WaterSMART

Water and Energy Efficiency Grants for FY 2019

Funding Opportunity Announcement No. BOR-DO-19-F004

Funding Group I

City of Spanish Fork
Meter Upgrade & Smart Irrigation Controllers Project

Spanish Fork, Utah

City of Spanish Fork, Utah
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March 18, 2019

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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 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 proposed project*
- *Whether or not the project is located on a Federal facility*

Date: March 18, 2019

Applicant: City of Spanish Fork
Spanish Fork, Utah County, Utah

Project Title: Meter Upgrade & Smart Irrigation Controllers Project

Project Summary:

The Meter Upgrade & Smart Irrigation Controllers Project (Project) proposes improvements to the City of Spanish Fork's (City) pressurized irrigation (PI) system as well as its culinary water system. The goals of the Project include improving water conservation, eliminating/minimizing daily peak demands, and improving accuracy and real-time usage data for individual users. The Project would involve various water saving methods, including the installation of smart irrigation controllers on a portion of the residents' sprinkler systems, upgrading the City's meter software, and replacing a portion of the City's outdated culinary meters. These new water meters would connect to the City's Automated Meter Infrastructure (AMI) system to provide real-time data for culinary water through a new user access portal. In addition, the remaining meters not in need of replacement would be reprogrammed in order to be compatible with the updated software. Project benefits include a 17% irrigation water savings for each property where the smart irrigation controllers are installed and 10% water savings due to the update of outdated culinary water meters. The total water savings would be 150 acre-feet. Additionally, energy savings would result from updating the meter software and AMI system as less fuel and effort would be required to obtain meter readings. The City has also noted that as users have access to real-time data for culinary water, PI water, and electrical usage, voluntary water conservation occurs on an individual basis. This Project would greatly benefit the City as it conserves its water supply, delays the need for additional infrastructure and plans for the future.

Approximate Length: 24 months

Completion Date: Fall 2021

Federal Facility: The project is not located on a Federal facility.

Background Data

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.

The City has multiple water sources to serve its PI and culinary water systems. The culinary water system is supplied from several springs. The City also has several wells that can be used for either the culinary or PI systems but are currently only being used for the PI system. Other PI system sources for which the City holds water rights include the Spanish Fork River and Strawberry Reservoir, which are Reclamation facilities. In addition to holding its own water rights, the City also holds water shares in local canal companies for use in its PI system. Table 1 lists the City's water rights and volume of water as well as the shares held in the canal companies.

The City currently serves nearly 20,650 combined PI and culinary water connections. The City's 2018 annual water use was approximately 3.4 billion gallons, or 10,419 acre-feet. This equates to an annual usage of approximately 329,000 gallons (1.0 acre-feet) per residence. According to the City's PI System Master Plan prepared in 2012, it is anticipated that the buildout peak day demand would be 13,100 acre-feet annually. In order to reduce this future demand and reduce the amount of infrastructure needed to support it, the City is prioritizing the implementation of proposed water conservation measures such as this Project. This Project would ensure the reliability and sustainability of the City's current water supply.

Table 1: Water Rights Diverted into the Spanish Fork Culinary and PI System

Water Right/Shares	Source	Volume (ac-ft)	Priority
a26429*	Wells	10,467.53	03/14/2002
51-7805	Springs	355	08/26/1929
51-1750	Well	299.2	03/01/1925
51-5523	Springs	345	10/18/1983
51-6497	Springs**	2,421	07/17/1951
East Bench Canal Company	Spanish Fork River, Springs	1,393	-
West Field Canal Company	Spanish Fork River, Springs	500	-
Strawberry WUA	Spanish Fork River, Strawberry Reservoir	2,420	-

*This change application affects multiple water rights such that only the change is listed.

**This right was originally for water from Spanish Fork River and Strawberry Reservoir but has been exchanged for water from Cold Springs.

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 City's existing PI system consists of two pressure zones: the upper and lower zones. These zones are served by a system of 150 miles of pipelines ranging in size from 2 inches to 36 inches in diameter. Each of the 9,495 connections typically have a 3/4 or 1-inch lateral that connects to the PI system. All PI connections have a meter installed and are billed for all their water usage based on a flat fee, depending on meter size, plus a water usage charge. Included in the PI system are two reservoirs and three booster stations.

The City's culinary water system consists of four pressure zones. These are served through a system consisting of 232 miles of pipelines ranging in size from 2 inches to 36 inches in diameter. Each of the 11,153 connections typically have a 3/4 or 1-inch lateral connecting to the culinary system. All culinary connections are billed for all their water usage based on a tiered rate. Included in the culinary system are two wells, a water treatment facility, and four booster stations.

Hydropower or Energy Efficiency

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

The proposed Project would increase energy efficiency by reducing the current peak demand on the PI system. The City pumps to its storage tank during the day but because of current peak demands pumping also occurs during the peak hours in order to meet the demand. This project would reduce the peak water demand at the peak water use hours (see Figure 5) and therefore reduce the amount of water pumped and the amount of energy required. The City currently operates three booster stations connected to the PI system in order to provide the necessary pressure to its two pressure zones. The City is unique in that unlike most systems approximately half of the City is in a wind fan area with the wind coming from Spanish Fork Canyon. The wind created in this area evaporates sprinkler water six times faster than the sun. Therefore, it is more efficient with less water wasted for users to water this area during the daytime. By controlling the time of water use, the City would be able to reduce the amount of water it pumps and thus reduce the peak demands. This, in conjunction with reduced water demands, would result in decreasing the pumping costs into the City's PI reservoir. The City's PI pumping cost is $36.58 per acre-foot while the cost of culinary water pumping is $553 per acre-foot. Based on anticipated water savings of 113 acre-feet per year on the PI system and 37 acre-feet per year on the culinary system, the City could expect to save approximately $24,600 annually in pumping costs.

In addition, the water that would normally be pumped in order to meet peak demands would be available to go through an existing hydropower facility for energy generation. The facility is owned by South Utah Valley Electric Service District (SESD). The saved water would continue to flow through the hydropower facility, operated by SESD, so that no adverse impacts will be experienced, producing additional power.

As growth continues, the current source capacity would be adequate to support the City's current PI demands and the projected demand would increase at a slower rate than originally estimated in

the PI Water Master Plan. The PI system is already pressurized in such a way that individual residents do not need pumps to use the water on their property.

Prior Work with Reclamation

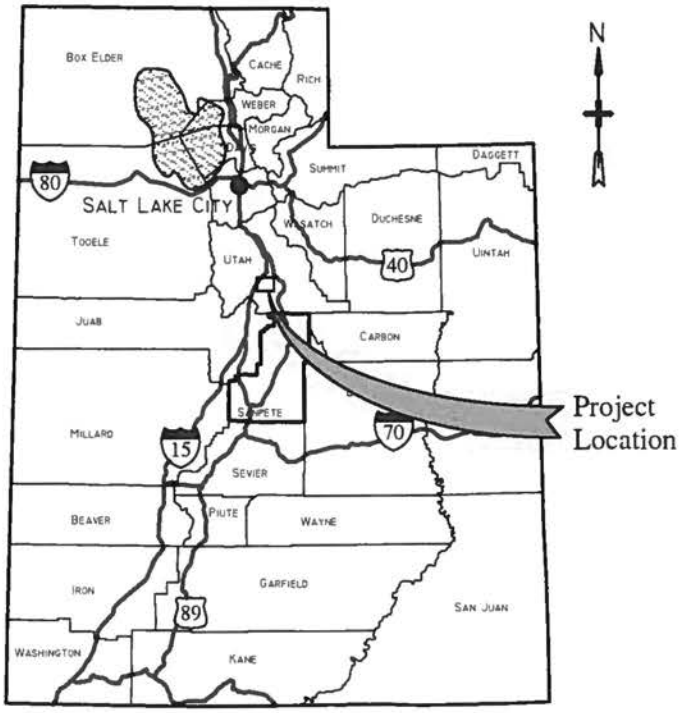
Identify any past working relationships with Reclamation. This should include the date(s), description of prior relationships with Reclamation, and a description of the project(s).

While the City does not have any direct relationships with Reclamation, they are closely tied with past Reclamation projects. The City uses water from Strawberry Reservoir, a Reclamation project, and is impacted by various features of the Central Utah Project (CUP) including the ULS, which is built in the City's vicinity.

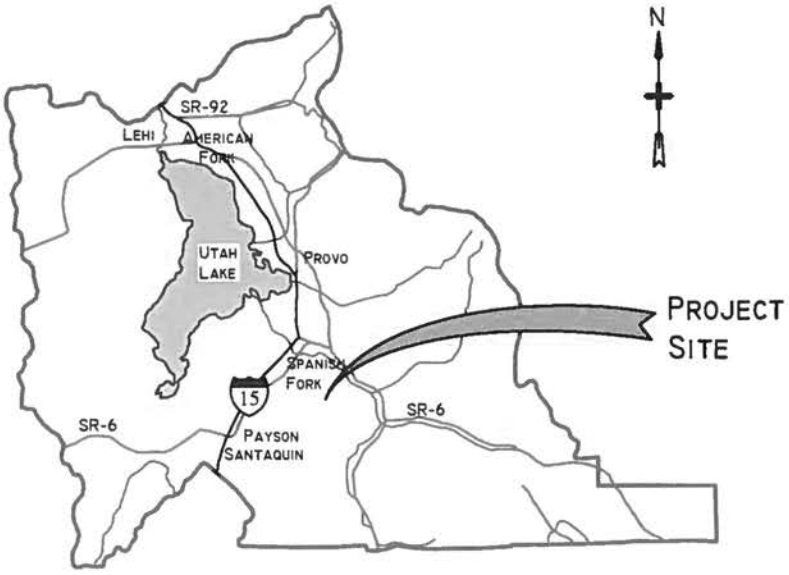
Project Location

Provide specific information on the proposed project location or project area including a map showing the geographic location. For example, {project name} is located in {state and county} approximately {distance} miles {direction, e.g. northeast} of {nearest town}. The project latitude is {##°##'N} and longitude is {###°##'W}.

The Project is located in Spanish Fork, Utah County, Utah, as shown in Figure 1. The Project latitude is 40°6.85'N and longitude is 111°39.29'W.



Utah



Utah County

FRANSON CIVIL ENGINEERS	DATE: April 23, 2018 SCALE: Location Maps.dwg P:\UT\Central\Spanish Fork City\4-Drawings	Spanish Fork City Meter Upgrade & Smart Irrigation Controllers Project	Figure 1 Location Maps

Technical Project Description

The technical project description should describe the work in detail, including specific activities that will be accomplished. This description shall have sufficient detail to permit a comprehensive evaluation of the proposal. Please note, if the work for which you are requesting funding is a phase of a larger project, please only describe the work that is reflected in the budget and exclude description of other activities or components of the overall project.

Utah has one of the fastest population growth rates of any state in the U.S. Spanish Fork City is currently growing by almost 2% each year. This rate is expected to increase in the future as cities to the north reach build-out, pushing growth to communities in the south. Utah is aware of this issue and is working to solve the problem. Having water sources to support this growth is an issue Utah is working to address. Governor Herbert of Utah has claimed that it is imperative to use water efficiently to meet future water needs. He has challenged Utah to improve efficiency by 25% by 2025. A Water Conservation Team was appointed to investigate, promote, and communicate the need for water conservation.

Utah is located in a desert, with the City having a yearly rainfall of less than 22 inches. The project area as well as most of Utah are in a moderate drought where voluntary water-use restrictions are requested, with some damage to crops due to lack of water. https://www.drought.gov/drought/states/utah. In 2018, the area around the Spanish Fork River experienced some extreme fires which "burnt nearly 92% of the Spanish Fork River Watershed". (Ed Vidmar, Spanish Fork River Water Commissioner), which have added to the dire water conditions. Wildfires can significantly alter the hydrologic response, the result being that even mild rainstorms can produce dangerous flash flood flows. With such a large area of the watershed being burnt, there is great concern in the area that the City's water supply from surface springs could become compromised and contaminated. Additionally, the lack of hillside vegetation causes sediment to load the channel bottoms with loose sediment resulting in debris flows.

The Project proposes improvements to the City's PI system as well as its culinary water system in order to support the Governor's initiative by conserving water and reducing peak demands. This will thereby allow the current infrastructure to support additional growth, improve accuracy, and provide real-time usage data to individual users. The Project would include all costs associated with purchasing and professionally installing the PI smart irrigation controllers, replacing outdated culinary water meters, reprogramming the remaining existing culinary water meters, purchasing the software associated with the meters, and program management.

Pressurized Irrigation System Improvements

The City's PI system is shown in Figure 2 and the wind fan boundary in Figure 3. The City proposes to professionally install approximately 1,000 smart irrigation controllers throughout the City to residents, free of charge. This program would allow the City to conserve water, control peak demands, and provide the participating residents with real-time usage data. These controllers would be EPA WaterSense certified and rely on current weather conditions and City demands to adjust watering schedules. Additionally, the meters would be professionally installed and programmed by the City with an efficient watering plan based on soil type, slope, type of sprinkler heads, plant types, grass locations, etc.

The smart irrigation controllers would be offered to residents at no cost. In exchange, residents would allow the City to periodically review their watering schedule and regulate their time-of-day usage which would enable the City to eliminate instantaneous peak demands. The City would then install the controller, at no charge to the resident, to ensure correct installation and setup for the resident's landscaping needs. While commitment to the program does give the City access to a resident's personal controller in order to regulate usage, the resident does have final control of their watering system and could override changes made by the City. Based on the pilot program in 2018, the success of the pilot program has identified the need and desire for more residents to participate using smart irrigation controllers. The Project would allow the City to install more smart controllers throughout the City, increasing water savings. Information and registration are available on the City's website at:

https://www.spanishfork.org/departments/public_works/pressirrig/conservation/index.php.

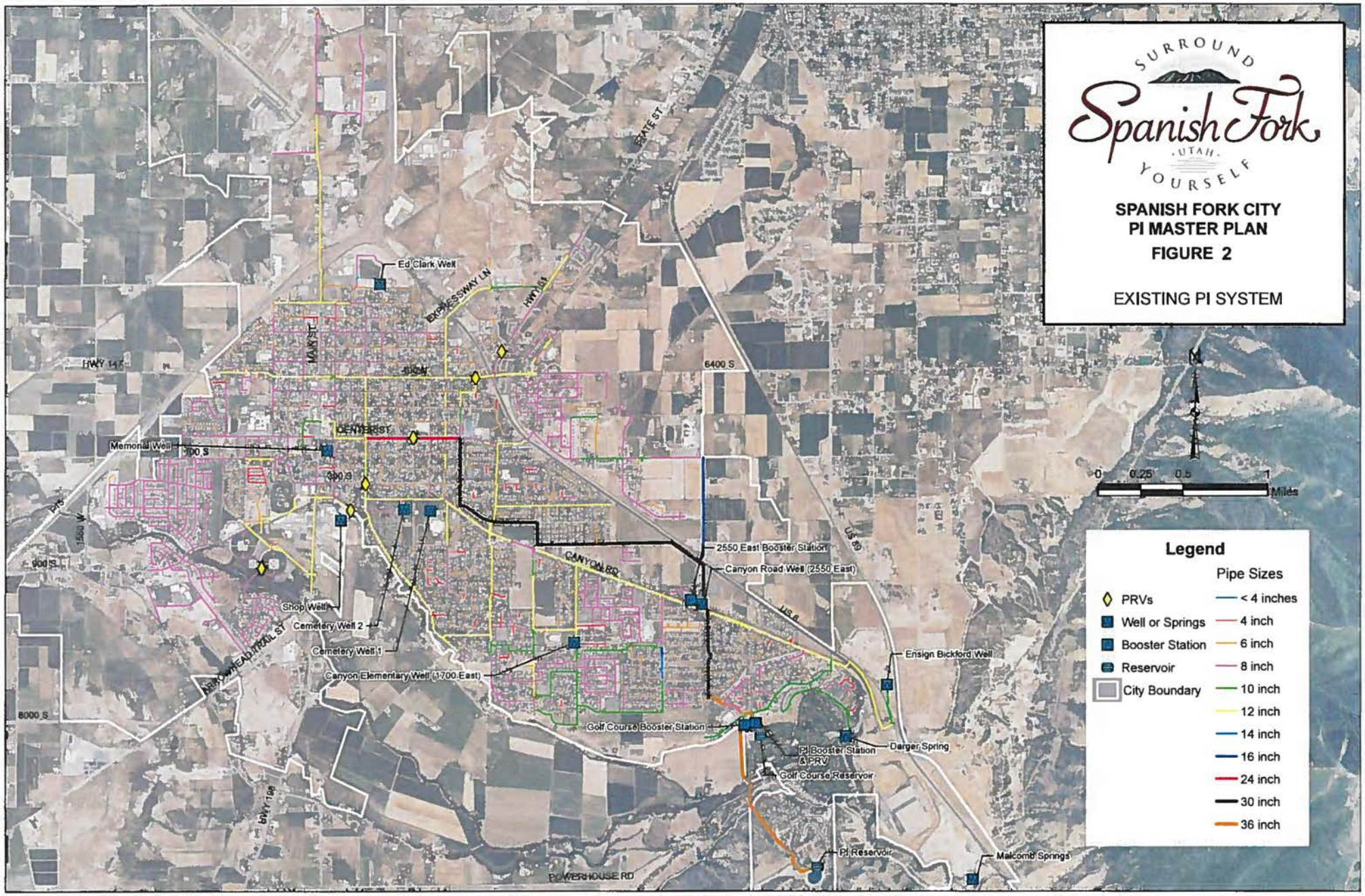

SURROUND
Spanish Fork
UTAH
YOURSELF
SPANISH FORK CITY
PI MASTER PLAN
FIGURE 2
EXISTING PI SYSTEM
Ed Clark Well
EXPRESSWAY LN
HWY 6
MAIN ST
STATE ST
HWY 147
6400 S
CENTER ST
Memorial Well
300 S
300 S
1550 W
900 S
CANYON RD
2550 East Booster Station
Canyon Road Well (2550 East)
US 89
US 6
Shop Well
Cemetery Well 2
Cemetery Well 1
Canyon Elementary Well (1700 East)
NEWSPAPER TRAIL ST
8000 S
Ensign Bickford Well
Golf Course Booster Station
PI Booster Station & PRV
Golf Course Reservoir
Darger Spring
HWY 198
PI Reservoir
Malcomb Springs
POWERHOUSE RD
0 0.25 0.5 1 Miles
Legend
PRVs
Well or Springs
Booster Station
Reservoir
City Boundary
Pipe Sizes
< 4 inches
4 inch
6 inch
8 inch
10 inch
12 inch
14 inch
16 inch
24 inch
30 inch
36 inch

Figure 3

Spanish Fork Wind Boundary

1 " = 4,600 Ft

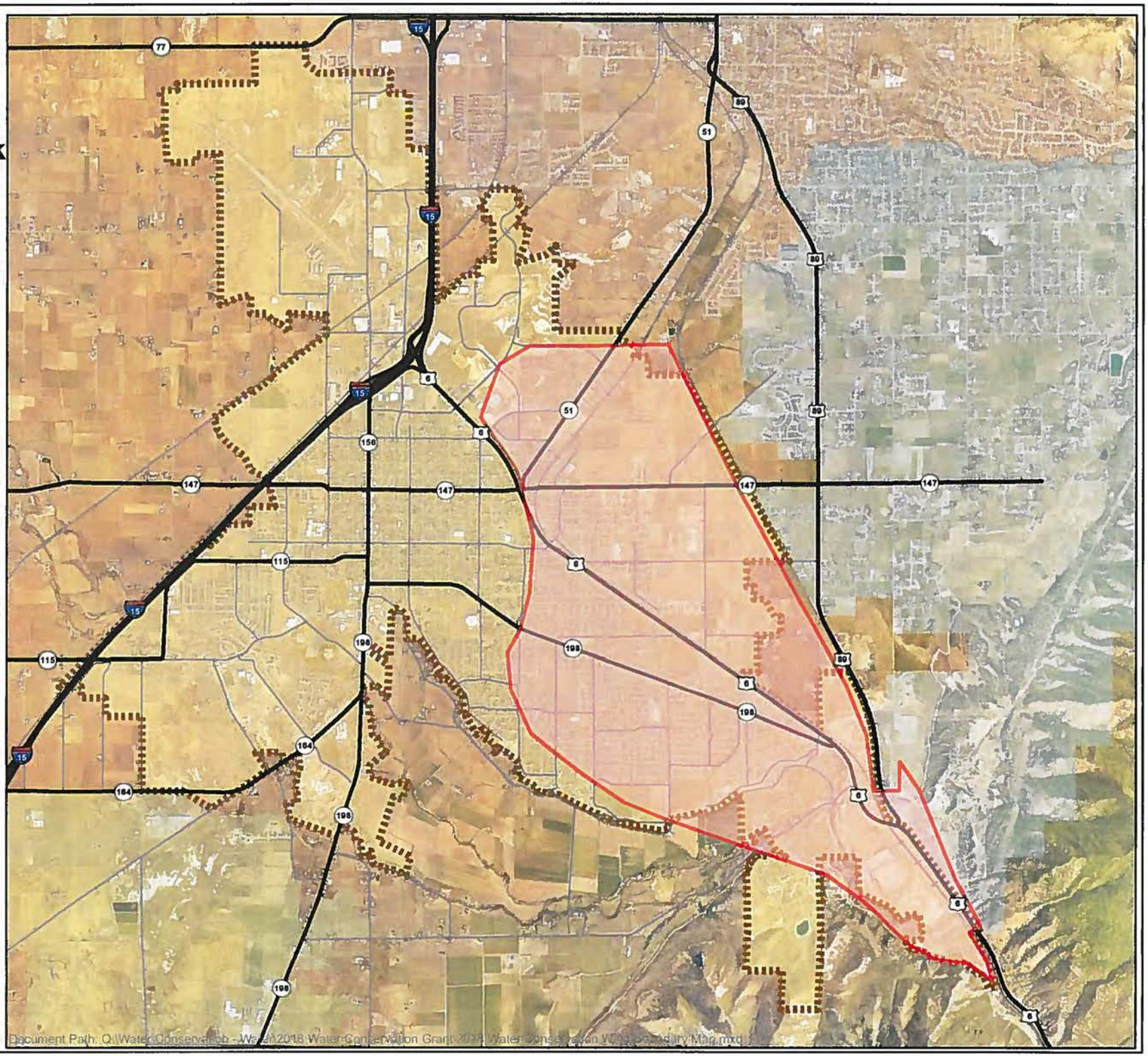
Legend

- Wind Boundary Assessment
- Highways
- Major Roads
- Railroads
- Spanish Fork Boundary
- Mapleton
- Salem
- Springville
- Spanish Fork Poly

Print Date: 7/25/2018

SPANISH FORK
PUBLIC WORKS

Spanish Fork City GIS
40 South Main St
Spanish Fork, UT 84660
GIS Phone Numbers;
(801) 804-4571 (Administrator)
(801) 804-4570 (Intern)
(801) 804-4572 (Intern)



In addition to better watering schedules and amounts, this program would allow users to see their usage in real-time and better adapt their usage to more efficient watering practices. The City can also compare each individual user with their neighbors and include this information on the user's utility bill. This would likely be in the form of a statement and/or simple graphic to illustrate the comparative water use. If a resident does notice that their neighbors use less water but still have green lawns, this may encourage them to decrease their water use.

This program has been in practice now for one year and the City has seen nearly 1,500 users decrease their water use by an average of nearly 17%. The City expects this to result in at least a 10% decrease in overall usage for the new users that sign up for the smart irrigation controllers.

It is anticipated that approximately 1,000 City residents would sign up for the program. This would allow the City to regulate an additional 31% of its PI water demand in such a way that peak demands throughout the day are reduced and future infrastructure sizing requirements can be reduced and delayed despite growth. This increased water control would greatly benefit the City as it conserves its water supply as well as planning for the future.

Culinary Water System Improvements

In addition to the PI improvements, the City proposes to replace approximately 1,000 outdated culinary water meters. There would be nearly 17,500 of the remaining meters that are new enough that they could be reprogrammed to work with the new software. This new software would allow for meters to be read to the nearest one gallon rather than the nearest 1,000 gallons.

The current software used by the City to monitor water use does not have a user portal to provide real-time data to the water users. This new user portal software would notify the water user and the City of a water leak, allowing for immediate detection and correction. This feature would also conserve water.

The software associated with the smart irrigation controllers for the PI system can also be connected to the residential culinary and electrical meters to provide real-time data to the user and City in order to report all usage. This real-time data has the potential to improve water management, provide immediate information on leak detections, and measure usage to the nearest gallon.

Evaluation Criteria

Evaluation Criterion A: Quantifiable Water Savings

Up to 30 points may be awarded for this criterion. This criterion prioritizes projects that will conserve water and improve water use efficiency by modernizing existing infrastructure. Points will be allocated based on the quantifiable water savings expected as a result of the project. Points will be allocated to give greater consideration to projects that are expected to result in more significant water savings. All applicants should be sure to address the following:

Water Savings

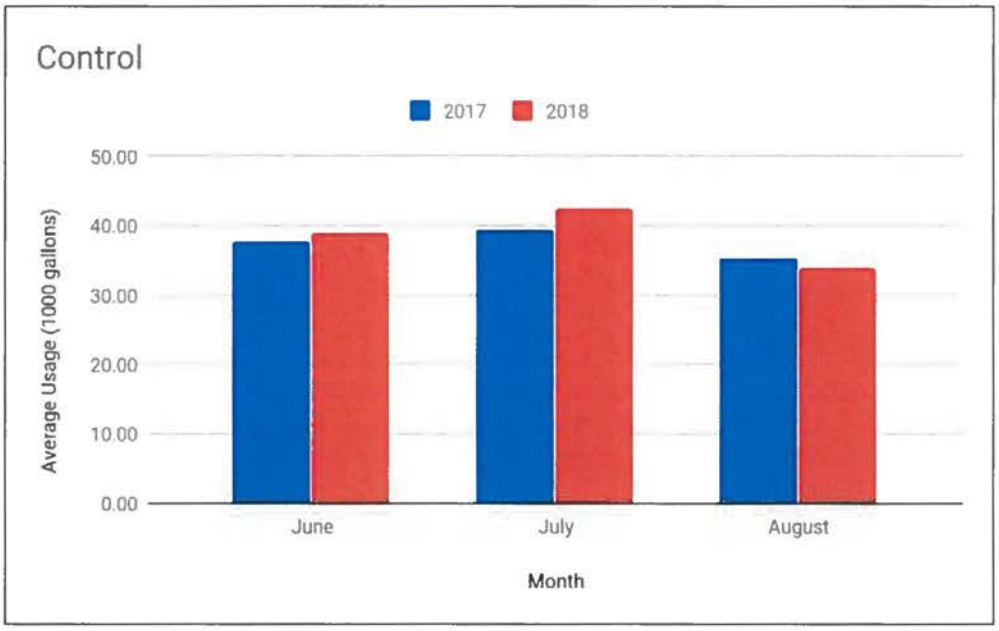
Describe the amount of estimated water savings. *For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project.*

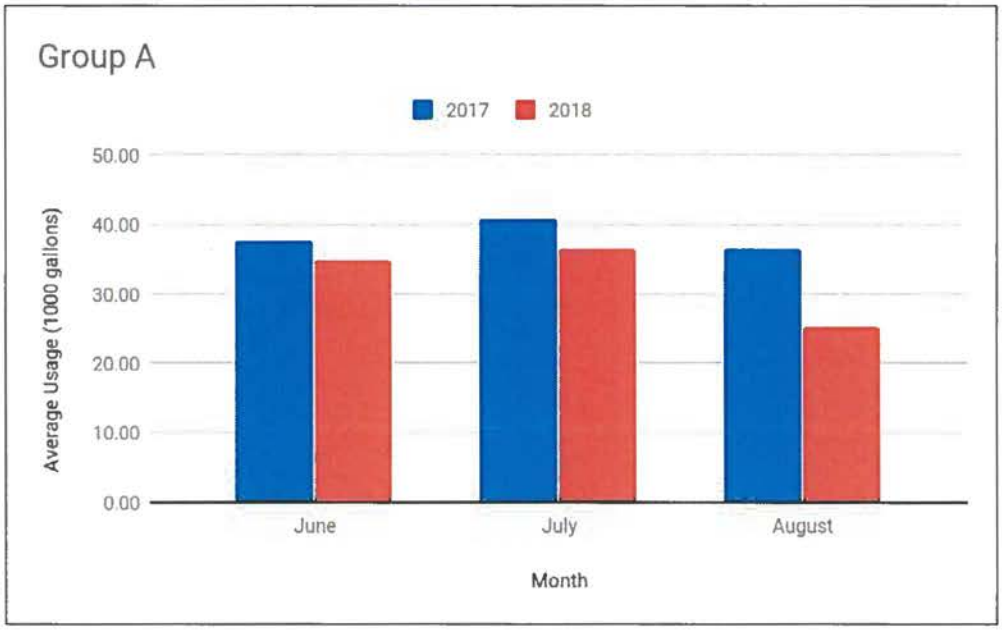
PI System Water Savings:

Residents with a PI connection have a meter which measures their water usage which helps water users to be accountable and know how much water they are using for irrigation. It has been documented that municipal metering of PI systems encourages water conservation. Spanish Fork City has encouraged water savings by directing rates by a usage charge of $0.82 per 1,000 gallons. The City will be implementing a tiered rate structure in 2019. Each resident receives a monthly water usage report detailing their usage and providing additional information to help manage water use efficiently. Weber Basin Water Conservation District (District) has also implemented a PI metering program. Appendix D provides their secondary water metering report which documents a 23% reduction in water use from 2013 to 2015 after they implemented a program that educated users on how much water they were using and provided ways to better utilize the water they did use.

While the City has reduced water use through the use of meters, they wish to improve their water conservation further by installing smart irrigation controllers which will provide an avenue for users to better understand their secondary water usage with real-time data. During the summer of 2018, the City installed 953 smart irrigation controllers on its PI system. The City realized the conservation benefits immediately. Two thousand homes were analyzed in 2017 and 2018 as shown in Figure 4. It shows the Control group which has no controllers and Group A with smart controllers. On average, homes without smart controllers used nearly 26,540 gallons while homes with smart controllers used only 21,970. The smart controllers saved an average of 4,570 gallons per month, which is a 17.2% savings. (J. Paxton, et al, *Spanish Fork Irrigation-Water Conservation Study*, BYU Project ID: CEEn_2018CPST_004, 2019)

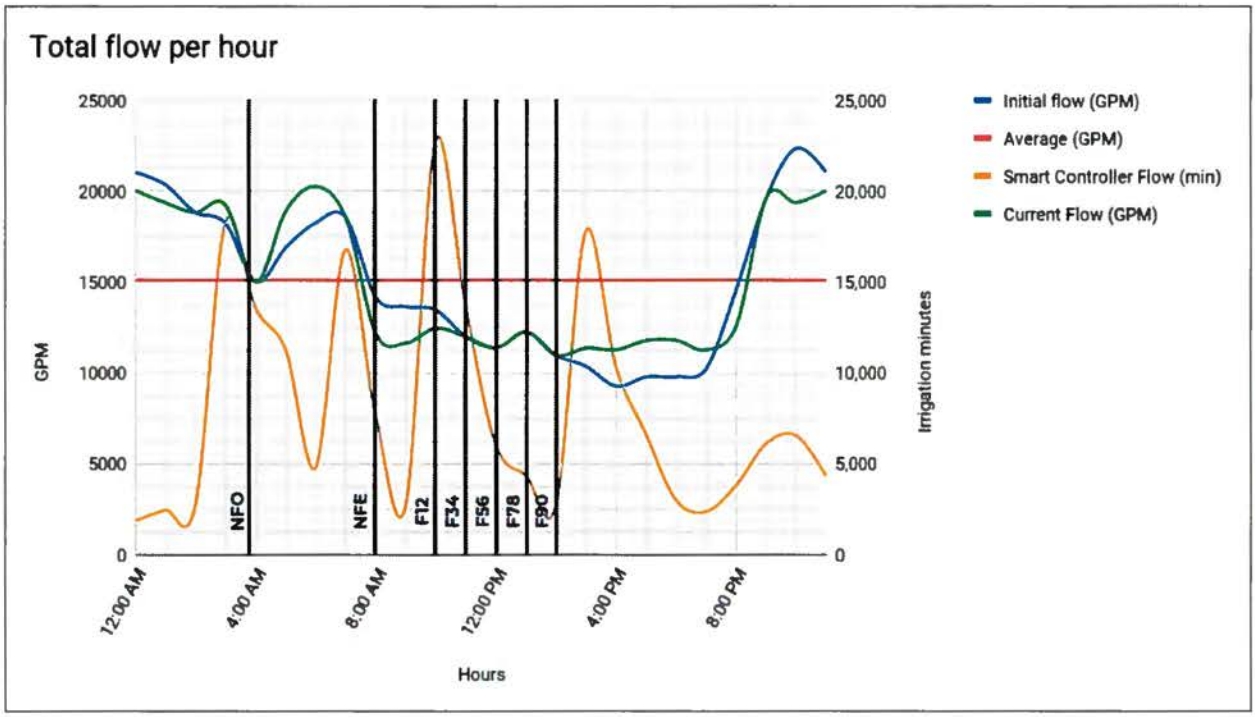
Figure 4: No Smart Controllers vs. Smart Controllers





Additionally, Figure 5 shows that the peak demands during the middle of the night were reduced by 4.9% when comparing the initial flow (blue line) to the current flow (green line). The proposed Project would add more smart controllers and by fine tuning when residences are scheduled to water, the water savings would improve even more. It is anticipated that with expanding on these results by installing more smart controllers, the City can push off constructing infrastructure.

Figure 5: Total Water Flow per Hour



Based on results from the 2018 pilot program, each resident that has a smart irrigation controller installed through this program would experience a 17% water savings. Based on the City's 2018 PI system metering records, the average annual PI water use is 6,321 acre-feet for the 9,495 connections during the 2018 calendar year. This means that each connection, on average, used 216,925 gallons (0.67 acre-feet). Assuming 1,000 connections install a smart irrigation controller on their system, the average annual PI water use for those connections would then be 180,048 gallons per connection per year. The total savings experienced by the City for installing the smart irrigation controllers would be approximately 113 acre-feet (36.9 million gallons) annually. The calculations are shown in the support/documentation section below.

This water savings is verified by a similar program installed in Yucaipa, California, where they offered a smart irrigation controller rebate program and allowed residents to install their own controller or have it professionally installed. Data was collected for a year and the usage of those with professionally-installed controllers was compared to those without smart controllers. The average water savings was 20%. When the usage of those with self-installed controllers was compared to those without controllers, there were only minimal savings.

Culinary System Water Savings:

Culinary water meter upgrades are expected to reduce water use by 10% based on previous water use information from the City's existing water customers who have had their meters upgraded in the past. This 10% of additional water savings can be realized by replacing the outdated culinary water meters and reprogramming the remaining ones to be compatible with modernized software. Rather than measure in 1,000 gallons increments, they would measure in 1-gallon increments. These meter enhancements would detect water leaks sooner and notify the City and residents as well as

provide real-time data to users and improve accuracy. The City's culinary system in 2018 had 11,153 connections and used 4,098 acre-feet of water. This equates to an average of 119,729 gallons per connection. For the 1,000 culinary water meters that would be replaced, the 10% conservation would equate to nearly 36.7 acre-feet (12.0 million gallons) every year.

In addition, the City can use individual meter data to verify conservation data determined by comparing post-project usage with historical usage data. Individual water use data compared to neighbors' water use data may be shared in utility bills to encourage water conservation by means other than cost.

Current Water Losses

Describe current losses: *Please explain where the water that will be conserved is currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?*

The current water loss is being delivered to residents where it is wasted on their landscaping. This can result from various situations such as running sprinklers during a rain event or overwatering. Water losses due to leaks, which do happen, are not currently detectable due to the high increment of metering at 1,000 gallons.

Support/Documentation of Water Savings

Describe the support/documentation of estimated water savings: *Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Note: projects that do not provide sufficient supporting detail/calculations may not receive credit under this section. 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, please note that the use of visual observations alone to calculate water savings, without additional documentation/data, are <u>not</u> sufficient to receive credit under this section. Further, the water savings must be the result of reducing or eliminating a current, ongoing loss, not the result of an expected future loss.*

As indicated above, the City's Pilot Program on its PI system of 953 smart controllers documented water savings of 17%. The culinary water savings will be 10% for implementation of the new meters. The calculations are shown below.

Existing Condition:

Annual PI Use = 6,321 acre-feet / 9,495 connections = 0.67 acre-feet OR 216,925 gallons per connection.

Annual Culinary Use = 4,098 acre-feet / 11,153 connections = 0.367 acre-feet OR 119,729 gallons per connection.

Table 2: PI Post-Project Condition

PI System	Existing Connections	New Controllers
Total # of PI Connections (connections)	8,495	1,000
Average Annual PI Use (gallons/connection)	216,925	180,048
Total Annual PI Use (million gallons)**	1,842.8	180.0

*Calculated based on 17% savings = 216,925*0.17= 36,877 gallons/connection savings
**Calculated by multiplying total # of connections by average annual use.

Total Annual PI Use = 1,842.8 million gallons + 180.0 million gallons = 2,022.8 million gallons

Total Annual PI Savings = 1,000 controllers * 36,877.3 gallons/connection = 36.9 million gallons or 113.2 Acre-Feet, rounded to 113 Acre-Feet

Table 3: Culinary Post-Project Condition

Culinary System	Existing Connections	New Meters
Total # of Meter Connections *(connections)*	10,153	1,000
Average Annual Culinary Use *(gallons/connection)*	119,729	107,756*
Total Annual Culinary Use *(million gallons)***	1,215.6	107.8

*Calculated based on 10% savings = 119,729*0.1= 11,973 gallons/connection savings
**Calculated by multiplying total # of connections by average annual use.

Total Annual Culinary Use = 1,215.6 million gallons + 107.8 million gallons = 1,323.4 million gallons

Total Annual Culinary Savings = 1,000 controllers * 11,973 gallons/connection = 12.0 million gallons or 36.7 Acre-Feet, rounded to 37 Acre-Feet

Water Savings:

Total Water Savings = 36.9 million gallons + 12.0 million gallons = 48.9 million gallons OR 149.9 acre-feet, rounded to 150 Acre-Feet

Additional water savings are anticipated if a statement and/or graphic is included on users' bills comparing their usage to their neighbor. However, these savings have not been included here.

Project Types

Please address the following questions according to the type of infrastructure improvement you are proposing for funding. See Appendix A: Benefit Quantification and Performance Measure Guidance for additional guidance on quantifying water savings.

(1) ***Municipal Metering:*** *Municipal metering projects can provide water savings when individual user meters are installed where none exist to allow for unit or tiered pricing, when existing individual user meters are replaced with advanced metering infrastructure (AMI) meters, and when new meters are installed within a distribution system to assist with leakage reduction. To receive credit for water savings for a municipal metering project, an applicant must provide a detailed description of the method used to estimate savings, including references to documented savings from similar previously implemented projects. Applicants proposing municipal metering 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.*

See the "Support/Documentation of Water Savings" section for water savings calculations.

b. *How have current distribution system losses and/or the potential for reductions in water use by individual users been determined?*

Culinary water meter upgrades are expected to reduce water use by 10% based on previous water use information from Spanish Fork's existing water customers who have had their meters upgraded in the past.

c. *For installing individual water user meters, refer to studies in the region or in the applicant's service area that are relevant to water use patterns and the potential for reducing such use. In the absence of such studies, please explain in detail how expected water use reductions have been estimated and the basis for the estimations.*

Culinary water meter upgrades are expected to reduce water use by 10% based on previous water user information from Spanish Fork's existing water customers.

d. *If installing distribution main meters will result in conserved water, please provide support for this determination (including, but not limited to leakage studies, previous leakage reduction projects, etc.). Please provide details underlying any assumptions being made in support of water savings estimates (e.g., how leakage will be reduced once identified with improved meter data).*

No water main meters would be installed as part of this Project. Only water user connection meters would be installed as part of this Project.

e. *What types (manufacturer and model) of devices will be installed and what quantity of each?*

The City plans to use 1,000 of the Sensus I-Perl water meters. This meter has been used by the City previously to replace broken meters and has been required on all new water connections on the City's water system for the last several years. The meters have integrated well with the City's existing AMI system.

(2) ***Smart Irrigation Controllers and High-Efficiency Nozzles:*** *Applicants proposing smart controller or high-efficiency nozzle projects should address the following:*

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

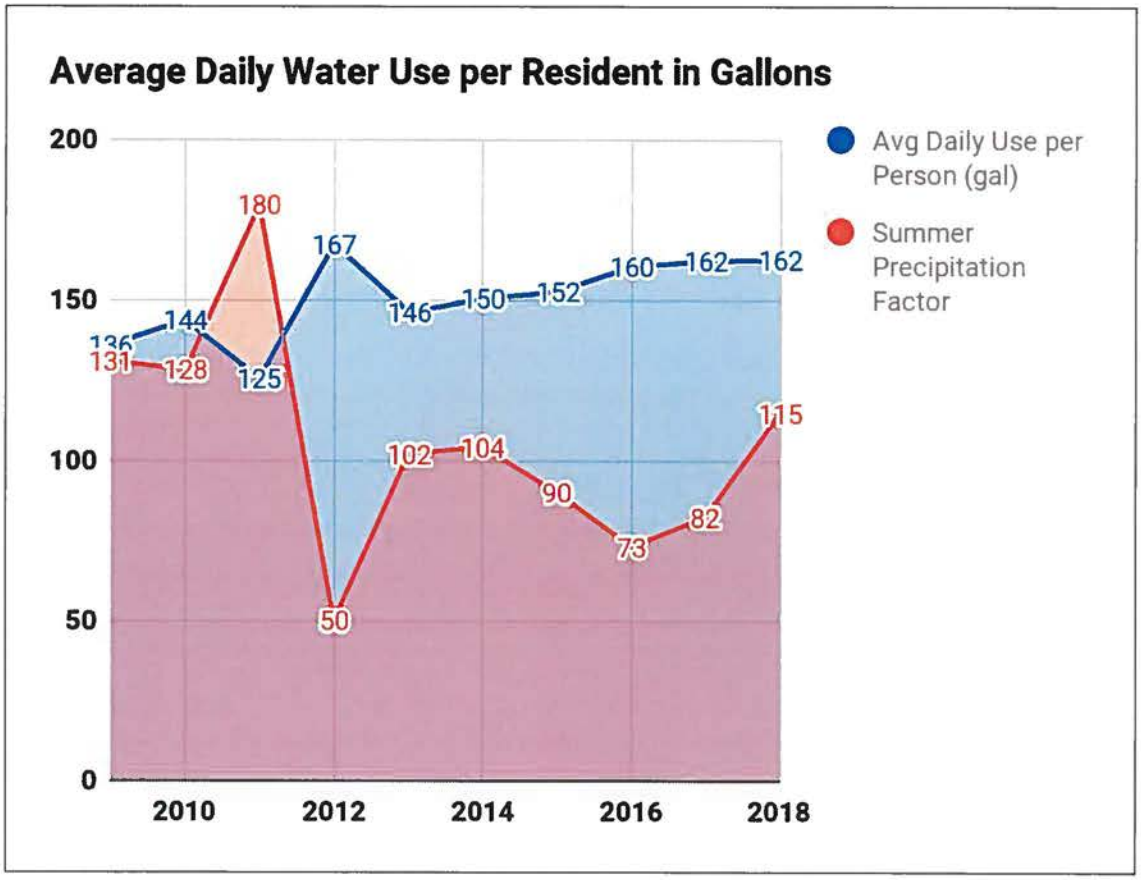
As shown above, the City has seen an average reduction of 17.2% in PI use with smart controllers based on the pilot program's initial installations in the City. As such, water savings are expected to be approximately 113 acre-feet per year (36.9 million gallons per year) with the proper professional setup the City is proposing. Calculations are shown above.

These anticipated savings also appear realistic in comparison with Yucaipa's data which indicated a 20% water use reduction through installing smart controllers and educating users. The proposed Project would provide users with their real-time water use, educate them, as well as provide a more efficient watering solution in the form of a smart irrigation controller.

b. *Was historical water consumption data evaluated to estimate the percent reduction in water demand per unit area of irrigated landscape? If so, did the evaluation include a weather adjustment component?*

Each residential connection serves approximately 0.15 irrigable acres. Historical data indicates that the yearly water demand is 1,446,169 gallons per irrigable acre. It is expected that this project would reduce the yearly water demand to 1,200,321 gallons per irrigable acre for those who participate in the program. Weather was not directly incorporated into this calculation but the water savings experienced by those who participate in the program would include savings due to immediate watering schedule adjustments based on local weather conditions. For example, if the local weather station predicts a rain event or indicates that one is currently underway, the smart irrigation controller would automatically modify the watering schedule to only put down enough water to provide the landscape with the needed water not provided by the rain event. This is supported by 10 years of usage versus precipitation data that is represented in Figure 6. It shows that the amount of precipitation directly correlates to how much irrigation water is used. It also shows that water conservation improved in most of the recent years.

Figure 6: Average Daily Water Use per Resident in Gallons



a. What types (manufacturer and model) of devices will be installed and what quantity of each?

The City is currently using the Rachio 3 Smart Irrigation Controller for approximately 1,000 previous residents who have signed up for the City's water conservation program. The controller is EPA WaterSense Certified. It is anticipated that all 1,000 of this Project's smart irrigation controllers will be the same make and model.

b. Will the devices be installed through a rebate or direct-install program?

The smart irrigation controllers would be offered through a direct-install program where the resident signs up for the program. This allows the City to have limited access to their watering schedule with the City providing the controller, installation, and setup free-of-charge to that resident. This would ensure that the controller is installed and programmed correctly and integrates with the City's software to ensure the most benefit to the user and the City. Residents can sign up on the City's website at:

https://www.spanishfork.org/departments/public_works/pressirrig/conservation/index.php.

c. *Will site audits be performed before and after installation?*

A site audit would be performed prior to installation to evaluate the landscaping water needs while ensuring that the existing sprinkler system is operating at peak performance (e.g. no crooked, damaged, clogged or broken heads and that head filters are operating properly). After installation, site audits would only be performed if necessary, but the City would be able to evaluate usage and operation via the installed software associated with the controller.

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

Upon completion, the City would continue to monitor and record water use for each resident. Once sufficient data has been collected, the City would compare pre-project and post-project water usage for those residents participating in the program. This was done previously as shown in Figure 4. To ensure the validity of the data collected, residents without a controller installed would be used as a control group.

Evaluation Criterion B: Water Supply Reliability

Up to 18 points may be awarded under this criterion. This criterion prioritizes projects that address water reliability concerns, including making water available for multiple beneficial uses and resolving water related conflicts in the region.

Note that an agreement will not be awarded for an improvement to conserve irrigation water unless the applicant agrees to the terms of Section 9504(a)(3)(B) of Public Law 111-11 (see p. 52 of the FOA for additional information).

Please address how the project will increase water supply reliability. Proposals that will address more significant water supply shortfalls benefitting multiple sectors and multiple water users, will be prioritized. General water supply reliability benefits (e.g., proposals that will increase resiliency to drought) will also be considered. Please provide sufficient explanation of the project benefits and their significance. These benefits may include, but are not limited to, the following:

1. Will the project make water available to address a specific water reliability concern? Please address the following:

- *Explain and provide detail of the specific issue(s) in the area that is impacting water reliability, such as shortages due to drought, increased demand, or reduced deliveries. Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)?*

As previously stated, Utah is the fastest growing state in the U.S. Utah is also located in a desert with the City having a yearly rainfall of less than 22 inches. The project area, as well as most of Utah, is in a moderate drought where voluntary water-use restrictions are requested and there is also some damage to crops. https://www.drought.gov/drought/states/utah Additionally, the Pole Canyon and Bald Mountain fires in 2018 have added to the dire water conditions. The City is located adjacent to these fires which burned more than 120,800 acres of the mountain areas. Wildfires can significantly alter the hydrologic response, which means that even mild rainstorms can produce

dangerous flash flood flows. Additionally, the lack of hillside vegetation causes sediment to load the channel bottoms with loose sediment, resulting in debris flows.

The water conserved by the smart irrigation controllers and the culinary water meters would allow the city to postpone other facility improvement projects like water tanks, the purchase of additional water rights, new wells, new water treatment facilities, and others. The additional water would be used to provide additional water to the City's expanding population which is currently growing at nearly 2% (http://worldpopulationreview.com/us-cities/spanish-fork-ut-population/).

- *Describe how the project will address the water reliability concern. In your response, please address where the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversion or reduce deliveries, made available for transfer, left in the river system, or used to meet another intended use.*

The conserved water would be able to help meet the water demands of the City's growing population. The conserved water would be used to meet the additional water users demands while postponing the need for other water systems or facility improvements. The City currently relies on wells and springs for its water supply as well as water shares owned in the local companies. The area around the Spanish Fork River experienced some extreme fires which "burnt nearly 92% of the Spanish Fork River Watershed". (Ed Vidmar, Spanish Fork River Water Commissioner) With such a large area of the watershed being burnt, there is a great concern in the area that the City's water supply from surface springs could become compromised and contaminated.

The PI system within the City was originally constructed because the drinking water system had reached capacity. The implementation of the PI system has proven very beneficial to the future of the City in maintaining and providing a reliable water supply. Drought is a common concern for the state as well as the City as it strives to provide the necessary water throughout the summer months. In addition, in a municipal setting, peak instantaneous demands can be extremely high and put stress on the existing system as well as require that additional infrastructure be constructed to meet demands to meet these instantaneous demands that occur for a small portion of the day. By controlling water schedules of approximately one-third of the residents, the City can reduce, if not eliminate, these high peak instantaneous demands, thus reducing future infrastructure requirements and ensuring a more stable, reliable water supply. The conserved water would remain in the City's storage reservoirs or left instream if not needed, improving the local environment and fish habitat. City employees within the public works department would oversee the overall water management of the PI system to ensure no water is wasted and the conserved water is put to beneficial use.

- *Provide a description of the mechanism that will be used, if necessary, to put the conserved water to the intended use.*

The conserved water would be stored in the City's existing water tanks, remain underground by reducing groundwater pumping, or would stay in the Spanish Fork River. The City's existing culinary and PI systems would be used to transport the conserved water to the growing population when the water is needed.

- *Indicate the quantity of conserved water that will be used for the intended purpose.*

It is anticipated that there would be nearly 113 acre-feet per year conserved and used to supply the City's growing population. See the "Support/Documentation of Water Savings" section for water savings calculations.

2. Will the project make water available to achieve multiple benefits or to benefit multiple water users? Consider the following:

- *Will the project benefit multiple sectors and/or users (e.g., agriculture, municipal and industrial, environmental, recreation, or others)?*

This project would principally supply the municipality of Spanish Fork City but would also have the potential to benefit the local environment and fish habitat in the Spanish Fork River as described above and below.

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

There is one endangered fish species in the project area: the June Sucker. If conserved flows are not needed in the PI system, including the storage reservoirs, they would be left in the Spanish Fork River system to improve local fish habitat, including the June Sucker.

- *Will the project benefit a larger initiative to address water reliability?*

As previously discussed, the state of Utah has a goal to reduce per capita water use by at least 25% by the year 2025. This project would help the city move toward that goal by reducing the per capita water demand.

- *Will the project benefit Indian tribes?*

No Indian tribes are expected to benefit from this project.

- *Will the project benefit rural or economically disadvantaged communities?*

Not applicable.

- *Describe how the project will help to achieve these multiple benefits in your response, please address where the conserved water will go and where it will be used, including whether the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversions or reduce deliveries, made available for transfer, left in the river system, or used to meet another intended use.*

See response in Question 1 above.

3. Does the project promote and encourage collaboration among parties in a way that helps increase the reliability of the water supply?

- *Is there widespread support for the project?*
- *What is the significance of the collaborations/support?*
- *Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?*
- *Will the project help to prevent a water-related crisis or conflict? Is there frequently tension of litigation over water in the basin?*
- *Describe the roles of any partners in the process. Please attach any relevant supporting documents.*

Water conservation within a municipality requires the efforts of all users within that municipality. There is only so much the municipality can do to conserve water on its own. For this reason, the support and collaboration of individual City residents is critical to the success of this project. Their commitment to participate in this program and better manage their water use would have the largest impact on the success of this project. Based on the pilot program for smart irrigation controllers, the residents are supportive of this Project.

In addition, support among City officials is also critical in order to set a positive example and provide the necessary resources to make it happen. As indicated by the letters of support in Appendix A, this project has widespread support among local water authorities, the City mayor and City Council, as well as residents who have committed to participate in this program. It is anticipated that those who are wary of this program would be able to see the benefit to those who do participate and would therefore be encouraged to participate or take conservation measures on their own.

4. Will the project address water supply reliability in other ways not described above?

Additional benefits provided through this project include reduced pumping costs, increased hydropower revenue, ensured compliance with local restrictions, leak detection notification, and increased measurement accuracy. If some watering schedules are controlled, pumping costs within the system would be reduced. In addition, if less water is needed for the system, the volume of water pumped into City reservoirs would decrease leading to an overall decrease in pumping costs.

A side benefit to this project is increased water supply reliability and hydropower revenue to the City. All water not diverted into the PI system flows through an existing hydropower facility. If less water is needed in the system, more flows can be diverted through the hydropower facility, increasing revenue.

Additionally, the installation of smart irrigation controllers ensures that individual water users remain in compliance with local restrictions. The controllers also notify the water user if a leak is detected, preventing property damage and excessive water use. Lastly, the new meters that would be installed would measure usage to the nearest gallon, increasing the overall accuracy of the system. Each of these additional benefits improves the management of the system and allows the

City to stabilize its water supply and thus increase reliability within the PI system as well as the hydropower facility.

Evaluation Criterion C: Implementing Hydropower

Up to 18 points may be awarded for this criterion. This criterion prioritizes projects that will install new hydropower capacity in order to utilize our natural resources to ensure energy is available to meet our security and economic needs.

If the proposed project includes construction or installation of a hydropower system, please address the following:

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

Although no hydropower generation is proposed as part of this project, there is an existing hydropower facility on the system owned by SESD. The water conserved in the Spanish Fork River would have the opportunity to contribute to power generation at the hydropower facility to benefit the area as described above.

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

No hydropower would be produced directly from the proposed project. Hydropower production is not included as part of this project but is an indirect benefit of the Project.

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

- *Any expected reduction in the use of energy currently supplied through a Reclamation project*
- *Anticipated benefits to other sectors/entities*
- *Expected water needs, if any, of the system*

Because this is an existing hydropower facility, there are no direct costs associated with building a facility. The water conserved provides a win-win situation by using the available capacity, generating usable energy, and generating revenue.

Evaluation Criterion D: Complementing Future On-Farm Irrigation Improvements

Up to 10 points may be awarded for projects that describe in detail how they will ***complement on-farm irrigation improvements*** *eligible for NRCS financial or technical assistance.*

Note: Scoring under this criterion is based on an overall assessment of the extent to which the WaterSMART Grant project will complement ongoing or future on-farm improvements. Applicants should describe any proposal made to NRCS, or any plans to seek assistance from NRCS in the future, and how an NRCS-assisted activity would complement the WaterSMART Grant project. Financial assistance through the Environmental Quality Incentives Program (EQIP) is the most commonly used program by which NRCS helps producers implement improvements to irrigation systems, but NRCS does not have additional technical or financial assistance programs that may be available. Applicants may receive maximum points under this criterion by providing the information described in the bullet points below. ***Applicants are not required to have assurances of NRCS assistance 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 assistance if necessary.*

Please note: on-farm improvements themselves are not eligible activities for funding under this FOA. The criterion is intended to focus on how the WaterSMART Grant project will complement ongoing or future on-farm improvements. NRCS will have a separate application process for the on-farm components of selected projects that may be undertaken in the future, separate of the WaterSMART Grant project.

If the proposed projects will complement an on-farm improvement eligible for NRCS assistance, please address the following:

- *Describe any planned or ongoing projects by farmers/ranchers that receive water from the applicant to improve on-farm efficiencies.*
    - *Provide a detailed description of the on-farm efficiency improvements.*
    - *Have the farmers requested technical or financial assistance from NRCS for the on-farm efficiency projects, or do they plan to in the future?*
    - *If available, provide documentation that the on-farm projects are eligible for NRCS assistance, that such assistance has or will be requested, and the number or percentage of farms that plan to participate in available NRCS programs.*
    - *Applicants should provide letters of intent from farmers/ranchers in the affected project areas.*

Not applicable.

- *Describe how the proposed WaterSMART project would complement any ongoing or planned on-farm improvement.*
    - *Will the proposed WaterSMART project directly facilitate the on-farm improvement? If so, how? For example, installation of a pressurized pipe through WaterSMART can help support efficient on-farm irrigation practices, such as drip-irrigation.*

OR

    - *Will the proposed WaterSMART project complement the on-farm project by maximizing efficiency in the area? If so, how?*

Through the on-site evaluations and audits of each program participant's landscape, sprinkler systems would be improved to ensure maximum efficiency. City installers would provide

education to the property owner regarding repairing or replacing damaged or clogged sprinkler heads and ensuring they are aligned properly. In addition to the benefit provided to each resident by installing the controller which waters landscaped areas in zones, the sprinkler system itself would also be improved. This would encourage the property owner to continue regular maintenance of the sprinkler system. Additionally, access to real-time usage data would allow the resident to modify their watering schedule as needed to ensure the highest operating efficiency for their landscape.

- *Describe the on-farm water conservation or water use efficiency benefits that are expected to result from any on-farm work.*
    - *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.*

It is anticipated that additional residents who do not initially participate in the program, would want to implement water conservation measures on their own property once they see the water savings experienced by their neighbors. This may lead to additional smart irrigation controller installations or other water user-initiated conservation measures. If more residents installed controllers outside of this program's intended 1,000 installations, each additional controller installation is expected to conserve 36,877 gallons per year as shown above.

Evaluation Criterion E: Department of the Interior Priorities

Up to 10 points may be awarded based on the extent that the proposal demonstrates that the project supports the Department of the Interior priorities. Please address those priorities that are applicable to your project. It is not necessary to address priorities that are not applicable to your project. A project will not necessarily receive more points simply because multiple priorities are addressed. Points will be allocated based on the degree to which the project supports one or more of the priorities listed, and whether the connection to the priority(ies) is well supported in the proposal.

1. *Creating a conservation stewardship legacy second only to Teddy Roosevelt*
    a. *Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment;*
    b. *Examine land use planning processes and land use designations that govern public use and access;*
    c. *Revise and streamline the environmental and regulatory review process while maintaining environmental standards.*
    d. *Review DOI water storage, transportation, and distribution systems to identify opportunities to resolve conflicts and expand capacity;*
    e. *Foster relationships with conservation organizations advocating for balanced stewardship and use of public lands;*
    f. *Identify and implement initiatives to expand across to DOI lands for hunting and fishing;*
    g. *Shift the balance towards providing greater public access to public lands over restrictions to access.*

The proposed project is directly in line with the Department of the Interior's (DOI) priority to "utilize science to identify best practices to manage land and water resources and adapt to changes in the environment." Science and research have resulted in the development of smart irrigation controllers that are programmed to adapt to the environment and weather to conserve water resources. These controllers are designed to classify various parts of a water user's landscape into zones with specific water needs based on slope, vegetation, and other identifying factors. In addition to this, the controllers are linked to local weather stations which allows each controller to adapt its set watering schedule based on the predicted and current weather conditions. Smart irrigation controllers have become the best practice for residential outdoor water management.

2. *Utilizing our natural resources*
    a. *Ensure American Energy is available to meet our security and economic needs;*
    b. *Ensure access to mineral resources, especially the critical and rare earth minerals needed for scientific, technological, or military applications;*
    c. *Refocus timber programs to embrace the entire 'healthy forests' lifecycle;*
    d. *Manage competition for grazing resources.*

Not applicable.

3. *Restoring trust with local communities*
    a. *Be a better neighbor with those closest to our resources by improving dialogue and relationships with persons and entities bordering our lands;*
    b. *Expand the lines of communication with Governors, state natural resource offices, Fish and Wildlife offices, water authorities, county commissioners, Tribes, and local communities.*

By installing smart irrigation controllers, individual residents are willingly collaborating with their local water authority (the City) to find methods to conserve water, improve watering efficiencies, and plan for the future. By funding this project, Reclamation is joining the team for better water management and showing its support of local water authorities in trying to better allocate its scarce resources. The lines of communication between residents, the City, and Reclamation would be expanded for the betterment of all involved.

4. *Striking a regulatory balance*
    a. *Reduce the administrative and regulatory burden imposed on U.S. industry and the public;*
    b. *Ensure that Endangered Species Act decisions are based on strong science and thorough analysis.*

Not applicable.

5. *Modernizing our infrastructure*
    a. *Support the White House Public/Private Partnership Initiative to modernize U.S. infrastructure;*

b. *Remove impediments to infrastructure development and facilitate private sector efforts to construct infrastructure projects serving American needs;*
c. *Prioritize DOI infrastructure needs to highlight:*
    1. *Construction of infrastructure;*
    2. *Cyclical maintenance;*
    3. *Deferred maintenance.*

By installing smart irrigation controllers combined with a full Automated Meter Reading (AMR) system and providing real-time data access for individual users, the City is striving to modernize the infrastructure within the City's PI system. Through this project, the City is supporting the DOI's priority to modernize U.S. infrastructure. WaterSMART funding for this project would remove the financial impediment and also facilitate City efforts to implement this project.

Evaluation Criterion F: Implementation and Results

Up to 6 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 applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place? *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, Drought Contingency Plan or other planning efforts done to determine the priority of this project in relation to other potential projects.

The City is continually planning ways to provide for the future of its current and future residents regarding water supply. They have identified various ways to improve the existing water systems and encourage water conservation. The PI system was installed in 2001-2002 and became operational in 2003 with meters to mitigate overwatering as a result of this planning. In May 2012, a Pressurized Irrigation System Master Plan was prepared. It can be found online at: http://www.spanishfork.org/dept/pubworks/utilities/pressirrig/pdf/pi_master_plan.pdf.

The City adopted their Water Conservation Plan in 2014 which set goals to conserve water and also identified existing and proposed water conservation measures to be implemented. It described the City's efforts in reducing its unaccounted water losses from 41% in 2008 to 22% in 2013, which indicated that other improvements have been successful. The unaccounted water is attributed to leaks in the distribution system, meter inaccuracies, and miscellaneous unmetered water use. Identified improvements were to replace meters found to be leaking or defective. Lastly, the City set goals to address the identified problems and to promote conservation measures similar

to the State of Utah's water conservation initiatives. It can be found online at: https://www.spanishfork.org/document_center/Ordinances-Resolutions/2014/RES%2014-13%20Amend%20Water%20Conservation%20Plan.pdf.

As planning and brainstorming efforts have continued, the City has invested much time, effort, and money into researching the implementation requirements and benefits associated with initiating a smart irrigation controller program. The result of this time and energy is the proposed Project which is a high priority for the City as it postpones the need for costly infrastructure projects. The City sees this as a beneficial and worthwhile modern program to implement which would meet their water goals, Utah Prepare60 goals, and Utah State Water Plan goals.

(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 Project is in line with the goals set in the City's Water Conservation Plan which also promotes the state's conservation measures. The Utah State Water Plan emphasizes water conservation and improved water management as key strategies for the future. Spanish Fork also resides within the Central Utah Water Conservancy District (CUWCD) boundaries, which is a key member of Utah Prepare60 which aims to protect existing water rights, maintain aging infrastructure, use water efficiently, and provide for the future by conserving water. Detailed information is found at http://prepare60.com. These three plans all support this project as proposed by the City.

The City has a PI System Master Plan dated May 2012, that analyzed the City's buildout water demands and compared it with existing available storage. While water conservation is not a main component of this plan, it would impact the findings of this study by reducing the need for or amount of capital improvements listed.

Subcriterion No. F.2 – 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 or better managed, energy generated or saved). For more information calculating performance measure, see Appendix A: Benefit Quantification and Performance Measure Guidance.

In order to evaluate the success of this project, the City would monitor water usage among participants of the smart irrigation controller program as well as those residents who do not participate and who would be used as a control group or baseline. Meters are already installed, therefore historic data is already available and new data would be easily collected. Participant's water use would be evaluated on a pre-project and post-project basis in addition to comparing participant usage with non-participant usage. The city would perform the same process for the culinary water meters by evaluating the new meters compared to residents' historical water usage in order to calculate the water savings. These combined results would serve as the performance measure for the success of the Project.

Subcriterion No. F.3 - 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.*

The proposed project schedule is as follows:

Task	Start Date	Duration
Finalize Contract with Reclamation	September 2019	1 Month
Begin NEPA Compliance	October 2019	3 Months
FONSI, Categorical Exclusion	January 2020	2 Months
Purchase Meters and Smart Controllers (incremental)	March 2020	9 Months
Install PI Meters	May 2020	10 Months
Install Smart Irrigation Controllers	May 2020	10 Months
Purchase Water User Portal Software, Setup, Incorporate	July 2020	8 Months
Collect post-installation water use information	June 2020	10 Months
Prepare Final Project Report, Project Closeout	April 2021	3 Months

- *Describe any permits that will be required, along with the process for obtaining such permits.*

The City's Public Works would not need to obtain any permits to complete this work. The residents would request that the City install the Smart irrigation controllers. This permission would be obtained when the residents sign up for the controller.

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

There was no design work associated with this Project. Engineering work thus far has consisted of preparing cost estimates, estimating water savings, and preparing this application.

- *Describe any new policies or administrative actions required to implement the project.*

Administrative actions would be required to hire, train, and manage additional employees to complete this Project. Some additional administrative actions would be required to administer project funds. No new policies are expected to be required for the completion of this Project.

- *Describe how the environmental compliance estimate was developed. Has the compliance cost been discussed with the local Reclamation office?*

The environmental compliance cost estimate was prepared by an engineering firm with experience in NEPA compliance for projects similar to the proposed Project. The costs for this Project were not directly discussed with the local Reclamation office but the costs from other similar projects were used to develop the cost estimate.

Evaluation Criterion G: Nexus 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.

- *Is the proposed project connected to Reclamation project activities?*
  - *Does the applicant receive Reclamation project water?*
  - *Is the project on Reclamation project lands or involving Reclamation facilities?*
  - *Is the project in the same basin as a Reclamation project or activity?*
  - *Will the proposed work contribute water to a basin where a Reclamation project is located?*

The City receives water from Strawberry Reservoir, a Reclamation project. In addition, the Project is located near many Reclamation facilities installed as part of the CUP. The ULS system provides water to Spanish Fork City. Many other CUP features are located in the same basin as the proposed Project. Conserved water from the proposed project would be used within the same basin as multiple Reclamation facilities associated with the CUP.

- *Will the project benefit any tribe(s)?*

Not applicable.

Evaluation Criterion H: 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 using the following calculation:

$$\frac{\textit{Non-Federal Funding}}{\textit{Total Project Cost}} = \frac{\$ \quad 415{,}500}{\$ \quad 692{,}500} = \mathbf{60\%}$$

Project Budget

Project costs for environmental and cultural compliance and engineering/design that were incurred or are anticipated to be incurred prior to award should be included in the proposed project budget.

If the proposed project is selected, the awarding Reclamation Grants Officer will review the proposed pre-award costs to determine if they are consistent with program objectives and are allowable in accordance with the authorizing legislation. Proposed pre-award costs must also be compliant with all applicable administrative and cost principles criteria established in 2 Code of Federal Regulations (CFR) Part 200, available at www.ecfr.gov, and all other requirements of this

FOA. ***In no case will costs incurred prior to July 1, 2018 be considered for inclusion in the proposed project budget.***

Please note that the costs for preparing and submitting an application in response to this FOA, including the development of data necessary to support the proposal, are not eligible project costs under this FOA and must not be included in the project budget. In addition, Budget Proposals must not include costs for the purchase of water or land, or to secure an easement other than a construction easement. These costs are not eligible project costs under this FOA.

Funding Plan and Letters of Commitment

Describe how the non-Federal share of project costs will be obtained. Reclamation will use this information in making a determination of financial capability.

Project funding provided by a source other than the applicant shall be supported with letters of commitment from these additional sources. Letters of commitment shall identify the following elements:

- *The amount of funding commitment*
- *The date the funds will be available to the applicant*
- *Any time constraints on the availability of funds*
- *Any other contingencies associated with the funding commitment*

Commitment letters from third party funding sources should be submitted with your application. If commitment letters are not available at the time of the application submission, please provide a timeline for submission of all commitment letters. Cost-share funding from sources outside the applicant's organization (e.g., loans or State grants), should be secured and available to the applicant prior to award.

Reclamation will not make funds available for an award under this FOA until the recipient has secured non-Federal cost-share. Reclamation will execute a financial assistance agreement once non-Federal funding has been secured or Reclamation determines that there is sufficient evidence and likelihood that non-Federal funds will be available to the applicant subsequent to executing the agreement.

Please Identify the sources of the non-Federal cost share contribution for the project, including:

- *Any monetary contributions by the applicant towards the cost-share requirement and source of funds (e.g., reserve account, tax revenue, and/or assessments)*
- *Any costs that will be contributed by the applicant*
- *Any third party in-kind costs (i.e., goods an services provided by a third party)*
- *Any cash requested or received from other non-Federal entities*
- *Any pending funding request (i.e., grants or loans) that have not yet been approved and explain how the project will be affected if such funding is denied*

The non-Federal portion of project costs would be covered with funds from the City's internal budget. Most of the funds would be monetary with some in-kind contributions from the City in the

form of administrative work, marketing campaigns, website maintenance, scheduling, installment, and programming of the controllers.

In addition, please identify whether the budget proposal includes any project costs that have been or may be incurred prior to award. For each cost, describe:

- *The project expenditure and amount*
- *The date of cost incurrence*
  - *How the expenditure benefits the project*

Provide the identity and amount of funding to be provided by funding partners

Funding from Reclamation is the only pending funding request at this time. If funding is not provided, the City would significantly scale down the project but would need to re-evaluate and prioritize the remainder of the Project and what could be implemented now versus in the future. This would cause major re-planning efforts in order to ensure a beneficial outcome.

Please include the following chart to summarize all funding sources. Denote in-kind contributions with an asterisk (*).

Table 4: Summary of Non-Federal and Federal Funding Sources

FUNDING SOURCES	AMOUNT
Non-Federal Entities	
1. City of Spanish Fork	$415,500
Non-Federal Subtotal	**$415,500**
Other Federal Entities	
1. N/A	$0
Other Federal Subtotal	**$0**
REQUESTED RECLAMATION FUNDING	**$277,000**

The City of Spanish Fork would contribute their portion of funds to the project through a combination of monetary funds and in-kind contributions through having employees manage the project, advertise and promote the smart controllers, and through the installation of the controllers.

Budget Proposal

The total project cost (Total Project Cost), is the sum of all allowable items of costs, including all required cost sharing and voluntary committed cost sharing, including third-party contributions, that are necessary to complete the project

Table 5: Total Project Cost

SOURCE	AMOUNT
Costs are reimbursed with the requested Federal Funding	$ 277,000
Costs to be paid by the applicant	$ 415,500
Value of third-party contributions	$ 0
TOTAL PROJECT COST	**$ 692,500**

*The budget proposal should include detailed information on the categories listed below and must clearly identify **all** items of cost, including those that will be contributed as non-Federal cost share by the applicant (required and voluntary), third-party in-kind contributions, and those that will be covered using the funding requested from Reclamation, and any requested pre-award costs. Unit costs must be provided for all budget items including the cost of services or other work to be provided by consultants and contractors. Applicants are strongly encouraged to review the procurement standards for Federal awards found at 2 CFR §200.317 through §200.326 before developing their budget proposal.*

It is also strongly advised that applicants use the budget proposal format shown below in Table 6 or a similar format that provides this information. If selected for award, successful applicants must submit detailed supporting documentation for all budgeted costs. Additional information regarding the types of documentation that will be necessary to support budgeted costs can be found in Attachment 1 to this FOA.

Table 6: Budget Proposal

BUDGET ITEM DESCRIPTION	COMPUTATION		Quantity Type	TOTAL COST
	$/Unit	Quantity		
Environmental Services	$150/hr	80	Hours	$12,000
Program Administration	$100/hr	300	Hours	$30,000
Controllers, Meters, & Software	See Appendix C			$635,500
Reclamation Reporting	$100/hr	150	Hours	$15,000
TOTAL ESTIMATED PROJECT COSTS				**$692,500**

Budget Narrative

Submission of a budget narrative is mandatory. An award will not be made to any applicant who fails to fully disclose this information. The budget narrative provides a discussion of, or explanation for, items included in the budget proposal. The types of information to describe in the narrative include, but are not limited to, those listed in the following subsections. Costs, including the valuation of third-party in-kind contributions, must comply with the applicable cost principles contained in 2 CFR Part §200, available at the Electronic Code of Federal Regulations (www.ecfr.gov).

Salaries and Wages

Indicate the Project Manager and other key personnel by name and title. The Project Manager must be an employee or board member of the applicant. Other personnel should be indicated by title alone. For all positions, indicate salaries and wages, estimated hours or percent of time, and rate of compensation. The labor rates must identify the direct labor rate separate from the fringe rate or fringe cost for each category. All labor estimates must be allocated to specific tasks as outlined in the applicant's technical project description. Labor rates and proposed hours shall be displayed for each task.
The budget proposal and narrative should include estimated hours for compliance with reporting requirements, including final project and evaluation. Please see Section F.3. Program Performance Reports for information on types and frequency of reports required.
Generally, salaries of administrative and/or clerical personnel will be included as a portion of the stated indirect costs. If these salaries can be adequately documented as direct costs, they should be included in this section; however, a justification should be included in the budget narrative.

Seasonal employees would be hired by the City to market and install the smart irrigation controllers. These employees would go through training from the smart controller supplier prior to beginning work to ensure proper installation of the controllers. It is assumed that the wage rate will be $15 per hour and that each installation will require four hours. This results in a total of 4,000 hours for the installation of 1,000 controllers. Total wage expenditures are expected to be $60,000.

Fringe Benefits

Identify the rates/amounts, what costs are included in this category, and the basis of the rate computations. Federally approved rate agreements are acceptable for compliance with this item.

City employees would not earn fringe benefits or reimbursements from funding obtained to implement this project. The majority of contributions by City employees would be funded by the City and serve as in-kind contributions to the project. It is anticipated that the City would hire seasonal employees to install the controllers; expected wages are shown below. The remaining funding secured from City's internal funds would be used to pay contractual agreements to purchase the materials and software, perform environmental services, and coordinate with Reclamation to request project funds and fulfill the reporting requirements.

Travel

Identify the purpose of each anticipated trip, destination, number of persons traveling, length of stay, and all travel costs including airfare (basis for rate used), per diem, lodging, and miscellaneous travel expenses. For local travel, include mileage and rate of compensation.

Travel costs are included as part of the meter and controller installation costs.

Equipment

If equipment will be purchased, itemize all equipment valued at or greater than $5,000. For each item, identify why it is needed for the completion of the Project and how the equipment was priced. Note: if the value is less than $5,000, the item should be included under materials and supplies.

If equipment is being rented, specify the number of hours and the hourly rate. Local rental rates are only accepted for equipment actually being rented or leased.

If the applicant intends to use their own equipment for the purposes of the project, the proposed usage rates should fall within the equipment usage rates outlined by the United States Army Corps of Engineers (USACE) within their Construction Equipment Ownership and Operating Expense Schedule (EP 1110-1-8) at www.publications.usace.army.mil/USACE-Publications/Engineer-Pamphlets/u43545q/313131302D312D38.

Note: If the equipment will be furnished and installed under a construction contract, the equipment should be included in the construction contract cost estimate.

Any equipment or tools used for the project would be supplied under contractual agreements.

Materials and Supplies

Itemize supplies by major category, unit price, quantity, and purpose, such as whether the items are needed for office use, research, or construction. Identify how these costs were estimated (i.e., quotes, engineering estimates, or other methodology). Note: If the materials/supplies will be furnished and installed under a contract, the equipment should be included in the construction contract cost estimate.

Materials and supplies for meter and controller installation are included under the installation cost. This includes the tools needed for a complete installation.

Contractual

Identify all work that will be accomplished by consultants or contractors, including a breakdown of all tasks to be completed, and a detailed budget estimate of time, rates, supplies, and materials that will be required for each task. For each proposed contract, identify the procurement method that will be used to select the consultant or contractor and the basis for selection. Please note that all procurements with an anticipated aggregate value that exceeds the Micro-purchase Threshold (currently $10,000) must use a competitive procurement method (see 2 CFR §200.320 – Methods of

procurement to be followed). *Only contracts for architectural/engineering services can be awarded using a qualifications-based procurement method. If a qualifications-based procurement method is used, profit must be negotiated as a separate element of the contract price. See 2 CFR §200.317 through §200.326 for additional information regarding procurements, including required contract content.*

The majority of the funding obtained for this project would be used to pay for the smart irrigation controllers, installation and programming the controllers, culinary water meters and reprogramming, software, and training provided through contractual agreements with the City. Estimated costs are $635,500 as detailed in Appendix C.

Third-Party In-Kind Contributions

Identify all work that will be accomplished by third-party contributors, including a breakdown of all tasks to be completed, and a detailed budget estimate of time, rates, supplies, and materials that will be required for each task. Third-party in-kind contributions, including contracts, must comply with all applicable administrative and cost principles criteria, established in 2 CFR Part 200, available at www.ecfr.gov, and all other requirements of this FOA.

No third-party contributions are expected as part of this Project.

Environmental and Regulatory Compliance Costs

Prior to awarding financial assistance, Reclamation must first ensure compliance with Federal environmental and cultural resources laws and other regulations ("environmental compliance"). Every project funded under this program will have environmental compliance costs associated with activities undertaken by Reclamation and the recipient.

To estimate environmental compliance costs, please contact compliance staff at your local Reclamation Office for additional details regarding the type and costs of compliance that may be required for your project. Note, support for your compliance costs estimate will be considered during review of your application. Contact the Program Coordinator (see Section G. Agency Contacts) for Reclamation contact information regarding compliance costs and requirements.

Environmental compliance costs are considered project costs and must be included as a line item in the project budget and will be cost shared accordingly.

The amount of the line item should be based on the actual expected environmental compliance costs for the project, including Reclamation's cost to review environmental compliance documentation. Environmental compliance costs will vary based on project type, location, and potential impacts to the environment and cultural resources.

How environmental compliance activities will be performed (e.g., by Reclamation, the applicant, or a consultant) and how the environmental compliance funds will be spent, will be determined pursuant to subsequent agreement between Reclamation and the applicant. The amount of funding required for Reclamation to conduct any environmental compliance activities, including

Reclamation's cost to review environmental compliance documentation, will be withheld from the Federal award amount and placed in an environmental compliance account to cover such costs. If any portion of the funds budgeted for environmental compliance is not required for compliance activities, such funds may be reallocated to the project, if appropriate.

Costs associated with environmental and regulatory compliance must be included in the budget. Compliance costs include costs associated with any required documentation of environmental compliance, analyses, permits, or approvals. Applicable Federal environmental laws could include NEPA, ESA, NHPA, CWA, and other regulations depending on the project. Such costs may include, but are not limited to:

- *The cost incurred by Reclamation to determine the level of environmental compliance required for the project*
- *The cost incurred by Reclamation, the recipient, or a consultant to prepare any necessary environmental compliance documents or reports. The cost incurred by Reclamation to review any environmental compliance documents prepared by a consultant. The cost incurred by the recipient in acquiring any required approvals or permits, or in implementing any required mitigation measures*

The City is planning on conducting the environmental compliance requirements with the assistance of consultants and in consultation with Reclamation. It is assumed that a Categorical Exclusion could be prepared for the project as all improvements are located in an urban environment that has been previously disturbed. A total of $12,000 is budgeted for environmental services, approximately two percent of the total project costs.

The budget for reporting and coordinating with Reclamation throughout the duration of the project has been estimated at $15,000 based on labor hours and hourly rates of consultants assisting with the project.

Other Expenses

Any other expenses not included in the above categories shall be listed in this category, along with a description of the item and why it is necessary. No profit or fee will be allowed.

To educate residents about the program and coordinate program administration, the City has budgeted $30,000 to ensure all administrative and marketing needs are fulfilled. These costs include, but are not limited to, project management, educational materials, social media information, neighborhood canvassing, and record-keeping.

Indirect Costs

Indirect costs are costs incurred by the applicant for a common or joint purpose that benefit more than one activity of the organization and are not readily assignable to the activities specifically benefitted without undue effort. Costs that are normally treated as indirect costs include, but are not limited to, administrative salaries and fringe benefits associated with overall financial and organizational administration; operation and maintenance costs for facilities and equipment; and, payroll and procurement services. If indirect costs will be incurred, identify the proposed rate, cost

base, and proposed amount for allowable indirect costs based on the applicable cost principles for the applicant's organization. It is not acceptable to simply incorporate indirect rates within other direct cost line items.

If the applicant has never received a Federal negotiated indirect cost rate, the budget may include a de minimis rate of up to 10 percent of modified total direct costs. For further information on modified total direct costs, refer to 2 CFR §200.68 available at www.ecfr.gov.

If the applicant does not have a federally approved indirect cost rate agreement and is proposing a rate greater than the de minimis 10 percent rate, include the computational basis for the indirect expense pool and corresponding allocation base for each rate. Information on "Preparing and Submitting Indirect Cost Proposals" is available from Interior, the National Business Center, and Indirect Cost Services, at www.doi.gov/ibc/services/finance/indirect-cost-services. If the proposed project is selected for award, the recipient will be required to submit an indirect cost rate proposal with their cognizant agency within 3 months of award.

No indirect costs are being submitted as part of this project.

Total Costs

Indicate total amount of project costs, including the Federal and non-Federal cost-share amounts.

The total project cost is $692,500. Of this total cost, the City would provide $415,500 over the course of two years, and the remaining $277,000 is requested from Reclamation.

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.

No permits or easements would be required for the completion of this Project. Smart irrigation controllers would only be installed on systems where the resident has provided approval for the controller installation and programming and has agreed to allow the City to access their controller. Once the resident has learned about the program and chosen to participate, a contract would be signed to indicate approval.

Note that improvements to Federal facilities that are implemented through any project awarded funding through this FOA must comply with additional requirements. The Federal government will continue to hold title to the Federal facility and any improvement that is integral to the existing operations of that facility. Please see P.L. 111-11, Section 9504(a)(3)(B). Reclamation may also require additional reviews and approvals prior to award to ensure that any necessary easements, land use authorizations, or special permits can be approved consistent with the requirements of 43 CFR Section 429, and that the development will not impact or impair project operations or efficiency.

Letters of Support

Please include letters from interested stakeholders supporting the proposed project. To ensure your proposal is accurately reviewed, please attach all letters of support/partnership letters as an appendix. (Note: this will not count against the application page limit.) Letters of support received after the application deadline for this FOA will not be included with your application.

Letters of Support are included in Appendix A.

Official Resolution

Include an official resolution adopted by the applicant's board of directors or governing body, or for State government entities, an official authorized to commit the applicant to the financial and legal obligations associated with receipt of a financial assistance award under this FOA, verifying:

- *The identity of the official with legal authority to enter into an agreement*
- *The board of directors, governing body, or appropriate official who has reviewed and supports the application submitted*
- *The capability of the applicant to provide the amount of funding and/or in-kind contributions specified in the funding plan*
- *That the applicant will work with Reclamation to meet established deadlines for entering into a grant or cooperative agreement*

An official resolution meeting the requirements set forth above is mandatory. *If the applicant is unable to submit the official resolution by the application deadline because of the timing of board meetings or other justifiable reasons, the official resolution may be submitted up to 30 days after the application deadline.*

The signed Official Resolution is shown in Appendix B.

Unique Entity Identifier and System for Award Management

All applicants (unless the applicant has an exception approved by Reclamation under 2 CFR §25.110[d]) are required to:

(i) Be registered in the System for Award Management (SAM) before submitting its application;

(ii) Provide a valid unique entity identifier in its application; and

(iii) Continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.

The City of Spanish Fork has an active SAM registration with CAGE code 5CVV3 and DUNS number 073105488. The City will maintain an active registration throughout the duration of the project.

Appendix A

Letters of Support

SPANISH FORK
PRIDE & PROGRESS

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Re: Meter Upgrades & Smart Irrigation Controllers - Spanish Fork City WaterSMART

To Whom It May Concern:

Spanish Fork City (City) is committed to water conservation and sustainability. As mayor, I recognize the importance of city-initiated conservation programs to provide positive support and encourage individual conservation efforts. As such, I see the benefit of investing time, money, and effort into providing smart irrigation controllers with the associated training to willing residents and meter and system improvements.

Through this program, I hope to see a better understanding of water usage, demands, and supply among residents. This will then encourage water conservation efforts and allow our Public Works Department to better manage our water supply, decrease future needed infrastructure, reduce pumping costs, and increase overall water conservation and control.

I fully support the project proposed by our city's Public Works Department to provide and install smart irrigation controllers and make the necessary upgrades to the water system throughout the City to allow real-time data access and control for the residents and the City. This WaterSMART grant proposal submitted to the Bureau of Reclamation to request funds to assist in the implementation of this project is critical in helping our city reach its conservation and water management goals.

Sincerely,

Mayor Steve Leifson
Spanish Fork City

SPANISH FORK
PRIDE & PROGRESS

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Re: Meter Upgrade & Smart Irrigation Controllers - Spanish Fork City WaterSMART

To Whom It May Concern:

Spanish Fork City (City) is committed to water conservation and sustainability. As city council members, we recognize the importance of city-initiated conservation programs to provide positive support and encourage individual conservation efforts. As such, we see the benefit of investing time, money, and effort into providing smart irrigation controllers and the associated training to willing residents and the meter and system improvements.

We anticipate that residents will gain a better understanding of their water usage as a result of this program thereby encouraging water conservation efforts. This will allow our Public Works Department to better manage our water supply, decrease future needed infrastructure, reduce pumping costs, and increase overall water conservation and control.

We fully support the project proposed by our city's Public Works Department to provide and install smart irrigation controllers and make the necessary upgrades to the water system throughout the city to allow real-time data access and control for the residents and the City. This proposal to request funds to assist in the implementation of this project is critical in helping our City reach its conservation and water management goals.

Sincerely,
Spanish Fork City Council Members

Stacy Beck

STRAWBERRY
Water Users Association

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Re: Meter Upgrade & Smart Irrigation Controllers - Spanish Fork City WaterSMART

To Whom It May Concern:

Stawberry Water Users Association (SWUA) is committed to water conservation and sustainability. As a large water authority in the area, we recognize the importance of city-initiated conservation programs to provide positive support and encourage individual conservation efforts. As such, we see the benefit of investing time, money, and effort into providing smart irrigation controllers and the associated training to willing residents and the meter and system improvements.

We anticipate that residents will gain a better understanding of their water usage as a result of this program thereby encouraging water conservation efforts. This will allow Spanish Fork City (City) to better manage their water supply and help us contribute to providing for the future.

We fully support the project proposed by the City to provide and install smart irrigation controllers and make the necessary upgrades to the water system throughout the city to allow real-time data access and control for the residents and the City. This proposal to request funds to assist in the implementation of this project is critical in helping the City, and SWUA, reach the defined conservation and water management goals.

Sincerely,

Jeremy Sorensen
Strawberry Water Users Association

CENTRAL UTAH WATER
CONSERVANCY DISTRICT

355 W. University Parkway
Orem, UT 84058-7303
801.226.7100
www.cuwcd.com

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

To Whom It May Concern:

The Central Utah Water Conservancy District (CUWCD) is committed to water conservation and preparing for the future. We recognize the value of city-initiated conservation programs as they are highly-effective in their communities. Spanish Fork City (City) is striving to implement a water conservation program in-line with these same goals.

Through similar programs, we have seen significant water savings and are confident in the impact smart irrigation controllers and enhanced management software will have in the City. By implementing new software that allows individual users to access their real-time water use and control outdoor water use easily, water conservation should increase. In addition, with the ability to better manage peak demand, the City will be able to reduce long-term infrastructure needs and improve their water supply management.

CUWCD is working to allocate funds to assist with this project, as demonstrated in the submitted proposal to the Bureau of Reclamation. This project will also benefit the CUWCD as a water supplier to the City. We support them in this project and are pleased to see the City moving forward with a valuable water conservation program.

Thank you for your consideration.

Sincerely,

Rick Maloy
Water Conservation Manager
Central Utah Water Conservancy District

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Re: Meter Upgrade & Smart Irrigation Controllers - Spanish Fork City WaterSMART

To Whom It May Concern:

As Spanish Fork River Commissioner, I am committed to water conservation and sustainability. Being intimately involved with the management of the Spanish Fork River, I recognize the importance of city-initiated conservation programs to provide positive support and encourage individual conservation efforts that will impact the future. As such, I see the benefit of investing time, money, and effort into providing smart irrigation controllers and the associated training to willing residents and the meter and system improvements.

I anticipate that residents will gain a better understanding of their water usage as a result of this program thereby encouraging water conservation efforts. This will allow Spanish Fork City (City) to better manage their water supply and help all river users work to provide for the future.

I fully support the project proposed by the City to provide and install smart irrigation controllers and make the necessary upgrades to the water system throughout the city to allow real-time data access and control for the residents and the City. This proposal to request funds to assist in the implementation of this project is critical in helping the City, which affects the overall management of the Spanish Fork River, reach the defined conservation and water management goals.

Sincerely,

John Mendenhall
Spanish Fork River Commissioner

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Re: Meter Upgrade & Smart Irrigation Controllers - Spanish Fork City WaterSMART

To Whom It May Concern:

As a resident of Spanish Fork City (City), I love the area and am very interested in preserving our scarce resources for the future. I see water conservation as a critical component in sustaining our community and support the efforts the City is making to make conserving water feasible for me.

I am committed to supporting this program by installing a smart irrigation controller on my sprinkler system once the opportunity is available to me. I see the financial benefits for both my household and the city as a whole and want to be a part of this program striving for the future of my community.

I fully support the proposed project. The requested funds from the Bureau of Reclamation to assist in the implementation of this project is very valuable to me and my community.

Sincerely,

Resident
Spanish Fork City

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Re: Meter Upgrade & Smart Irrigation Controllers - Spanish Fork City WaterSMART

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I fully support the proposed project. The requested funds from the Bureau of Reclamation to assist in the implementation of this project is very valuable to me and my community.

Sincerely,

Shawn Beecher

Resident
Spanish Fork City

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Re: Meter Upgrade & Smart Irrigation Controllers - Spanish Fork City WaterSMART

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Sincerely,

Resident
Spanish Fork City

April 16, 2018

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Financial Assistance Support Section
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Sincerely,

Resident
Spanish Fork City

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

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I fully support the proposed project. The requested funds from the Bureau of Reclamation to assist in the implementation of this project is very valuable to me and my community.

Sincerely,

Shawni Call

Resident
Spanish Fork City

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

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I fully support the proposed project. The requested funds from the Bureau of Reclamation to assist in the implementation of this project is very valuable to me and my community.

Sincerely,

Marlo Smith

Resident
Spanish Fork City

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Re: Meter Upgrade & Smart Irrigation Controllers - Spanish Fork City WaterSMART

To Whom It May Concern:

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I fully support the proposed project. The requested funds from the Bureau of Reclamation to assist in the implementation of this project is very valuable to me and my community.

Sincerely,

James Daly

Resident
Spanish Fork City

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

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I fully support the proposed project. The requested funds from the Bureau of Reclamation to assist in the implementation of this project is very valuable to me and my community.

Sincerely,

Resident
Spanish Fork City

April 16, 2018

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I am committed to supporting this program by installing a smart irrigation controller on my sprinkler system once the opportunity is available to me. I see the financial benefits for both my household and the city as a whole and want to be a part of this program striving for the future of my community.

I fully support the proposed project. The requested funds from the Bureau of Reclamation to assist in the implementation of this project is very valuable to me and my community.

Sincerely,

Sammy Williams

Resident
Spanish Fork City

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

Re: Meter Upgrade & Smart Irrigation Controllers - Spanish Fork City WaterSMART

To Whom It May Concern:

As a resident of Spanish Fork City (City), I love the area and am very interested in preserving our scarce resources for the future. I see water conservation as a critical component in sustaining our community and support the efforts the City is making to make conserving water feasible for me.

I am committed to supporting this program by installing a smart irrigation controller on my sprinkler system once the opportunity is available to me. I see the financial benefits for both my household and the city as a whole and want to be a part of this program striving for the future of my community.

I fully support the proposed project. The requested funds from the Bureau of Reclamation to assist in the implementation of this project is very valuable to me and my community.

Sincerely,

Marty Warren

Resident
Spanish Fork City

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

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Sincerely,

Kimball Hall

Resident
Spanish Fork City

April 16, 2018

Bureau of Reclamation
Financial Assistance Support Section
P.O. Box 25007, MS 84-27814
Denver, CO 80225

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Sincerely,

Resident
Spanish Fork City

Appendix B

Signed Official Resolution

RESOLUTION No. 19-04

ROLL CALL

VOTING	YES	NO
STEVE LEIFSON Mayor *(votes only in case of tie)*		
CHAD ARGYLE *Council member*	X	
STACY BECK *Council member*	X	
BRANDON B. GORDON *Council member*	X	
MIKE MENDENHALL *Council member*	X	
KEIR A. SCOUBES *Council member*	X	

I MOVE this ordinance be adopted: Council member Scoubes

I SECOND the foregoing motion: Council member Beck

RESOLUTION No. 19-04

A RESOLUTION AUTHORIZING THE CITY TO ENTER INTO A GRANT AGREEMENT WITH THE BUREAU OF RECLAMATION FOR WATER SMART IRRIGATION METERS

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, Spanish Fork City has need for funding to complete the Meter Upgrade & Smart Irrigation Controllers Projects.

NOW, THEREFORE, BE IT RESOLVED by the Spanish Fork the City Council as follows:

1. The City Council has reviewed and supports the application submitted;

2. The City 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 City will work with the Bureau of Reclamation to meet established deadlines for entering into a grant or cooperative agreement.

4. This Resolution shall take effect immediately upon its adoption.

DATED this 5th day of March, 2019

STEVE LEIFSON, Mayor

ATTEST:

Kent R. Clark, City Recorder

MUNICIPAL SEAL EST. 1855 SPANISH FORK UTAH

Appendix C

Probable Cost for Materials

Cost Estimate for Controllers, Meters, and Software

Costs for the smart irrigation controllers were determined by obtaining cost estimates from several suppliers. This cost will be finalized in May when bids to provide the controllers are evaluated. Note that the pilot program went out to competitive bid and Rachio was selected. Quantities and unit costs to reprogram the existing meters and replace the necessary culinary meters were obtained from the Water Division Manager for the City. Costs for the software were obtained from an actual bid given to the City to supply the software, setup, and training.

Table 7: Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Smart Irrigation Controllers (Excludes Installation)	1,000	EA	$ 140	$ 140,000
Smart Controller Installation	1,000	EA	$ 60	$ 60,000
Replace Culinary Meters (3/4" or 1")	1,000	EA	$ 200	$ 200,000
Reprogram Existing Meters (Culinary & PI)	17,500	EA	$ 12.36	$ 216,300
Software Integration (Consumer Portal)	1	LS	$ 11,400	$ 11,400
Software Setup (Consumer Portal)	1	LS	$ 5,700	$ 5,700
Software Onsite Training (Consumer Portal)	1	LS	$ 2,100	$ 2,100
TOTAL MATERIAL & SOFTWARE COSTS				**$ 635,500**

Matt McAllister 1505 W. 130 S. T: 801.224.6050
Director of Sensus Sales Orem, UT 84058 F: 801.224.6058
matt.mcallister@mountainlandsupply.us
www.mountainlandsupply.com

MOUNTAINLAND SUPPLY COMPANY

Bill to Customer:

Spanish Fork City
40 South Main
Spanish Fork, UT 84660

Ship to Customer:

Spanish Fork City
40 South Main
Spanish Fork, UT 84660

Reference: Sensus FlexNet AMI System - BaseStation Upgrade/Replacement
Salesman: Morgan Evans **Effective:** 11/4/2017
Terms: Net 30 Days

Line	Description	Qty	U/M	Unit Price	Extension
	Software On-Time Costs				
1	Consumer Portal System Setup	1	ea	$5,500.00	$5,500.00
2	Consumer Portal Customer Information System Integration	1	ea	$11,000.00	$11,000.00
3	Consumer Portal Onsite Training	1	ea	$2,000.00	$2,000.00
	TOTAL One-Time Price:				**$18,500.00**
6	Consumer Portal Core - Annual Fee (1500 Electric Users) ***All annual Fees are subject to a 3.5% annual increase over a prior year*	1	ea	$5,750.00	$5,750.00
7	Consumer Portal Core - Annual Overage Electric Fee - Annual Fee (Each User over 1500) ***All annual Fees are subject to a 3.5% annual increase over a prior year*	1	ea	$2.25	
6	Consumer Portal Core - Annual Fee (1500 Water Users) ***All annual Fees are subject to a 3.5% annual increase over a prior year*	1	ea	$3,500.00	$3,500.00
7	Consumer Portal Core - Annual Overage Water Fee - Annual Fee (Each User over 1500) ***All annual Fees are subject to a 3.5% annual increase over a prior year*	1	ea	$2.25	
8	Annual Block of 6K Text messages - (Optional) ***All annual Fees are subject to a 3.5% annual increase over a prior year*	1	ea	$700.00	$700.00
	TOTAL Yearly SaaS (2017)				**$9,950.00**
	TOTAL SaaS Costs				**$28,450.00**

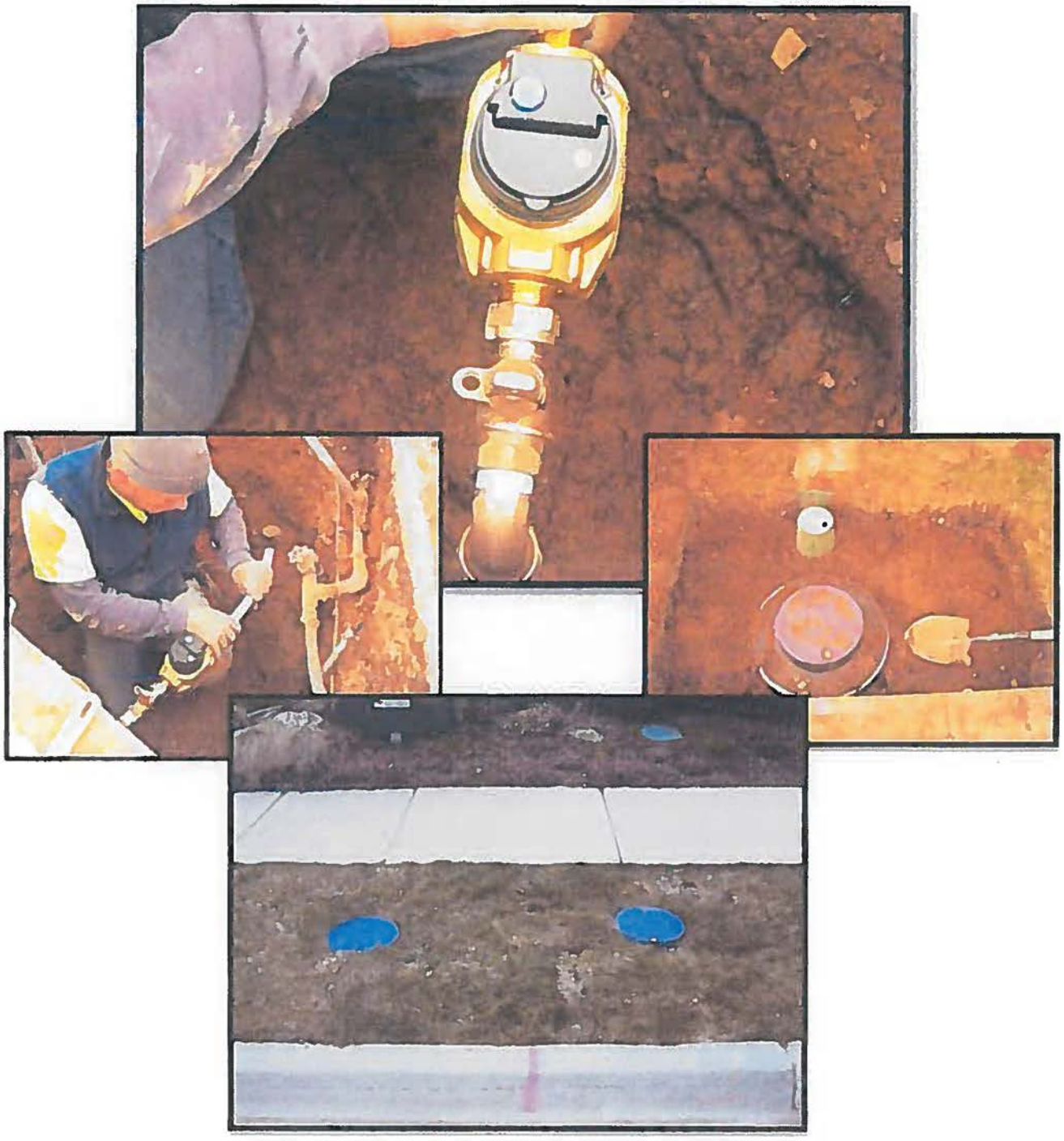
Notes:

1. This is a material estimate only and there are no guarantees as to the estimated quantities and all quantities should be reviewed prior to bidding or ordering.
2. ALL Special Order Material is Non-Returnable
3. All prices quoted herein supersede all prior quotes and are subject to change without prior notice, without exception.
4. Proposal pricing is valid until July 15, 2017.
5. The following items and prices are applicable to the statement of work based upon a commitment of a 5 years on all annual services. All annual fees are subject to a 3% annual increas over a prior year.
6. Customer is responsible for backhaul from the base stations to the RNI.

Appendix D

Weber Basin Water Conservancy District Secondary Water Metering Report December 2015

Weber Basin Water Conservancy District
Secondary Water Metering Report
December 2015



Weber Basin Water Conservancy District
Secondary Water Metering Report

1. Meter Project Summary.

Weber Basin Water Conservancy District (District) has been studying and tracking data on meters for secondary water for the past several years. The first individual property meters were installed as test meters in 2006 to evaluate their effectiveness and verify if they could tolerate poor water quality, winter temperatures and other pressurized secondary water system related issues. The Elster Smart Meter was the selected meter and 30 meters were installed in various locations within the District's service area as test meters. These 30 meters were watched and tracked to evaluate performance for 3 full irrigation seasons. In 2010, it was determined that the meters would be successful and the District adopted a policy that all new secondary connections of the District would require the installation of a meter. Since 2010, the meter studies have continued with the adoption of additional meter types (there are now 4 types of meters in the field) and a total of 2,683 meters installed to date. It was also determined there was a need to purchase an electronic read system which has the capability of collecting data in hourly increments. The system chosen to meet the data needs and to be compatible with the various brands of meters was the Itron AMR system (using the 100W electronic radio transmitter or ERT).

In 2010, the District partnered with the Bureau of Reclamation to install 1,100 meters in the Uintah Bench and South Weber areas. This was the first large installation project for secondary water meters, so there was some question as to what the outcome of this project would be. Care was taken to ensure that cities and the neighborhoods affected were well informed and had opportunity to voice their concerns at city meetings and District sponsored open houses. Overall it could be said that things progressed smoothly and all concerns were addressed and resolved as they came up. After installation, there were a few challenges with software and the Itron units interacting with Elster's meter register. The issues were resolved with the help of Itron and Elster, but it was determined that the data for that first full year (2011) could be partially incorrect or compromised and would not be used in comparison with other data collected during the following years. Things began working properly, however since that time, the District has begun using the Sensus iPerl meter. This new meter is a true one inch meter and we have not had any issues with anything since its implementation. The Elster Smart Meter is still in place but is no longer being specified as an option for installation.

At the end of the 2015 irrigation season, the District now has 4 full years of irrigation data comprised of monthly consumption and hourly usage. Because new meters are being added every month, and for consistency purposes, the data being used for this report comes from a study group of 1,057 meters that have been in since 2010. However, a second study group is also set up and data from that group will be used in comparison with this first group as we have a few years of consistency with that group. In connection with this data, all metered users are receiving a water use statement each month letting them know their usage compared to their estimated need. The need is based on their parcel's landscape area using a historical 30 year average evapotranspiration value and irrigation system efficiency assumptions to determine

water need for their landscape area. More detail will be given on the system and how it all comes together in the body of this report.

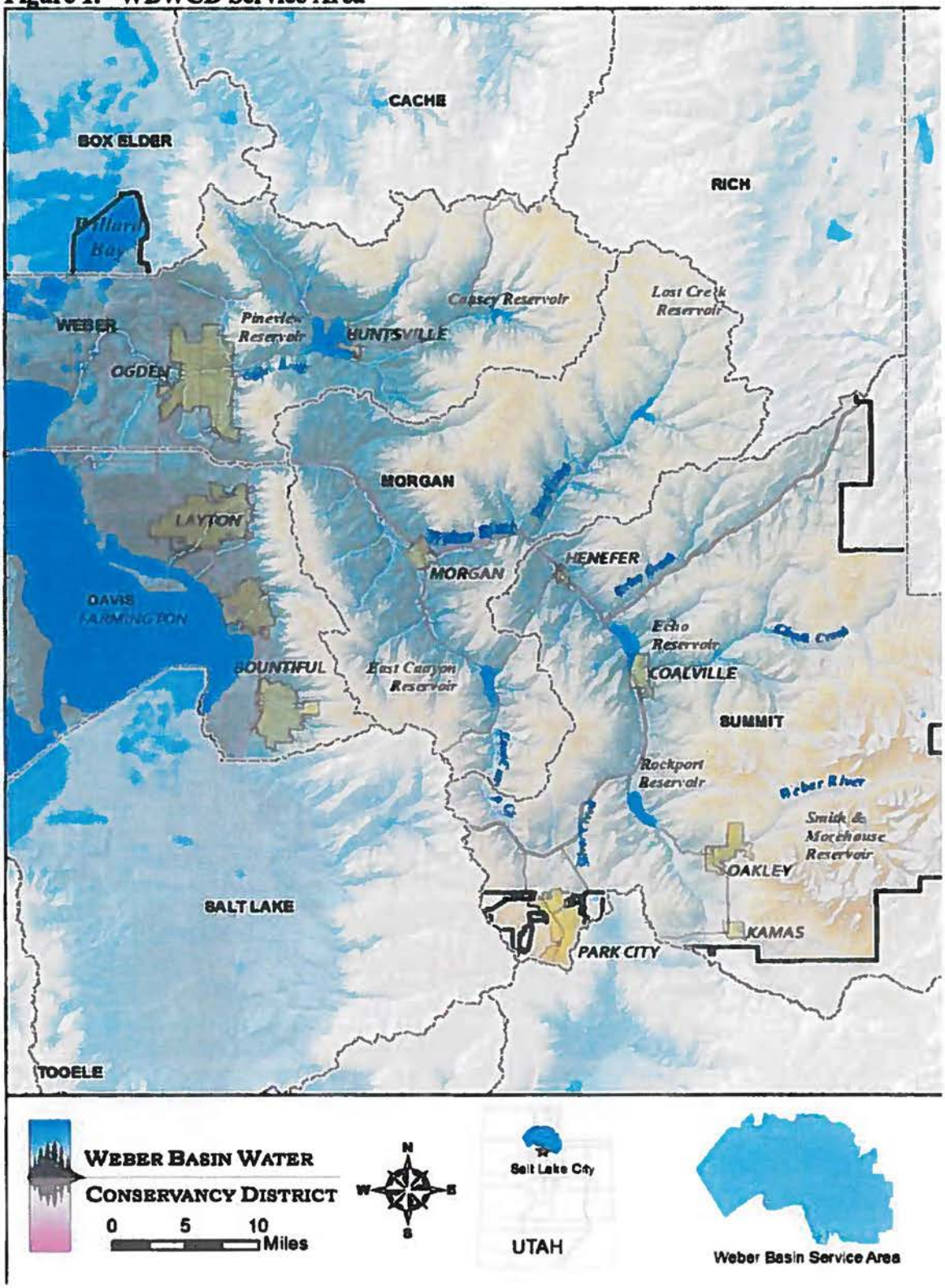
Overall, the metering is proving to be very effective with helping people know what they are using and how to adjust their usage down to meet the target need for their yard. The target need provides adequate and acceptable water for all users to maintain healthy turf and other landscape plant material while guiding users to eliminate waste and excess irrigation and to be accountable for their water. The potential conservation savings are large, and it is recommended that all secondary connections receive a meter and begin receiving help and education on how to reduce their landscape water needs. There will always be some ongoing issues of repair and replacement associated with any metering system, but over the last 4 irrigation seasons the results have been very positive with few setbacks. Some of the success of metering is being able to address the users' questions, gather and use quantifiable data on usage and conservation, and now being able to incorporate GIS and mapping technology to show on a larger scale where high use areas are and indicate which users may struggle to understand proper landscape water needs. The more information available the better we can analyze and implement programs and provide educational information to users which are cost effective and make the most sense for achieving desired water conservation goals and maintaining adequate water supply.

2. WBWCD Background

The Bureau of Reclamation began planning for the Weber Basin Project in 1942. Between 1952 and 1969, the Bureau of Reclamation constructed the original project consisting of reservoirs, canals, irrigation and drainage systems, and power plants. Weber Basin Water Conservancy District was created in June of 1950, by a decree of the Second District Court of Utah, under the guidelines of the Utah Water Conservancy Act. The District entered into a repayment contract with the United States Government in1952, which will be completed in 2034, to repay all of the original Weber Basin Project costs.

The Weber Basin Water Conservancy District is the legal agency representing the people of the five-county area of the project as shown below in Figure 1. The counties involved include Davis, Morgan, Summit, Weber, and part of Box Elder, which total a population of approximately 640,000 people and growing. That population is expected to double over the next 40 years and is going to require additional water supply and better management of the water supply currently available. The District administers the sale and delivery of project water and other water resources, operates and maintains the project facilities, and has contracted with the U.S. Government for repayment of reimbursable costs of the Weber Basin Project.

Figure 1. WBWCD Service Area



The Weber Basin Project was planned to conserve and utilize practically all of the excess flows of streams in the natural drainage basin of the Weber River, including the basin of the Ogden River, its principal tributary. Other areas encompassed are those lying between the west slope of the Wasatch Mountains and the east shore of the Great Salt Lake.

The District operates and maintains facilities for municipal potable and secondary irrigation needs providing approximately 225,000 acre feet of water annually to meet those needs. Of the total water delivered, 85,000 acre feet goes to municipal and industrial uses and 139,000 acre feet is delivered for irrigation needs of both agriculture and residential pressurized secondary irrigation systems. The District operates seven large storage reservoirs which store approximately 400,000 acre feet of the District's water, which is approximately a two years water supply for the current population.

Irrigation water for agriculture and municipal uses accounts for approximately 61% of Weber Basin Water Conservancy District's total water deliveries. Within the District's service area over 138,000 acre-feet of water is used to irrigate lands in five counties. In Utah it is estimated that approximately 60%-67% of all per capita water use is used to water landscapes which are primarily turf grass lawn. The District is committed to reducing water usage and has set a goal to reduce all water usage 25% by 2025 using the year 2000 as the base year.

One of the most promising areas identified to conserve water is by reducing irrigation usage for residential and urban applications in the landscape. Within the District's service area may exist the largest area of retail secondary water connections in the United States. The District has approximately 17,650 individual connections that are operated and maintained by the District, with many other irrigation companies and cities having tens of thousands of connections in their own retail areas throughout Davis and Weber Counties. This is water that is not treated but is in its own system directed to each property for the use of irrigating landscapes and gardens. Up until the last several years, this water has not been metered due to the difficulty with the meters currently on the market not being able to last with the poor water quality and the wear or plugging of the moving parts within those meters. This water has been allocated to properties based on property size and generally averages 1 acre foot per raw acre of property. However, the users have no way to know how much water they are using or when their allocation has been exceeded because there has been no metering of any kind in the past.

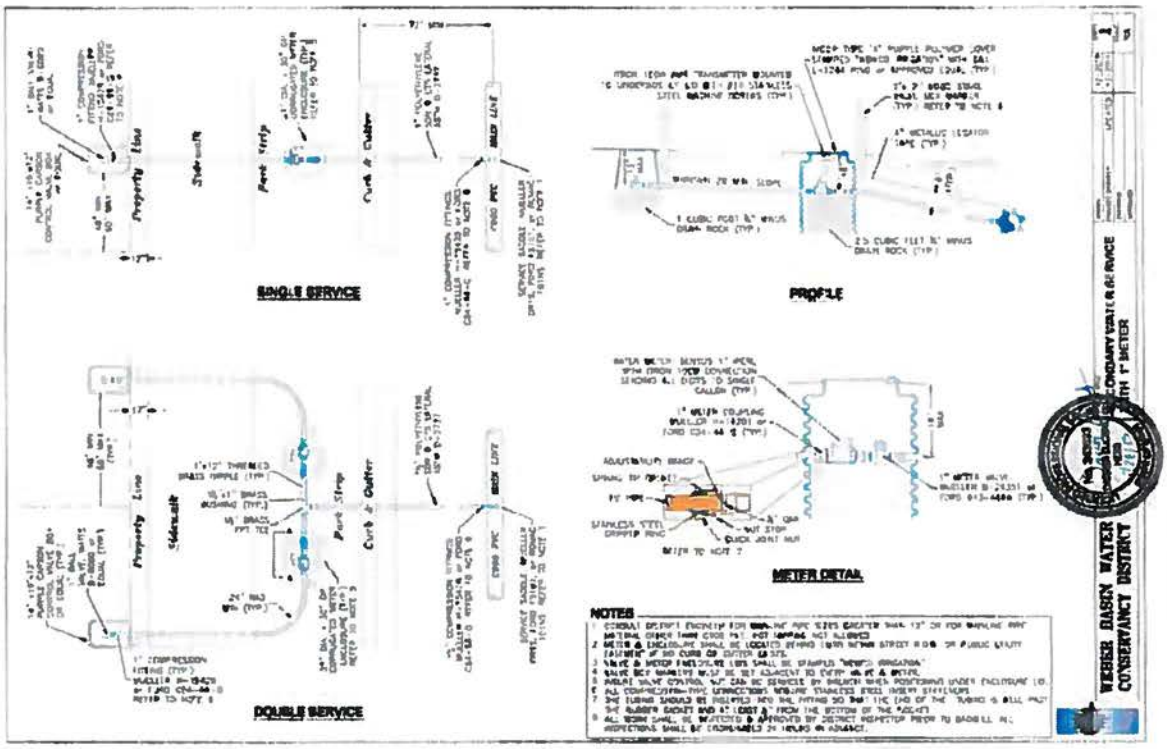
The District understands the importance of secondary water metering and the vital role metering will play in creating sustainable conservation. Goals for water use reductions will be achieved through usage accountability of the water currently being delivered. With a consistent study group of 1,057 meters with good data from 2012-1015, we have seen a reduction from an average use of .80 acre feet (AF) per connection down to .49 AF, which is a reduction of 39% over 4 years. This is meter data after a meter was installed. It is assumed and data is being gathered to show that unmetered connections do in fact use more than the .80 AF and many exceed allocation every year. More data will be made available as it is gathered. Effects of metering are continue to be seen with the meters now installed, and unlike drought messaging which creates a short term response, the meter will help users know what they use all the time to maintain the constant reduction rather than short term messaging or restriction response. The District will continue metering until all of its retail secondary connections have meters. It will take time and money to work through the system and install a meter on all existing connections.

3. Meter Project History

The District started metering individual properties in 2006 with a pilot study which included the installation of 30 Smart Meters (made by Severn Trent, later sold to Elster). The intent was to allow the District to monitor the effectiveness of the meters to see if they would work for secondary water systems. Some of the concerns included the ability of the meters to tolerate the conditions that exist in secondary systems and if they would read with accuracy the volume of water delivered. Secondary water connections are generally shallow, have the potential of being submerged for extended periods, and only have water through them for 6 months (no water during the winter season). These original 30 meters did not have capability for electronic reading but were read and monitored for 3 years to determine if they would provide a solution for accountability on every connection. The District has now replaced all of these meters so they can be read with all others and store data with the data collector. The data from these meters has shown that there is a lot of water being used, and it has shown that metering can work and will be an effective conservation tool to achieve long term savings and provide water for future growth needs.

To assist the District in this pilot meter study, the Utah Division of Water Resources joined as a partner to gather data and determine if the meters would be acceptable for secondary water systems. It was determined from the study that the Elster Smart Meter would be effective and be able tolerate poor water quality and provides accurate volume of water delivered. At the time, there were not many other options. It was determined that the District could move forward and commit to metering its secondary water connections on a larger scale beginning with the implementation of a policy that all new connections on Weber Basin's retail secondary system require a meter to be installed. A policy was created and adopted by the District's board of directors and took effect in 2010, with the full engineering drawings for specified installation and all other necessary information available for developers. The current meter installation specification is shown below as Figure 2.

Figure 2: Secondary Water Meter Installation Detail



This new policy did allow some choice in meters even though the smart meter was the only meter tested in the pilot study. The option available to developers was centered on using the Elster Smart Meter and Badger E Series with an Itron radio meter reading system to be used to read and gather usage data. The policy was developed at the same time that a larger project was being planned to install meters on existing connections, some of which would receive the Badger meters.

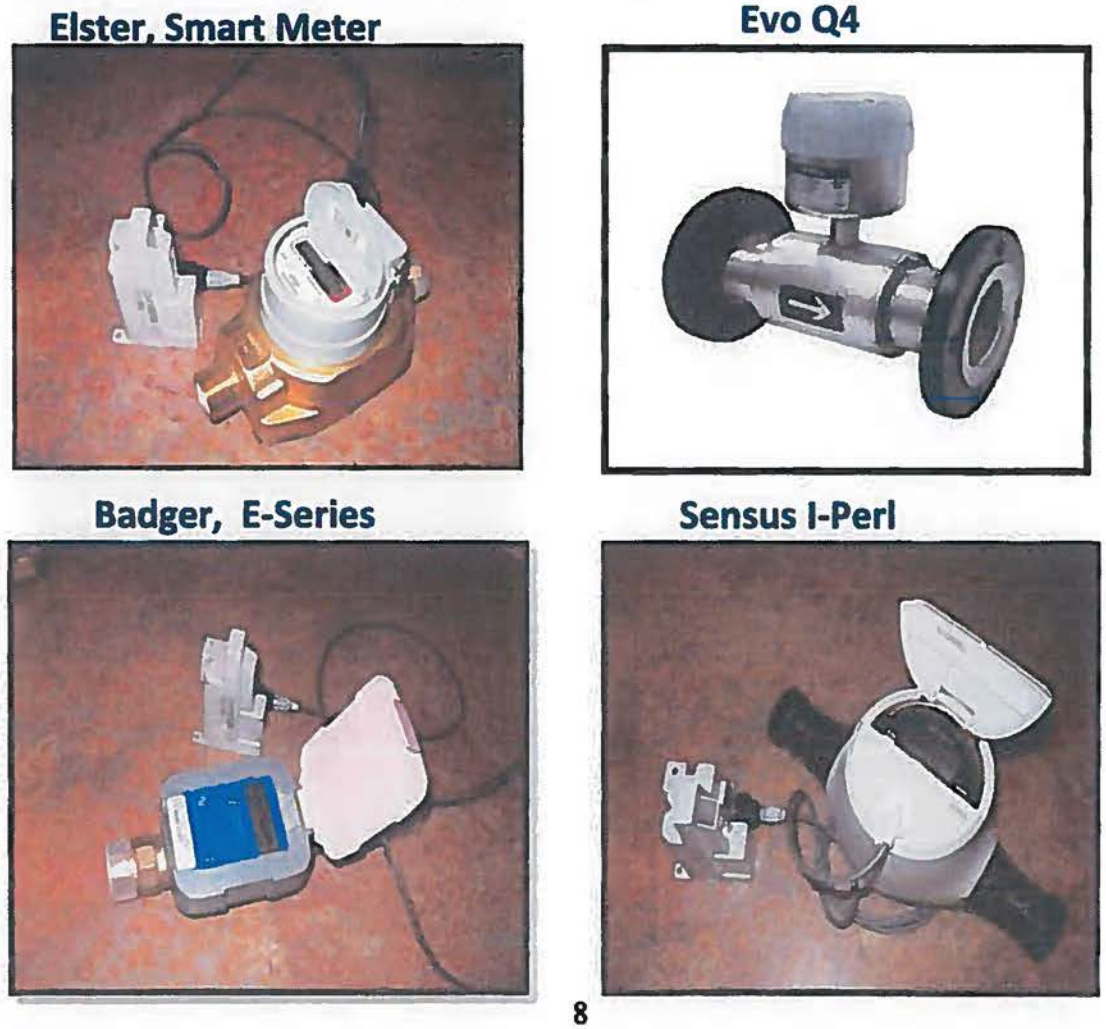
Since that time, the District has also been using and testing the Elster EvoQ4 and Sensus iPerl meters to determine if they will provide the reliability needed as well. All these meters have been produced and marketed with the ability to do what is needed in handling poor water quality, turbidity and no water in the pipes for half of the year. Itron was chosen as the read and data storage system because of its ability to be used with multiple brands and companies. The District is using several EvoQ4 meters on large connections because it is the only meter that can be used on connections larger than one inch diameter while still being cost effective. Other manufacturers have produced larger meters, but they are very costly. The District has now chosen to use the Sensus iPerl meter for all residential connections. This meter will be used until technology improves and other meters are introduced on the market and proven effective for this application. If it is determined that another meter can show effectiveness and affordability the District is willing to look at using other meters in the future. Below in Table 1, there is a comparison of each meter and the costs associated (all but labor to install it) to have an operational system.

Table 1. Meter Brands and Cost Comparisons

Meter Brand	Meter Cost	Cable	AMR - Itron 100W	Fittings	Enclosure (all parts)	Total
SmartMeter 3/4"	$158.00	included	$72.75	$120.00	$90.00	$440.75
Badger E Series 1"	$186.00	included	$72.75	$120.00	$90.00	$468.75
Badger E Series 1.5"	$484.00	included	$72.75	$120.00	$90.00	$766.75
Sensus I-PerlL 1"	$182.00	included	$72.75	$120.00	$90.00	$464.75
Evo Q 4 (4")	$1,977.00	$261.00	$72.75	$120.00	$90.00	$2,520.75
Evo Q 4 (2")	$1,526.00	$261.00	$72.75	$120.00	$90.00	$2,069.75

Photos of each of the meters are included here in Figure 3. Labor costs fluctuate and are not listed here because of the variability at the time of bidding. Our past experience indicates that labor to install is on average about equal to the cost of the meter components.

Figure 3. Meters Used in Weber Basin's Metering Projects



After installation there will be costs associated with the ongoing maintenance and operation of the system. These costs include time and materials for ongoing program operations, not including any meter or ERT replacement costs. The District has put together a cost breakdown of what it has taken to maintain and track meter usage so far. This work is at the heart of making a metering program successful. These costs will change as more meters are installed. It is likely the cost per meter would go down as more meters are installed due to the economy of scale and many portions of this work occurring regardless of the number of meters installed. Some costs will however increase such as paper, postage and time needed to prepare larger number of statements. Some of this can become more automated with equipment as the size of the project justifies cost to purchase such equipment. The operation cost estimations and calculations are shown below in Table 2, however, these costs will change as the number of meters in the system changes. From read time to time to process and the materials needed to get usage info to consumers will change as numbers increase.

Table 2. Costs of Maintaining Meters, Gathering Data and Providing Statements for Meter Study Group

Annual Meter Program Costs For Basic Ongoing Operation, No Physical Hardware

Average Employee wages and Benefits			$45.50					
Mileage allowance by IRS			$0.55					
	May	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Total**	**Cost**
Time for reading (in hours)	20	20	20	20	20	20	120	$5,460.00
Mileage of truck for meter reading	200	200	200	200	200	200	1200	$660.00
Time to generate reports (in hours)	4	4	4	4	4	4	24	$1,092.00
Maintenance of meters/amr's (ERT)(in hours)	8	8	8	8	8	8	48	$2,184.00
Printing cost (paper & ink, etc)	130	130	130	130	130	130	780	$780.00
Time to print, fold and stuff envelopes (hours)	8	8	8	8	8	8	48	$2,184.00
Postage cost	510	510	510	510	510	510	3060	$3,060.00
Time to respond to questions (hours)	8	5	3	3	3	4	26	$1,183.00
Update Meter Customer website (hours)	8	3	3	3	3	3	23	$1,046.50
Programming time for changes and bugs (meter software) (hours)	8	3	3	3	3	3	23	$1,046.50
Database maintenance / tracking development	8	2	2	2	2	2	18	$819.00
							Total	**$19,515.00**
Annual Cost per metered connection			**$15.01**					
Annual Cost Per Acre Foot Allocated (1401 af/allocated)			**$13.93**					
Annual Cost per Acre Foot Used (1004.8 af/delivered)			**$19.44**					

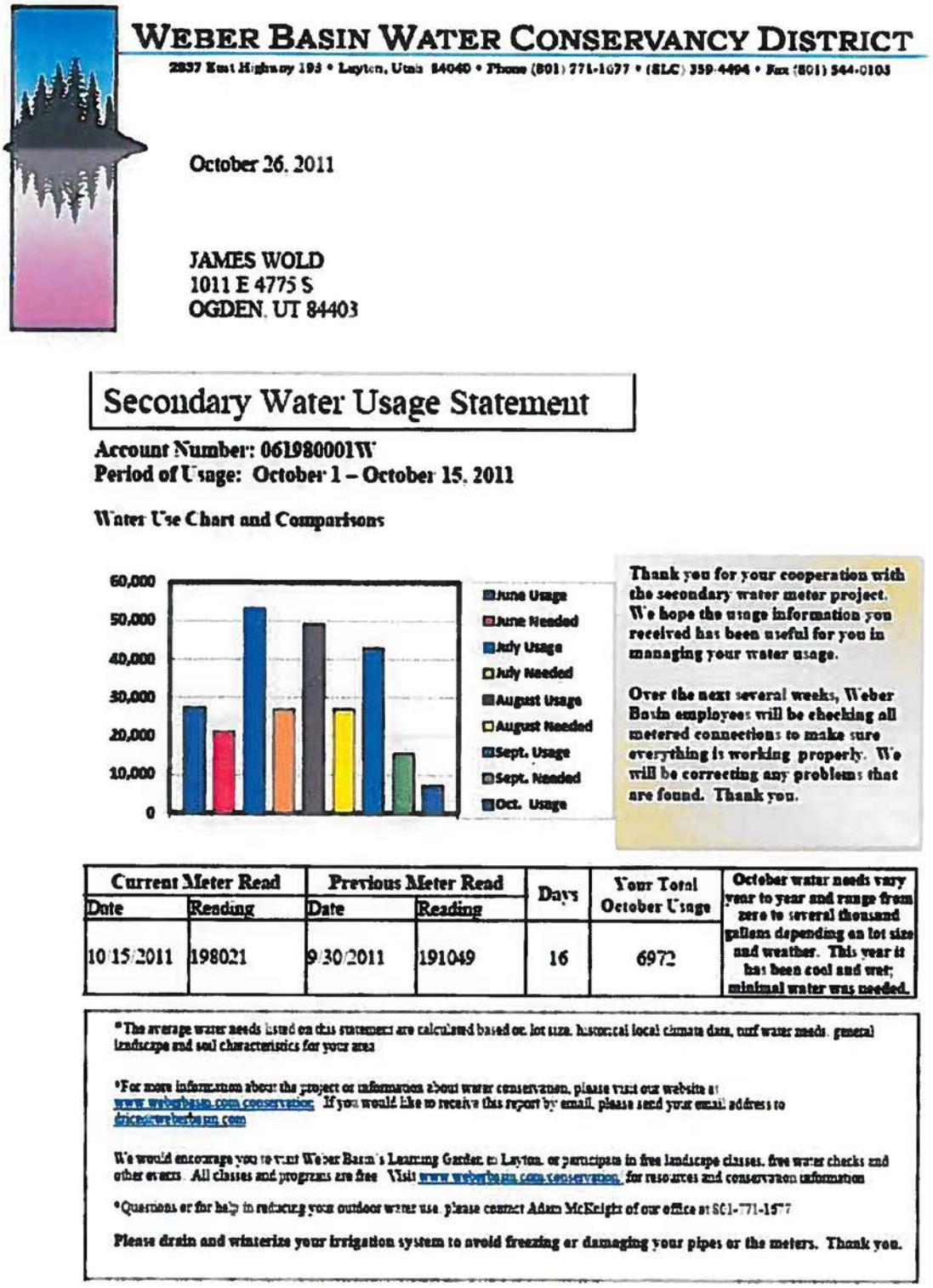
The pilot study provided the information needed for the District to proceed with a larger scale project and install 1,100 meters. With partial grant funding from Reclamation the District went forward with an installation project in the Uintah Bench area. The area was chosen because it is mostly built out, there are system limitations for delivery and there were larger trunk line meters installed for the area that could be used as comparisons to see if metering affected overall water delivery. The trunk line data will be used to compare usage once the entire Uintah Bench area is metered. It was determined that since this was the first experience with metering existing connections, there would need to be some public relations done to educate and address any questions and keep a positive image with secondary customers. The Langdon

Group was retained to handle the PR as a third party to help these meter recipients and cities where the meters would be installed to understand the goals, construction process, and why the District was metering. Meetings were held with the cities and city councils, open houses were done, and information was provided door to door to all those that would be receiving a meter. There was a website created with information and answers to common questions, and a phone hotline number was set up to address any concerns as the project proceeded.

The first 1,100 meters needed to be installed in the off season, so it was decided they would be installed in 2 phases with phase 1 to include portions of Washington Terrace and South Ogden. These areas were chosen due to some system limitations and pressure concerns as well as the varied location of both front and back yard connections. Phase 1 of the project began in the spring of 2011 with about 500 meters installed. It was planned that data for the entire 2011 irrigation season could be gathered. Phase 2 was completed in the spring of 2012 before irrigation water was turned on and included all of South Weber and additional portions of South Ogden, finishing the total 1,100 meters.

The data collection did begin the first year (spring of 2011) and included monthly reads and hourly consumption data for each connection. A report had been devised to provide the homeowner with their monthly value compared to a personalized need based on parcel size and historical weather data. An example of this first report is shown in Figure 4 below. This first report was a bit cumbersome to create because a database had not yet been created and a software program had not been purchased to put the data into any specific format (such as a billing format). The progression of the user statements is something that improved significantly over the 3 years since we have been providing them to the users. The main reason being that District staff was able to create and customize some software that would take the raw data, place it into our existing water contract system database then extract that data and put it into the format that we desired in a report.

Figure 4. 2011 Water Use Report Generated with Merge Files in Excel



WEBER BASIN WATER CONSERVANCY DISTRICT

2837 East Highway 193 • Layton, Utah 84040 • Phone (801) 771-1677 • (SLC) 359-4494 • Fax (801) 544-0103

October 26, 2011

JAMES WOLD
1011 E 4775 S
OGDEN, UT 84403

Secondary Water Usage Statement

Account Number: 061980001W
Period of Usage: October 1 – October 15, 2011

Water Use Chart and Comparisons

Thank you for your cooperation with the secondary water meter project. We hope the usage information you received has been useful for you in managing your water usage.

Over the next several weeks, Weber Basin employees will be checking all metered connections to make sure everything is working properly. We will be correcting any problems that are found. Thank you.

Current Meter Read		Previous Meter Read		Days	Your Total October Usage	October water needs vary year to year and range from zero to several thousand gallons depending on lot size and weather. This year it has been cool and wet; minimal water was needed.
Date	Reading	Date	Reading			
10/15/2011	198021	9/30/2011	191049	16	6972	

*The average water needs listed on this statement are calculated based on: lot size, historical local climate data, turf water needs, general landscape and soil characteristics for your area

*For more information about the project or information about water conservation, please visit our website at www.weberbasin.com/conservation. If you would like to receive this report by email, please send your email address to drice@weberbasin.com

We would encourage you to visit Weber Basin's Learning Garden in Layton, or participate in free landscape classes, free water checks and other events. All classes and programs are free. Visit www.weberbasin.com/conservation for resources and conservation information

*Questions or for help in reducing your outdoor water use, please contact Adam McKnight of our office at 801-771-1577

Please drain and winterize your irrigation system to avoid freezing or damaging your pipes or the meters. Thank you.

After just the first couple of months of metering in Phase 1, there was an issue that came up where data for many connections was showing very low or even negative values compared to the prior month. It took some time and patience to figure out that the data logging AMR unit was interacting incorrectly with the meters and resetting the meter register. The District frustration associated with this problem as well as the end user concern over accurate values was very high but with the help of both Itron and Elster, all AMR units were replaced with a new units (testing in manufacturing labs identified a compatibility problem, and they resolved the issue and provided new equipment). The downside to this little setback was that the data for 2011 was deemed unreliable for accuracy of usage. Some of the data may have been correct, but there was enough uncertainty that it was decided to never use the 2011 data in any of the comparisons of metered water use.

In connection with the installation and again with help from Reclamation, an additional study related to secondary meters began with USU extension. It was done simultaneously with the install but focused on the behavioral and social science side to metering. The project was to evaluate and survey the users to determine how this meter would be perceived and to receive and gather feedback from end users regarding the information that they were provided about their water usage and their general perceptions of a meter installed on their connection. USU assisted the District in this effort and in developing surveys and determining an appropriate usage volume for each parcel based on fly over areal mapping and thermal imaging. Their work was connected with the project during the 2011 and 2012 irrigation seasons and provided good direction for the District to fine tune the reporting and evaluation of water need and the report provided to what it is today (more detail is discussed in the data section). The survey work from USU has been completed, and their full report can be provided upon request. It is not attached to this report due to the length of their report which also included the surveys and focus group questions and the processes to do these types of human behavior studies.

In the spring of 2013 the District installed 40 additional meters in South Ogden, this time trying the Sensus iPerl. The iPerl needed to be put to the test to see if it would also meet the District's requirements for quality and data collection. As of the completion of the 2015 irrigation season, there were no issues to report about the function of the meter, the collection of the data or other problems that were encountered with testing their meter in this project. This meter is now added to the approved meter for installation and included in the specifications of meters suitable for our desired outcomes.

There is now reliable data for 1,057 metered connections for four consecutive irrigation years. Additional meters have been installed ongoing since that time bringing the total to 2,683 individual property meters. We continue to use the 1,057 meters with consecutive years of data for analysis but have started a second data set of different metered connections that have only been in the ground for a couple of years. That data is being analyzed and will be used as a comparison to the first study group to measure effectiveness across demographics and areas. The District has been tracking and monitoring usage and providing water use information to all users that have a meter on their connection. Data and additional details from Phases 1 and 2 of the project are discussed below in the data section of this report.

4. Meter Data and Analysis

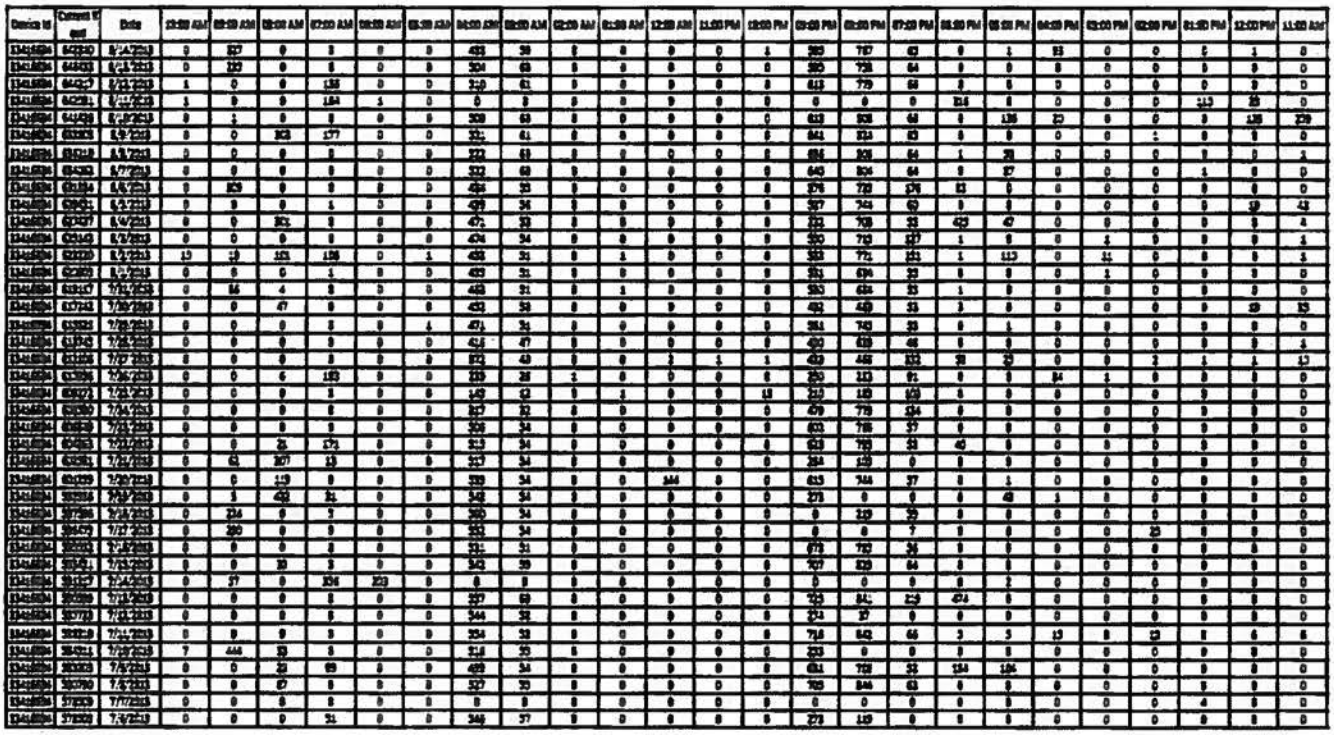
The data collected so far has been very informative and has helped the District continue to fine tune the information given to home owners. In addition, the data has provided the District the needed water usage information that has previously only been estimated and assumed due to the lack of detailed metering information. Current retail irrigation water is allocated at 3 acre-feet per acre and users are charged based on the allocated water to their parcel, not usage. Until meters were installed it was not known to what extent the end users stayed within their water allocation or to what extent they were exceeding what they pay for on individual basis. The overall water deliveries helped to estimate average residential use, but no specific detailed information was available. Several university studies and studies from water districts throughout the West have shown that the most effective way to reduce water usage is to have water use accountability and provide financial or other incentives to conserve water. The meters are beginning to give the District a more accurate and bigger picture on secondary water use which will be important for future policy decisions, future water development and how to proceed with conservation programs and water supply planning for the future.

The data is very important to the District in terms of total water delivered compared to water allocated for each parcel. Allocations have previously been determined by the parcel size (not irrigated area), but the allocation is now determined by parcel size minus 2,500 square feet for impermeable surfaces. The estimated need provided to homeowners through the metering project is based not on parcel size but area of landscape on that parcel. A map similar to those on Google maps is used and staff will zoom into that parcel and use GIS software to hand draw measurement lines around the parcel which excludes home, concrete (except sidewalk by street) and any other visual structures. The rest of the area is classified as landscape, and it is assumed the area is all turf and the estimated need is based on that area.

To effectively gather data and to determine how water is being used, it was decided that a system that can collect and store hourly data would be the most beneficial. The Itron 100W data logger with a radio read collection system was determined to meet this need since it is compatible with multiple meter manufacturers and can provide hourly data. Each unit, attached to the meter will gather and store hourly flow through the meter and keep up to 40 days of data in memory. After 40 days it is like a rolling log, the oldest data is replaced by new data. These 40 days of data logging provides the District the flexibility to read and gather the data each month with a few days to spare if a problem is noticed or if for some reason data collection is missed during normally scheduled read dates.

Hourly data has proven to be very effective for the District in the case of usage disputes. There have been a few cases where a user has called very concerned that the meter may be incorrectly reading usage. With a few direct questions about their normal watering habits, a comparison can be made to the hourly data, and verification made to see if what they claim matches the data collected. This process has helped to educate homeowners on usage and volume and has also been useful to find and correct a few meter problems where indeed a meter was not reading correctly or a leak in their system can be determined. Occasionally a site visit needs to be made and water run through a faucet into a bucket to compare and ensure meter accuracy. An example of hourly data in spreadsheet form is shown here below in Figure 5.

Figure 5. Example of Hourly Data Spreadsheet

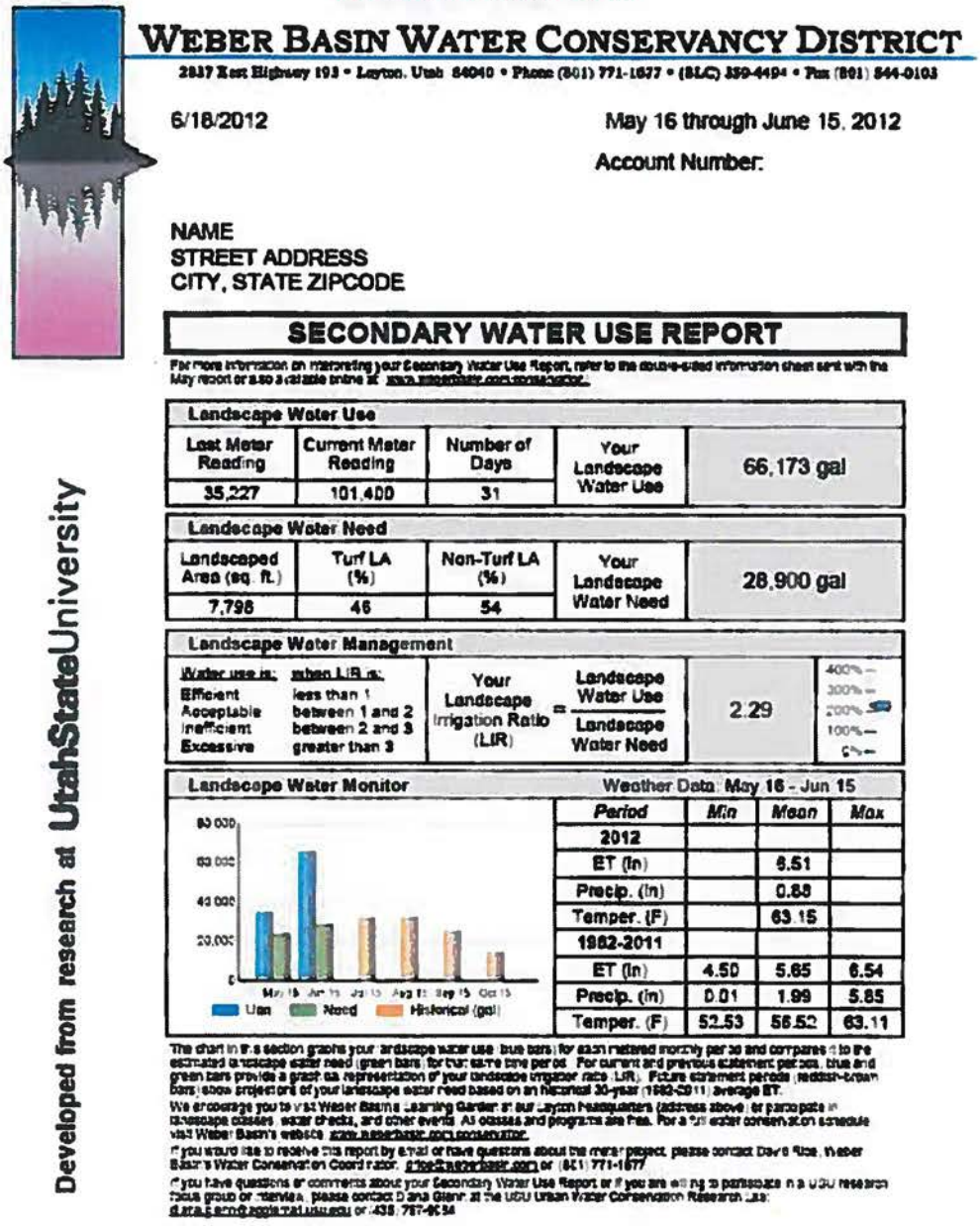


The data collected each month is brought back to the office and uploaded from raw form into a data base that was created and designed to be used for multiple features and format outputs and to assist the ease of creating water usage statements and data reports. The reading of the meters is broken into smaller manageable routes, usually by city boundaries to simplify and help manage the data and analysis. It takes staff about 12-16 hours to drive the entire District service area gathering the data (hourly data takes a little longer to gather than monthly values only) from the various metered areas. Since meters are being installed on new connections, there are small pockets of meters in areas all throughout the District's service area.

The data collected each month is analyzed and quality checked to ensure good data collection. A few reports in the Itron software are generated to assist in quality checking. Various tamper and code reports indicate if there was a problem on any meter. If a problem exists or is suspected, a site visit and manual check on the meter and the meter registry are done to see if a physical problem exists. The data is then used with District developed software to create user reports which are printed in color, a process which takes about 4 hours to complete with one printer. The processing done to have the documents ready for print is done overnight. It essentially creates a PDF file for each user statement which is then printed in batches. It should be mentioned that an e-mail option was provided to users, and there are approximately 300 statements that are not printed but generated in a digital format and e-mailed to users who have requested a paperless statement. An example of the first water use statement is shown in Figure

4 (page 12). New statements that the District is using are shown in Figures 6 and 7 below. Figure 6 below, shows the statement used in 2012 with the partnership between the District and USU, and Figure 7 shows the modifications and simplification that the District implemented at the beginning of 2013 and is still using to date. This format seems to be effective and simple enough for homeowners to understand and use effectively, modifications can and will be made as needed to ensure that the statement is providing the information a homeowner can use.

Figure 6. 2012 Meter Use Statement (USU Partnership Year)



EXAMPLE REPORT

WEBER BASIN WATER CONSERVANCY DISTRICT

2837 East Highway 193 • Layton, Utah 84040 • Phone (801) 771-1677 • (SLC) 359-4494 • Fax (801) 544-0103

6/18/2012

May 16 through June 15, 2012

Account Number:

NAME
STREET ADDRESS
CITY, STATE ZIPCODE

SECONDARY WATER USE REPORT

For more information on interpreting your Secondary Water Use Report, refer to the double-sided information sheet sent with this May report or also available online at: www.weberbasin.com/conservation

Landscape Water Use

Last Meter Reading	Current Meter Reading	Number of Days	Your Landscape Water Use	66,173 gal
35,227	101,400	31		

Landscape Water Need

Landscaped Area (sq. ft.)	Turf LA (%)	Non-Turf LA (%)	Your Landscape Water Need	28,900 gal
7,798	46	54		

Landscape Water Management

Water use is:	when LIR is:
Efficient	less than 1
Acceptable	between 1 and 2
Inefficient	between 2 and 3
Excessive	greater than 3

Your Landscape Irrigation Ratio (LIR) = Landscape Water Use / Landscape Water Need = 2.29

400% — 300% — 200% — 100% — 0% —

Landscape Water Monitor — Weather Data: May 16 - Jun 15

Period	Min	Mean	Max
2012			
ET (in)		6.51	
Precip. (in)		0.88	
Temper. (F)		63.15	
1982-2011			
ET (in)	4.50	5.65	6.54
Precip. (in)	0.01	1.99	5.85
Temper. (F)	52.53	58.52	63.11

The chart in this section graphs your landscape water use (blue bars) for each metered monthly period and compares it to the estimated landscape water need (green bars) for that same time period. For current and previous statement periods, blue and green bars provide a graphical representation of your landscape irrigation ratio (LIR). Future statement periods (reddish-brown bars) show projections of your landscape water need based on an historical 30-year (1982-2011) average ET.

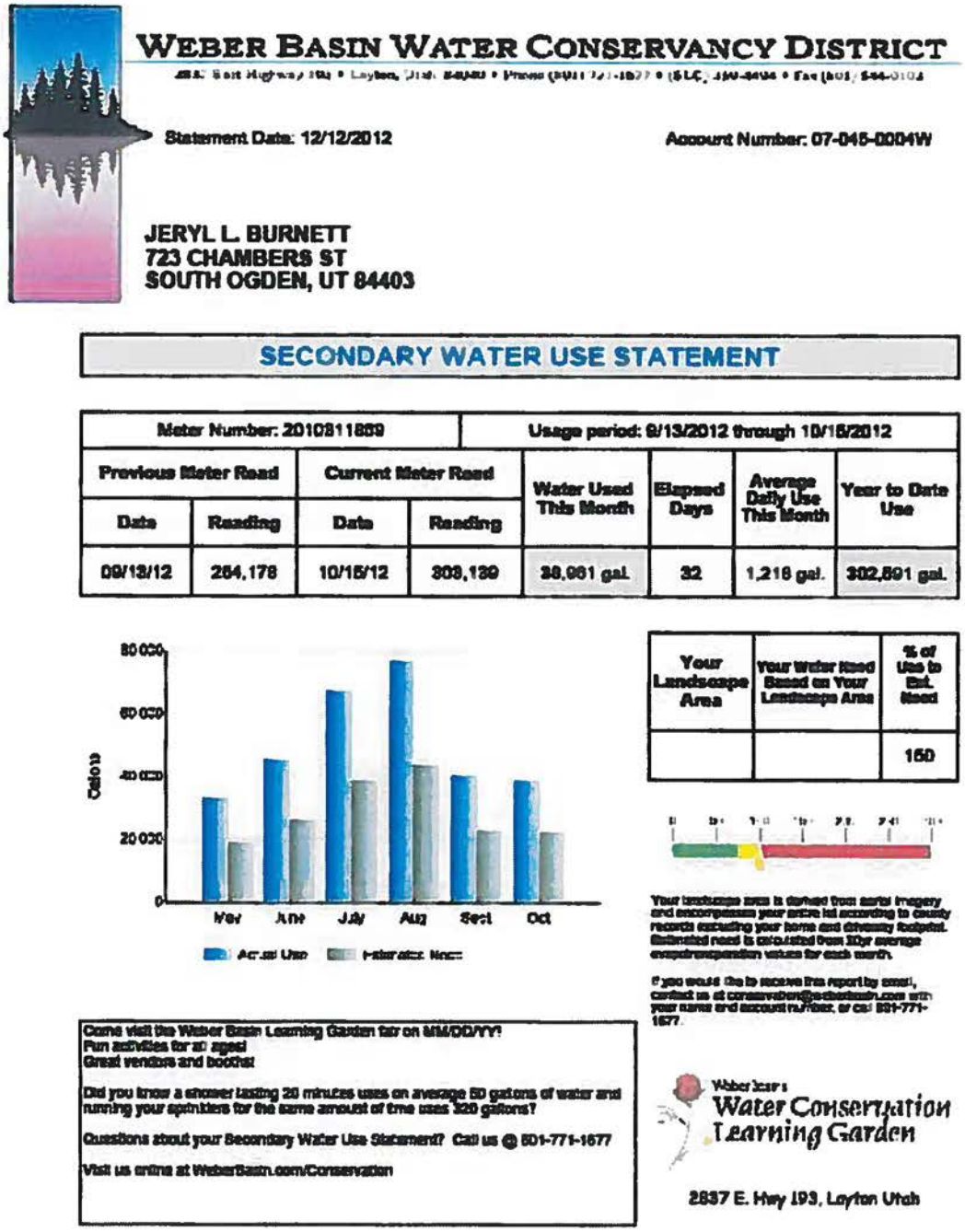
We encourage you to visit Weber Basin's Learning Garden at our Layton Headquarters (address above) or participate in landscape classes, water checks, and other events. All classes and programs are free. For a full water conservation schedule visit Weber Basin's website: www.weberbasin.com/conservation

If you would like to receive this report by e-mail or have questions about the meter project, please contact Dave Rice, Weber Basin's Water Conservation Coordinator: drice@weberbasin.com or (801) 771-1677

If you have questions or comments about your Secondary Water Use Report or if you are willing to participate in a USU research focus group or interview, please contact Dana Glenn at the USU Urban Water Conservation Research Lab: dana.glenn@aggiemail.usu.edu or (435) 797-8634

Developed from research at UtahStateUniversity

Figure 7. 2013 Sample User Statement Sent to Each Metered User



WEBER BASIN WATER CONSERVANCY DISTRICT

Statement Date: 12/12/2012

Account Number: 07-045-0004W

JERYL L. BURNETT
723 CHAMBERS ST
SOUTH OGDEN, UT 84403

SECONDARY WATER USE STATEMENT

Meter Number: 2010811869		Usage period: 9/13/2012 through 10/15/2012					
Previous Meter Read		Current Meter Read		Water Used This Month	Elapsed Days	Average Daily Use This Month	Year to Date Use
Date	Reading	Date	Reading				
09/13/12	264,178	10/15/12	303,139	38,961 gal.	32	1,218 gal.	302,891 gal.

Your Landscape Area	Your Water Need Based on Your Landscape Area	% of Use to Est. Need
		150

Your landscape area is derived from aerial imagery and encompasses your entire lot according to county records excluding your home and driveway footprint. Estimated need is calculated from 30yr average evapotranspiration values for each month.

If you would like to receive this report by email, contact us at conservation@weberbasin.com with your name and account number, or call 801-771-1677.

Come visit the Weber Basin Learning Garden fair on MM/DD/YY!
Fun activities for all ages!
Great vendors and booths!

Did you know a shower lasting 20 minutes uses on average 50 gallons of water and running your sprinklers for the same amount of time uses 320 gallons?

Questions about your Secondary Water Use Statement? Call us @ 801-771-1677

Visit us online at WeberBasin.com/Conservation

Weber Basin's
Water Conservation
Learning Garden

2837 E. Hwy 193, Layton Utah

There is a lot of information that can be gathered from the data. The data is comprehensive, and there is hourly usage information for every meter which can be used for different reports and analysis. Since there isn't data to compare usage prior to meter installation to the current metered usage, the information presented here may indicate some prior behavior but it is impossible to tell. However, water use is likely decreasing in part because of more awareness and the educational campaigns, more media attention and other programs that have been implemented over the last several years that have helped users recognize their over use and change their behaviors.

Tables 3A through 3D below show data from a metered study group in a comparison between 2012 and 2015. Total usage and number of users exceeding water allocation to their property for this group, which includes 1,057 meters, is tracked over the four year period. It should be noted that the data for each city pertaining to the percent of estimated need is not weighted but represents the average of the city as whole. The totals in Table 4 have been weighted toward individual use. In instances where a meter fails and is replaced, the data continues to be collected, but the meter may not have recorded some usage during the period that it failed. A small amount of data could have been lost with a few of these meters. However, the District found no significant change in the data with the brief outages, so no adjustments for dead meters water uses or losses has been made for this group.

In Table 4 below, the data is from the same study group but the numbers are presented in total form and not by city areas. The difference in use between years is significant, and it is very difficult to identify the exact reason why the usage is different between each year due to many factors, which may include weather differences. It is clear however that usage is declining. There were varied weather conditions, and the media emphasis during different years could have brought more awareness to general public use which influenced behavior and water reductions from year to year. The relatively dry conditions over the last 4 years have brought a lot of media attention to water supply and water usage.

Table 3A. 2012 Meter Data

Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need(AF)	Use (AF)	% of Alloc.	% of Need	Number Exceeding Allocation	Percent Exceeding Allocation
Washington Terrace	263	259.5	141.2	199.9	77.0	142	48	18%
South Ogden	292	251.9	155.0	228.6	91	148	81	28%
South Ogden Badgers	48	35.3	17.3	36.4	103	211	23	48%
South Weber	356	436.2	284.9	323.2	74	113	65	18%
South Ogden Ph. 2	98	86.8	64.0	85.8	99	134	43	44%
Totals	**1057**	**1069.7**	**662.2**	**874**	**83**	**136**	**260**	**25%**

Table 3B. 2013 Meter Data

Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need(AF)	Use (AF)	% of Alloc.	% of Need	Number Exceeding Allocation	Percent Exceeding Allocation
Washington Terrace	263	259.5	141.2	162	62	115	16	6%
South Ogden	292	251.9	155.0	172.8	69	111	42	14%
South Ogden Badgers	48	35.3	17.3	25.7	73	148	11	23%
South Weber	356	436.2	284.9	249.8	57	88	18	5%
South Ogden Ph. 2	98	86.8	64.0	65.1	75	102	17	17%
Totals	**1057**	**1069.7**	**662.2**	**675.3**	**64**	**105**	**104**	**10%**

Table 3C. 2014 Meter Data

Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need(AF)	Use (AF)	% of Alloc.	% of Need	Number Exceeding Allocation	Percent Exceeding Allocation
Washington Terrace	263	259.5	141.2	150.6	58	107	14	5%
South Ogden	292	251.9	155.0	162.2	64	105	43	15%
South Ogden Badgers	48	35.3	17.3	23.2	66	134	6	13%
South Weber	356	436.2	284.9	235.8	54	83	20	6%
South Ogden Ph. 2	98	86.8	64.0	58	67	91	10	10%
Totals	**1057**	**1069.7**	**662.2**	**629.9**	**60**	**98**	**93**	**9%**

Table 3D. 2015 Meter Data

Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need(AF)	Use (AF)	% of Alloc.	% of Need	Number Exceeding Allocation	Percent Exceeding Allocation
Washington Terrace	263	259.5	141.2	124.8	48	88	4	2%
South Ogden	292	251.9	155.0	131.7	52	85	14	5%
South Ogden Badgers	48	35.3	17.3	19.9	56	115	3	6%
South Weber	356	436.2	284.9	192.8	44	68	10	3%
South Ogden Ph. 2	98	86.8	64.0	46.5	54	73	4	4%
Totals	**1057**	**1069.7**	**662.2**	**515.5**	**49**	**80**	**35**	**3%**

For the data set above, 1,057 connections that have had consecutive data for 2012 -2015 were used in the comparisons over the four years. In Table 4 below, the same data set is used and shows clearly that the study group has reduced consumption and is now using much less than the traditional allocation of 3 acre feet per acre. Users complying with the volume given them as the estimated need shows a significant improvement from 145% in 2012 to just 90% in 2015. However, each year has a fairly large standard deviation, meaning that the range of usage is quite large but still converging from one year to the next. Similar tendencies can be found on the

percent of allocation used. This data seems conclusive in showing that having a meter and receiving usage information promotes accountability and will cause behavior changes in usage to occur when users are given a target.

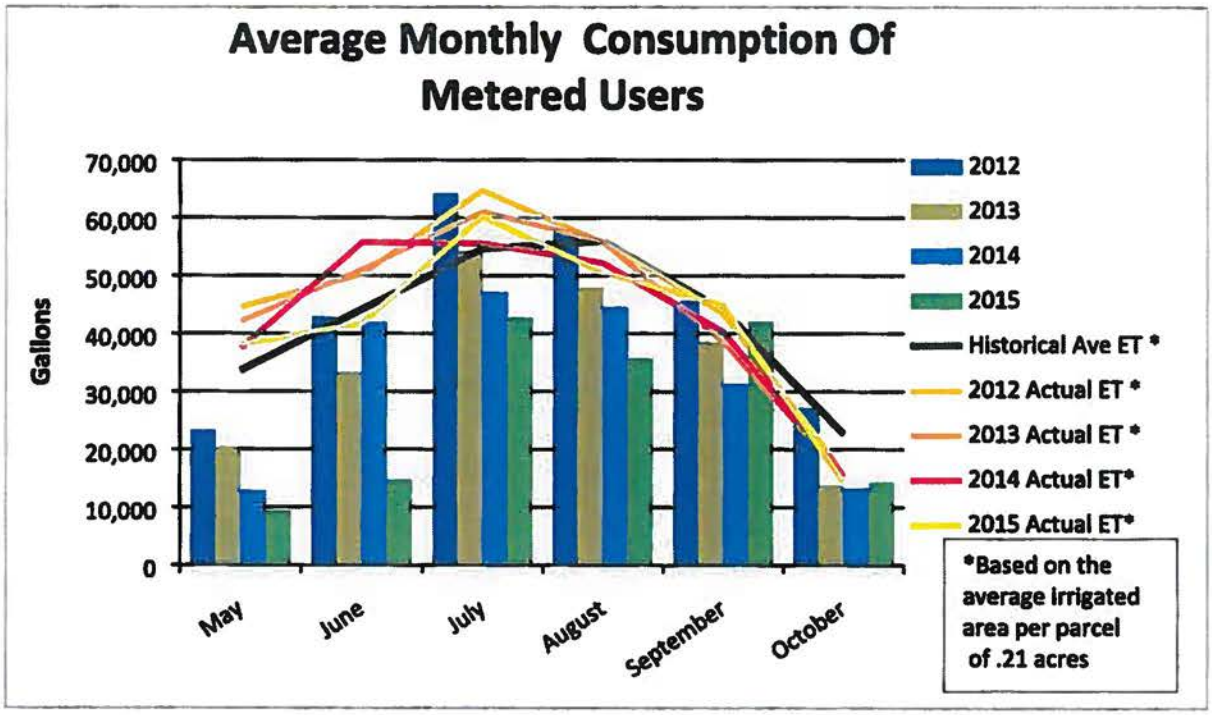
Table 4. 2012-2015 Water Use Comparison

	2012	2013	2014	2015
Used Gallons	284,912,371	220,146,962	205,346,968	168,066,551
Used AF	874	675.3	629.9	515.5
Gross Acreage	324.4	324.4	324.4	324.4
Used AF / Gross Acreage	2.69	2.08	1.94	1.59
Landscaped Area	225.3	225.3	225.3	225.3
Used AF/ Landscaped Area	3.9	3	2.8	2.3
Estimated Need (Gal)	215,886,557	215,886,557	215,886,557	215,886,557
Percentage Used / Est. Need (Weighted)	145.00%	117.40%	109.71%	90.24%
Average % Allocation Used (Weighted)	83.00%	64.00%	59.60%	50.18%
Average Allocation	1.0 AF	1.0 AF	1.0 AF	1.0 AF
Total Allocation	1074.0 AF	1074.0 AF	1074.0 AF	1074.0 AF

*This data includes 1,057 meters that have data for 2012, 2013, 2014, and 2015, with accurate landscape area. 2012 was adjusted to reflect an Oct. 1st shutdown.

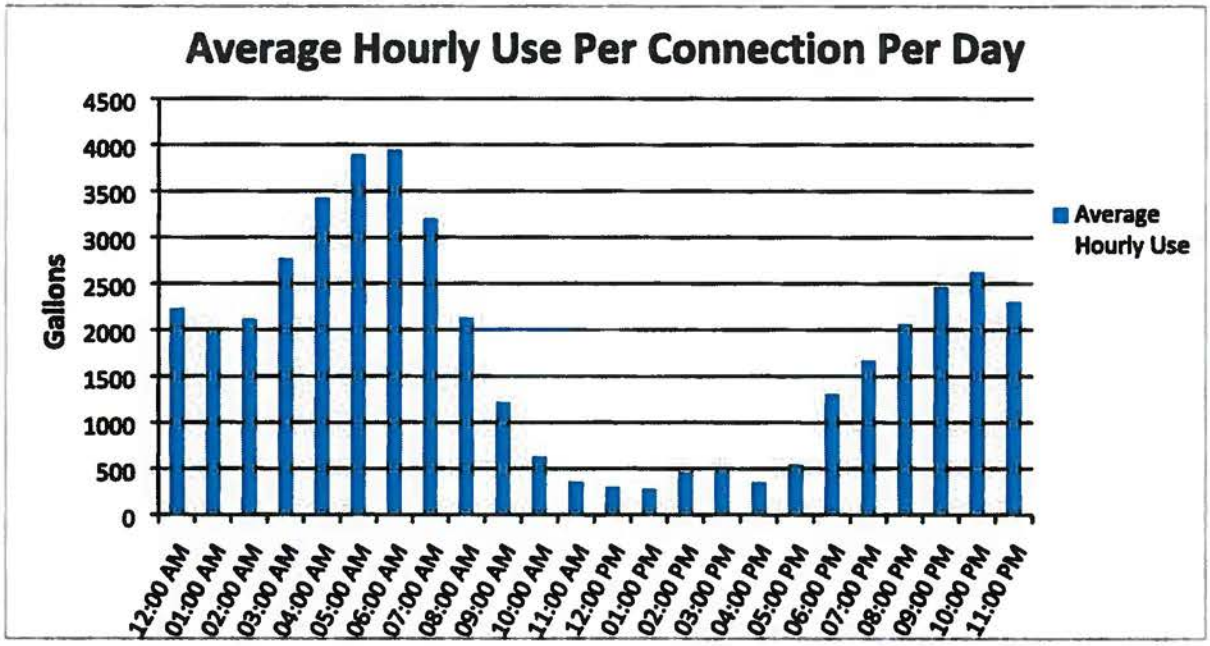
Chart 1 below illustrates the water use information shown in Table 4 in more of a graphical representation. It is clear the there is a reduction in use when comparing the four years of metered data. The historical average evapotranspiration (ETo) value is used in all reports to water users so that value is also shown here. The actual values are not much different from the historical, however for information purposes the actual ETo values are; 2012; 34.69 inches; 2013; 33.55 inches; 2014; 32.38 inches; and 2015; 31.54 inches. The historical 30 year average is 31.26 inches. This lower ET values from 2013 to 2015 could have and should have played some role in overall reduction in use over that same time. More analysis for weather will be done to determine its effect. This reduction in overall use does show that awareness and conservation messaging, even if it is drought messaging, does reach end users and they do respond. The continuation of data gathering, which will include figuring out a weather normalization process, will help the District know if sustainable changes are being made even when no drought messaging is present or there are no water restrictions in place during an irrigation year. The knowledge users have with their usage should help to sustain reasonable irrigation water use once habits are formed and compliance is achieved the first time.

Chart 1. 2012-2015 Average Monthly Consumption Comparison



To illustrate a significant conservation and policy messaging impact, Chart 2 below shows the average hourly use among all metered users. It is very clear that the policy of no watering between 10:00 am and 6:00 pm has been generally adopted among water users. There are still those that are not following the policy, but they are a small percentage of users. With meter data such as this, those who do not comply with policy or specific yearly messaging can be identified and encouraged to comply with incentives or disincentives. This is also a very useful chart in identifying system demand peaking which can facilitate the operation of the District facilities and distribution system that involves pumping, small reservoir levels, pipe sizing, etc.

Chart 2. Average Hourly Use in Gallons Among all Metered Water Users



All the information presented in this report is only a representation of the types of reports or analysis that can be created with metered secondary (landscape) water data. Another tool that can be used from the data collected by each meter is the creation of what is referred to as a heat map. In Figures 8, 9, 10 and 11 below, heat maps are used to show what can be done to visually show a good representation of how water use has changed in one of the metered areas during the four year time period. This kind of information makes it easy to quickly see the areas where water use may be an issue and may help in the future for conservation targeting programs.

These maps are useful tools in visually identifying patterns or problem spots where moderate or very high water use has occurred. These maps can be generated every month and used know where we might see over-usage later in the season due to early season use patterns or early season excessive use. The red indicates parcels where water use has exceeded the water allocation for that property. Yellow indicates use between 76% and 100% of allocation and green indicates water use that fits within allocations for the property at below 75%. These tools can assist the District in determining what factors may be part of water use trends. There could be soil issues, neighborhood expectations, issues within individual systems dealing with pressure causing poor sprinkler system uniformity and coverage. There could be various factors of demographics where the neighborhoods may consist of larger homes and naturally a higher income level where there is less concern over resources and more thought for curb appeal or there are high social pressures to ensure things look a certain way. It is likely that in the future the District will rely on usage data as illustrated in heat maps to use targeted programs to help educate users about proper water use for landscapes.

Figure 8. 2012 Heat Map for South Ogden Area

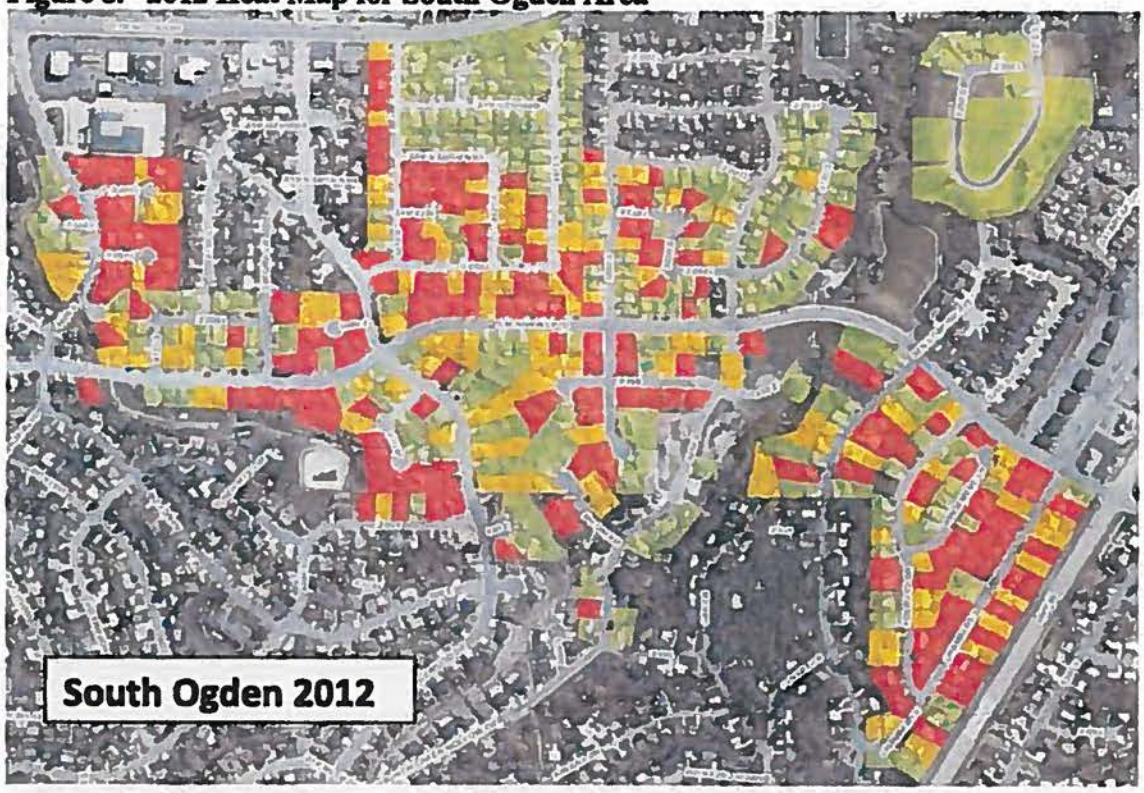


Figure 9. 2013 Heat Map for South Ogden Area

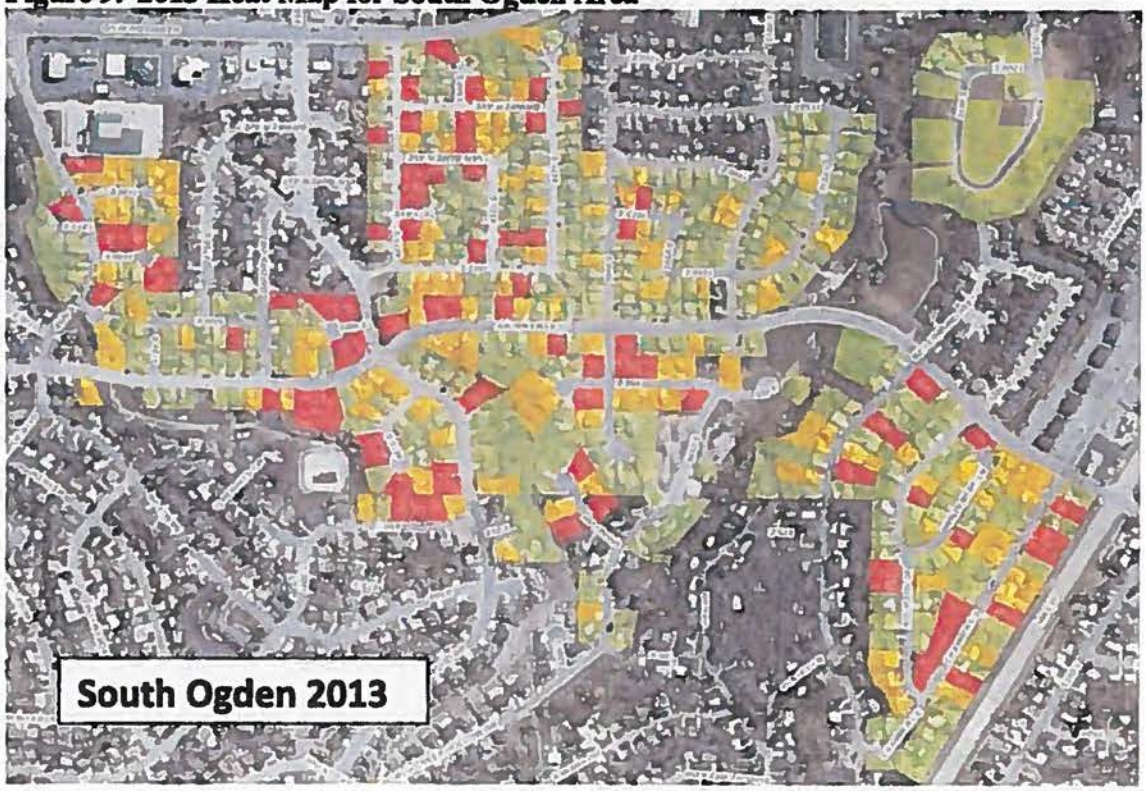


Figure 10. 2014 Heat Map for South Ogden Area

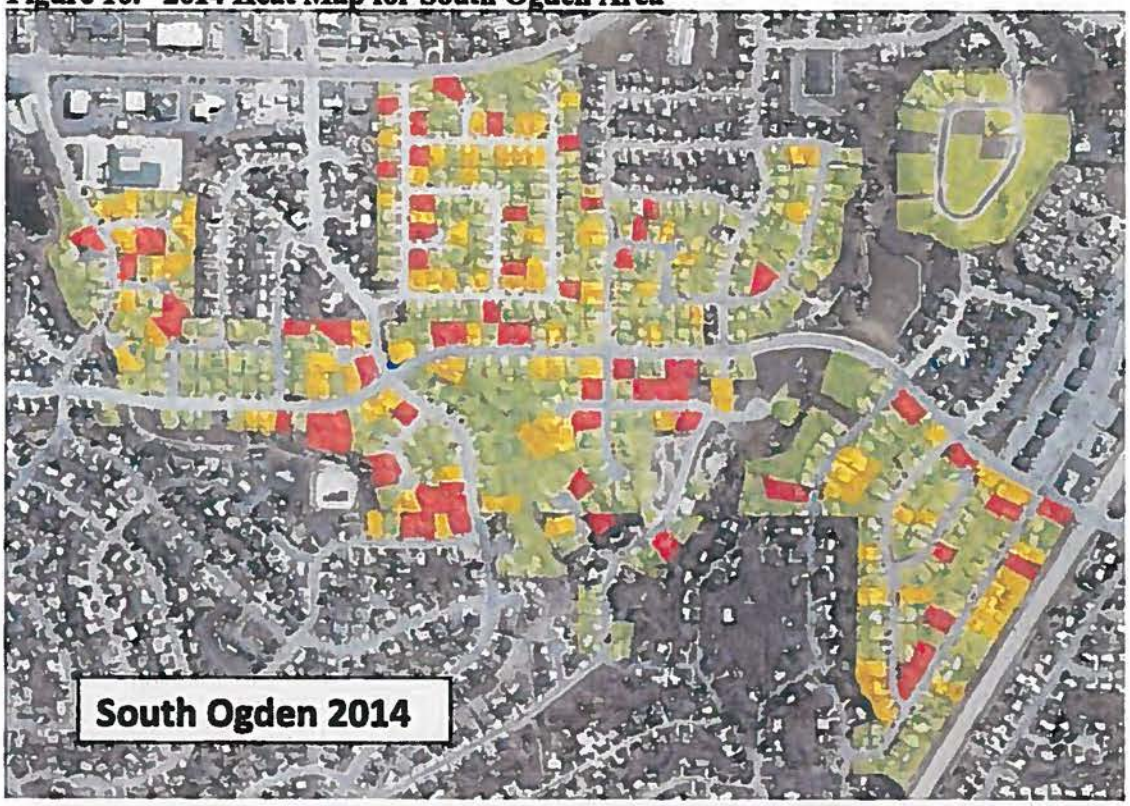
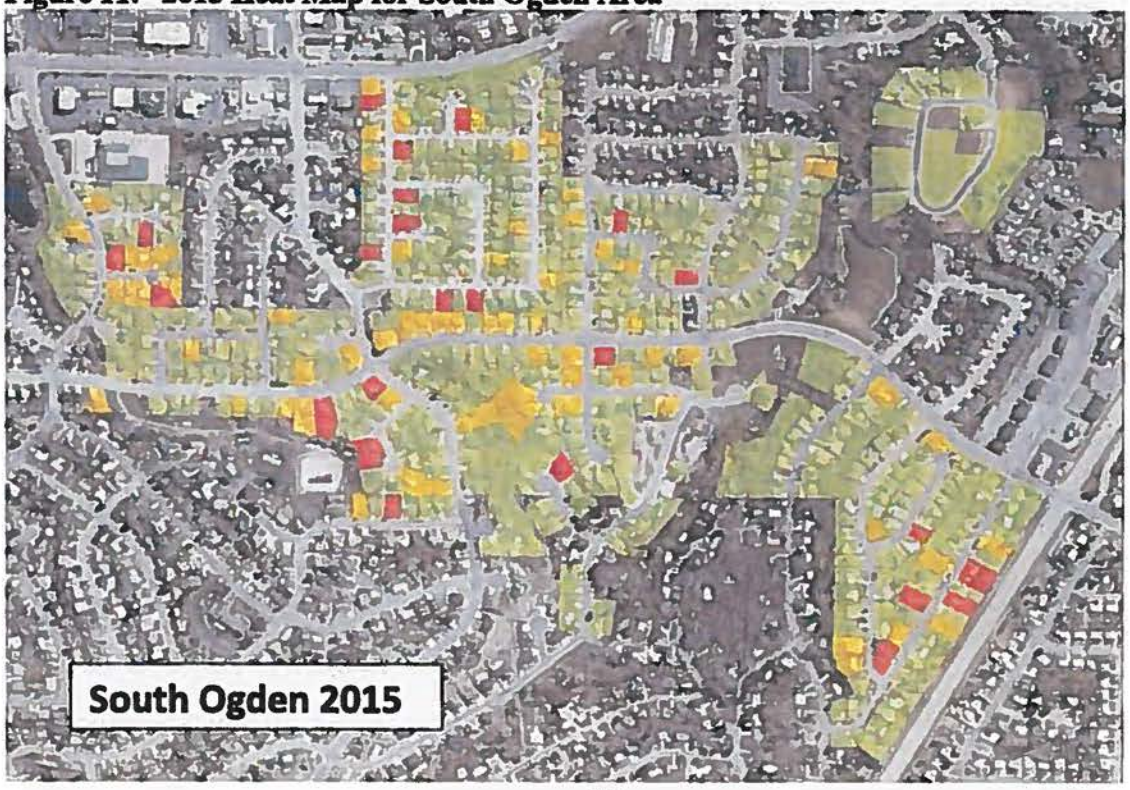


Figure 11. 2015 Heat Map for South Ogden Area



5. Customer Feedback and Perception and District Customer Service

The physical installation of meters is one piece of the overall project, easily defined by cost, time and exact specifications. The perception and response of District customers was somewhat unknown and very unpredictable at first, but as time passes, the feedback is becoming more positive in general. This section will focus on initial perception and the feedback gathered from District staff, the Langdon group and USU as they participated with us in the initial phases of meter installation.

As the District started the first large scale metering project, it was known there would be some learning along the way as well as adjustments. For the first project, it was determined to retain the Langdon Group as the District's PR representation and direct contact for public feedback, comment concern or other issues. The plan was established to go into the project with as much good public involvement, knowledge and input as possible to address, minimize, and resolve any concerns as the project progressed. The Langdon Group helped set up public open houses where maps, information about the meters, the install process and impacts could be discussed with concerned residents. They also assisted in the development of a meter website, creating a phone hotline, and the door to door information and questionnaire for those that would be receiving the meters. This was beneficial for the first round because of the newness of this type of project and the District's desire to remain in a positive light with its customers.

A few of the major concerns from customers that came immediately included the construction impacts, the potential for damaging established landscapes, and the fear of being charged high rates for secondary water once a meter was installed. An overarching question of why the District was doing this now and why their area was the first to be done came up in personal contacts with staff and the Langdon Group. All of these questions became the focus of the PR efforts to educate the public on conservation principles, user responsibility and accountability, and the assurance that water rates would not change in the near future until there was equity among all of Weber Basin's customers. The door to door contact and providing the recipients of the meter with good information and even a specific time window of when their meter would be installed (48 hour window) was helpful to ease anxiety and fear among many meter recipients.

Once the meter was installed and usage information began to be provided, the questions changed from the concern over installation to the concern over accuracy, and the looming question of how much they would be charged for going over their estimated need. Some of this has remained over the years, but for the most part is no longer a concern except for those that may be just receiving a new meter. There still remains a sense of skepticism and distrust among many of the metered customers mostly because they struggle to understand the volumes of water that a sprinkler system uses. For most, the only comparison they have is their indoor use which may range between 8-10,000 gallons a month for the average household compared to the 40,000 -80,000 gallons a month of sprinkler irrigation depending on parcel size. When they receive their outdoor usage information on their statements and the value is in the tens of thousands, many can't believe that they would use such large volumes of water. Their perception is that they have small yards and run their sprinklers for relatively short irrigation cycles. Meter data shows that typical usage would include cycles that run for 2 or more hours and use up to 3,000

gallons per cycle or more. Because of the huge range in yard sizes, an average has not been calculated, but usage could be calculated by creating a sort group for properties of similar size to get average use by lot size. This type of information could also be useful to homeowners to help them know where they fit compared to those that irrigate an area of similar size.

During the installation of Phase 1, the District also contracted with USU on a social science research study. The focus was to assess how best to interact with water users during these types of transitions to ensure desired efficiency outcomes and accountability results. One area of focus was on the development of a report to share meter data with the users in a format to provide understanding of landscape water needs and the appropriateness of their own use. It also included analyzing the perceptions and behaviors of water users in connection with the information that they would receive about their usage. The study was intended to span 2011 and 2012 with comparisons of use over those two years using the data collected but providing somewhat different information to evaluate what type of information works best. However, with the data gathering problems encountered during 2011, the data from that season was not able to be used. The study was altered and more emphasis was placed on the meter statement development and the use of surveying and talking to those that would be interested in sharing their perspectives related to having a meter and the information they were receiving. It essentially became more of the social science study that focused on behavior and perception rather than actual water use data.

The USU study and the development of the secondary water use report provided users their monthly consumption value, a landscape water need based on area imagery (size of their lot and landscape area), the evapotranspiration and weather data for the same period, and how they did in comparison to how much their need was (based on lot size and weather info). No hourly irrigation information was provided to water users; however if they called to discuss their use and had concerns, their hourly data was available and could be discussed and explained over the phone. An example of the imagery used in 2013 with the digitization of landscape area is shown below in Figure 12. This process allows the District to get a much better idea of need and to help homeowners understand their need and be able to get water use to appropriately match that need.

Figure 12. Digitization for Landscape Areas on Metered Parcels House, Driveway and Other Structures Not Part of Irrigation Need

USU also conducted surveys and did a couple focus groups to gather feedback about the project and meter customer comfort level with the information being provided. The majority of responses echoed the initial sentiment in that they did not agree with what they were being told concerning their consumption and they did not think the estimates provided were adequate to maintain their property. There were those that loved what was being done and loved the information and even desired more technical and detailed reports, but this group was in the minority of those surveyed. Because of the length of the report and findings, a full copy of the USU report on their study will be made available upon request. The underlying issue that seemed to surface is that the general public using secondary water believe they are being conservative and efficient, but when given actual data on their usage they are shocked and disbelieve that they are high users. Many feel like they cannot reduce what they use without risk of losing the quality of their landscape, especially regarding green lawns.

The District now has several additional years of data since the USU and Langdon Group contracts. The District is still faced with ongoing public interaction; however, the metering has progressed smoothly with fewer and fewer concerns from metered customers. There is still the typical response during the first year on any metered connection, but most of the other items and concerns with metering are addressed smoothly with very little problem. The District has maintained positive customer service and support in every occasion when staff interacts with customers. These interactions have been through phone conversation, meter reading contact and maintenance interactions or by metered customers participating in other conservation programs such as the water check, free landscape classes or Learning Garden events. Each of these provides an opportunity for staff to be positive, help resolve questions or concerns and where needed, fix a problem.

Since the metering began, there have been new meters added on an ongoing basis. The information is entered into the database, and there are a couple of data sets that are now being managed so that the District will be able to make comparisons between different demographics of water users in different locations. The District will continue to keep study groups separated by when the meter was installed so that the comparisons can be consistent within that study group. The District will also continue to plan meter projects to install as many meters as possible each year as far as the budget allows.

Throughout the irrigation season many calls are fielded regarding water usage and the meters. All calls were fielded by District staff. Information and the data base technology created by District staff have allowed the tracking of calls, services, and any District interaction to a specific address. Not every call was logged into this system during the year, but it is anticipated that in the future, all types of calls can be logged then reports generated with the data from those calls which could assist staff with specific reports for each type of situation. It should be noted that the 2013 year was a good learning year for the District. Modifications were made to the user reports, the process for determining landscape area was simplified with adjustments being made to the calculation for the users "estimated need", and it became very obvious that the need for hourly data is critical in helping users understand and learn how to be more efficient and to resolve customer disputes over the accuracy of the meter reads. With just monthly values, there would be no way to resolve the issue of how often and how long they water and the determination if a meter needs to be tested for accuracy.

During the last four years of metering, District staff conducted all the relevant work related to the meter project. No outside consulting or other agreements were in place for the collection or analysis of meter user data. The fielding of calls and discussing of hourly data with each of water user was handled by staff as were the personal sight visits and any physical meter issues. Most of the calls are handled with a quick look at the data, and for the first couple years, every call was logged with date and time and the type of call and issues resolved. As the District continues to meter and now has a program in place for project management, all calls can now be logged and tracked for better recal of what issues occurred and how they were resolved. Calls with various questions or complaints mostly centered on the accuracy of the read data and the legitimacy of the estimated need that was being provided to them for "efficient use". This is not the total number of calls taken but those that were historically logged. It is estimated that the number of calls were at a minimum double the logged volume. Many of the calls were not logged because of the complexity of the water year and the call concerns that may or may not have dealt directly with the meter and the data. It should be noted that during the last four years there were water restrictions due to low water storage levels and warmer, drier conditions. During this time, door hangers were used as a means to reinforce the water use statements for those that were exceeding their estimated need by more than 200% in any given month. There have been fewer of these individuals each year. A specific message of water use being high on a bright orange "Water Violation" tag really got the attention of the high water users and resulted in many calls. The majority of the calls that were taken about water use and meter data resulted from the door hangers.

As the years have passed, adjustments have been made and much has been learned. In 2013, as each month passed it was apparent that many would exceed their allocation early in the season. It was determined that the highest of users would receive a personal visit by staff. The purpose of these visits was to inform them of the excessive use, show them their data and help where possible on scheduling or on providing other conservation education or services. Some of these visits resulted in staff helping them with their timers, or just explaining the use, which changed usage behaviors the following month. Most of these visits were accepted very well while a few did not appreciate a personal visit and basically accosted staff about how the meter is ridiculous, not accurate and an invasion to their rights or personal privacy. The concept of "big brother is watching" is fairly prevalent among metered users. This year of visiting did provide some experience about how people are reacting. Site visits are made each year as need is determined, but not for every parcel exceeding allocation. The District has found that there are those that refuse to accept and give any heed to the information and personal education provided relating to their water consumption for their yards, and they continue to be excessively high users, some exceeding their estimated need by over 300% and exceeding their allocation, sometimes by July of the irrigation season. These indifferent and high users are actually very few compared to most users.

There are many things that have been learned during the past 4 years of metering secondary connections on a larger scale. The following bullet points are some of the most significant.

- Customer service and information are critically important. Doing a meter project without good information will create doubt and mistrust with customers (which naturally exists but can be managed and turned into positive if treated properly).

- When metering secondary water, there will be many users that doubt the accuracy of the meter and the value of the information provided. Continue in a positive way to help the users learn that what you are providing is accurate. Internal checks can help make sure you are correct and acknowledge to them when errors or mistakes happen.
- There is about a 1% failure rate for the meter or other physical components. Any metering program has to plan for some bad meters and their quick replacement. Data adjustments when switching meters to provide continual accurate information is vital. Sometimes the customer will help to identify the issue. The technology continues to improve and if a fixed network is use, failures can be identified in any hour time window.
- It is difficult to determine what is most effective and what is minimally effective in doing these programs in connection with other conservation programs because there are always multiple actions and programs taking place at the same time. To isolate one thing and try to determine effectiveness is not a reality, hence you continue with the things that seem to be working until proven otherwise through experience.
- There may be some users that no matter how much information and education you provide, they will continue to use what they feel is right and will not comply with their proper use or stay within their allocation. Financial incentives/disincentives may be the only way to reach this group of users.
- The meters have shown both in numbers and visually on GIS mapping that the majority of people are responsible users and will respond to messaging and education when it is provided. Most people want to be responsible but they just haven't known how much water they have actually been wasting until they get a meter and begin to use the data to alter behavior patterns. The key is that most people will not give up landscape quality to save water. If they can achieve both, they are willing and able to do their part.
- Hourly data is a must to help users identify over-use in scheduling and in enforcing time of day or other water use restrictions. Without it, you have no basis to know if what you are providing is correct, and it is their word against yours if a dispute arises.
- A multifaceted approach is good to provide many means of understanding and tools for water users to interpret and use to their best abilities. Technology and many other tools are available, but keeping it simple and clear is the most useful for the general end user.

6. Recommendations

The experience Weber Basin has had in metering has provided new perspectives and insight into what it is going to take to meter secondary water users across the District's entire service area. The costs are very high, and the staff needs to read meters, maintain and replace meters, track data, deal with customer calls and inquiries and generate statements will increase over time as the number of metered users grows. There has been valuable data gained in relation to usage and the perspective of users in how they use their water and even the insight of

how some customers view it as their right to use water how and when they please. The efforts to educate will be ongoing as long as there continues to be the landscape style and level of expectation that we currently have for our home landscapes. The culture of the Weber Basin Service area has been up until now, a culture of cheap, all you can use water with little or no accountability. Changing this mindset will not come over night, but with the help of actual numbers for their consumption, it will make it easier for the District to change individual user behavior when all users have a meter.

It is the recommendation of District staff that the metering of users continues and if possible accelerates to accomplish the goal of all users being metered in a reasonable time table. If the current rate of installation were to continue, it would likely be more than 30 years before all of the District's existing connections are metered. The new connections won't be of concern as they will all be metered as growth happens. However, the meters are only rated to last for 20 years (battery life). The point will come where full meter replacement will need to occur before all secondary users have a meter. With that in mind, it would be recommended to budget for and seek additional grant funds to accelerate the meter installations to ensure that all users are metered before meter replacement would have to start.

There is a high conservation value in metering to gain valuable water use data and provide the means for users to begin to be accountable for their water use. As population continues to grow and water supplies remain the same with the compounding effect of drought cycles, metering will play a key role in future water supply and management. Metering provides a tool for tracking use, improving efficiency, determining problems and leaks, and if needed, the ability to increase water rates in a tiered structure to penalize those that will not otherwise use their water responsibly. There may be a need to have the high users pay for future water supply that will be costly to develop but driven by the high use and demand of irresponsible users. The meters can rightly justify changes in rates for high users as well as the need for future water supply due to responsible use among the majority as there will be an increasing need for additional water supply and development.

The District has determined that the Sensus IPerl meter is the main meter to be used on a one inch connection. But as time passes on, new and better products and technology may dictate something else. The IPerl has little to no effect on pressure and will meet the needs for data storage and collection currently desired. There are many types of data gathering systems as well. From touch pads on meter lids to higher end network systems where a data logger sends data to collectors which route that data to a computer in the office for instant access to data. We have chosen to use the Itron drive-by system which gathers that data from the data loggers on each meter as a staff member drives through the various neighborhoods. Over time and with the use of meters in the entire service area, it will likely become a necessity for the use of and the cost associated with installing a network type system. This will only become needed as the volume of meters dictates the cost justification in time, fuel and other component cost savings.

One additional item of note and recommendation is the reminder that every type of reading program needs software to get that data into the desired needed format to be useful. Whether it is billing software or other type of database software, it is important that this be an item of discussion for any metering program. The data is useless without the proper software to make the data useful and in the proper format. When beginning this process, the District did not

realize that a separate billing or report generating software would be needed. The District was fortunate enough to have a very good programmer on staff that was able to write code and was able to create a custom program for taking the data and converting it into a useable format for a statement for each water user and for other types or reports that are desired.

7. Conclusion

In conclusion, the metering of secondary water has many challenges and certainly costs. The District as the entity is charged with providing adequate water supply with increased demands and increased need for conservation and user accountability. That burden for water accountability should naturally be shared with the users of the water. The meter and the data gathered from metered connections on water use is the very tool which can bring knowledge to each water user and help them to become more accountable for the water they use. Metering essentially becomes a large scale and significant water supply project, with the potential of reducing water by 1 acre foot per acre per acre of landscaped area.

There may need to be policy changes and there will certainly be more education and programming to teach people about efficient and proper use of water in the landscape. In the future there may need to be changes made regarding the cost for secondary water and how that breakdown would be made and how billing for secondary water will be collected. Overall, the metering has been very successful. The data collected is invaluable and will provide the necessary information for the District to make wise policy decisions. Current water supply can be managed more effectively and future water supply projects and the timing of those projects to meet all water demands can be planned and constructed to meet real and projected need in a more efficient and effective manner.

Appendix E

Spanish Fork City
Pressurized Irrigation System Master Plan
May 2012

SURROUND
Spanish Fork
UTAH
YOURSELF

PRESSURIZED IRRIGATION SYSTEM MASTER PLAN

(HAL Project No.: 348.09.200)

May 2012

HANSEN ALLEN & LUCE inc
ENGINEERS