

Culinary Smart Metering Project

WaterSMART Small-Scale Water
Efficiency Grants for FY2017

April 2017

Draper Irrigation Company

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TECHNICAL PROPOSAL

1. Executive Summary

April 27, 2017

Draper Irrigation Company (DIC)/ WaterPro
Draper City, Salt Lake County, Utah

Culinary Smart Metering is a small-scale on-the-ground efficiency project that implements municipal metering work previously identified in DIC water planning efforts. The project is not located on a federal facility.

The project will use federal and private funds to install new ¾-inch and 1-inch ultrasonic meters with smart technology on existing metered culinary services over an eight-month period. The project proposes installing 130 ultrasonic smart meters with cellular data transmission. The 130 existing culinary service laterals will be minimally impacted by replacing the existing meters with the new meters and end points.

The future goal is to use these meters and data collection system for the entire culinary system.

Several other municipalities around the United States have successfully used these meters to improve reliability, accuracy and efficiency. The meters improve detection of leaks and overuse, as well as system flow understanding.

2. Background Data

Draper Irrigation Company (DIC) was established in 1888 when its founding members contributed their flow rights from five mountain streams for the benefit of all members. The Company was later incorporated under the laws of the State of Utah and is now a mutual irrigation company. In 1911 DIC began providing culinary water to residents within the Draper area of Salt Lake County in Utah, approximately 18 miles to the south of Salt Lake City. The area was mainly farmland and undeveloped land until the 1970's when residential development began as part of a general suburbanization trend along the Wasatch Front. Now the Draper area is primarily residential with approximately 7,467 connections to the culinary system and a census population in 2015 of 45,206. The connections to the culinary system are metered and monthly readings are taken by physically locating and reading meters. Available data from 2009 through 2016 shows the average annual usage for the system of 140 million gallons.

The system consists of over 150 miles of water lines, a water treatment plant, five wells, nine water storage reservoirs, and three connections for supplemental water from Jordan Valley Water Conservancy District (JVWCD).

2.A. Existing Facilities

Figure 1 shows a map of the culinary service area with existing facilities.

2.A.1 Sources

Culinary water for the DIC system comes from four sources: the Company's water treatment plant, the JWCD, the Company's wells, and surplus raw water from JWCD through Metro.

a) Water Treatment Plant (WTP)

Most of the system's water comes from the WTP, which has a capacity of 8.0 million gallons per day with operation near or at capacity during spring runoff and during summer when demand is highest. Surface water originates from seven canyons along the Wasatch Front in the Draper and Sandy areas and is treated at the WTP, located at the northeastern part of the service area (along 11600 South). DIC owns and operates the WTP.

b) JWCD

DIC receives water from JWCD at three separate connection points: 700 East, the WTP, and Autumn Ridge. Autumn Ridge is a surplus backup connection used for emergencies. Water from JWCD is mostly used in the summer months when demand is high due to outdoor use. DIC contracts with JWCD to receive a perpetual yearly supply of 950 ac-ft of water with an option to use an additional 20 percent, for a total of 1,140 ac-ft. If more water is available, DIC may purchase more. DIC also has a contract with JWCD to sell canyon water to JWCD and buy banked water back at the lower of either the wholesale or operational cost.

c) Wells

Five wells provide extra water as needed during times of high demand. The table shows well location and capacities.

Table 1: Descriptions of DIC wells

Qty.	Location	Capacity
1	1300 East in Draper, Utah	950 gpm
1	Valle Di Villa	650 gpm
1	Hidden Valley	3,000 gpm
2	Water Treatment Plant	1,100 gpm
		220 gpm

2.A.2 Storage

DIC owns and operates nine storage tanks for the culinary water system, with a total capacity of 23,120,000 gallons as identified in the table below.

Table 2: Descriptions of DIC storage facilities

Tank Description	Tank Location	Storage Capacity (gallons)
Northeast Bench Tank (WTP)	2558 Wasatch Blvd	1,000,000
Treatment Plant Tank	2558 Wasatch Blvd	7,000,000
Southeast Bench Tank	13800 South 1100 East	500,000*
Cove of Bear Canyon Sub. Tank	12300 South 2300 East	250,000
South Mountain Tank	1420 E Rambling Road	3,000,000
Centennial Tank (10% of tank)	15400 South 300 East	120,000
Traverse Ridge Road Tank	700 East Traverse Ridge Rd	3,000,000
Little Valley Tank	1430 East Traverse Ridge Rd	750,000
Corner Canyon Tanks	13496 South Corner Canyon Rd	8,000,000
TOTAL STORAGE		23,120,000

The Southeast Bench Tank is at an elevation between two of the zones and therefore cannot be used by DIC; it is not included in the total storage capacity.

2.A.3 Reclamation Relationship

DIC has a contract with JWCD, which is affiliated with the Central Utah Project (CUP), a Bureau of Reclamation project. CUP funding helped develop the PI system, which replaced a flood irrigation system. DIC has also received a WaterSMART grant directly from the Bureau of Reclamation for work on the Bear Canyon Intake Structure, which saved an estimated 672 acre-feet of water per year. The project was completed in November 2012.

3. Project Description

The Culinary Smart Metering project includes designing and constructing a new culinary metering system using ultra-sonic flow meters with cellular endpoints for transmitting data. This initial portion of the project includes **130 new meters**.

The new system will transmit meter readings to a computer system for near-instantaneous tracking and viewing, greatly reducing the manual labor required for meter reading and allowing faster detection of leakage and overuse. In addition, the lead-free ultra-sonic flow meters will improve accuracy, keep maintenance low, and increase reliability. The ultimate goal is to convert the entire culinary service area to this “smart” type of metering.

The proposed meter project will include removing the existing meter and replacing it with the new meter and a cellular endpoint for transmitting the data. On older meters this may also include replacing the service (setter, all adapters, nipples, tees, bends and appurtenances

needed to complete the connection to the existing service laterals). The Orion Cellular AMI Network is already used for collecting the data. Because the system is already in place, replacement will interfere very little with the existing services. We anticipate that most of the new meters will require only installing a new meter and cellular endpoint, but for budgeting and cost estimating purposes we have included the cost of replacing the entire service for half of the meters.

The expected outcome is that DIC (and the customers with the new “smart” metered connections) will be able to monitor and track usage more accurately. This type of technology can increase leakage detection and sustainability of DIC’s water supply by saving water. We anticipate that with the additional data from the meters, we can detect maintenance issues and make repairs before failure occurs.

4. Evaluation Criteria

4.A. Planning Efforts Supporting the Project

DIC has a system-wide Water Conservation Master Plan in place that supports this proposed project and the common goal of the Bureau of Reclamation’s Central Utah Project’s water conservation goal of 25 percent water usage reduction by 2025, which is directly applicable to the contract between JVVCD and DIC. The reduction in water usage, increase in leakage detection and reduction of DIC staff to collect meter data are the main conservation tactics for this project.

Automated flow meter data collection will be an asset for the system with respect to the aging of the infrastructure and the anticipated growth within the area. It will enable DIC to detect leakage and other deficiencies more quickly and react more efficiently. Upgrading the system to the new meters with smart technology is a priority because it will take several years and several stages due to the number of connections.

4.B. Project Benefits

The anticipated benefits of this project include:

1. Reducing time and energy for meter reading
2. Reducing time to repair system deficiencies (due to a reduction in time reading meters), therefore improving system reliability
3. Reducing time for detecting leakage and reacting to it
4. Increased accuracy and reliability due to technology advancements of the new meters
5. Better understanding of the overall water usage and supply reliability throughout the system
6. Increased collaboration, information sharing and customer service due to software that enables interactive, real-time flow measurements

4.C. Project Implementation

DIC is ready and able to proceed with the proposed project once a financial assistance agreement is reached. The planning and scheduling is established, along with required funding by DIC.

4.C.1 Implementation Plan

Advertising and bidding for the project will occur in July 2017. Construction will begin in August 2017 with completion anticipated by January 2018. Figure 2 shows the project schedule.

4.C.2 Permits

DIC may be required to obtain permits through Draper City. DIC has a great relationship with Draper City and will have no trouble obtaining an excavation permit and land disturbance permit for the project if needed.

4.C.3 Engineering or Design Work

Most of the engineering and design work has already been completed. There will still be some engineering and design work required for installation issues that arise in the field and situations where typical installation is not feasible.

4.C.4 New policies or Administrative Actions

Personnel will need training to maintain and operate the new meters, use the data collection equipment, and install and use the new software. Customers will also need information about the new meters. We do not anticipate that the billing structure or rates will change; however, the software may require that we create new templates for billing. We anticipate that once the entire system has smart meters installed, some policies will require updating.

4.D. Nexus to Reclamation

DIC has a contract with JVVCD, which is affiliated with the Central Utah Project, a Bureau of Reclamation project. Therefore, any improvement in conservation or water management in DIC's system is indirectly connected to the Bureau of Reclamation. DIC still has an agreement with the CUP and provides updates to the CUP on conservation totals.

5. Environmental and Cultural Resourced Compliance

- 1) Earth disturbing work will be limited to areas which have been previously disturbed.
- 2) DIC is not aware of any species listed or proposed to be listed as a Federal endangered or threatened species, or Critical habitat in the project area.
- 3) There are no wetlands or surface waters within the project that fall under jurisdiction as waters of the United States.
- 4) The water delivery system was constructed between 1911 – Present.
- 5) No modifications to irrigation system features will be made as part of this project.
- 6) There are no buildings, structures, or features within the project eligible for listing on the National Register of Historic Places.
- 7) There are no known archeological sites in the proposed project area.

- 8) The project will not have a disproportionately high or adverse effect on low income or minority populations.
- 9) The project will not limit access or result in impacts to tribal lands.
- 10) The project will not contribute to the introduction, continued existence, or spread of noxious weeds or not-native invasive species.

6. Required Permits or Approval

DIC may be required to obtain permits through Draper City. DIC has a great relationship with Draper City and will have no trouble obtaining an excavation permit and land disturbance permit for the project if needed.

7. Official Resolution

The Official Resolution will be included as a separate document at a later date due to Board meeting dates.

8. Project Budget

The project budget includes a funding plan, letters of commitment, budget proposal and budget narrative as described later.

8.A. Funding Plan and Letters of Commitment

Funding plan details are as follows:

- 1) DIC will contribute their share of the project costs through a reserve fund.
- 2) There are no in-kind costs incurred before the anticipated project start date.
- 3) There are no funding partners requiring letters of commitment on this project.
- 4) No other federal funding is being requested or has been requested for this project.
- 5) There are no pending funding requests that could affect the project costs.

Table 3: Summary of non-federal and federal funding sources

Funding Sources	Funding Amount
Non-Federal Entities	
1. Draper Irrigation Company	\$55,990.00
2. *Draper Irrigation Company	\$12,980.00
Non-Federal Subtotal:	\$75,000.00
Other Federal Entities Subtotal:	\$0.00
Requested Reclamation Funding:	\$75,000.00
Total Project Funding:	\$150,000.00

* DIC in-kind contribution

8.B. Budget Proposal

The project budget includes contractual, construction, and environmental and regulatory compliance costs. Detailed information of these costs is included as Table 4 and Figure 3, including the unit costs for all budget items. Federal and applicant funding will be the only funding sources for this project with the applicant contribution being 50 percent.

Table 4: Budget proposal breakdown

BUDGET ITEM DESCRIPTION	COMPUTATION			RECIPIENT FUNDING	RECLAMATION FUNDING	TOTAL COST
	\$/Unit and Unit	Quantity				
SALARIES AND WAGES	\$0	NA	0	\$0.00	\$0.00	\$0.00
FRINGE BENEFITS	\$0	NA	0	\$0.00	\$0.00	\$0.00
TRAVEL	\$0	NA	0	\$0.00	\$0.00	\$0.00
EQUIPMENT	\$0	NA	0	\$0.00	\$0.00	\$0.00
SUPPLIES/MATERIALS	\$305	EA	130	\$0.00	\$39,580.00	\$39,580.00
CONTRACTUAL / CONSTRUCTION						
Item 1 (Contractor)	\$1,400	EA	61	\$55,990.00	\$29,410.00	\$85,400.00
Item 2 (DIC-In Kind)	\$100	EA	130	\$12,980.00	\$0.00	\$12,980.00
Item 3 (Prelim-Engineering)	\$1,200	EA	1	\$600.00	\$600.00	\$1,200.00
Item 4 (Engineering)	\$6,000	EA	1	\$3,000.00	\$3,000.00	\$6,000.00
Item 5 (Construction Mangmnt)	\$3,000	EA	1	\$1,500.00	\$1,500.00	\$3,000.00
OTHER	\$0	EA	0	\$0.00	\$0.00	\$0.00
Reporting	\$1,800	EA	1	\$900.00	\$900.00	\$1,800.00
Contingency	\$0	NA	1	\$0.00	\$0.00	\$0.00
TOTAL DIRECT COSTS				\$75,000.00	\$75,000.00	\$150,000.00
TOTAL CONTRIBUTION %				50%	50%	100%
INDIRECT COSTS - __%						0%
TOTAL PROJECT COSTS				\$75,000.00	\$75,000.00	\$150,000.00

8.C. Budget Narrative

- (a) **Salaries and Wages.** This item is not applicable. Any of these costs are accounted for in (f) *Contractual Costs*.
- (b) **Fringe Benefits.** This item is not applicable. Any of these costs are accounted for in (f) *Contractual Costs*.
- (c) **Travel.** This item is not applicable. Any of these costs are accounted for in (f) *Contractual Costs*.
- (d) **Equipment.** This item is not applicable. Any of these costs are accounted for in (f) *Contractual Costs*.

- (e) **Supplies/Materials.** The supplies/materials for this project include the cost for meters only. The unit costs of all supplies/materials are included in the construction cost estimate.
- (f) **Contractual/Construction.** The engineer will perform the design, project bidding and award, construction management, coordination with the Bureau of Reclamation, and feasibility study. The project requires as estimated 132 man-hours. The personnel involved in these tasks are Principal Engineer, Project Engineer, Engineer I, Design Tech and Clerical. Total engineering costs are estimated at **\$12,000** based on the wages and man-hours as outlined in Figure 3.

Purchase and construction will be a total cost estimated at **\$150,000.00**. DIC will install each meter as an in-kind contribution and perform any construction work necessary with a total cost of **\$75,000.00**.

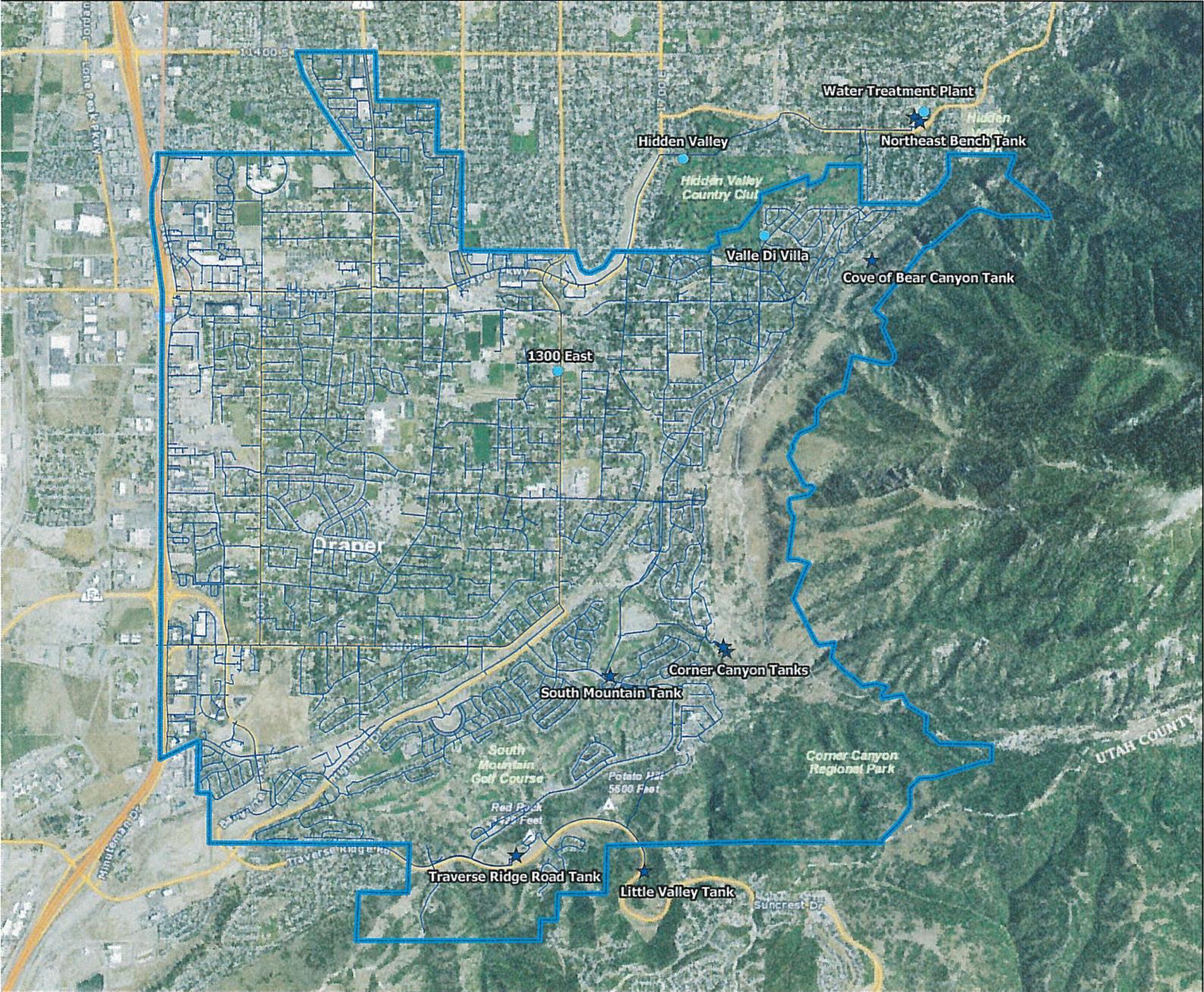
- (g) **Other.** N/A.
- (h) **Reporting.** The reporting costs are accounted for in the contractual cost estimate in Figure 3. Task numbers 501 through 505 relate to completing and submitting financial, semi-annual, final, and development reports, as well as anticipated additional correspondence with the Bureau of Reclamation. The total estimated reporting cost is **\$1,800.00**.
- (i) **Contingency Costs.** There will be no contingency cost added.
- (j) **Indirect Costs.** N/A.
- (k) **Total Cost.** The total estimated cost for the project is **\$150,000.00**. The applicant will contribute **\$75,000.00**, which will cover **50%** of the total cost. Federal funding will account for **\$75,000.00**, which will cover the remaining **50%**.

**BUREAU OF RECLAMATION
WaterSMART GRANT**

FIGURE 1

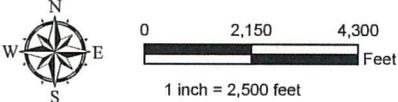
**DRAPER IRRIGATION COMPANY
Culinary Service Area Map**

APRIL 2017



Legend

-  Culinary Service Area Boundary
-  Storage Tanks
-  Wells
-  Culinary Pipe



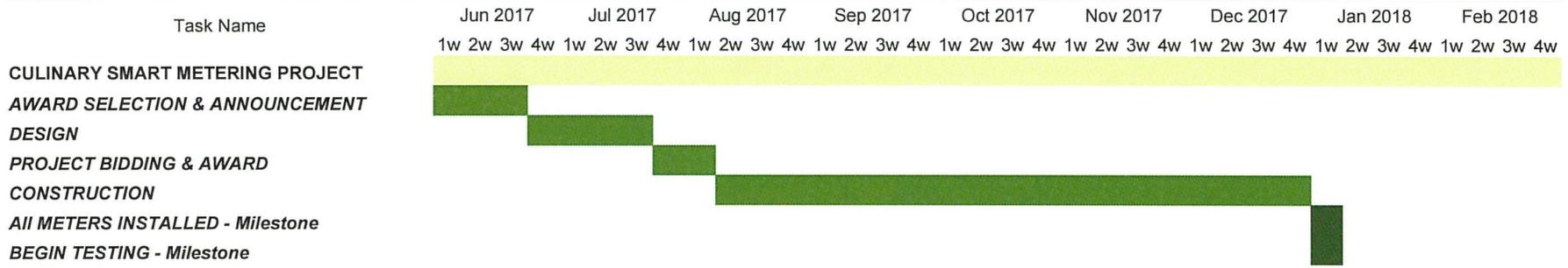
Source: Utah Automated Geographic Reference Center (AGR)



DRAPER IRRIGATION COMPANY



FIGURE 2 - Culinary Smart Metering Project Schedule



DRAPER IRRIGATION COMPANY

FIGURE 3 - Scope of Work and Budget Analysis
Culinary Smart Metering Project

Prepared by Epic Engineering P.C.

April 2017

Total Fee Proposal: \$12,000.00



Task No.	Description	Hours	Cost	Principal	Project	Engineer I	Engineer	Design	Clerical	Indirect
				Engineer	Engineer	F.E.	Intern	Tech		
				\$143.00	\$124.00	\$84.00	\$54.00	\$82.00	\$51.00	
100	Preliminary Design									
101	Coordination Meetings	2.00	\$208.00		1.0	1.0				
102	Conservation Calculations	2.00	\$168.00			2.0				
103	Utility Search	3.00	\$292.00		1.0	2.0				
104	Data Collection/Research	2.00	\$208.00		1.0	1.0				
105	Preliminary Design Review w/DIC	3.00	\$351.00	1.00	1.0	1.0				
	SUB-TOTAL	12.00	\$1,227.00	0.00	4.0	7.0	0.0	0.0	0.0	\$0.00
200	Design									
201	Design	6.50	\$555.50	0.50	1.0	3.0	2.0			
202	Import GPS location Data provided by DIC/Survey	4.0	\$422.00		1.0	2.0				
203	Drawings	17.00	\$1,483.00	0.50	3.0	2.0	2.0	9.0	0.50	
204	Technical Specifications	13.00	\$1,145.00	0.50	4.0	4.0	4.0		0.50	
205	30% Review Meeting with DIC	4.00	\$372.00		1.0	1.0		2.0		
206	90% Review Meeting with DIC	3.00	\$290.00		1.0	1.0		1.0		
207	Qty Takeoffs & Engineer's Estimate of Construction Cost	3.00	\$292.00		1.0	2.0				
208	Draper City Review	2.00	\$208.00		1.0	1.0				
	SUB-TOTAL	52.50	\$4,767.50	1.50	13.0	16.0	8.0	12.0	1.0	\$0.00
300	Project Bidding & Award									
301	Advertise, Bidder Questions, Addenda	5.50	\$571.50	0.50	2.0	3.0				
302	Pre-bid Meeting	2.00	\$208.00		1.0	1.0				
303	Review Bids & Recommend Award & Agreement	2.00	\$171.50		0.5	1.0			0.50	
304	Review Bonds, Insurance & Issue NTP	2.00	\$171.50		0.5	1.0			0.50	
	SUB-TOTAL	11.50	\$1,122.50	0.50	4.0	6.0	0.0	0.0	1.0	\$0.00
400	Construction Management									
401	Preconstruction Meeting	3.50	\$363.50	0.50	1.0	2.0				
402	Review & Recommend Submittals	5.00	\$400.00		1.0	2.0	2.0			
403	Review & Recommend Pay Requests	3.50	\$363.50	0.50	1.0	2.0				
404	Review & Recommend Change Orders	3.00	\$292.00		1.0	2.0				
405	Construction Meetings & Minutes	6.00	\$484.00		1.0	3.0	2.0			
406	Punchlist & Final Inspection	3.50	\$363.50	0.50	1.0	2.0				
407	Record Drawings	7.00	\$587.00		1.0	1.0		4.0	1.00	
408	O&M Manual Review	3.00	\$262.00		1.0	1.0	1.0			
	SUB-TOTAL	34.50	\$3,115.50	1.50	8.0	15.0	5.0	4.0	1.0	\$0.00
500	Coordination with Bureau of Reclamation									
501	Complete and submit financial reports	4.00	\$346.00		1.0	2.0	1.0			
502	Complete and submit semi-annual reports	4.50	\$371.50		1.0	2.0	1.0		0.50	
503	Complete and submit final report	5.00	\$443.00	0.50	1.0	2.0	1.0		0.50	
504	Complete and submit significant development reports	4.00	\$346.00		1.0	2.0	1.0			
505	Correspondence w/ BOR	3.50	\$284.00		0.5	2.0	1.0			
	SUB-TOTAL	21.00	\$1,790.50	0.50	4.5	10.0	5.0	0.0	1.0	\$ -
MAN-HOUR / TASK COST TOTALS		131.50	12,023.00	4.00	33.50	54.00	18.00	16.00	4.00	\$ -