WaterSMART

Water and Energy Efficiency Grants for FY 2016

Funding Opportunity Announcement No. R16-FOA-DO-004

Funding Group I

South Field Canal Metering and Piping Project

Spanish Fork, Utah

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January 20, 2016

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Technical Proposal and Evaluation Criteria

Executive Summary

The executive summary should include:

- *The date, applicant name, city, county, and state*
- *A one paragraph project summary that specifies the work proposed, including how project funds will be used to accomplish specific project activities and briefly identifies how the proposed project contributes to accomplishing the goals of this FOA*
- *State the length of time and estimated completion date for the project*
- *Whether or not the project is located on a Federal facility*

Date:	January 20, 2016
Estimated Start Date:	July 2016
Estimated Completion Date:	August 2017
Applicant:	Spanish Fork South Irrigation Company Spanish Fork, Utah County, Utah
Project Title:	South Field Canal Metering and Piping Project

Project Summary:

The Spanish Fork South Irrigation Company (SFSIC) is submitting this application requesting funding to assist in the installation of flow measuring devices and data collection telemetry (SCADA) for the eight large laterals of the South Field Canal System, as well as piping 6,180 feet of open canal where there are significant losses of water due to seepage and evaporation. This project will fall under Funding Group I. By installing SCADA on the large laterals, SFSIC will be able to monitor, on a real time basis, the flows in the laterals and control the amount of water turned into each. Historically, the water users err on the side of caution, turning too much water to the shareholders so as not to short them water. Controlling the amount of water to the shareholders will provide water savings of up to 3,095 acre-feet per year and the section of canal piping will save an additional 630 acre-feet per year. This section of canal is particularly prone to water loss due to being located along a sandy loam ridge. A public safety aspect to this project is that this section of canal traverses through a soon to be populated area. Within the next few years, the area will have a 100+ home subdivision surrounding the canal. The canal is situated on a hillside with many of these homes to be situated on the downhill side. By piping the 6,180 feet of canal, the public safety issues of having an open, high hazard canal located adjacent to homes will be resolved.

The project is not located on a Federal facility.

Background Data

Project Location

Provide a map of the area showing the geographic location (include the State, county, and direction from the nearest town).

The South Field Canal System begins near the mouth of Spanish Fork Canyon at the tailrace of the Reclamation-owned Spanish Fork Power Plant. The main canal runs in a westerly direction for 9.46 miles, serving the irrigated acreage south and west of Spanish Fork City from Highway 192 to near the base of West Mountain. See Figure 1.

Applicant's Water Supply

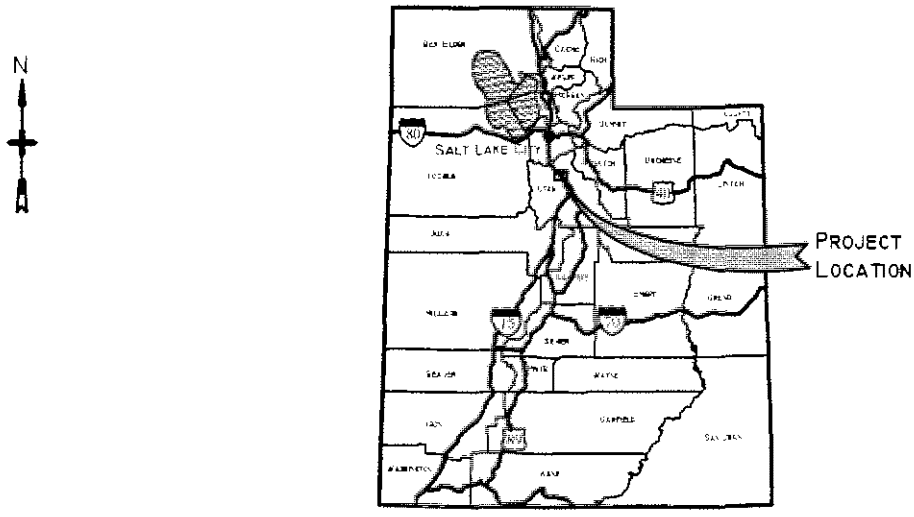
As applicable, describe the source of water supply, the water rights involved, current water uses (e.g., agricultural, municipal, domestic, or industrial), the number of water users served, and the current and projected water demand. Also, identify potential shortfalls in water supply. If water is primarily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

SFSIC has an average annual water delivery of approximately 12,000 acre-feet. The Spanish Fork River water is based on the 1896 McCarty Decree. Table 1 shows the source of the water supply for SFSIC.

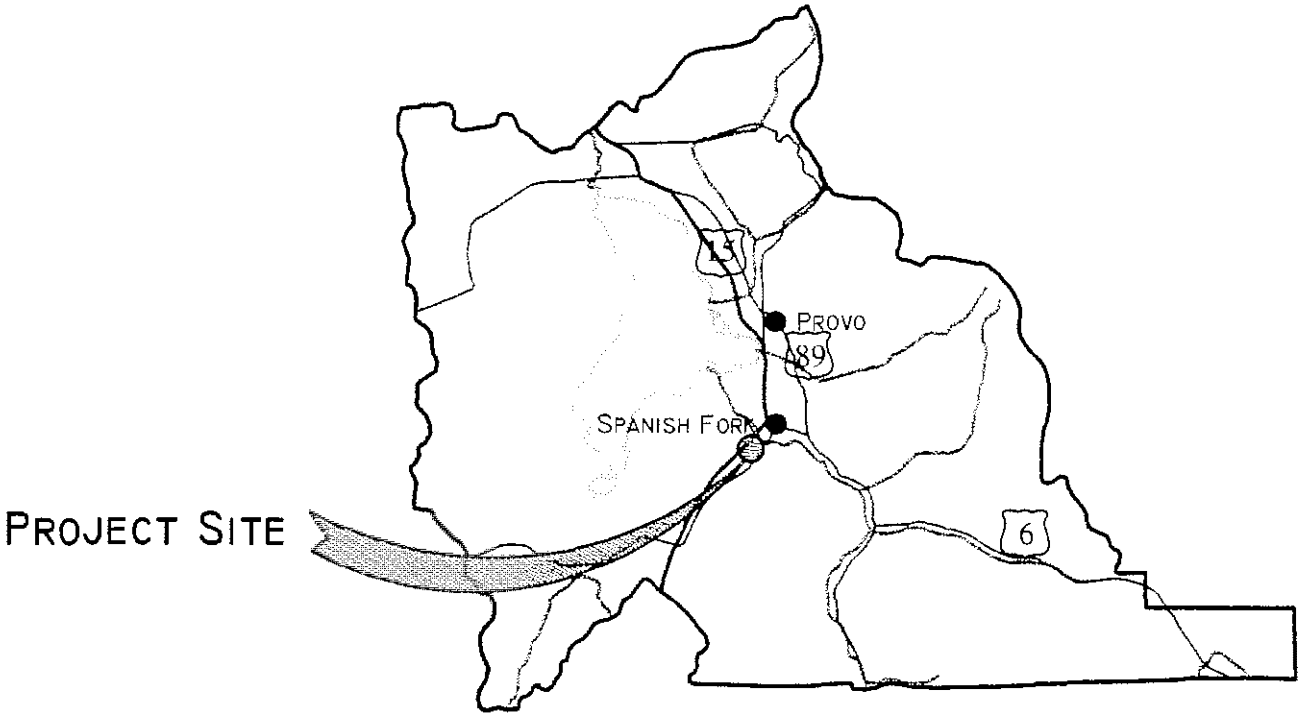
Table 1: Water Rights diverted into the South Field Canal

Water Right	Source	Flow	Type	Priority
51-8603	Spanish Fork River	77.9390 ac-ft	Shared	09/03/2014
51-8485	Spanish Fork River	75.0 cfs	Decree	07/01/1860
	Strawberry Valley Project	3,500 ac-ft	Leased (individually)	
	Central Utah Project	2,450 ac-ft	Leased (individually)	

Of this acreage, approximately 98% is agricultural, with the major crops being alfalfa, wheat, and corn. The remainder of the acreage is residential housing with water from the canal system being used for secondary irrigation systems. SFSIC has 510 water users, and according to water right records, serves 6,570 acres.



UTAH



UTAH COUNTY

FRANSON CIVIL ENGINEERS	DATE: JANUARY 6, 2016 SCALE: Mill Road.dwg \\Franson\Projects\UT\Central\South Field Irrigation Company\WaterSMART 2016 LAYOUT: Loc Map	SOUTH FIELD IRRIGATION WATERSMART 2016	FIGURE 1 LOCATION MAP

Water Delivery System

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

The SFSIC provides irrigation water to approximately 6,570 acres of agricultural land. The South Field Main Canal is 9.46 miles long. There are eight significant laterals off of the main canal distributing 10 cfs for each lateral. Of the 9.46 miles of main canal, approximately 2.09 miles of the main canal are concrete-lined, 2.18 miles are piped, and the remaining 5.19 miles are earthen-lined open canal.

The SCADA system will allow SFSIC to track the water flowing into each of the eight main laterals, which will allow them to better manage their water system. By better managing annual water deliveries of 12,000 acre-feet with a savings of 3,725 acre-feet, the project would meet the goals of this FOA. The project has close ties to Utah Lake, which water savings will benefit the endangered June Sucker.

Renewable Energy or Energy Efficiency

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

The existing traveling trash screen structure is operated with commercial electricity. This is the only electricity used on the project. Mountainland Applied Technology College currently pays the electric bill for the traveling trash screen.

Prior Work with Reclamation

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

There have been no direct working relationships between SFSIC and Reclamation. The SFSIC uses Strawberry Valley Project (SVP) and Central Utah Project (CUP) water. The SVP and CUP are both Reclamation projects, and the water supply for each is from trans-basin deliveries from the Strawberry River. Conserving water for the SFSIC will conserve water for Reclamation.

Technical Project Description

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

If a grant from Reclamation is awarded, SFSIC will secure a loan from the Utah Division of Water Resources to complete the project. The application will be submitted by March 3 and is

expected to be on the agenda for the May 12 Board meeting for approval. SFSIC will then proceed to finalize components of SCADA, flow measurement, piping, and preparation of scopes of work for the material and/or services needed. An engineering design report will be prepared to finalize the best SCADA equipment options, alignment options, pipe size, and complete all the required permits. An environmental and cultural review will be done by a registered environmental firm. Once environmental clearance is obtained, the engineering design and construction documents will be prepared. It is anticipated that all permitting, environmental clearances, and engineering design would be completed by the middle of January 2017 and that construction would occur early spring of 2017 with an estimated project completion date of August 2017.

A preliminary analysis has been completed to evaluate potential pipe alignment and sizing. The proposed project will replace the existing open canal with a non-pressurized pipeline as shown in Figure 2. The canal section to be piped consists of 4,680 feet of canal situated on a hillside of sandy loam material and 1,500 feet of concrete lined canal located adjacent to a soon to be developed subdivision. Steel reinforced polyethylene pipe will be used for piping the canal. The new pipe alignment will be 5,900 feet in length with 48-inch diameter pipe. The new alignment will follow a more efficient route replacing 4,680 feet of earth-lined canal with 4,400 feet of pipeline. Along with replacing 1,500 feet of concrete-lined canal, the new pipeline will be 5,900 feet long, relocating the existing traveling trash screen structure to the new inlet structure, and tying directly into the existing piped canal. The design includes 930 feet of 36-inch steel reinforced polyethylene pipe to serve as a bypass to a natural drainage channel in the event of plugging of the traveling screen. The current location of the traveling screen allows the bypass to scatter in a local field. That field will become a subdivision in a few years. Air-valves and fittings will be installed at appropriate locations to ensure the proper operation of the pipeline.

Figure 2 shows the locations of each of the SCADA sites. The complete design of the SCADA equipment and the canal piping will be done by a professional engineering firm to ensure the system meets minimum standards of quality. All design drawings will be stamped by a professional engineer and be available to Reclamation for review if requested. Additional details of the individual SCADA sites can be found in Appendix D.

Evaluation Criteria

Evaluation Criterion A: Water Conservation

Up to 28 points may be awarded for a proposal that will conserve water and improve efficiency. Points will be allocated to give consideration to projects that are expected to result in significant water savings.

Subcriterion No. A.1 – Quantifiable Water Savings

Up to 24 points may be allocated based on the quantifiable water savings expected as a result of the project.

Describe the amount of water saved. *For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Please be sure to consider the questions associated with your project type (listed below) when determining the estimated water savings, along with the necessary support needed for a full review of your proposal.*

In addition, all applicants should be sure to address the following:

- *What is the applicant's average annual acre-feet of water supply?*
- *Where is that water currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground, etc.)?*
- *Where will the conserved water go?*

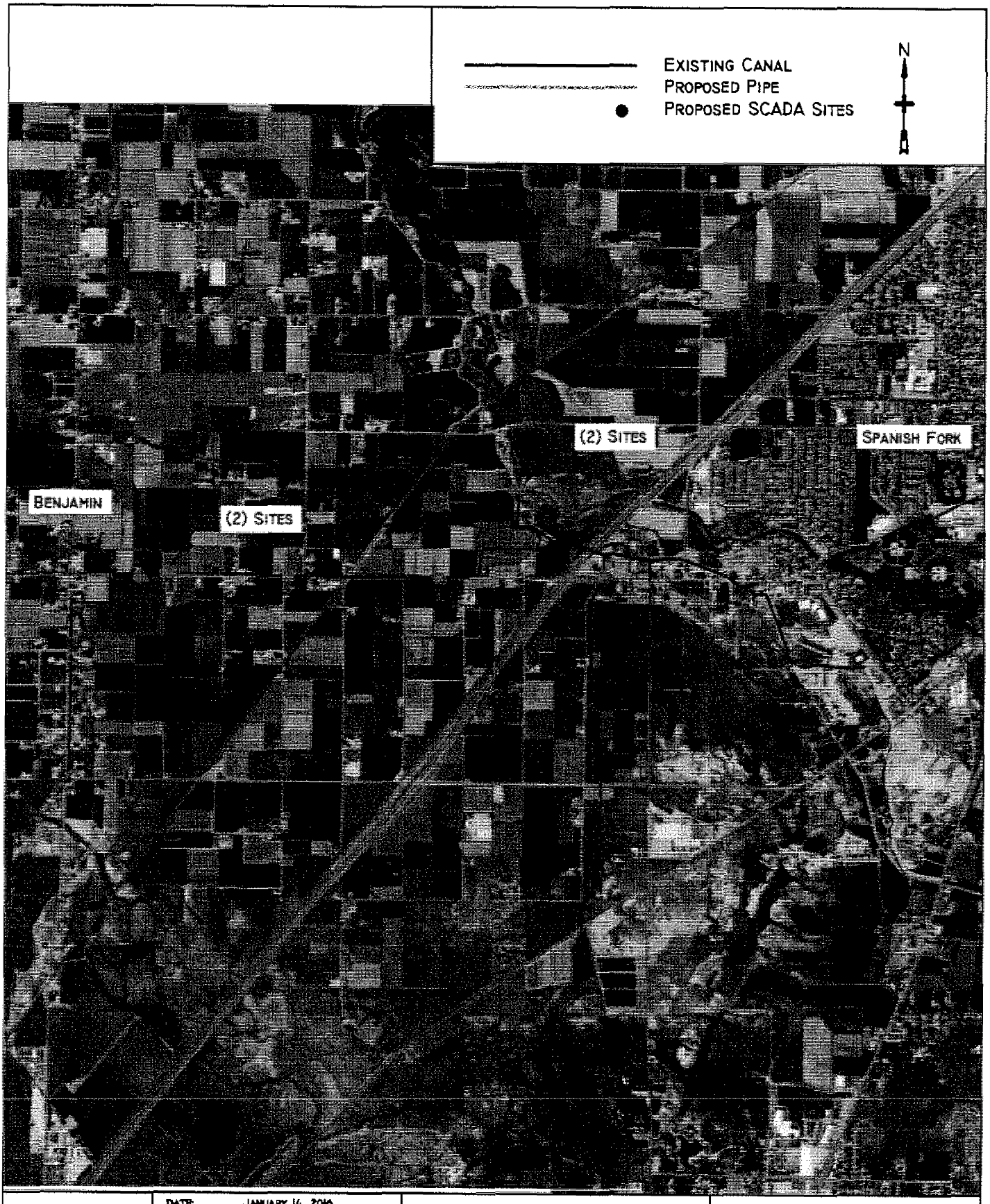
Please include a specific quantifiable water savings estimate; do not include a range of potential water savings.

SFSIC has average annual water deliveries of 12,000 acre-feet between the Decreed water, the leased SVP water, and the leased CUP water. The Spanish Fork River Commissioner has stated that typical deliveries to the large laterals average 12 cfs per turn versus the allotment of 10 cfs. This has been common practice to not short the irrigators on water. The lack of flow measurement on the laterals has led to overuse of the water supply.

Table 2 shows the potential savings of 3,725 acre-feet (31% system loss) for each of the eight laterals identified for metering as well as the conveyance losses calculated through the identified section of canal to be piped. To remain conservative on the water savings calculations, an average of six water turns a year were used. The shareholders on some years will get seven water turns.

Table 2: Potential Water Conservation Amount

Lateral	Days/Turn	Turns/Yr	Average Over Delivery (cfs)	Conservation Potential (ac-ft)
Hansen	20	6	2	476
Ludlow	20	6	2	476
Argyle	20	6	2	476
West	14	6	2	333.3
Center	14	6	2	333.3
North	14	6	2	333.3
Issac	14	6	2	333.3
Hone	14	6	2	333.3
Total Over Delivery				**3,095**
Calculated Canal Section Conveyance Loss				**630**
Total Conservation Potential *(Conveyance loss + irrigation efficiency improvement)*				**3,725**



FRANSON CIVIL ENGINEERS

DATE: JANUARY 14, 2016
SCALE:
Mill Road.dwg
W:\Franson\Projects\JTV\Capital\South Field Irrigation Company\WaterSMART 2016
LAYOUT: Detail

SOUTH FIELD IRRIGATION
WATERSMART 2016

FIGURE 2
PIPING PROJECT & SCADA LOCATIONS

Water is currently lost in the system through seepage into the ground, through evaporation to the atmosphere, through overuse by shareholders, and spilled at the end of the water delivery system.

The conserved water would assist in extending the irrigation season during drought years, and/or reducing the use of leased CUP water, thereby making the water available to be delivered to Utah Lake for the June Sucker Recovery Implementation Program.

Please address the following questions according to the type of project you propose for funding.

(1) ***Canal Lining/Piping:*** *Canal lining/piping projects can provide water savings when irrigation delivery systems experience significant losses due to canal seepage. Applicants proposing lining/piping projects should address the following:*

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

The estimated average annual water savings of 630 acre-feet per year for the 4,680 feet of earth-lined canal that will be piped was calculated based on methodology provided in "Irrigation and Water Resource Engineering" by G.L. Asawa, copyright 2008, on canal losses. The calculated evaporation losses on the 1,500 feet of concrete-lined canal were minimal and not considered.

The water savings for the over-delivery of water to the eight laterals is shown in Table 2. See Appendix B for the details on the water savings calculations.

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

The canal seepage losses were calculated based on a methodology provided in "Irrigation and Water Resource Engineering" by G.L. Asawa. Appendix B provides the canal loss methodology and the calculations.

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

The post-project seepage losses will conservatively be reduced by 17%, or 4,680 feet of the 27,395 feet of earth-lined canal for the South Field Main Canal. The section of earth-lined canal to be piped is on the side of a sandy loam ridge. The remainder of the canal in the valley is more of a silty material, with lower seepage rates.

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

The calculated conveyance loss for the 6,180 feet of canal to be piped is 630 acre-feet. This correlates to a transit loss reduction of 538 acre-feet per mile for the project.

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

Actual seepage losses will be difficult to verify as the piped section of canal is in the middle of a long open earth-lined section of canal. Historically, the water lost through this identified section of canal can be seen bubbling up in the fields near the base of the hillside where the canal resides. A simple method of verification of reduced seepage will be the hillside remaining dry during irrigation season.

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

The proposed material to be used in the piping of the canal is a steel reinforced polyethylene pipe with the brand name of DuroMAXX manufactured by Contech Engineered Solutions. The DuroMAXX pipe will utilize the bell and spigot coupling system and be installed in 24-foot lengths.

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

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

The average annual water savings estimates for the delivery of water through the eight large laterals was determined based on observations of the Spanish Fork River Commissioner and the SFSIC President that indicates a delivery of 12 cfs is very common in the laterals where 10 cfs is to be delivered. The calculations of a yearly water savings of reducing each of the eight laterals 2 cfs over the course of a typical irrigation season amount to 3,095 acre-feet per year. These calculations are shown in Table 2.

(b) Have current operational losses been determined? If water savings are based on a reduction of spills, please provide support for the amount of water currently being lost to spills.

The current operational losses are based on the over-delivery of water in each lateral. No operational losses were determined based on spills.

(c) Are flows currently measured at proposed sites and if so what is the accuracy of existing devices? How has the existing measurement accuracy been established?

Three of the eight laterals proposed for SCADA currently have Parshall flumes located near the head of the lateral. The flumes were installed in the early 1960's. No measurements are

currently being taken at these flumes. The remaining five laterals have no means of flow measurement for the lateral.

(d) Provide detailed descriptions of all proposed flow measurement devices, including accuracy and the basis for the accuracy.

The proposed flow measurement devices for each of the remaining laterals without a measuring device will be Parshall flumes. This type of measuring device is commonly used on irrigation systems and will aid in keeping a consistent type of flow measurement on the system.

A November 1984 technical report on the recommended use of Parshall flumes by the National Bureau of Standards states, "The basic uncertainty of properly constructed and installed flumes is ± 3 percent." This is an allowable level of accuracy based on the site conditions.

The SCADA system for each metering site will be a solar powered station with battery backup, a datalogger, as well as cellular communication to the site. The water users will have the ability to obtain, through a smart phone, the flow in each lateral on a 24/7 basis during the irrigation season. Having the datalogger on the site will allow downloadable data from each site for historic record purposes.

(e) Will annual farm delivery volumes be reduced by more efficient and timely deliveries? If so, how has this reduction been estimated?

As stated above, the water users, in an effort to not short the shareholders water, and without a means of accurately measuring the flow in the laterals, have consistently delivered 2 cfs more in each lateral than the allotment. Farm deliveries will be reduced in each lateral from historic delivery levels based on the new ability to measure the flow and deliver the proper amount of water in each lateral.

(f) How will actual water savings be verified upon completion of the project?

The water savings will be verified by the ability to download the flow data from the datalogger at each metering site.

Subcriterion No. A.2 – Percentage of Total Supply

Up to 4 additional points may be allocated based on the percentage of the applicant's total average water supply (i.e., including all facilities managed by the applicant) that will be conserved directly as a result of the project.

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

$$\frac{\textit{Estimated Amount of Water Conserved}}{\textit{Average Annual Water Supply}} = \frac{3{,}725 \text{ acre-feet}}{12{,}000 \text{ acre-feet}} = 31\%$$

Evaluation Criterion B: Energy-Water Nexus

Up to 16 points may be awarded based on the extent to which the project increases the use of renewable energy or otherwise results in increased energy efficiency.

For projects that include construction or installation of renewable energy components, please respond to Subcriterion No. B.1. If the project does not implement a renewable energy project but will increase energy efficiency, please respond to Subcriterion No. B.2. If the project has separate components that will result in both implementing a renewable energy project and increasing energy efficiency, an applicant may respond to both.

Subcriterion No. B.1 – Implementing Renewable Energy Projects Related to Water Management and Delivery

Up to 16 points may be awarded for projects that include construction or installation of renewable energy components (e.g., hydroelectric units, solar-electric facilities, wind energy systems, or facilities that otherwise enable the use of renewable energy). Projects such as small-scale solar resulting in minimal energy savings or production will be considered under Subcriterion No. B.2 below.

Not applicable.

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

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

This project is not implementing a large-scale renewable energy component, but will be converting the existing traveling screen that will be relocated to the new inlet structure, to a DC powered system with solar/electric power.

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

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

No energy savings are expected as a result from the water conservation improvements on the proposed project.

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

There is no pumping by SFSIC on the project.

- *Please indicate whether your energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.*
- *Does the calculation include the energy required to treat the water?*

Not applicable.

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

The SCADA system will result in reduced maintenance and operation. The watermaster will not need to drive the canal alignment as frequently for safety, change in gate settings, and other inspection needs.

Solar panels will be used on each of the six SCADA sites to charge the batteries for the meters and SCADA equipment. The Ludlow Lateral and the Argyle Lateral will be combined into one SCADA site. The Center Lateral and the North Lateral will be combined into one SCADA site as well. A total of six SCADA sites will be installed on the project.

Evaluation Criterion C: Benefits to Endangered Species

Up to 12 points may be awarded for projects that will benefit federally-recognized candidate species or up to 12 points may be awarded for projects expected to accelerate the recovery of threatened or endangered species, or addressing designated critical habitat. Note: proposals for water efficiency projects that simply state that a species in the basin will benefit from water savings (i.e., without a commitment to dedicate water savings for instream flows) shall receive minimal consideration under this criterion.

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

- *What is the relationship of the species to water supply?*
- *What is the extent to which the proposed project would reduce the likelihood of listing or would otherwise improve the status of the species?*

Not applicable.

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

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

The Spanish Fork River is a tributary to Utah Lake, and the grow-out habitat for the June Sucker is Utah Lake. The species was listed due to habitat alteration including change of natural flow events in the Provo River, and reduced annual lake level stability. The Reclamation Provo River Project and CUP are located on the Provo River.

(2) Is the species subject to a recovery plan or conservation plan under the ESA?

The June Sucker Recovery Plan was finalized by the U.S. Fish and Wildlife Service in 1999.

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

Water for the SFSIC system is supplied from the Spanish Fork River. Utah Lake is the grow-out habitat for the June Sucker. This project would improve the status of the species by allowing conserved water to remain in the Spanish Fork River and Utah Lake systems, and giving the river commissioners and operators operational flexibility that could allow them to benefit the species.

Evaluation Criterion D: Water Marketing

Up to 12 points may be awarded for projects that propose developing a new water market. Note: Water marketing does not include an entity selling conserved water to an existing customer. This criterion is intended for the situation where an entity that is conserving water uses water marketing to make the conserved water available to meet other existing water supply needs or uses outside of the entity's geographic service area.

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

- *Estimated amount of water to be marketed*
- *A detailed description of the mechanism through which water will be marketed (e.g., individual sale, contribution to an existing market, the creation of a new water market, or construction of a recharge facility)*
- *Number of users, types of water use, etc. in the water market*
- *A description of any legal issues pertaining to water marketing (e.g., restrictions under Reclamation law or contracts, individual project authorities, or State water laws)*
- *Estimated duration of the water market*

State laws prohibit the sale or lease of water rights that are designated for a specific plot of land, unless the land itself is sold and taken out of production, but the SFSIC Spanish Fork River water is not tied to specific lands. As such, the water conserved could be available to lease or sell, but other water uses could also be achieved by SFSIC not calling for the leased SVP or CUP water, thus making it available for use in other areas. The conserved water will alleviate shortages for water users in drought years.

Marketing is not a direct function of the SFSIC. The company's function is to assure the delivery of water and maintain the canals as a delivery system. Recent years have seen municipalities or other non-private entities purchasing shares for use in secondary water systems for parks and residences.

Evaluation Criterion E: Other Contributions to Water Supply Sustainability

Up to 14 points may be awarded for projects expected to contribute to a more sustainable water supply. This criterion is intended to provide an opportunity for the applicant to explain 1) how the project relates to a completed WaterSMART Basin Study; 2) how the project could expedite future on-farm improvements; and/or 3) how the project will provide other benefits to water supply sustainability within the basin. An applicant may receive the maximum 14 points under this criterion based on discussions of one or more of these subcriteria.

Subcriterion No. E.1 – Addressing Adaptation Strategies in a WaterSMART Basin Study

Up to 14 points may be awarded for projects that address an adaptation strategy identified in a completed WaterSMART Basin Study.

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

- *Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project and how the proposed WaterSMART Grant project would help implement the adaptation strategy.*
- *Describe how the adaptation strategy and proposed WaterSMART Grant project will address the imbalance between water supply and demand identified by the Basin Study.*
- *Identify the applicant's level of involvement in the Basin Study (e.g., cost-share partner, participating stakeholder, etc.).*
- *Describe whether the project will result in further collaboration among Basin Study partners.*

This project does not fall within one of the areas that have a completed WaterSMART Basin Study. However, the project area is located within an area that receives water through a trans-basin diversion from the Duchesne River in the Colorado River Basin. Water is diverted from the Duchesne River into the Spanish Fork River system by way of the Syar Tunnel and Diamond Fork system. Reclamation recently completed the Colorado River Basin Water Supply and Demand Study (year 2012). Duchesne County is located in the Uintah Basin of Utah, which was identified in the Colorado River Basin Study as an area that needed additional water savings to

meet long-term water needs. The project will meet some of these water needs and will result in additional collaboration by the entities that are included in this WaterSMART application.

This WaterSMART project will address water supply shortages and could make more water available to the water users in the Duchesne River Basin. The Duchesne River contributes to flows in the Colorado River.

Subcriterion No. E.2 – Expediting Future On-Farm Irrigation Improvements

Up to 14 points may be awarded for projects that describe in detail how they will directly expedite future ***on-farm irrigation improvements****, including future on-farm improvements that may be eligible for NRCS funding.*

Note: Scoring under this sub-criterion is based on an overall assessment of the extent to which the WaterSMART Grant project will facilitate future on-farm improvements. Applicants should describe any proposal made to NRCS, or any plans to seek funding from NRCS in the future, and how an NRCS-funded activity would complement the WaterSMART Grant project. Applicants may receive maximum points under this sub-criterion by addressing the types of information described in the bullet points below. Applicants are not required to have assurances of NRCS funding by the application deadline to be awarded the maximum number of points under this sub-criterion. Reclamation may contact applicants during the review process to gather additional information about pending applications for NRCS funding if necessary.

If the proposed projects will help expedite future on-farm improvements please address the following:

- *Include a detailed listing of the fields and acreage that may be improved in the future.*
- *Describe in detail the on-farm improvements that can be made as a result of this project. Include discussion of any planned or ongoing efforts by farmers/ranchers that receive water from the applicant.*
- *Provide a detailed explanation of how the proposed WaterSMART Grant project would help to expedite such on-farm efficiency improvements.*
- *Fully describe the on-farm water conservation or water use efficiency benefits that would result from the enabled on-farm component of this project. Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.*
- *Projects that include significant on-farm irrigation improvements should demonstrate the eligibility, commitment, and number or percentage of shareholders who plan to participate in any available NRCS funding programs. Applicants should provide letters of intent from farmers/ranchers in the affected project areas.*
- *Describe the extent to which this project complements an existing or newly awarded NRCS funded project.*

Currently, all of the irrigated acreage in the SFSIC system is flood irrigation. By providing more accurate flow measurement on the large laterals, thereby reducing the historic flows, the shareholders might be provided an incentive to seek more efficient means of irrigation on their farms.

Subcriterion No. E.3 – Other Water Supply Sustainability Benefits

Projects may receive up to 14 points under this sub-criterion by thoroughly explaining additional project benefits, not already described above. Please provide sufficient explanation of the additional expected project benefits and their significance. Additional project benefits may include, but are not limited to, the following:

- *Will the project make water available to alleviate water supply shortages resulting from drought?*
  - *Explain in detail the existing or recent drought conditions in the project area. Describe the impacts that are occurring now or are expected to occur as a result of drought conditions.*
  - *Describe the severity and duration of drought conditions in the project area.*
  - *Describe how the water source that is the focus of this project (river, aquifer, or other source of supply) is impacted by drought.*
  - *Provide a detailed explanation of how the proposed WaterSMART Grant project will improve the reliability of water supplies during times of drought.*

The US Drought Monitor has shown Utah County to be classified in a moderate to severe drought for the past four consecutive years, with two of those years listed as severe. In Utah County, ten of the past 15 years have been classified from abnormally dry to severe drought. The Spanish Fork River, from which SFSIC diverts its water, has no storage and is greatly affected by spring runoff. Because of the recent low snowpack years, the river flows have been below average, directly affecting those who divert from it. The level of Utah Lake has been below average since 2012.

When the Spanish Fork River is low, SFSIC leases water from SVP and CUP to supplement water needs for shareholders. In 2015, SFSIC needed to additionally utilize a portion of the "bank" of SVP water. Metering the laterals, and piping the canal, will reduce over-delivery and reduce seepage losses, thereby the savings will assist SFSIC in not leasing as much water.

- *Will the project make water available to address a specific concern? For example:*
  - *Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)?*
  - *Describe how the water source that is the focus of this project (river, aquifer, or other source of supply) is impacted by climate variation.*
  - *Will the project help to address an issue that could potentially result in an interruption to the water supply if unresolved?*

The project will make more direct flow Spanish Fork River water available for use by the water users. The saved water will assist in lengthening the irrigation season and reducing the amount of leased water from SVP and/or CUP.

- *Will the project make additional water available for Indian tribes?*

The project will not make additional water available for Indian tribes.

- *Will the project make water available for rural or economically disadvantaged communities?*

The project will make more water available for the rural communities of Spanish Fork, Leland, and Benjamin.

- *Does the project promote and encourage collaboration among parties?*
  - *Is there widespread support for the project?*
  - *What is the significance of the collaboration/support?*
  - *Will the project help to prevent a water-related crisis or conflict?*
  - *Is there frequently tension or litigation over water in the basin?*
  - *Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?*

The project will require collaboration from several entities including SFSIC, Spanish Fork City, Reclamation, Utah Division of Water Resources, and NRCS. The SFSIC shareholders have voted to implement the project.

With Utah being the second driest state in the country, water conservation projects are widely supported throughout the state. Water conservation and development is a top priority for the State of Utah.

This project will help prevent possible conflict or litigation by conserving water and keeping accurate records. Utah County has seen many conservation improvements by canal companies recently, and this will maintain and encourage more conservation by other water users.

- *Will the project increase awareness of water and/or energy conservation and efficiency efforts?*
  - *Will the project serve as an example of water and/or energy conservation and efficiency within a community?*
  - *Will the project increase the capability of future water conservation or energy efficiency efforts for use by others?*
  - *Does the project integrate water and energy components?*

The proposed project will integrate water conservation and includes the installation of solar power for the SCADA sites. The project will conserve water that will set an example of water and energy conservation to the local and surrounding communities. As SFSIC has followed the example of other irrigation companies that have improved their system to conserve water, hopefully other irrigation companies will likewise follow the example of SFSIC.

Evaluation Criterion F: Implementation and Results

Up to 10 points may be awarded for these subcriteria.

Subcriterion No. F.1 – Project Planning

Points may be awarded for proposals with planning efforts that provide support for the proposed project.

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

Provide the following information regarding project planning:

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

The SFSIC does not have a Water Conservation Plan. However, this project is in compliance with the Utah State Water Plan. A Facility Conveyance Safety Management Plan will be prepared by SFSIC as it is required for obtaining funding from the State of Utah.

A preliminary design has been done by Franson Civil Engineers to be used in the funding acquisition portion of the project. Preliminary SCADA equipment, flumes, pipe size, pipe length, alignment, cost estimates, water savings, and financial feasibility have been prepared.

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

The Utah State Water Plan emphasizes water conservation and efficient management of developed water supplies as key strategies in providing for the present and future water needs in the state. The project in this WaterSMART application will be in harmony with the State of Utah's water conservation goals by conserving 3,725 acre-feet of water.

Subcriterion No. F.2 – Readiness to Proceed

Points may be awarded based upon the extent to which the proposed project is capable of proceeding upon entering into a financial assistance agreement.

Describe the implementation plan of the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates. (Please note, under no circumstances may an applicant begin any ground-disturbing activities—including grading, clearing, and other preliminary activities—on a project before environmental compliance is complete and Reclamation explicitly authorizes work to proceed).

The project is ready to move forward if the grant is awarded. The remaining funding will be secured from the Utah Board of Water Resources (BWR). A loan application is prepared and will

be submitted by March 3, 2016 with the BWR and will be pending approval at the Board meeting scheduled for May 12, 2016. The BWR application is pending the award of the grant application. Once funding is secured, an engineering design report and the design work will begin immediately thereafter. A detailed schedule showing major tasks, milestones, and dates is shown in Appendix E of this application.

Please explain any permits that will be required, along with the process for obtaining such permits. Identify and describe any engineering or design work performed specifically in support of the proposed project.

Environmental clearance will be completed before construction begins. The environmental clearance is not expected to have any major issues. SFSIC will work with Reclamation to comply with NEPA requirements. Coordination with Utah County, Spanish Fork City, and Utah Department of Transportation will be required for some road crossings and locations where the pipe will be crossing State Highway 164. No issues are anticipated with obtaining the required permits.

Subcriterion No. F.3 – Performance Measures

Points may be awarded based on the description and development of performance measures to quantify actual project benefits upon completion of the project.

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

Measuring flumes will be installed to measure the amount of water diverted into the laterals. Flow measurements will clearly show the amount of water conserved when compared to the historical deliveries. The water conserved will be reported in the final report submitted to Reclamation.

The environmental benefits will be very apparent as the proposed metering system will allow for diverting less water. The conserved water will stay in the river and flow downstream to other water users and eventually Utah Lake.

Subcriterion No. F.4 – Reasonableness of Costs

Points may be awarded based on the reasonableness of the cost for the benefits gained.

Please include information related to the total project cost, annual acre-feet conserved, energy capacity, or other project benefits and the expected life of the improvement(s).

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

All the major lateral deliveries will be better managed through the system. In addition, the project will conserve approximately 3,725 acre-feet of water annually. It is anticipated that the SCADA systems, new flow measuring devices, and canal piping will last for 50 years with only minor repairs.

$$\frac{\text{Total Project Cost}}{\text{AF Conserved x Improvement life}} = \frac{\$1,184,900}{(3,725)*50} = \$6.36$$

The calculation yields a cost of $6.36 for every acre-foot per year of water conserved.

$$\frac{\text{Total Project Cost}}{\text{Better Managed x Improvement life}} = \frac{\$1,184,900}{(12,000)*50} = \$1.97$$

The calculation yields a cost of $1.97 for every acre-foot per year of water better managed.

Evaluation Criterion G: Additional Non-Federal Funding

Up to 4 points may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided.

$$\frac{\textit{Non-Federal Funding}}{\textit{Total Project Cost}} = \frac{\$\ 884,900}{\$\ 1,184,900} = \mathbf{75\%}$$

Evaluation Criterion H: Connection to Reclamation Project Activities

Up to 4 points may be awarded if the proposed project is in a basin with connections to Reclamation project activities. No points will be awarded for proposals without connection to a Reclamation project or Reclamation activity.

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

SFSIC signed a contract with Reclamation on March 22, 1915 to provide SVP water for stockholders and non-stockholders of SFSIC. Individual shareholders have signed contracts with CUP for additional water.

(2) Does the applicant receive Reclamation project water?

Yes, SFSIC delivers SVP and CUP water.

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

The SFSIC system is located on Reclamation project lands for both the SVP and CUP.

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

The project is located in the same basin as the Reclamation SVP, CUP, and Provo River Project.

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

The project will contribute water to the Utah Lake Basin where the above three mentioned projects are located.

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

The project has the potential to help Reclamation in meeting trust responsibilities to the Ute Tribe in the Uintah Basin. The SVP and the CUP water are trans-basin diversions from the Duchesne River. With the saved water from the project, less CUP water could be diverted over the mountain, thereby allowing the water to flow in the Duchesne River to where the Ute Tribe could utilize the water.

Performance Measures

All WaterSMART Grant applicants are required to propose a method (or "performance measure") of quantifying the actual benefits of their project once it is completed. Actual benefits are defined as water actually conserved, marketed, or better managed, as a direct result of the project. Quantifying project benefits is an important means to determine the relative effectiveness of various water management efforts, as well as the overall effectiveness of WaterSMART Grants.

Environmental and Cultural Resources Compliance

To allow Reclamation to assess the probable environmental and cultural resources impacts and costs associated with each application, all applicants must respond to the following list of questions focusing on the NEPA, ESA, and NHPA requirements. Please answer the following questions to the best of your knowledge. If any question is not applicable to the project, please explain why.

Note: Applicants proposing a Funding Group II project must address the environmental compliance questions for their entire project, not just the first 1-year phase.

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

There will be minimal disturbance with the installation of SCADA and new flow measurement structures. All of the metering work will be performed in previously disturbed areas. The proposed pipe alignment will follow the existing canal alignment with the exception of the first 750 feet of the new alignment that will parallel Woodland Hills Drive to make the new pipeline alignment more efficient. There will be minimal, short-term impacts associated with installing the pipeline. All land surface disturbances would be confined to the proposed pipe alignment area and small staging areas. Contract documents for construction work will outline the responsibility of the contractor relative to dust control, air, and water pollution during construction activities. Minimal environmental disturbances are anticipated. It is anticipated that the NEPA environmental compliance for this project will be at the level of a simple Environmental Assessment.

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

Project participants are aware of the plants and animals listed under the Federal threatened or endangered species that could be impacted by this project. There is no designated critical habitat that would be impacted by this project. Before construction activities begin, SFSIC will work with Reclamation to comply with NEPA requirements and identify any threatened or endangered species or critical habitat areas. The project is not anticipated to have any impact to such areas or species.

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

Project participants are not aware of any wetlands or other surface water inside the project boundaries that fall under Clean Water Act (CWA) jurisdiction as "waters of the United States." This will be verified by environmental engineers when complying with the NEPA requirements.

(4) When was the water delivery system constructed?

It is thought the canal and ditches were originally constructed in the late 1800's, due to the associated main water right having a priority date of 1860. SFSIC was officially incorporated on December 23, 1941.

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

The proposed project will rehabilitate three existing Parshall flumes and add pressure transducers to the stilling well of each flume. The existing flumes were installed in the early 1960's, and currently no flow measurements are taken at these flumes. The project will also

replace 6,180 feet of the South Field Canal with 5,900 feet of pipeline. The existing canal will be filled in and graded at the end of the project.

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

The only structures that might be listed or eligible for listing on the National Register of Historic Places database would be at the headworks of the canal. These structures are part of the SVP. A complete cultural resources report will be prepared prior to any construction activities in the area, which will include consultation with Utah State of Historic Preservation Office (SHPO), a complete Class I literature search to identify any archeological and historic architectural resources within the project area, and a Class III pedestrian inventory of the pipeline alignment and staging areas.

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

It is not anticipated that the project will impact any archeological sites or historic structures.

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

The project will not have a disproportionately high and adverse effect on low income or minority populations.

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

The project will not affect tribal lands.

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

The project will not contribute to the spread of noxious weeds.

Required Permits or Approvals

Applicants must state in the application whether any permits or approvals are required and explain the plan for obtaining such permits or approvals.

Applicants proposing renewable energy components to Federal facilities should note that some power projects may require FERC permitting or a Reclamation Lease of Power Privilege. To complete a renewable energy project within the time frame required of this FOA, it is recommended that an applicant has commenced the necessary permitting process prior to applying.

OFFICIAL RESOLUTION
OF THE
Spanish Fork South Irrigation Company

RESOLUTION NO. 2016 - 1

WHEREAS, the United States Department of the Interior, Bureau of Reclamation has announced the *WaterSMART Water and Energy Efficiency Grants* in order to prevent water supply crises and ease conflict in the western United States, and has requested proposals from eligible entities to be included in the WaterSMART Program, and

WHEREAS, the Spanish Fork South Irrigation Company has need for funding to complete the South Field Canal Metering and Piping Project.

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

1. The Board of Directors has reviewed and supports the proposal submitted;

2. The applicant is capable of providing the amount of funding and/or in-kind contributions, specified in the funding plan; and

3. If selected for a WaterSMART Grant, the applicant will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

DATED: 1/7/16

Neil L Anderson

Neil Anderson, President

ATTEST:

Greg Price

Greg Price, Secretary

Appendix B

Water Savings Calculations

Source: Irrigation and Water Resource Engineering by G.L. Asawa copyright 2008

5.7. CANAL LOSSES

When water comes in contact with an earthen surface, whether artificial or natural, the surface absorbs water. This absorbed water percolates deep into the ground and is the main cause of the loss of water carried by a canal. In addition, some canal water is also lost due to evaporation. The loss due to evaporation is about 10 per cent of the quantity lost due to seepage. The seepage loss varies with the type of the material through which the canal runs. Obviously, the loss is greater in coarse sand and gravel, less in loam, and still less in clay soil. If the canal carries silt-laden water, the pores of the soil are sealed in course of time and the canal seepage reduces with time. In almost all cases, the seepage loss constitutes an important factor which must be accounted for in determining the water requirements of a canal.

Between the headworks of a canal and the watercourses, the loss of water on account of seepage and evaporation is considerable. This loss may be of the order of 20 to 50 per cent of water diverted at the headworks depending upon the type of soil through which canal runs and the climatic conditions of the region.

For the purpose of estimating the water requirements of a canal, the total loss due to evaporation and seepage, also known as conveyance loss, is expressed as m^3/s per million square metres of either wetted perimeter or the exposed water surface area. Conveyance loss can be calculated using the values given in Table 5.2. In UP, the total loss (due to seepage and evaporation) per million square metres of water surface varies from 2.5 m^3/s for ordinary clay loam to 5.0 m^3/s for sandy loam. The following empirical relation has also been found to give comparable results (2).

$$q_i = (1/200)(B + h)^{2/3} \qquad (5.1)$$

Table 5.2 Conveyance losses in canals (1)

Material	*Loss in m^3/s per million square metres of wetted perimeter (or water surface)*
Impervious clay loam	0.88 to 1.24
Medium clay loam underlaid with hard pan at depth of not over 0.60 to 0.90 m below bed	1.24 to 1.76
Ordinary clay loam, silty soil or lava ash loam	1.76 to 2.65
Gravelly or sandy clay loam, cemented gravel, sand and clay	2.65 to 3.53
Sandy loam	3.53 to 5.29
Loose sand	5.29 to 6.17
Gravel sand	7.06 to 8.82
Porous gravel soil	8.82 to 10.58
Gravels	10.58 to 21.17

In this relation, q_i is the loss expressed in m^3/s per kilometre length of canal and B and h are, respectively, canal bed width and depth of flow in metres.

Irrigation Season Apr 1 to Oct 1 = 183 days

Width	10	Length	4680 ft
Height	3		0.89 miles
Soil Factor	1.2		

0.031	m^3/s per km	1.785	ft^3/s per mile
3.281	ft/meter	3.54	ac-ft/day/mile
1.609	km/mile	647.8	ac-ft/year/mile
183	irrigation days/year		

Seepage Losses

574.2 ac-ft per year

Evaporation (10% of seepage)

57.42 ac-ft per year

Conveyance Losses

630 ac-ft per year

Lateral Conservation

Lateral	Days per Turn	Turns per Year	cfs over allocation	Acft over delivered
Hansen Ditch	20	6	2	476
Ludlow Ditch	20	6	2	476
Argyle Ditch	20	6	2	476
West Ditch	14	6	2	333
North Ditch	14	6	2	333
Hone Ditch	14	6	2	333
Issac Ditch	14	6	2	333
Center Ditch	14	6	2	333
				3,095

Total Water Savings 3,725 ac-ft per year

Appendix C

Probable Cost for Engineering Services

(Engineering, Design, Construction Management, Environmental, and Legal)

Appendix D

Probable Cost for Construction Services