COPY

C. TITLE PAGE

DANIEL IRRIGATION COMPANY CANAL PIPING

DANIEL IRRIGATION COMPANY
PRESIDENT: HUGH BARKER
80 LITTLE SWEDEN ROAD
HEBER CITY, UTAH 84032
hughbarker@gmail.com
PHONE: (435) 654-0520
FAX: (435) 671-0520

PREPARED BY:
EPIC ENGINEERING
50 EAST 100 SOUTH
HEBER CITY, UTAH 84032
PHONE: (435) 654-6600
FAX: (435) 654-6622

PROJECT MANAGER: RYAN TAYLOR
rtaylor@epiceng.net

COPY

TABLE OF CONTENTS

COPY

COPY

E.1 TECHNICAL PROPOSAL: EXECUTIVE SUMMARY

January 16, 2015
Daniel Irrigation Company
The Town of Daniel, Wasatch County, Utah

The Daniel Irrigation Company Canal Piping project falls under the Bureau of Reclamation's criteria for "Task A –Water Conservation" under the WaterSMART funding opportunity's guidelines. This project includes the conversion of 1.3 miles of open canal to pipeline. The segment being converted experiences significant seepage losses from deteriorated lined and unlined sections that are in poor condition. Underlying layers of sands and gravels allow the water to seep rapidly. This high rate of seepage also poses a safety concern for a housing development located down slope from portions of the canal. Conversion of this segment of canal to pipeline will result in a quantifiable and sustained water savings as well as rectify a public safety concern.

Average annual water supply: 8341.1 AF
Estimated annual water saved after project completion: 2003.4 AF

Additionally, this project will result in an energy savings by reducing the amount of water that will need to be pumped from the Jordanelle Reservoir into the Daniel Irrigation Company system; resulting in a saving of both water resources and energy costs required for the pumping operations.

The conceptual design of this project was completed in December 2013. Project design, bidding and award are anticipated to be complete by June 2015. Construction is anticipated to begin on August 1st, 2015 and shall be complete by the beginning of the 2016 irrigation season on April 1st, 2016. Therefore, project length is estimated to be 271 days and the estimated completion date is April 1st, 2016. This project will not be located on or include a Federal Facility.

E.2 TECHNICAL PROPOSAL: BACKGROUND DATA

The project is located adjacent to U.S. 40 Mile Marker 22 and extends approximately 0.65 miles to the northwest and southeast in the south eastern corner of the Town of Daniel, Utah and Wasatch County Utah. The primary water supply source for the Daniel Irrigation Company is Daniels Creek. The diversion from Daniels Creek is located at approximately N 2400' W 1200' from the SE corner, Section 27 Township 4S, Range 5E, SL B&M and the termination point is approximately S 32' E 861' from the W4 corner of Section 22, Township 4S, Range 5E, SL B&M (see attached Exhibit A –Project Maps). When the primary supply source is inadequate, water is pumped in from a secondary source, the Jordanelle Reservoir. The water right (WR) number associated with this canal is 55-9665 for 54 cubic feet per second (cfs) from January 1st through December 31st.

Current water uses include agricultural irrigation and stock watering. According to the base permit a total of 1825 agricultural acres are watered of which about 26% is alfalfa, 73% is pasture and 1% is grain (USDA land uses 2012) and 800 livestock units are allotted use. The

total number of water users served is approximately 327 shareholders. The water is diverted into one open canal, multiple closed conduit piped canals, laterals and three holding ponds.

The current minimum demand to meet the needs of the shareholders along the project canal is 14 cfs. Known shortfalls to the water supply include seepage losses (described below) and potential shortfalls to water supply including seasonal drought conditions which reduce supplies between 25 to 35%. The following tables depict a high and low (drought) water year example of supply:

	High	Low
Water diverted	14 cfs	9 cfs
Losses in unlined section	-4.7 cfs	-4.7 cfs
	9.3 cfs	4.3 cfs

The current water right is an agricultural right, and as such, the area served is limited to the area for which the right is allocated. It is not anticipated that the agricultural base will increase; therefore, the current rights were deemed to be sufficient and the water demands of the system are unlikely to increase. The current and projected demand is unlikely to change significantly.

Water is diverted from the Daniels Creek into the delivery system consisting of three zones, the Lower, Middle and Upper (see Appendix A-Project Maps). The Lower zone supplies the southwest area of the Town of Daniels and consists of approximately 6 miles of buried pipe; the Middle zone supplies the central area of the Town of Daniel and consists of approximately 9 miles of buried pipe; The Upper zone supplies the southeast area of the Town of Daniel and Center Creek and consists of approximately 5 miles of buried pipe. The water for the middle pond is initially diverted from the Daniels Creek via a 1.3 mile long open canal and is routed to a storage pond. The water is distributed through a share system in which specific quantities are delivered to each shareholder that are determined and based on water available. That delivery may vary from season to season and within the season depending on water availability.

In 1949, the Daniel Irrigation Company filed Diligence Claim D-4 (WR 43-1954) to divert water from Daniel's Creek and Strawberry River for the irrigation of 1,825 acres, 800 livestock, and 25 families. In 1973, the Daniel Irrigation Company deeded WR 43-1954 to the Bureau of Reclamation. The Bureau of Reclamation then allocated 2,533.65 acre-feet from WR 43-1954 and gave it back to the Daniel Irrigation Company as WR 55-9665 (Utah Division of Water Rights, 2013). Since 2001, the Central Utah Water Conservancy District has supplemented an average of 2400 AF of water to the Daniel Irrigation Company out of the Jordanelle Reservoir. It is believed that the canal was lined by native materials when it was constructed but after nearly 100 years of use the liner has eroded and is susceptible to high seepage losses and raises safety concerns over slope stability along some sections of the canal. Water losses along the canal are calculated to be 4.7 cfs. The rest of the Daniel Irrigation Company's system was upgraded from open canals to buried, pressurized pipes starting in 1978. This section is the last remaining part of the system to be upgraded from open canal to enclosed piping.

Daniels Irrigation Company was also involved in the Wasatch County Water Efficiency Project (WCWEP) program started in the early 1990's. This program was created to improve irrigation efficiencies in irrigation companies within Heber Valley, Utah by upgrading flood irrigation to

sprinkler irrigation. This conversion is obtained by converting open canals to pressurized pipelines. Part of this project was the removal of the Daniels Irrigation Company's annual diversion of 2900 acre-feet from the Strawberry River and the installation of a replacement pipeline that supplies water from the Jordanelle Reservoir instead, thereby fulfilling an environmental mitigation commitment of the Central Utah Project. (Central Utah Project Completion Act Office, 2013)

The applicant is not aware of any Endangered Species Act (ESA) issues that exist in the nearby geographic area. Preliminary review shows no likely adverse impacts.

E.3 TECHNICAL PROPOSAL: TECHNICAL PROJECT DESCRIPTION

The Daniel Irrigation Company Canal Piping Project will consist of converting a 1.3 mile canal to pipeline. This canal is located within the first two miles of canal past the diversion, as previously described. The canal is located along the valley floor coming out of Daniel Canyon adjacent to U.S. 40. Approximately .6 miles down the canal from the diversion, houses are built adjacent to and down gradient of the canal. Due to terrain and excessive canal seepage along this section the hillside is vulnerable to failure and raises a safety concern for the homeowners and Daniels Irrigation Company. Converting this segment of open canal to pipeline will significantly reduce seepage losses and resolve a public safety concern.

E.3.1 Design

The design stage of the project has not been completed at this time. The design will include hydraulic calculations to determine the minimum diameter pipe size to handle the canal flows, minimize headlosses and minimize disturbance of the hillside where the canal is located. A 30-inch diameter high density polyethylene (HDPE) pipe has been preliminarily selected to be installed in the same alignment of the existing canal section. At a design slope of 0.0050 ft/ft this pipe can handle approximately 29 cfs full flow capacity. This will closely match the capacity of the existing open canal section with 3-inches of freeboard at this same slope. The design will include pipe bedding around the pipe and a berm built up over the pipe for protection and stability. The existing concrete headwall transition will be reused. Major upgrades to the diversion structure are not anticipated.

E.3.2 Project Bidding and Award

The project is anticipated to be bid and awarded as early as June of 2015. Project bidding and award will include advertising the project for construction bidding, addressing questions by bidders, issuing addenda to the Plans and Specifications, conducting a pre-bid meeting for bidders to attend, reviewing bids, making a recommendation for award by the engineer, approval by the irrigation company board and awarding the contract.

E.3.3 Construction

Since the new pipeline will be installed in the same alignment as the open canal, it must be completed near the end of the irrigation season, October 1st. This work is scheduled to begin

July 1st, 2015. Construction will include mobilization and removal of excessive silt build up within the existing canal, installation of concrete headwall transitions, excavation, installation and backfill of the pipe, testing, cleanup and demobilization. Construction management will include a preconstruction meeting with the contractor, irrigation company, and engineer; the review and recommendation of submittals, pay requests, and change orders; construction inspection; construction progress meetings; punchlist & final inspection; record drawings; and operation and maintenance manual review.

E.3.4 Permit Acquisition

An excavation permit will be required prior to commencement of this work from the Town of Daniel for the section where the canal passes underneath Haven Estates Drive. All of the information required to obtain the permit will be generated (design plans and specifications). A permit application will be submitted along with the applicable fees.

E.3.5 Estimated Project Schedule

An estimated project schedule that shows the stages and duration of the proposed work, including major milestones and dates is included as Exhibit B –Project Schedule in the Appendix. An assistance agreement award date of June 1st, 2015 was assumed in this schedule.

E.3.6 Engineering Plans, Designs, and Analyses

Engineering plans and specifications for the project have not been completed at this time.

E.3.7 Mechanism to Conserve Water & Improve Delivery Efficiency

The mechanism to conserve water and improve delivery efficiency will be the conversion of the open canal to a pipeline. This will eliminate seepage losses through the deteriorated and aged lined sections and unlined sections of the canal. It will also eliminate evaporation losses in this section. The elimination of these losses will conserve water for the irrigation company that would have otherwise been lost underground and also improve delivery efficiency by preventing these losses so this water travels further into the delivery system. Additionally, it will also reduce the amount of water that will need to be pumped from the Jordanelle Reservoir into the Daniel Irrigation Company system thereby saving both water resources and energy costs required for the pumping operations.

E.3.8 How the Project Will Improve Sustainable Water Supplies

This project will directly improve the sustainable water supply diverted from Daniels Creek to the irrigation company shareholders by eliminating the seepage and evaporation losses along the first section of canal. This improves delivery efficiency and reduces the amount of water required to be diverted by the amount saved as a result of this project. The project will demonstrate the results using two preselected survey points, one near the diversion structure and one at the end of the canal, for calculating flows. The points will be surveyed to determine a cross sectional area and flow velocity will be measured. From this information a flow rate will

be calculated. Since there are no turnouts, laterals or diversions along this section of canal the difference in the flow rates between the points will show the water lost between the two points due to infiltration and evaporation. Flow measurements will be taken after the project is completed and compared against measurements taken prior to project completion. The difference will demonstrate the water savings that result from converting the open canal to pipeline.

E.3.9 Non-Federal Funding

The portion of the project not covered by the federal grant funding will be paid for by the Daniel Irrigation Company (applicant) using a combination of cash reserves and loans obtained from the Utah Division of Water Resources, and rate increases as necessary. It is hoped that the money saved from the reduced volume of water pumped from the Jordanelle Reservoir will cover the majority of the loan payment.

E.4 TECHNICAL PROPOSAL: EVALUATION CRITERIA

E.4.A Water Conservation

E.4.A.1 Quantifiable Water Savings

This project will result in water conservation. The total estimated amount of water conserved as a result of this project is **2003.4 AF**. This is quantifiable using information provided by flow tests measured on losses along the 0.69 mile test section. Canal seepage rates in terms of cfs were then calculated from this information based on the length of open canal and wetted perimeter of the canal. This seepage rate was then applied to the length of open canal to be converted to pipeline to determine the savings (1998.8 AF) that will result assuming negligible seepage occurs once the pipe is installed. In addition, a calculation of the evaporation savings were made based on published evaporation rates in the geographic location applied to the open water surface in the canal to be piped. As expected this amount (4.6 AF) is minimal compared to the seepage losses. Please see attached calculations sheet (Exhibit D - Calculations in the Appendix) showing how this amount was quantified. It is assumed that once the new pipeline is installed there will be no evaporation losses and negligible seepage losses. These assumptions will be verified once the project is completed by measuring and comparing the flow rates from preconstruction and post construction as previously described.

E.4.A.2 Percentage of Total Supply

The total average annual water supply for the Daniels Irrigation Company is **8341.1 AF**. This calculation was made based on average flow measurements taken by Daniels Irrigation Company at different times of the season. The existing transport losses in the canal system are **2003.4 AF**. This calculation was made based on the total losses calculated from the canal test section multiplied by the number of days in the season. The existing delivery efficiency is **76%**. Based on the estimated water conserved as a result of this project the improved delivery efficiency is calculated below.

$$\frac{2003.4\ \text{AF}}{8341.1\ \text{AF}}\ \text{X}\ 100 = \mathbf{24\%}$$

E.4.A.3 Reasonableness of Costs

The total project cost is estimated to be **$498,000**. The annual AF of water conserved is **2003.4**. The expected life of the improvement is **100 years**. The following calculation represents the reasonableness of cost for the benefits gained:

$$\frac{\$498{,}000}{2003.4\ \text{AF X}\ 100\ \text{years}} = \mathbf{\$2.49\ per\ AF\ per\ year}$$

E.4.B Energy Efficiency

This project will improve energy efficiency by reducing the amount of water required to be pumped from Jordanelle Reservoir to Daniels Creek by 2003.4 AF. Using 70% pump efficiencies and $0.08 per kWh energy cost the average annual pumping costs saved could be as high as **$91,000** per year.

E.4.C Addressing Endangered Species Concerns

A detailed environmental study will be completed prior to design; however, no significant impacts are anticipated.

E.4.D Water Marketing and Banking

This section is not applicable. At this time Daniels Irrigation Company is not planning on marketing or banking any additional water due to the annual savings of this project.

E.4.E Other Contributions to Water Supply Sustainability

This project will also contribute to increasing the water supply sustainability of Daniels Creek during water supply shortages due to drought conditions by requiring less water be diverted to match the same demand.

This conserved water will continue downstream to other users thereby increasing their water supplies sustainability as well.

The project also helps prevent a water-related crisis such as drought related crop damage/low yields that could result from having less water.

This project will also alleviate a public safety concern over the slope stability of a section of canal running adjacent to a low lying neighborhood.

E.4.F Implementation and Results

E.4.F.1 Project Planning

This project can demonstrate results based on the level of planning and support for the project as evidenced by their Water Management & Conservation Policies and Procedures and their involvement with the WCWEP project and the Central Utah Project Completion Act Office (CUPCAO); see Exhibit E-Wasatch County Water Efficiency Project. These policies and procedures were developed for the Daniels Irrigation system as part of the WCWEP project and the piping of this canal will continue the goals established this project. The policies and procedures identify and prioritize short term and long term goals to better manage and conserve water within Heber Valley and to restore canals to their full capacity. This pipeline project is currently the highest priority for Daniels Irrigation Company. The current policies and procedures are being incorporated into a Water Management and Conservation Plan that will be adopted by the Daniels Irrigation Company's Board.

Preliminary Engineering and design work has been completed for this project. An outline of the preliminary Engineering Plans and Specifications for the project are included as Exhibit C in the Appendix.

This project conforms to and assists in meeting the goals of the State of Utah Division of Water Resources Water Management and Conservation Plan by reducing overall demand in the Provo Basin Watershed. It also supports the efforts and goals started by the WCWEP to improve irrigation efficiencies within Heber Valley, Wasatch County, Utah.

This proposal provides several calculations (Exhibit D in Appendix, and above), measurements, engineering design (Exhibit C in Appendix), and references water conservation plan (Exhibit E in Appendix).

E.4.F.2 Readiness to Proceed

Assuming an assistance agreement award date of June 1st, 2015, construction would start on July 1st, 2015. An estimated project schedule that shows the stages and duration of the proposed work, including major milestones and dates is included as Exhibit B –Project Schedule in the Appendix.

An excavation permit will be required prior to completion of this work from the Town of Daniel. The requirements to obtain an excavation permit are submittal of the design plans, specifications, permit application and applicable fees to the Town of Daniel for review and approval. If it is determined that the diversion structure from Daniels Creek requires modification a Utah State Stream Alteration Permit will also need to be obtained. All of the information required to obtain the permits will be generated and submitted before construction is started.

E.4.F.3 Performance Measures

This project provides support for the development of performance measures to quantify actual project benefits upon completion of the project. The performance measure will be water and

energy saved before and after the project is completed. The project will demonstrate the water savings results using a minimum of two preselected survey points, one near the diversion structure and one at the end of the canal, for calculating flows. The points will be surveyed to determine a cross sectional area and flow velocity will be measured. From this information a flow rate will be calculated. Since there are no turnouts, laterals or diversions along this section of canal the difference in the flow rates between the points will show the water lost between the two points due to infiltration and evaporation. Flow measurements will be taken after the project is completed and compared against measurements taken prior to project completion. The difference will demonstrate the water savings that result from converting the open canal to pipeline.

The energy savings will be demonstrated by the comparison of historical average pumping rates and cost with the pumping rates and cost after the project is completed. The difference will demonstrate the energy savings that result from converting the open canal to pipeline.

E.4.G Additional Non-Federal Funding

Estimated costs for this work are based on costs for similar construction. In addition, this work will be bid out prior to construction and therefore be representative of current costs in the construction industry for this type of work. Therefore, these costs will be reasonable, appropriate, and necessary for the work proposed. As seen in the Budget Proposal, the budget clearly identifies direct, indirect, environmental and contingency costs. The funds are entirely allocated to direct costs.

This proposal provides non-federal funding in excess of 50 percent of the project costs. Non federal funds will be approximately **55 percent** of the overall project costs.

E.4.H Connection to Reclamation Project Activities

This project will reduce the amount of water needed to be pumped out of the Jordanelle Reservoir in Wasatch County, Utah. The Jordanelle Reservoir is a Bureau of Reclamation facility, therefore this project will contribute water to a basin where a Bureau of Reclamation project or activity is located and is directly connected.

F. PERFORMANCE MEASURE FOR QUANTIFYING ACTUAL POST-PROJECT BENEFITS

The performance measure will be water saved and energy saved before and after the project is completed. The water savings will be determined using two preselected survey points, one near the diversion structure and one at the end of the canal, for calculating flows. The points will be surveyed to determine a cross sectional area and flow velocity will be measured. From this information a flow rate will be calculated. Since there are no turnouts, laterals or diversions along this section of canal the difference in the flow rates between the points will show the water lost between the two points due to infiltration and evaporation. Flow measurements will be taken throughout the irrigation season to account for seasonal infiltration rates; at a minimum one early and one late season test will be conducted. The post-project flow rates will be compared to pre-project and historical flow rates. The difference will demonstrate the water

savings that result from converting the open canal to pipeline. The energy saved will be determined by comparing pre-project and historical pumping costs and rates to post-project pumping costs and rates. The difference will demonstrate the energy savings that result from converting the open canal to pipeline.

Upon completion of the project a final report describing the completed project and quantifying the actual project benefits will be submitted to the Bureau of Reclamation in a timely manner.

G. ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

(1) This project will cause minimal impact to the surrounding environment because the new pipeline will be installed in place of the existing open canal. Some soil will be disturbed during excavation and backfilling of the pipeline however, standard construction procedures will be enforced to minimize potential issues including:

- Project will be constructed in colder, wetter months so air quality concerns from dust is not anticipated to be an issue but water trucks will be required to spray down open excavations to minimize dust if dry, windy conditions are encountered.
- There are no other nearby water bodies that will be affected by this construction other than the canal which will not be in operation during construction activities, therefore water quality and quantity will not be impacted as a result of this project.
- Only a small area in the immediate vicinity of the canal will be impacted and quickly restored. There are no known animal habitats in the project area.
- Standard stormwater water pollution prevention program procedures will also be required on the project to prevent any runoff or soil erosion during a stormwater event.

(2) There are no known endangered or threatened species in the project area.

(3) There are no wetlands within the project boundaries.

(4) The irrigation water delivery system was originally constructed in 1872.

(5) The project will result in modification of an individual feature of an irrigation system. This feature is the canal itself will be converted from open canal to pipeline in a 1.3 mile section. This canal feature was originally constructed in 1872 and other than standard maintenance has remained unaltered or modified.

(6) To the best of our knowledge, there are no known buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places.

(7) The project site is not known to contain any archeological artifacts.

(8) The project will not have any effect on low income or minority populations.

(9) The project will not limit use or impact access to tribal lands or Indian sacred sites.

(10) The project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area.

H. REQUIRED PERMITS AND APPROVALS

An excavation permit from the Town of Daniels is anticipated to be required prior to construction of this work. If it is determined the diversion structure needs modification a Utah State Stream Alteration Permit will also be required. At this time no alterations to the diversion structure are foreseen. The project has already been approved by the Daniel Irrigation Company board vote pending construction bids and available funding.

I. OFFICIAL RESOLUTION

Due to the timing of the Daniels Irrigation Board meeting, an official resolution adopted by the board was not able to be included with this application. This resolution will be submitted within 30 days of the application deadline.

J. FUNDING PLAN AND LETTERS OF COMMITMENT

(1) Daniels Irrigation Company will make their contribution of the cost share requirement through a combination of cash reserves, operating funds and a loan by the State of Utah Division of Water Resources (non-federal). This money comes from and will be repaid from yearly assessments to shareholders on a cost per share basis. Daniels Irrigation Company will contribute in-kind and cash contributions to the project which include the costs associated with the engineering and design and legal and administrative work for the project up to $100,000.

(2) The in-kind costs incurred prior to the anticipated project start date include the application and preliminary design costs.

a. The project expenses that have been incurred include professional design & engineering consulting fees.
b. These consulting fee expenses benefit the project because the scope of work is clearly defined and therefore the likelihood of achieving the goals are high and the likelihood of changes in scope or costs are low.
c. The amount of the expenses total $3,305.50. Invoices reflecting this amount have been included in the Appendix as Exhibit G –Invoices.
d. These costs were incurred after July 1, 2013. See Exhibit G –Invoices for exact dates.

(3) No other funding partners are involved in this project.

(4) No other funding is being requested or has been requested for this project from other Federal partners.

(5) The loan approval from the State of Utah Division of Water Resources is still pending approval. If the full loan amount is not approved the project will have to be either postponed until such time that it can be funded or the scope of work will need to be reevaluated and reduced. For example, the 1.3 mile canal could be split into two 0.65 mile sections and completed in two phases.

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

Funding Sources	Funding Amount
Non-Federal Entities	
1. Daniel Irrigation Company (applicant)*	$ 3,305.50
2. Daniel Irrigation Company (applicant)	$ 54,833.30
3. Utah Division of Water Resources	$ 216,027.69
Non-Federal Subtotal:	
Other Federal Entites:	
1. N/A	$ -
2.	
3.	
Other Federal Subtotal:	
Requested Reclamation Funding:	$ 224,318.04
Total Project Funding:	$ 498,484.53

*Denotes in-kind contributions for application writing and preliminary engineering fees

Daniels Irrigation Company has no funding partners for this project therefore no letters of commitment for funding are required. However, a letters of approval/support from the City of Daniels, Wasatch County, and CUPCAO for this project have been included in Exhibit H- Support Letters.

K. BUDGET PROPOSAL

(1) **General Requirements**

It is anticipated that 70% of the work will be completed in the 2015 fiscal year and the remaining 30% will be completed in the 2016 fiscal year. As a result, the 2015 annual cost for the project is estimated at $348,939 and the 2016 annual cost is estimated at $149,545 for a total project cost of $498,485. The project budget includes contractual, construction, and environmental and regulatory compliance costs. Detailed information of these costs is included in the Exibit E- Cost Estimates in the Appendix, including the unit costs for all budget items. As can be seen in Table 2, the total recipient (non-federal) contribution will be 55%, including in-kind contributions, of the total for both the 2015 and 2016 fiscal year. Federal and applicant funding will be the only funding sources for this project. Budget Table 3 has been provided in addition to the following budget narrative.

Table 2. Funding Sources

Funding Sources	Percent of Total Project Cost	Total Cost by Source
Recipient Funding	55%	$ 274,166.49
Reclamation Funding	45%	$ 224,318.04
Other Federal Funding	0%	$ -
Totals	100%	$ 498,484.53

(2) Budget Narrative Format

(a) ***Salaries and Wages***
This item is not applicable. Any of these costs are accounted for in the *(f) Contractual Costs* section.

(b) ***Fringe Benefits***
This item is not applicable. Any of these costs are accounted for in the *(f) Contractual Costs* section.

(c) ***Travel***
This item is not applicable. Any of these costs are accounted for in the *(f) Contractual Costs* section.

(d) ***Equipment***
This item is not applicable. The equipment for this project will not be provided by the applicant. All equipment will be provided by the contractor. Any of these costs are accounted for in the *(f) Contractual Costs* section.

(e) ***Materials and Supplies***
Most of the materials and supplies for this project will be purchased and supplied by the contractor. These costs are accounted for in the *(f) Contractual Costs* section.

(f) ***Contractual Costs***
The costs associated with the grant design work include preliminary engineering, hydraulic calculations, plan and profile and detail drawings, and specifications. It is anticipated that 340 man-hours will be required for this work. The personnel involved in these tasks are Principal Engineer, Project Engineer, Engineer I, Senior CAD Technician, Senior Field Inspector, Surveyor, and Clerical. It is estimated that the total of these costs will be **$37,200** based on the wages and man hours performed by the personnel as outlined in Exhibit F –Cost Estimates in the Appendix.

The tasks of project bidding and award and construction management will be performed by the Engineer. It is anticipated that 375 man-hours will be required for this work. The

personnel involved in these tasks are Principal Engineer, Project Engineer, Engineer I, Senior CAD Technician, Senior Field Inspector, Surveyor, and Clerical. It is estimated that the total of these costs will be **$40,920** based on the wages and man hours performed by the personnel as outlined in Exhibit F –Cost Estimates in the Appendix.

The task of construction will be performed by the contractor. The construction cost estimate is included in Exhibit F- Cost Estimates in the Appendix. The construction cost estimate is broken down to match the anticipated bid schedule. The construction cost estimate includes line items and unit prices for the 30-inch diameter HDPE pipe material, 30-inch diameter HDPE pipe excavation & installation, and site grading and seeding. This also includes the 10% construction cost contingency. It is estimated that the total costs of construction will be **$409,203**.

(g) ***Environmental and Regulatory Compliance Costs***
The environmental and regulatory compliance costs include obtaining an excavation permit from the Town of Daniel. The estimated cost to obtain this permit is $75, the rest of the **$7,440** budget is allocated for environmental reviews and assessments. This cost accounts for 1.5% of the total estimated cost for this project.

(h) ***Reporting***
The reporting costs are listed as grant administration and are accounted for in the contractual cost estimate included in Exhibit F – Cost Estimates in the Appendix. The tasks relating to completing and submitting financial, semi-annual, final, and development reports, as well as anticipated additional correspondence with the Bureau of Reclamation will be completed by the Engineer. The total estimated reporting costs is **$3,720**.

(i) ***Other***
This item is not applicable.

(j) ***Indirect Costs.***
This item is not applicable. The engineer will be performing a large majority of the non-constructional tasks. As a result, all of the indirect costs associated with the tasks of the engineer will be accounted for in the contractual costs.

(k) ***Total Cost***
The total estimated cost for the project is $498,484.53. The applicant will contribute $274,166 which will cover 55% of the total cost. Federal funding will account for $224,318 which will cover the remaining 45% of the total cost.

(3) **Budget Form**
The budget form SF-424D was used for the budget proposal because this project is considered a construction program. The SF-424C is on the following 2 pages.

COPY

Table 3. Budget Proposal

Budget Item Description	$/Unit	Quantity	Quantity Type (hours/days)	Total Cost
Salaries and Wages	N/A	N/A	N/A	$ -
Employee 1				
Fringe Benefits	N/A	N/A	N/A	$ -
Full-time Employees				
Part-time Employees				
Travel	N/A	N/A	N/A	$ -
Trip1				
Equipment	N/A	N/A	N/A	$ -
Item A				
Supplies/Materials	N/A	N/A	N/A	$ -
Item A				
Contractual/Construction				
Item A - Design Engineering	$ 37,200.34	1	LS	$ 37,200.34
Item B - CM Engineering	$ 29,760.27	1		$ 29,760.27
Item C - Survey	$ 11,160.10	1		$ 11,160.10
Item D - Construction	$ 409,203.72	1	LS	$ 409,203.72
Item E - Environmental and Regulatory Compliance	$ 7,440.07	1	LS	$ 7,440.07
Other				
Grant Administration/Reporting	$ 3,720.03	1	LS	$ 3,720.03
Total Direct Costs				**$ 498,484.53**
Indirect Costs - __%	N/A	N/A	N/A	$ -
Total Project Costs				**$ 498,484.53**

APPENDIX

COPY

EXIBIT A – PROJECT LOCATION MAP

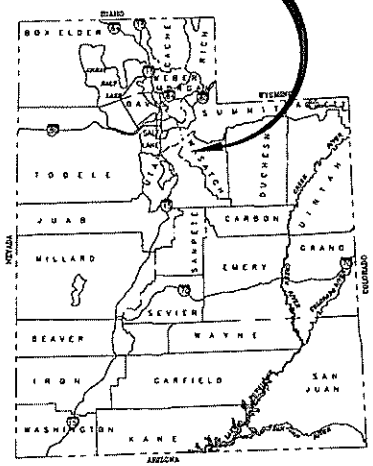
COPY

DANIELS IRRIGATION COMPANY

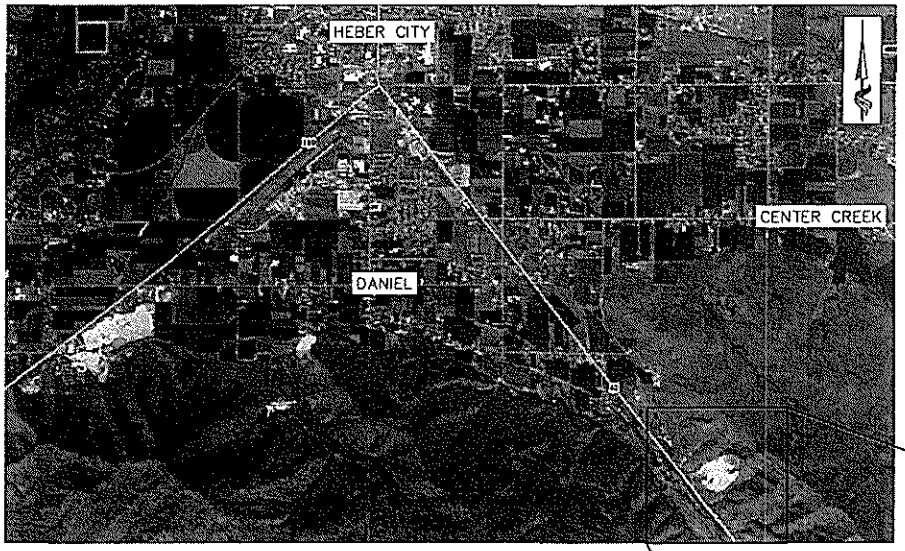
30" CANAL PIPING PROJECT

WASATCH COUNTY UTAH

PROJECT LOCATION



PROJECT LOCATION MAP
SCALE: N.T.S



PROJECT VICINITY MAP
SCALE N.T.S.

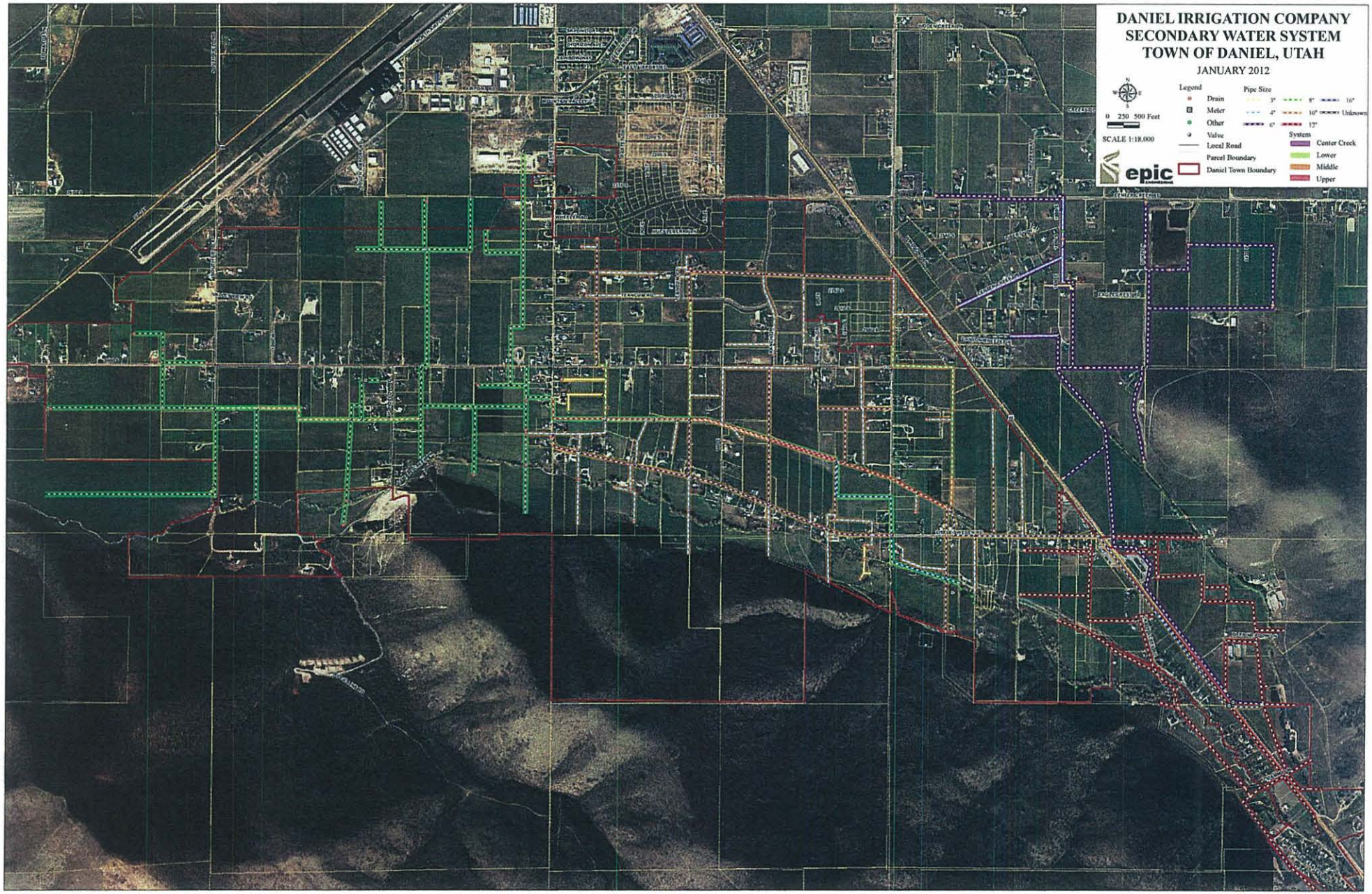
PROJECT INFORMATION	
MATERIAL	DESCRIPTION
30" ADS PIPE	1.3 MILES (6864 LF) BURIED
IMPORT BEDDING	3328 CY- 6" UNDER PIPE, 1' ON TOP AND SIDES
FINAL GRADING	96096 SF
SEEDING	96096 SF WITH NATIVE PLANTS

PREPARED FOR :
DANIELS IRRIGATION COMPANY

PREPARED BY :
EPIC ENGINEERING, P.C.
ENGINEER
50 EAST 100 SOUTH
HEBER CITY, UTAH 84032
435-654-6600
CONTACT: G. RYAN TAYLOR, P.E.

epic ENGINEERING

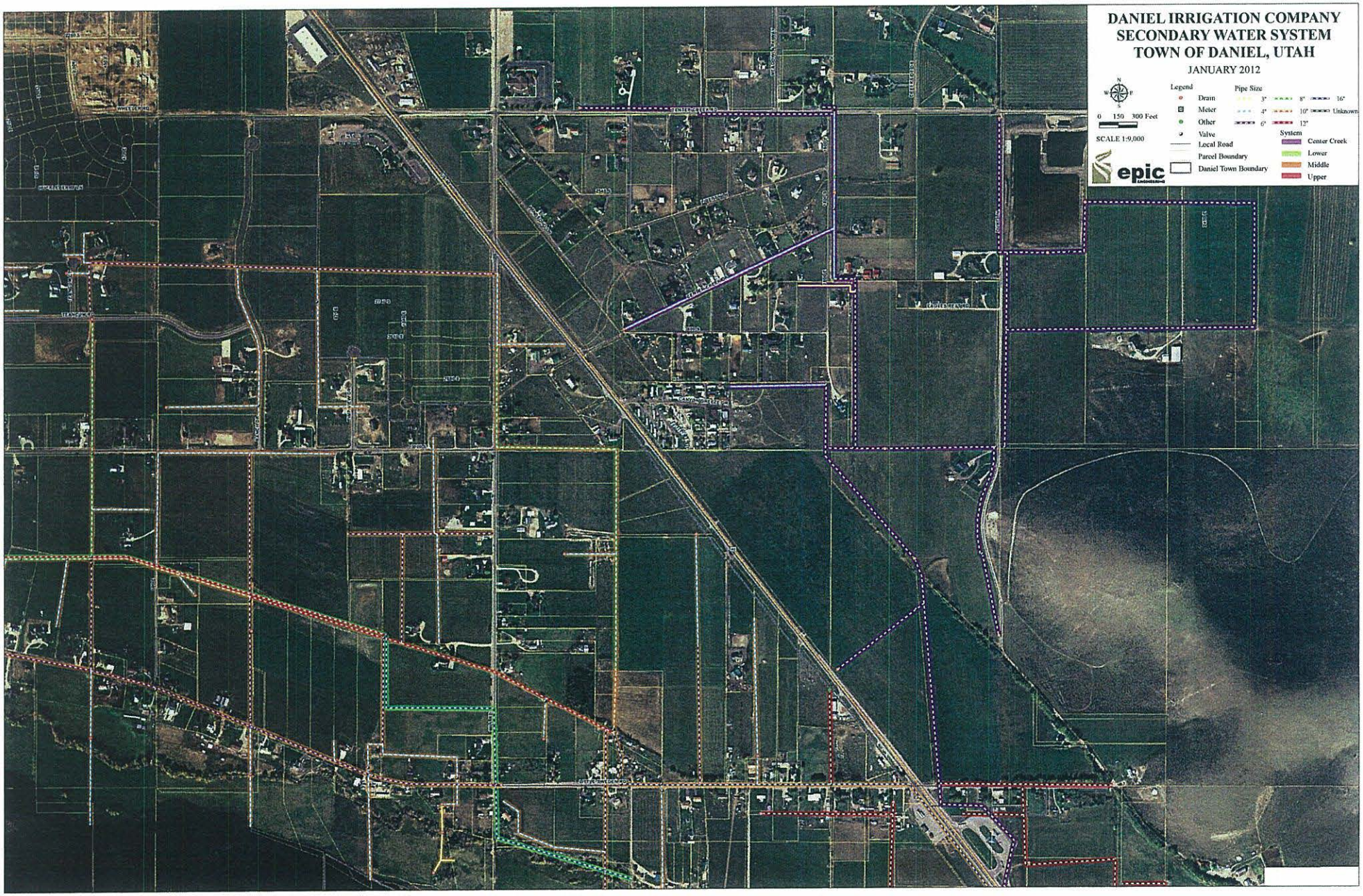
COPY


DANIEL IRRIGATION COMPANY
SECONDARY WATER SYSTEM
TOWN OF DANIEL, UTAH
JANUARY 2012
0 250 500 Feet
SCALE 1:18,000
Legend
Drain
Meter
Other
Valve
Local Road
Parcel Boundary
Daniel Town Boundary
Pipe Size
3"
4"
6"
8"
10"
12"
16"
Unknown
System
Center Creek
Lower
Middle
Upper
epic

COPY


DANIEL IRRIGATION COMPANY
SECONDARY WATER SYSTEM
TOWN OF DANIEL, UTAH
JANUARY 2012
0 150 300 Feet
SCALE 1:9,000
epic
Legend
Drain
Meter
Other
Valve
Local Road
Parcel Boundary
Daniel Town Boundary
Pipe Size
3"
4"
6"
8"
10"
12"
16"
Unknown
System
Center Creek
Lower
Middle
Upper

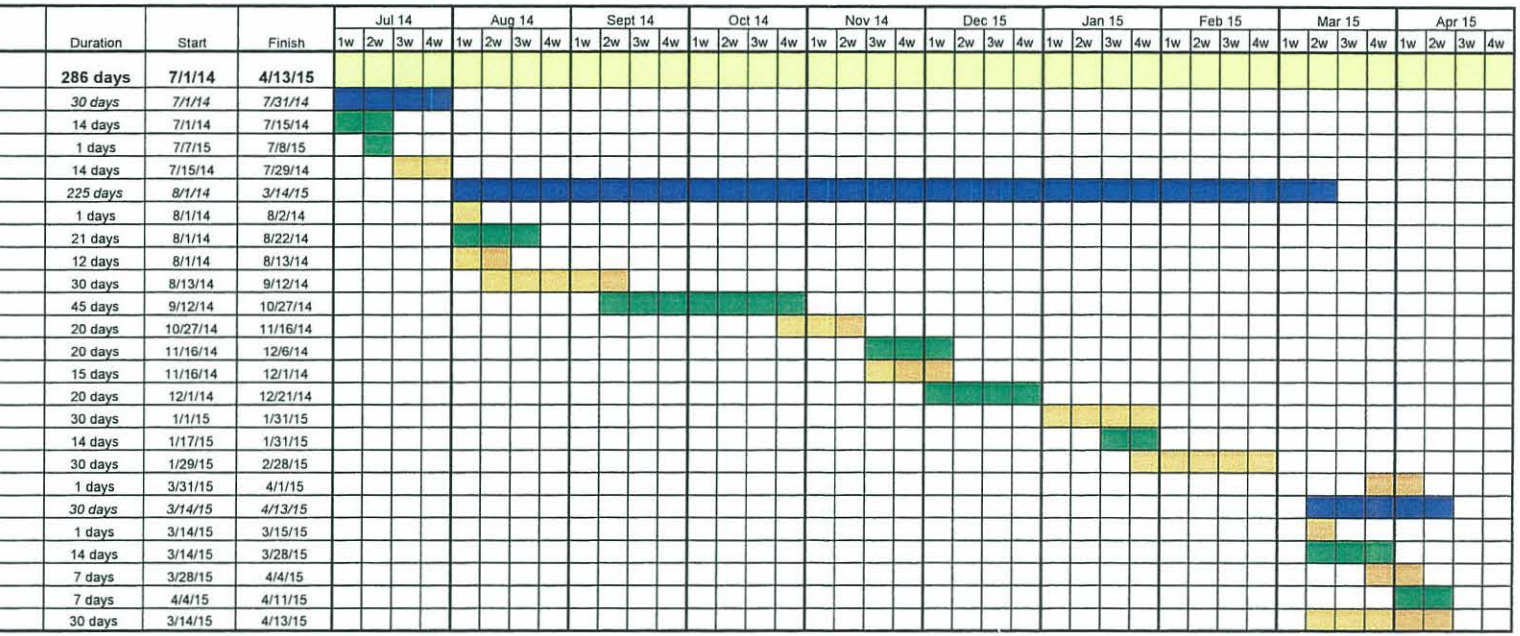
COPY


DANIEL IRRIGATION COMPANY
SECONDARY WATER SYSTEM
TOWN OF DANIEL, UTAH
JANUARY 2012
Legend
Drain
Meter
Other
Valve
Local Road
Parcel Boundary
Daniel Town Boundary
Pipe Size
3"
4"
6"
8"
10"
12"
16"
Unknown
System
Center Creek
Lower
Middle
Upper
0 150 300 Feet
SCALE 1:9,000
epic

COPY

EXHIBIT B –PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish
A	**Daniels Irrigation Company Canal Piping Project**	**286 days**	**7/1/14**	**4/13/15**
100	***PROJECT BIDDING & AWARD***	*30 days*	*7/1/14*	*7/31/14*
101	Advertise, Bidder Questions, Addenda	14 days	7/1/14	7/15/14
102	Pre-bid Meeting	1 days	7/7/15	7/8/15
103	Review Bids & Recommend Award	14 days	7/15/14	7/29/14
200	***CONSTRUCTION***	*225 days*	*8/1/14*	*3/14/15*
201	Preconstruction Meeting	1 days	8/1/14	8/2/14
202	Review & Recommend Submittals	21 days	8/1/14	8/22/14
203	Mobilization	12 days	8/1/14	8/13/14
204	Pipeline Excavation	30 days	8/13/14	9/12/14
205	Pipeline Installation	45 days	9/12/14	10/27/14
206	Pipeline Backfill	20 days	10/27/14	11/16/14
207	Cleanup and restoration	20 days	11/16/14	12/6/14
208	Testing	15 days	11/16/14	12/1/14
209	Punchlist & Final Inspection	20 days	12/1/14	12/21/14
210	Record Drawings	30 days	1/1/15	1/31/15
211	O&M Manual Review	14 days	1/17/15	1/31/15
212	Project Closeout	30 days	1/29/15	2/28/15
213	Open Canal For Use	1 days	3/31/15	4/1/15
300	***FINAL REPORT & FUNDING CLOSEOUT***	*30 days*	*3/14/15*	*4/13/15*
301	Meeting	1 days	3/14/15	3/15/15
302	Draft Report	14 days	3/14/15	3/28/15
303	Incorporate Review Comments	7 days	3/28/15	4/4/15
304	Final Report	7 days	4/4/15	4/11/15
305	Final Funding Documentation	30 days	3/14/15	4/13/15



COPY

EXIBIT C –ENGINEERING PLANS AND SPECIFICATIONS

COPY

DANIELS IRRIGATION CANAL PIPING PROJECT
Daniels Irrigation Company
Wasatch County, Utah

Preliminary Engineering Plans and Specifications Outline

- 30" diameter pipe required to maintain flow characteristics of existing canal
- Existing canal will be excavated to a consist design slope
- 30" pipe will be bedded and laid in existing canal alignment
- Pipe will be buried with a min of 1 foot of cover and graded
- All disturbed/graded areas will be reseeded with native plants

All designs and specifications will meet local and state design standards for buried pipelines.

COPY

EXHIBIT D –CALCULATIONS

epic ENGINEERING *"Sustainability is Epic"*

Date: 12/16/2013
Page: 1 of 1
By: Kyle Turnbow
Subject: Daniels Irrigation Company Piping Project
EXHIBIT C - CALCULATIONS

Daniels Irrigation Company Canal Piping Project

Given

Irrigation Season: April 1st thru October 31st = 7 months =	214	days
Water Right:	54	cfs
Jordanelle Reservoir Average Pumping:	2400	AF/yr
Average Supply For Project Canal Section:	14	cfs
Canal Length:	1.3	miles
Test Section Length:	0.69	miles
Test Section Percent of Canal:	53%	
Test Section Losses:	2.50	cfs
Annual Evaporation Rate:	60	inches/year
Wetted Perimeter:	10	ft

Calculations

Total Average Annual Water Supply :

= (average cfs for season)*(acre-ft/day/1 cfs)*(days/season)+(Jordanelle Pumping)
= **8341.07 acre-ft/season**

Canal Seepage Losses :

= (Test Section Losses)/(Test Section % of Canal)
= **4.71 cfs**

Evaporation losses :

= (Evaporation Rate*Length*Water Surface Width*Days in Season)/(ft/inches*AF/cf*day/yr)
= **4.62 acre-ft/season**

Existing Infiltration Losses :

= (Canal Seepage Losses)*(acre-ft/day/1 cfs)*(days/season)
= **1998.81 acre-ft/season**

Total Existing Transport Losses:

= Evaporation Losses + Existing Infiltration Losses
= **2003.43 acre-ft/season**

Total Existing Delivery Efficiency :

= (Total Average Supply-(Existing Transport Losses+Evaporation Losses))/(Total Average Supply)
= **76%**

Annual Water Saved After Completion:

= Existing Infiltration Losses + Evaporation Losses
= **2003.43 acre-ft/season**

Conversions

365	day	=	1	year
12	in	=	1	ft
5280	ft	=	1	mile
43560	cf	=	1	acre-ft
1	cfs	=	1.98	acre-ft/day

COPY

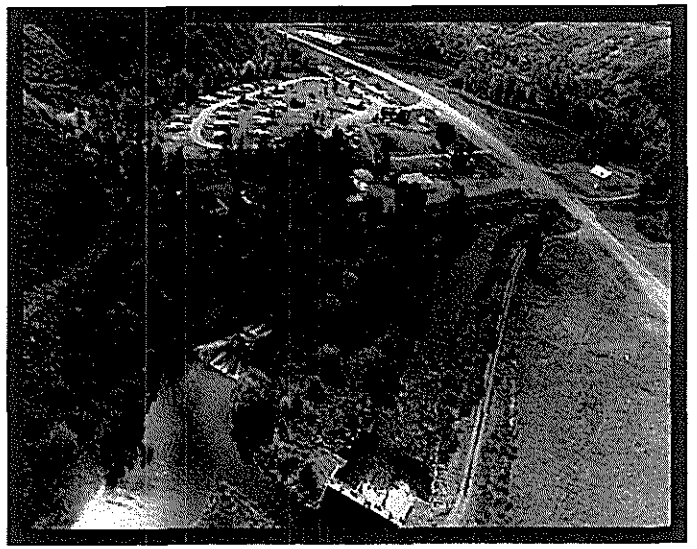
EXHIBIT E –WASATCH COUNTY WATER EFFICIENCY PROJECT

Central Utah Water
Conservancy District
355 West University Pkwy.
Orem, UT 84058
(801) 226-7100

Wasatch County Water Efficiency Project
626 East 1200 South
Heber, UT 84032
(435) 654-4369

http://www.cuwcd.com

Wasatch County Water Efficiency Project



November 2001

INTRODUCTION

The Wasatch County Water Efficiency Project (WCWEP) is located in Heber Valley, Wasatch County, Utah. The project area is on the east side of the Provo River, extending from the base of Jordanelle Reservoir to the south end of the valley near the mouth of Daniels Creek Canyon. The project is bounded on the east by the Timpanogos Canal and extends west to the town of Charleston, Utah.

PROJECT SCOPE

The Wasatch County Water Efficiency Project consists of approximately 48 miles of pipelines, 7 pumping stations, rehabilitation of over 21 miles of canals, and the project administration building. The current project includes the following project elements:

Regulating Ponds
Working pond, overflow pond, overflow weir, emergency spillway, and drainage piping for the Timpanogos and Humbug Regulating Ponds.

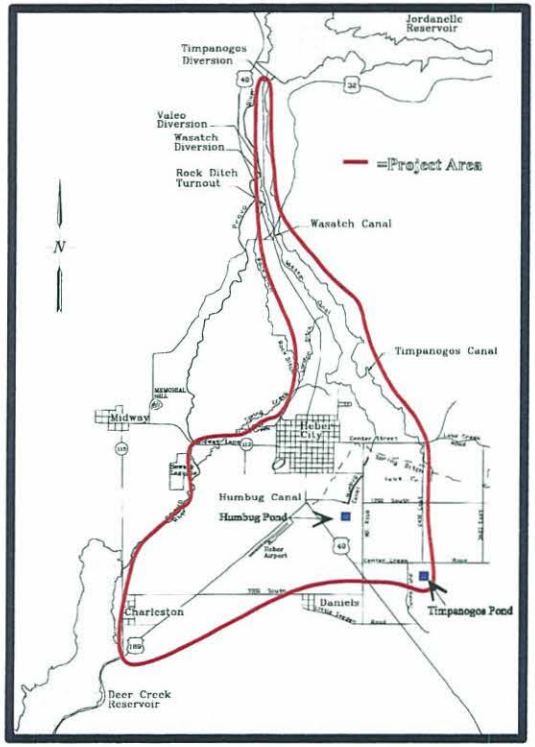
Canals
Restoration, linings (clay and concrete), and improvements to the Timpanogos, Wasatch and Humbug canals.

Pump Stations
Seven pump stations, four along the Timpanogos Canal: T-2/T-3, T-5, T-6b/T-6c, andT-7/T-9/T-8/DRP-1c/DLP; two along the Wasatch/Humbug Canal: W-1 and W-3; and one diesel booster pump, DRP-3, at the Daniels Irrigation Company Middle Pond.

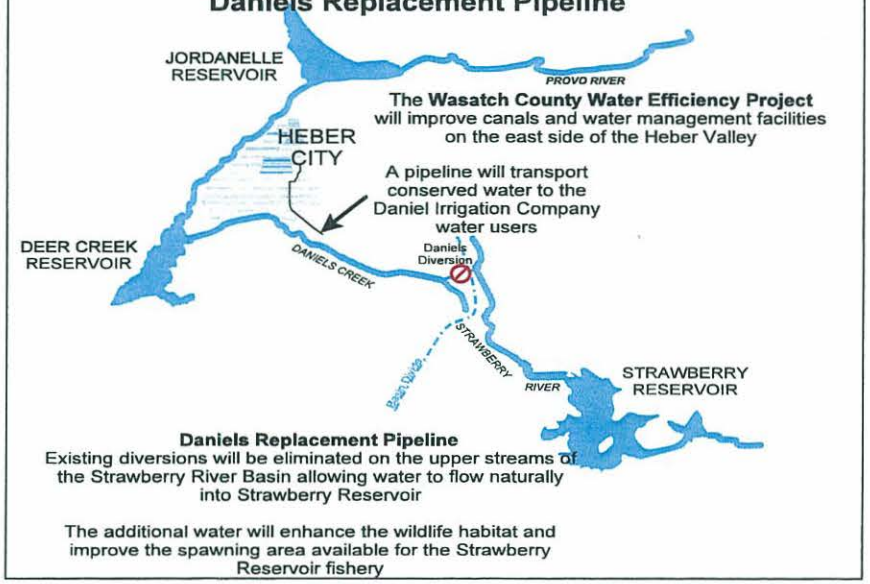
Administration Building
Administration Building, parking lot, storage yard, and SCADA (Supervisory Control and Data Acquisition) computer monitoring system.

On-Farm Distribution Pipe Systems
Over 48 miles of pipelines including main lines, laterals, meter stations and pressure reducing stations, air/vacuum stations, and turnouts for the users.

Daniels Replacement Line
Flow meter and float valve stations, Daniels Middle and Lower Pond Inlet Structures, and DRP-1 and DRP-2 pipelines.

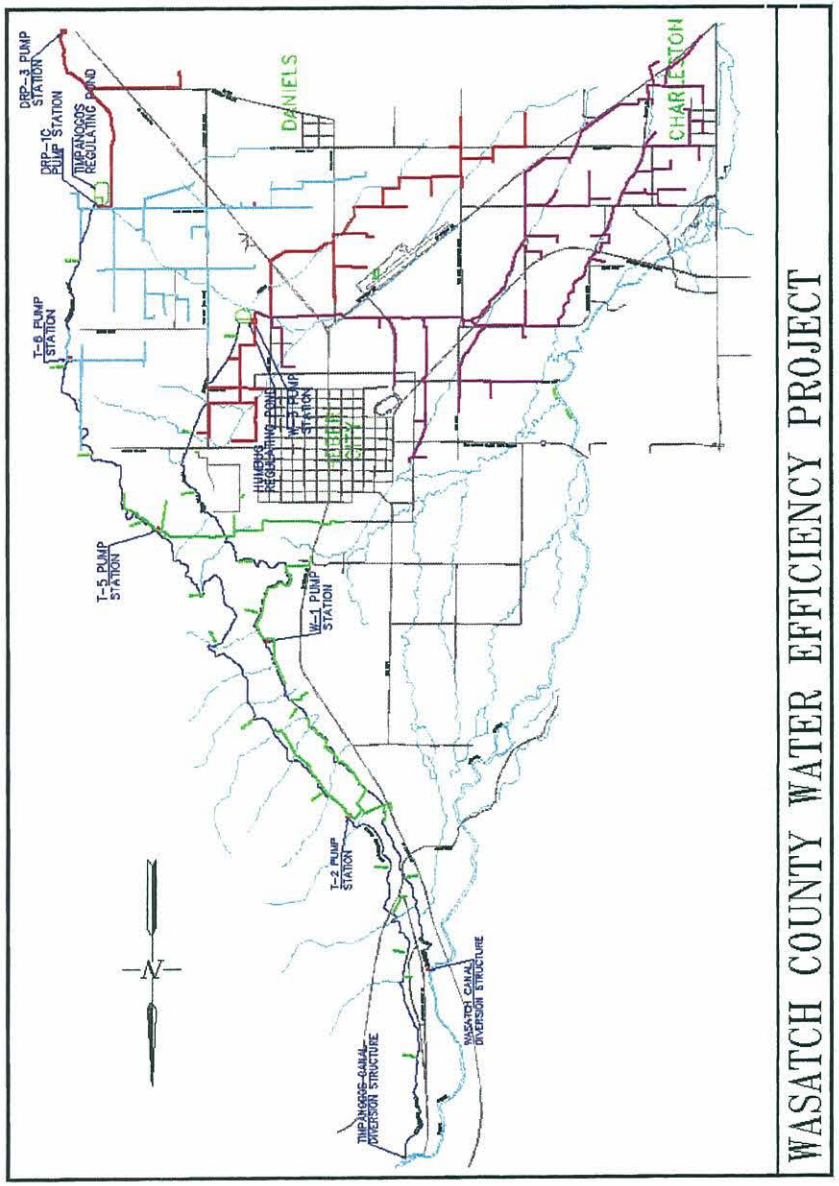


Wasatch County Water Efficiency Project (WCWEP) and the Daniels Replacement Pipeline



Daniels Replacement Pipeline
Existing diversions will be eliminated on the upper streams of the Strawberry River Basin allowing water to flow naturally into Strawberry Reservoir

The additional water will enhance the wildlife habitat and improve the spawning area available for the Strawberry Reservoir fishery



WASATCH COUNTY WATER EFFICIENCY PROJECT

The Wasatch County Water Efficiency Project (WCWEP) will dramatically reduce irrigation water use by making pressurized water available for sprinkler conversions. Conveyance losses will also be reduced as aged canals are lined and rehabilitated.

Water conserved will meet three particular goals:

1) help meet the CUPCA mandate of water conservation,
2) bolster in-stream flows in five Heber Valley streams, and
3) replace the historical source of Daniels Irrigation Company's water diverted from the Strawberry River.

The termination of the 100-year-old Daniels Diversion was mandated by CUPCA and has been included in WCWEP planning from the outset. Pressurized water will be delivered to irrigation company service areas through pipelines extending from the Timpanogos, Wasatch, and Humbug canals. Pumps along these canals will pressurize water for nearly all land above the Sagebrush and Spring Creek Canal. Land at lower elevations may be served by gravity pressure. All of the lands receiving pressurized irrigation water through the project will be sprinkler irrigated rather than flood irrigated, resulting in significant water conservation. Water conserved by the improved irrigation systems will be used to supplement stream flows of Heber Valley streams and to replace Strawberry Valley water in Daniels Creek.

Water Use in Heber Valley

Historical	
Provo River Diversions	53,900 acre-feet
Local Stream Diversions	35,410 acre-feet
Transbasin Diversion	2,900 acre-feet
Subtotal	92,210 acre-feet
CUP Ag. water available	12,100 acre-feet
CUP M&I water available	2,400 acre-feet
Total potential water supply	106,710 acre-feet
Efficiency Project Planned Conservaton	
Reduced demand for CUP Ag. water	2,900 acre-feet
Reduced spring & early summer diversions	20,750 acre-feet
Total conserved water	23,650 acre-feet

DANIEL'S REPLACEMENT PIPELINE PROJECT

A critical element of the WCWEP is the termination of a transbasin diversion from the Strawberry River. Water flowing through a diversion tunnel has been used by the Daniel Irrigation Company for nearly 100 years to service its irrigation area.

In addition to supplementing local streams, water conserved by WCWEP will be pumped to the Daniel Irrigation Company to replace water from the Strawberry River basin. The Daniel Replacement Pipeline will eliminate the need for the existing Daniel's Irrigation Company diversion facilities from the Strawberry River Basin. These facilities will be removed and the areas restored.

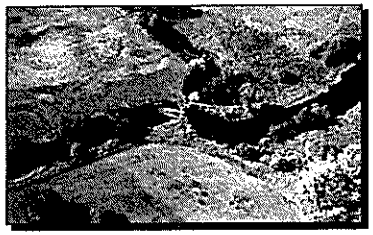
The termination of the Daniel Irrigation Company transbasin diversion will result in an increase of 2,900 acre-feet per year of natural inflow to Strawberry Reservoir which will benefit fish and fish spawning.

WCWEP PIPELINE DISTRIBUTION SYSTEM

A 48-mile system of pipeline laterals will extend from pump stations located along the rehabilitated main canals. Built to convey pressurized irrigation water, these laterals will enable the conservation of over 23,000 acre-feet of water per year as the valley converts from flood to sprinkler irrigation.

IN-STREAM FLOWS

Water conserved in the improved irrigation systems will be used to supplement the flows of some Heber Valley streams: Spring Creek, Lower Lake Creek, London Ditch, and Creamery Ditch.



PROJECT FEATURES

- Replacement of some distribution canals with pipeline
- Rehabilitation of aging irrigation canals
- Delivery of pressurized water across Heber Valley for use in sprinkler irrigation
- Conserved water used to supplement Heber Valley streams
- Conserved water used to replace Daniel Irrigation Company flows upon termination of Strawberry River diversion

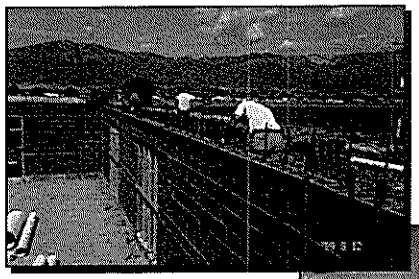
Project Component	Benefit
Area converted from flood to sprinkler irrigation	3,675 acres
Length of new pipeline, Heber Valley	48.1 miles
Existing canals rehabilitated	21.8 miles
New pumping stations	7
Sprinkler system booster pumps discontinued	32
Length of streams enhanced, Heber Valley	9.2 miles
Length of streams enhanced, Strawberry Valley	34.5 miles
Power line extensions	3.6 miles
Length of O&M roads	1 mile

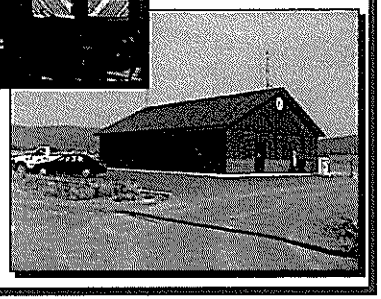
Stream	Present Flow (cfs)	Anticipated augmented flows (cfs)
Spring Creek above Charleston Upper Canal	26.9	34.36
Spring Creek at confluence with Provo River	21.79	38.69
Lower Lake Creek	0.35	5
London Ditch	2.4	2.93
Creamery Ditch	3.78	4.34

ADMINISTRATION BUILDING

The administration building is located at 1200 South 800 East, Heber City, near the Humbug Regulating Pond and the W-3 Pump Station. This building serves as the administrative offices for the project as well as the nerve center for the telemetry and monitoring system. This computer system interfaces with all the pump stations, ponds, diversion structures, etc., and allows the operators to view what is being delivered to each of the separate irrigation systems. This system transmits, via radio signal, the status of each pump station, the flows and pressures of the pumped lines, The flows on the major gravity lines, and the flows at each of the diversion splitter structures.

Alarms and problems are also transmitted to the administration building. This centralized location allows the operators and managers to have a real-time interface with all major system facilities without the requirement of traveling to each of the facilities several times a day. All irrigation subscriptions; individual irrigation system approvals; operation, maintenance, and customer problems; and concerns or questions are handled at this office. Contact Larry Hartley, Devin McKrola, or Jane Hinkson at 435-654-4369.





COPY

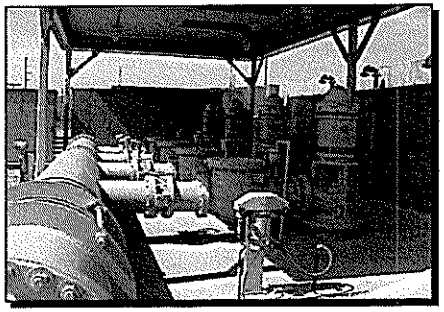
PUMP STATIONS cont.

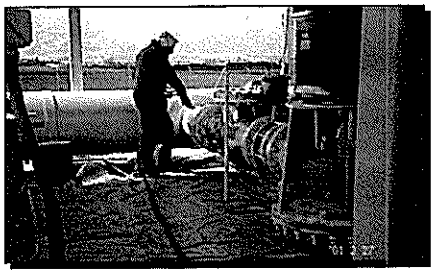
Pump Station W-3

The location of the W-3 Pump Station is at the edge of the Humbug Regulating Pond. The station provides pressure flow to distribution pipelines W-I, W-J, and W-K which serve the southern portion of Heber City and the southern side of Highway 189. A 48-inch, gravity pipeline also begins at this location.
This provides irrigation water to the western portion of the valley and the town of Charleston. This pump station consists of four, large, vertical-turbine pumps. The pump station is designed to provide 25.9 cfs at a pressure of 53 psi.

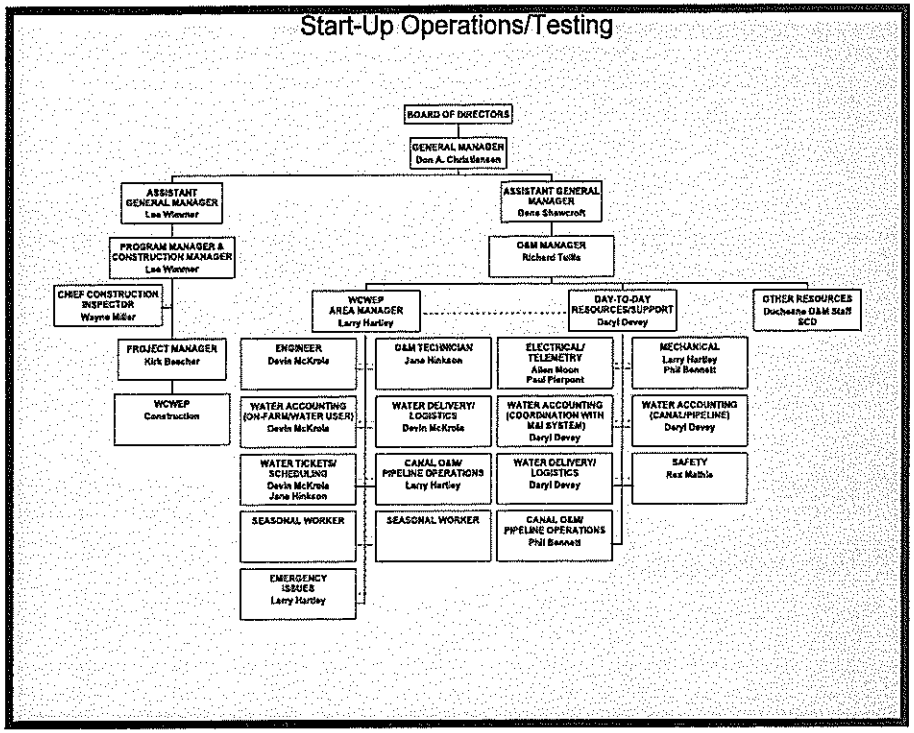
Pump Station W-3 - Operating Criteria

Minimum Pumping Rate:	3.1 cfs (1,390 gpm)
Design Flow Rate (Four Pumps):	25.8 cfs (11,625 gpm)
Design Operating Pressure (Four Pumps):	58 psi
Pressure for Starting Lag Pump (Pump B):	45 psi
Pressure for Starting Lag Pump (Pump C):	45 psi
Pressure for Starting Lag-Lag-Lag Pump (Pump D):	45 psi
Pressure for Stopping Lag-Pump (Pump B):	70 psi
Pressure for Stopping Lag-Lag Pump (Pump C):	65 psi
Pressure for Stopping Lag-Lag-Lag Pump (Pump D):	60 psi
Maximum Pressure:	78 psi
Minimum Pressure:	45 psi



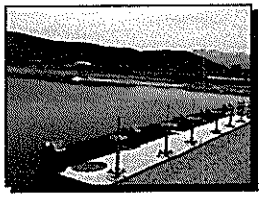


WCWEP ORGANIZATION CHART

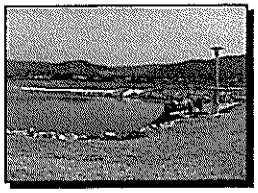


PONDS

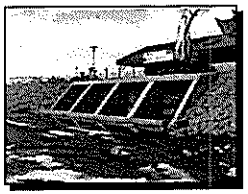
TIMPANOGOS POND

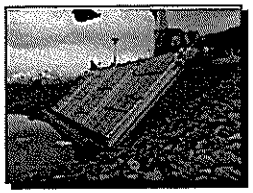


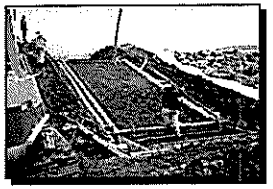
HUMBUG POND



Along the reconstructed and improved canals, four of the seven pump stations were constructed. The two largest pump stations are constructed on large regulating/overflow ponds. The Timpanogos Canal now ends at the Timpanogos Regulating and Overflow pond. This is located at approximately 2400 South and 2200 East. The Wasatch/Humbug Canal ends at the Humbug Regulating and Overflow pond. This is located at 1200 South and 800 East. These ponds were constructed to allow sediment and debris to settle before being pumped into the system. They also provide water storage, protection from flooding, and protection from other potential problems with a major storm. Both ponds are designed and constructed with a smaller working pond and a larger overflow pond. The working ponds are clay and riprap lined with overflow spillways, pump station inlet/screening structures, and piping to drain the pond at the irrigation season's end. The overflow ponds are not clay lined. This allows overflow waters to help recharge the ground water in the area. These overflow ponds are protected with overflow spillways and drains that are routed to existing natural channels and streams. The material excavated from both of these ponds was processed and used for bedding and construction of other parts of the project including pipelines, canals, and structures.







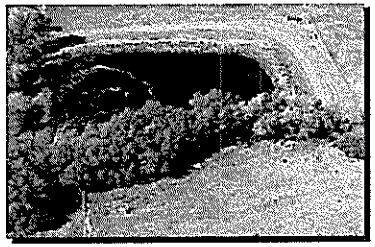
Pond-Operating Criteria

Description	Timpanogos Pond	Humbug Pond
Pond Total Area	15.7 acres	9.0 acres
Top of Dike Elevation	5,807.15	5684.00
Working Pond Criteria		
Pond Volume	11.0 ac-ft	11.0 ac-ft
Low Point Elevation	5,797.00	5,674.60
Working Water Elevation	5,804.20	5,681.80
Working Water Surface Depth	7.2 feet	7.2 feet
Spillway Elevation	5,804.70	5,682.30
Spillway Water Surface Depth	7.7 feet	7.7 feet
Spillway Water Width	90 feet	100 feet
Maximum Water Storage Elevation	5,806.27	5,683.10
Maximum Water Storage Depth	8.27 feet	8.5 feet
Operational Spillway Elevation	N/A	5,680.25
Operational Spillway Water Depth	N/A	5.65 feet
Operational Spillway Width	N/A	10 feet
Overflow Pond Criteria		
Pond Volume	62.3 ac-ft	44.1 ac-ft
Low Point Elevation	5,794.00	5,671.60
Spillway Water Elevation	5,804.20	5,682.00
Spillway Water Surface Depth	10.2 feet	10.4 feet
Spillway Width	100 feet	125 feet
Maximum Water Storage Elevation	5,806.27	5,681.10
Maximum Water Storage Depth	12.27 feet	11.5 feet

PUMP STATIONS cont.

Pump Station DRP-3

The location of the DRP-3 Pump Station is near the Daniels Middle Pond, just off Highway 40 south of Heber. It provides pressure flow to supplement Daniels Irrigation Company's feed from the Daniels Upper Pond.



The pump station is designed to provide 5.7 cfs at 23 psi at the station. This pump station is a diesel-powered, in-line, centrifugal pump. It is designed for use only in very dry water years.

Pump Station DRP-3 - Operating Criteria

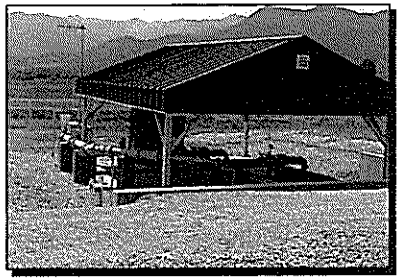
Minimum Pumping Rate:	2.0 cfs (900 gpm)
Design Flow Rate:	5.7 cfs (2,560 gpm)

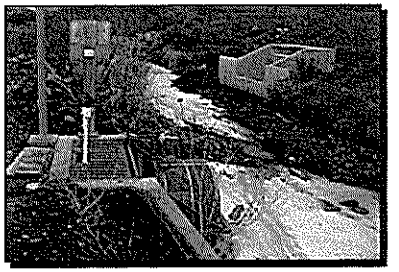
Pump Station W-1

The location of the W-1 Pump Station is along the Wasatch Canal near Coyote Lane north of Heber City. It provides pressure flow to distribution pipelines W-E and W-F. These pipelines serve properties along the Wasatch Canal in this area. The pump station is designed to provide 3.13 cfs at a pressure of 51 psi.

Pump Station W-1 - Operating Criteria

Minimum Pumping Rate:	0.62 cfs (280 gpm)
Design Flow Rate (Two Pumps):	3.13 cfs (1,405 gpm)
Design Operating Pressure (Two Pumps):	51 psi
Pressure for Starting Lag Pump (Pump B):	39 psi
Pressure for Turning Off Lag Pump (Pump B):	48 psi
Flow rate for Alarming Low Flow:	0.56 cfs (250 gpm)
Maximum Pressure:	55 psi
Minimum Pressure	38 psi





PUMP STATIONS cont.

Pump Station T-8

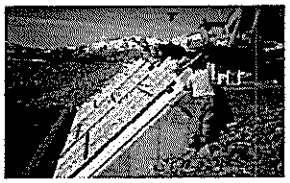
The location of theT-8 Pump Station is at the edge of the Timpanogos Regulating Pond in a shared facility with DRP-1c/DLP and T-7/T-9 pump stations. It provides pressure flow to distribution pipelines that supply supplemental irrigation water to the Center Creek Irrigation Company. The pump station is designed to provide 5.2 cfs at a pressure of 115 psi. This high pressure is required to match the system pressure of this irrigation company. This pump station is equipped with two vertical-turbine pumps.

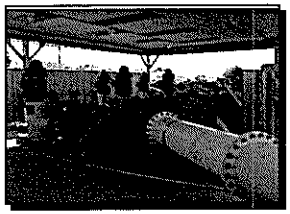
Pump Station (T-8) - Operating Criteria

Minimum Pumping Rate:	0.9 cfs (405 gpm)
Design Flow Rate (Two Pumps):	5.2 cfs (2,664 gpm)
Design Operating Pressure (Two Pumps):	115 psi
Pressure for Starting Lag Pump (Pump B):	110 psi
Pressure for Turning Off Lag Pump (Pump B):	143 psi
Flow rate for Alarming Low Flow:	0.84 cfs (375 gpm)
Maximum Pressure:	143 psi
Minimum Pressure:	110 psi

Pump Station DRP-1c/DLP

The location of the DRP-1c/DLP Pump Station is at the edge of the Timpanogos Regulating Pond in a shared facility with T-7/T-9 and T-8 pump stations. It provides pressure flow to feed the Daniels Irrigation Middle Pond and the Daniels Irrigation Lower Pond. The pump station is designed to provide 26 cfs at a pressure of 95 psi. These are the pumps that supply irrigation water to the Daniels Irrigation Company and eliminate the need to bring 2,900 acre-feet of water from the Strawberry Valley drainage. These pumps consist of five vertical-turbine pumps; one 100 hp and four 200 hp.



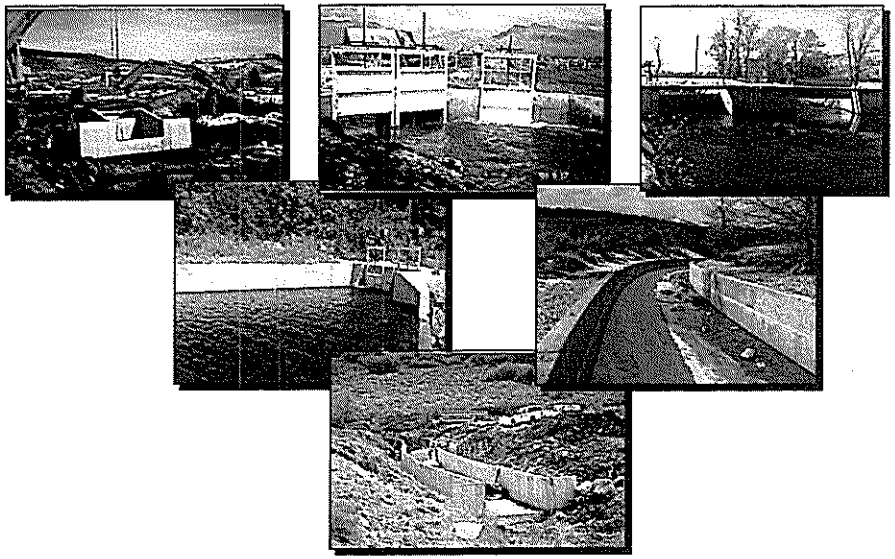


Pump Station (DRP-1C/DLP)) - Pumping Rates

Condition	Flow going to middle pond only Flow (cfs)	Flow going to both lower & middle ponds Flow (cfs)
All Pumps Off	0.0 (0 gpm)	0 (0 gpm)
1-100 hp	3.3 (1,480 gpm)	4.0 (1,795 gpm)
1-200 hp	6.4 (2,870 gpm)	7.8 (3,500 gpm)
1-100 hp + 1-200 hp	9.5 (4,265 gpm)	10.7 (4,800 gpm)
2-200 hp	12.4 (5,565 gpm)	13.1 (5,880 gpm)
1-100 hp + 2-200 hp	15.3 (6,865 gpm)	15.9 (7,135 gpm)
3-200 hp	18.0 (8,080 gpm)	18.6 (8,350 gpm)
1-100 hp + 3-200 hp	20.6 (9,245 gpm)	21.3 (9,560 gpm)
4-200 hp	23.0 (10,320 gpm)	23.6 (10,590 gpm)
1-100 hp + 4-200 hp	25.0 (11,220 gpm)	25.7 (11,535 gpm)

INLET WORKS, CANALS, & OVERFLOW STRUCTURES

Restoration and improvements to the Timpanogos, Wasatch, and Humbug Canals allow irrigation water to be carried to the new pump stations and storage ponds. These improvements include new diversion structures, cleaning of the entire canal system, new alignments, grading and clay lining in a portion of the three canals, and concrete lining for four sections of the Timpanogos Canal and one section of the Wasatch Canal. New diversions were constructed on the Provo River at the Timpanogos and Wasatch Canals. The existing Valeo Diversion on the Provo River was eliminated. Canal crossings at some existing roads and natural streams were replaced with new concrete structures. Provisions were also made to allow historical flood waters to be diverted into the canal systems. During recent history of the Timpanogos Canal, heavy storms have caused this canal to overflow and flood. The ability to control this overflow was also built into this project. At three separate locations, overflow structures and pipelines were constructed that convey overflow water from the Timpanogos Canal to the Wasatch Canal. One overflow structure was also constructed in the Wasatch Canal. This overflow takes water to the London Ditch.



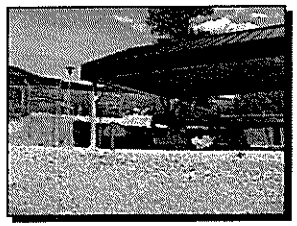
PUMP STATIONS

Pump Station T-2/T-3

The location of the T-2/T-3 Pump Station is along the Timpanogos Canal near Moulton Lane north of Heber City. It provides pressure flow to distribution pipelines T-D and T-D-A. The pump station is designed to provide 3.91 cfs at a pressure of 45 psi to the lands along the Timpanogos Canal in this area.

Pump Station (T-2/T-3) - Operating Criteria	
Minimum Pumping Rate:	0.66 cfs (296 gpm)
Design Flow Rate (Two Pumps):	3.91 cfs (1,755 gpm)
Design Operating Pressure (Two Pumps):	45 psi
Pressure for Starting Lag Pump (Pump B):	30 psi
Pressure for Turning Off Lag Pump (Pump B):	47 psi
Flow rate for Alarming Low Flow:	0.66 cfs (250 gpm)
Maximum Pressure:	50 psi
Minimum Pressure	30 psi

A gravity irrigation line starts at this pump station and delivers water to the area along the Wasatch Canal. This pump station consists of two in-line centrifugal pumps.

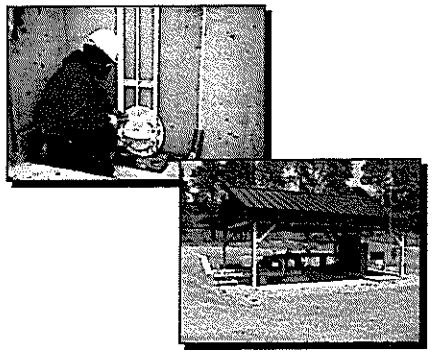


Pump Station T-5

The location of the T-5 Pump Station is along the Timpanogos Canal near 900 North 1600 East in the northeast corner of Heber City. It provides 1.9 cfs at a pressure of 28 psi.

Pump Station (T5) - Operating Criteria	
Minimum Pumping Rate:	0.10 cfs (45 gpm)
Design Flow Rate (Two Pumps):	1.9 cfs (850 gpm)
Design Operating Pressure (Two Pumps):	28 psi
Pressure for Starting Lag Pump (Pump B):	20 psi
Pressure for Turning Off Lag Pump (Pump B):	28 psi
Flow rate for Alarming Low Flow:	0.09 cfs (40 gpm)
Maximum Pressure:	31 psi
Minimum Pressure:	19 psi

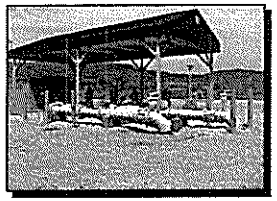
A gravity line also starts at this location and serves the northern/northeastern portion of Heber City west of Highway 40. This gravity line serves users that historically received irrigation water from the Wasatch Canal. This pump station consists of two in-line centrifugal pumps. A stilling/settling pond was constructed by routing the canal through an existing pond adjacent to this pump station.



PUMP STATIONS cont.

Pump Station T-6b/T-6c

The location of the T-6b/T-6c Pump Station is on the Timpanogos Canal along 2400 East at 700 South. This pump station is two separate pumping systems at the same location. They utilize common inlet/diversion structures and shelter facilities. The T-6c Pump Station is designed to provide 6.18 cfs at a pressure of 33 psi. The T-6c Pump Station provides pressure flow to distribution pipeline T-I and serves this area.



Pump Station (T-6b/T-6c) - Operating Criteria	
T-6B	
Minimum Pumping Rate:	2.22 cfs (1,000 gpm)
Design Flow Rate (Two Pumps):	8.79 cfs (3,945 gpm)
Design Operating Pressure (Two Pumps):	66 psi
Pressure for Starting Lag Pump (Pump B):	61 psi
Pressure for Turning Off Lag Pump (Pump B):	77 psi
Flow rate for Alarming Low Flow:	2.1 cfs (950 gpm)
Maximum Pressure:	92 psi
Minimum Pressure:	60 psi
T-6C	
Minimum Pumping Rate:	1.5 cfs (675 gpm)
Design Flow Rate (Two Pumps):	6.18 cfs (2,774 gpm)
Design Operating Pressure (Two Pumps):	33 psi
Pressure for Starting Lag Pump (Pump B):	30 psi
Pressure for Turning Off Lag Pump (Pump B):	45 psi
Flow rate for Alarming Low Flow:	1.4 cfs (630 gpm)
Maximum Pressure:	48 psi
Minimum Pressure	30 psi

The T-6b Pump Station is designed to provide 8.79 cfs at a pressure of 66 psi. The T-6b Pump Station supplies supplemental irrigation water to the Lake Creek Irrigation Company at two connection points. T-6b and T-6c are both a pair of vertical-turbine pumps.

Pump Station T-7/T-9

The location of the T-7/T-9 Pump Station is at the edge of the Timpanogos Regulating Pond and is combined at the same site with pump stations DRP-1c/DLP and T-8. It provides pressure flow to distribution pipelines T-J and T-K. These lines serve the area from 2400 East and 1200 South west to Highway 40 and Daniels Road. The pump station is designed to provide 22.3 cfs at a pressure of 39 psi. The pump station consists of two high- horsepower, vertical-turbine pumps.

Pump Station (T-7/T-9) - Operating Criteria	
Minimum Pumping Rate:	5.35 cfs (2,400 gpm)
Design Flow Rate (Two Pumps):	22.3 cfs (10,000 gpm)
Design Operating Pressure (Two Pumps):	39 psi
Pressure for Starting Lag Pump (Pump B):	37 psi
Pressure for Turning Off Lag Pump (Pump B):	58 psi
Flow rate for Alarming Low Flow:	6.7 cfs (3,000 gpm)
Maximum Pressure:	58 psi
Minimum Pressure:	35 psi

COPY

EXHIBIT F –COST ESTIMATES

COPY

ENGINEERS ESTIMATE OF PROJECT COST
DANIELS IRRIGATION COMPANY
30-INCH DIAMETER CANAL PIPING PROJECT
1/7/2015

Item	Description	Quantity	Unit	Unit Cost	Total
1	30" ADS Pipe	6864	LF	$ 26.00	$ 178,464.00
2	Import Bedding	3328	CY	$ 20.00	$ 66,555.38
3	Installation	6864	LF	$ 15.00	$ 102,960.00
4	Final Grading & Seeding	96096	SF	$ 0.25	$ 24,024.00
	Construction Total				**$ 372,003.38**
5	Engineering	1	LS	$ 37,200.34	$ 37,200.34
6	Grant Administration	1	LS	$ 3,720.03	$ 3,720.03
7	Survey	1	LS	$ 11,160.10	$ 11,160.10
8	Construction Management	1	LS	$ 29,760.27	$ 29,760.27
9	Environmental	1	LS	$ 7,440.07	$ 7,440.07
	Engineering Sub Total				**$ 89,280.81**
10	10% Construction Contingency				$ 37,200.34
	Grand Total				**$ 498,484.53**
	Applicants Cost Share	**55%**			**$ 274,166.49**
	Reclamations Cost Share	**45%**			**$ 224,318.04**

epic ENGINEERING

"Sustainability is Epic"

COPY

EXHIBIT G –INVOICES

COPY

Invoice

epic ENGINEERING
50 East 100 South
Heber City, UT 84032
P: (435) 654-6600 F: (435) 654-6622

Doug Crittenden
Daniel Irrigation Company
3115 South Daniel Road
Daniel, UT 84032

January 22, 2014
Invoice No: 20083308

Project Manager Geoffrey Taylor
PROJECT 13SM1275.02 Daniel Irrigation WaterSmart Grant 2014

Professional Services for the Period:July 01, 2013 to January 15, 2014

PHASE A Watersmart Application & Report

Professional Personnel

	Hours	Rate	Amount	
Project Manager				
Taylor, Geoffrey	10.00	124.00	1,240.00	
Engineer w/F.E.				
Bean, Joshua	.50	85.00	42.50	
Coburn, Kimberly	1.00	85.00	85.00	
Turnbow, Kyle	22.80	85.00	1,938.00	
Totals	34.30		3,305.50	
Total Labor				**3,305.50**
		PHASE TOTAL		**$3,305.50**
		TOTAL CURRENT INVOICE		**$3,305.50**

COPY

EXHIBIT H –SUPPORT LETTERS

COPY

January 17th 2014

Bureau of Reclamation
Financial Assistance Management Branch
P.O. Box 25007
Denver, CO 80225
ATTN: Michelle Maher, Mail Code 84-27852

Re: Letter of support for canal lining project

To whom it may concern:

The town of Daniel understands that the Daniel Irrigation Company is in the process of applying for a grant to pipe a canal that flows through the Town. The Town believes that the piping of the canal will be an improvement to the area, saving water, energy, and reducing safety risks to our residences that live below the existing canal. In addition, the canal piping will eliminate a bridge that is in much need of repair.

We support the project and appreciate your assistance in improving our town.

Respectfully
Daniel Town Mayor

Chip (Lance) Turner

COPY

COUNTY MANAGER
Michael K. Davis

WASATCH COUNTY

January 23, 2014

Bureau of Reclamation
Financial Assistance Management Branch
P.O. Box 25007
Denver, CO 80225
ATTN: Michelle Maher, Mail Code 84-27852

Re: Letter of support for canal lining project

To whom it may concern:

Wasatch County Special Service District #1 (County Water Management) supports Daniel Irrigation Company's proposed project to pipe the canal from their diversion in Daniel Creek to their middle storage pond. This will add greatly to their existing system, both in water conservation and canal safety. Water conservation through improved system efficiencies and public safety is in line with the County's general plan.

Thank you,

Steve Farrell

Steve Farrell
Chairman Wasatch County SSA #1