, funding will need to be increased. Additionally, already completed improvements should be depreciated and funding established for their eventual replacement.

WATER SAVINGS

Based on the system water loss information collected in 2012 approximately 3,500 acre-feet of water would be conserved by completing the projects identified in the Master Plan.

SCADA SYSTEM

Since 2005 DWCCC has been upgrading and installing their SCADA system. The central components and systems are maintained and updated as needed. As new meters are installed on main canal gates, a SCADA PLC panel should be installed and connected to the system. These new panels have been addressed as part of the Priority Project List and costs are included with the meters and/or turnouts.

HYDROPOWER GENERATION

A feasibility study has been completed to evaluate possible locations for power generation along the canal. Two scenarios for hydropower were identified and evaluated. The first scenario involved a specific site that would create a 1.3 megawatt hydropower plant at an existing penstock location in Riverdale. The second scenario involved multiple locations along the canal that investigated the feasibility for creating power using low head turbines in the main canal and box culverts. The feasibility study for the hydropower is attached in Appendix H.

MASTER PLAN UPDATES

As part of DWCCC's commitment to water conservation and safe operation of their facilities through developed communities within their service area this report will be updated approximately every 5 years. As projects are completed and as conditions change along the canal the priority projects and rankings will be evaluated and revised. Cost estimates will be updated approximately every 5 years or as needed to ensure that costs are reflecting actual construction costs for planning and projection purposes. Projects will be evaluated to determine if any additional concerns need to be addressed as part of the project and of the overall system's efficiency.

Impacts or Constraints – There are no adverse impacts or constraints to implementing this measure (working closely with Reclamation during the remediation process). All impacts from the actual Safety of Dams remediation will be addressed and evaluated as part of the process and are therefore not included in this analysis. *EI: "None", L&IC: "None"*

Goal 5 – Support Upgrade of Non-Association Facilities

As described in Section 2, all Project water is diverted through privately owned conveyance facilities. The conveyance facilities that divert water directly from the Weber River are the Davis & Weber, Gateway, Hooper, Uintah Central, Pioneer, Riverdale Bench, Wilson, Plain City, South Slaterville, and Warren Canals. Other canals in Weber, Morgan, and Summit Counties receive Project water by exchange. Even though the Association does not own or operate any of these facilities, they are very supportive of efforts to maintain and upgrade the facilities to improve their ability to safely and efficiently convey Association water to the end users.

CM 9 – Support the Upgrade of Davis & Weber Canal Facilities

A "Capital Improvement Plan" was prepared by DWCCC in 1999 for the approximate 9.1-mile reach of the D&W Canal from its headworks on the Weber River to the Roy Water Conservancy Subdistrict in Riverdale, Utah. This plan has been updated several times since that time to reflect work completed and modifications made to the previous version of the plan. To date, approximately 7.6 miles of this section of original canal liner has been replaced leaving a balance of about 1.5 miles of original canal.

Based on the current plan, additional improvements to this section of the canal would include a complete reconstruction of the headworks and forebay, replacing approximately 4,000 feet of original concrete lined canal with box culvert, replacing approximately 4,000 feet of reinforced concrete trapezoidal liner with water stop, and resealing joints and making roadway improvements to the remaining approximately 6.6 miles of canal. The project also includes installing remote monitoring and telemetry equipment to automate portions of the canal, monitor flow rates, and monitor other crucial elements of the canal. Construction would take place from now through the year 2018, at a total cost, based on 2008 dollars, of about $18 million.

Work contemplated in the next three years includes replacing the 4,000 feet of canal with box culvert at a cost of about $3,600,000, replacing the 4,000 feet of canal with reinforced concrete liner with water stop at a cost of about $1,600,000, and reconstructing the headworks and forbay for an additional cost of about $6,000,000.

This candidate measure consists of the Association cooperating with DWCCC to complete the rehabilitation of the canal. DWCCC would fund the work with the Association working closely to ensure Association interests are protected.

Projected Benefits – The primary objectives of the project are to improve the safety of the structure, conserve water by reducing seepage losses, and provide for more efficient operation and maintenance. Significant residential development has occurred adjacent to the canal in

recent years. The July 11, 1999 failure of a section of the canal caused significant damage down-slope of the canal and heightened the concern of area residents and the DWCCC Board of Directors. DWCCC has aggressively worked since that time to ensure the canal is safe and that additional failure does not occur. Implementation of the measure would increase safety of the structure, reduce DWCCC liability, reduce operation and maintenance costs, and reduce water loss from seepage. *WCE: "Moderate", O&M: "Minor", S&L: "Substantial"*

Costs – The project would be funded through loans from the Board of Water Resources and from DWCCC shareholder assessments. Costs to the Association for staff time and other requested assistance is considered negligible.

Impacts or Constraints – Implementation requires that a feasibility report be prepared and submitted to the State of Utah for review and approval prior to funding authorization. An environmental analysis is required as part of the feasibility report. Compliance with other applicable federal, state, and local laws is also required. *EI: "Moderate", L&IC: "Minor"*

Goal 6 – Protect and Maximize Use of Water Rights for Beneficial Use

Protecting and maximizing the use of Association water rights has always been a primary focus for the Association. The accelerated population growth in the area together with changing environmental laws and regulations pose a risk to Association water rights. In order to protect Project water rights as well as achieve the greatest benefit for shareholders and the public, the Association must be willing to adapt to the changing conditions. The Association has identified the following measures that if implemented would help achieve this goal.

CM 10 – Encourage and Support the Construction of Feasible Secondary Irrigation Systems

As land use changes from agriculture to residential, demands for Project water shift from commercial agriculture to irrigation of lawns and gardens. The Association, in conjunction with DWCCC, has developed a program to assist municipalities in converting water use for agriculture to municipal irrigation uses, where feasible, by developing secondary irrigation systems. This program has been very successful in the past. A list of existing secondary irrigation systems is shown in Table 5-1. The Association and DWCCC would like to continue the program into the future. This candidate measure consists of the Association and DWCCC assisting municipalities and others through the planning, construction, and startup phases of new secondary irrigation system development. This assistance comes in the form of technical consultation, helping with preparation and execution of the necessary agreements, and educating entities through presentations and distribution of information.

Projected Benefits – Secondary irrigation systems provide three main benefits. First and foremost, they provide better water distribution control and hence provide water savings. The quantification process associated with secondary systems reduces the water needed for the property by excluding the hard, non-irrigable surfaces such as roof tops, driveways, streets, and business parking lots from the calculated need. The city therefore only takes a portion of the irrigation right associated with the land and the remainder becomes available for beneficial use within the cities for parks, cemeteries, schools, churches, etc. Second, it provides a good source