

**WaterSMART Grants
Small-Scale Water Efficiency Projects**

**Water System Facilities
Automation Projects**

Final Project Report

**Agreement # R17AP00185
City of Big Bear Lake
Department of Water and Power
41972 Garstin Drive / P.O. Box 1929
Big Bear Lake, CA 92315-1929
September 27, 2019**

1. Recipient Information:	
Recipient Name: (Name, contact person, address and phone number)	City of Big Bear Lake Department of Water and Power (DWP) Reginald A. Lamson, General Manager (909) 866-5050 ext. 201 41972 Garstin Drive / P.O. Box 1929 Big Bear Lake, CA 92315-1929
Project Name:	Water System Facilities Automation Projects
Assistance Agreement No:	R17AP00185
Date of Award: (Month, Year)	September 20, 2018
Estimated Completion Date (Month, Year)	June 30, 2019
Actual Completion Date: (Month, Year)	April 26, 2019

2. Final Funding Information	Funding Amount
Non-Federal Entities	
1. Recipient Capital Improvement Reserves	\$81,488.18
2.	
3.	
<i>Non-Federal Subtotal:</i>	\$81,488.18
Other Federal Entities	
1.	
2.	
3.	
<i>Other Federal Subtotal:</i>	
<i>Requested Reclamation Funding:</i>	\$74,584.00
<i>Total Project Funding:</i>	\$156,072.18

3. One Paragraph Project Summary:
The DWP used the grant funds to equip three (3) of its older pumping plant controls with new variable frequency drive (VFD) units including pressure sensors and water level monitoring controls. Then, the DWP contracted to upgrade and install new telemetry components on all three (3) well sites and two (2) additional sites in order to more accurately control and monitor water use and fluctuations using the new technology. Additionally, the DWP installed twenty (20) production well meters.
4. Final Project Description: <i>Briefly describe components of the project and the work completed, including each element of the scope of work and the work completed at each stage of the project. Please include maps, sketches, and/or drawing of the features of the completed</i>

project, as appropriate. In addition, please describe any changes in the project scope.

Components for the Water System Facilities Automation Project include:

- (1) Installation of Variable Frequency Drives (VFDs) and pump controls on Wells: Division #6, Division #7, and Sheephorn for a total of three (3) VFDs
- (2) Installation of Telemetry on Wells: Division #6, Division #7, and Sheephorn and on Boosters: Goldmine and Wolf for a total of five (5) Telemetry upgrades
- (3) Replaced and/or Repaired twenty (20) Water Production Meters

In regards to changes in Project scope, the telemetry upgrade for the Wolf Booster was added to the Project because, since the original application, the Wolf Booster equipment was also deemed out of date and required an upgrade for compatibility.

5. Accomplishment of Project Goals: *Describe the goals and objectives of the project and whether each of these was met. Where appropriate, state the reasons why goals and objectives were not met, and describe any problems or delays encountered in completing the project. Please include whether or not the project was completed within cost.*

The goals and objectives of the Water System Facilities Automation Project are to enable the DWP staff to better manage:

- (1) Irregular drops in reservoir water levels which are often indicative of a large-scale water loss
- (2) Increases in water use which is commonly experienced on high-traffic holiday weekends
- (3) Water production as compared to water consumption to isolate sources of water loss
- (4) Improvements in energy efficiency
- (5) Remote control and monitoring of each pumping plant based on system needs and aquifer water levels
- (6) Accurate monthly production and water loss reports for California State mandated reporting

All of the above objectives were accomplished.

6. Discussion of Amount of Water Conserved, Marketed or Better Managed: *In responding to the questions set forth below, Recipients should rely on the best data or information available. Actual field measurements should be used whenever possible (e.g., baseline data or post-project data derived from measuring devices, diversion records, seepage tests, etc.) Where actual field measurements are not available, water savings (or amounts marketed or better managed) may be estimated based on studies, other similar improvement projects, or anecdotal evidence.*

A. Recipient's total water supply (average, annual, available water supply in acre-feet

per year):

Well Site	Technology Employed	Average AFY Produced (2015-2018)
Division #6 Well	VFD & Telemetry	58.75 AFY
Division #7 Well	VFD & Telemetry	203.34 AFY
Sheephorn Well	VFD & Telemetry	96.70 AFY

B. Amount of water conserved, marketed or better managed as a result of the project (in acre-feet per year): The water better managed as a result of this project is 358.79 AFY. Prior to the installation of the VFDs, the well pumps would run at 100% capacity no matter how much water was in the water table. The VFDs enable the pumps to run more efficiently, adjusting the flows per water level in the wells. This allows us to pump the maximum amount of water without harming the aquifer or the pumping equipment. The telemetry enables the DWP to make decisions remotely and timely respond to water production issues and demands.

C. Describe how the amounts stated in response to 6.B were calculated or estimated:
In responding to this question, please address (1) – (3) below.

(1) Describe the information/data being relied on to calculate/estimate the project benefits. State how that data/information was obtained, if appropriate. Provide any other information necessary to explain how the final calculation/estimate of project benefits was made.

Monthly, the DWP measures the water produced in each of the wells. Using this data, we calculated the AFY of the three wells that received VFDs and telemetry technology. The water in these wells is better managed because the new technology allows the DWP to adjust the pumping rate automatically according to water levels in the wells.

(2) As appropriate, please include an explanation of any concerns or factors affecting the reliability of the data/information relied on.

Not applicable.

(3) Attach any relevant data, reports or other support relied on in the calculation/estimate of project benefits, if available. Please briefly describe the data/information attached, if any.

Not applicable.

D. Use of Conserved Water: *Please explain where the water saved, marketed, or better managed, as a result of the project is going (e.g. used by the recipient, in stream flows, available to junior water users, etc.)*

For the wells that received new production meters, the water is not only better managed but it is also conserved. The new, more accurate production meters now compare produced water to consumed water for the area that the well supplies. This enables the DWP to determine potential water loss and its general location if more water is produced than consumed.

The better managed water remains in the aquifers and in the DWP's water supply. This is beneficial because the DWP does not use imported water to meet its water demand. The Bear Valley Basin lies, on average, 6,750 feet above sea level at the eastern end of the San Bernardino Mountains in San Bernardino County. Importing water into the Bear Valley would be extremely costly and is not a viable option.

E. Future tracking of project benefits: *Please state whether and how the recipient plans to track the benefits of the project (water saved, marketed or better managed) in the future. If no actual field measurements are currently available to support the estimate of project benefits in 6.B., please state whether actual field measurements will become available in the future. If so, please state whether the Recipient is willing to provide such data to Reclamation on a voluntary basis once it is available.*

The DWP tracks the benefits of the installed VFDs, telemetry, and production meters by evaluating the water levels of the Wells every few months. Additionally, the new equipment and technology enhances the longevity of the pumping equipment.

7. Discussion of Amount of Renewable Energy Added: *If your project included the installation of a renewable energy component, please describe the amount of energy the system is generating annually. Please provide any data/reports in support of this calculation.*

Not Applicable

8. Describe how the project demonstrates collaboration, stakeholder involvement or the formation of partnerships, if applicable: *Please describe the collaboration involved in the project, and the role of any cost-share or other types of partners. If there were any additional entities that provided support (financial or otherwise), please list them.*

Not Applicable

9. Describe any other pertinent issues regarding the project:

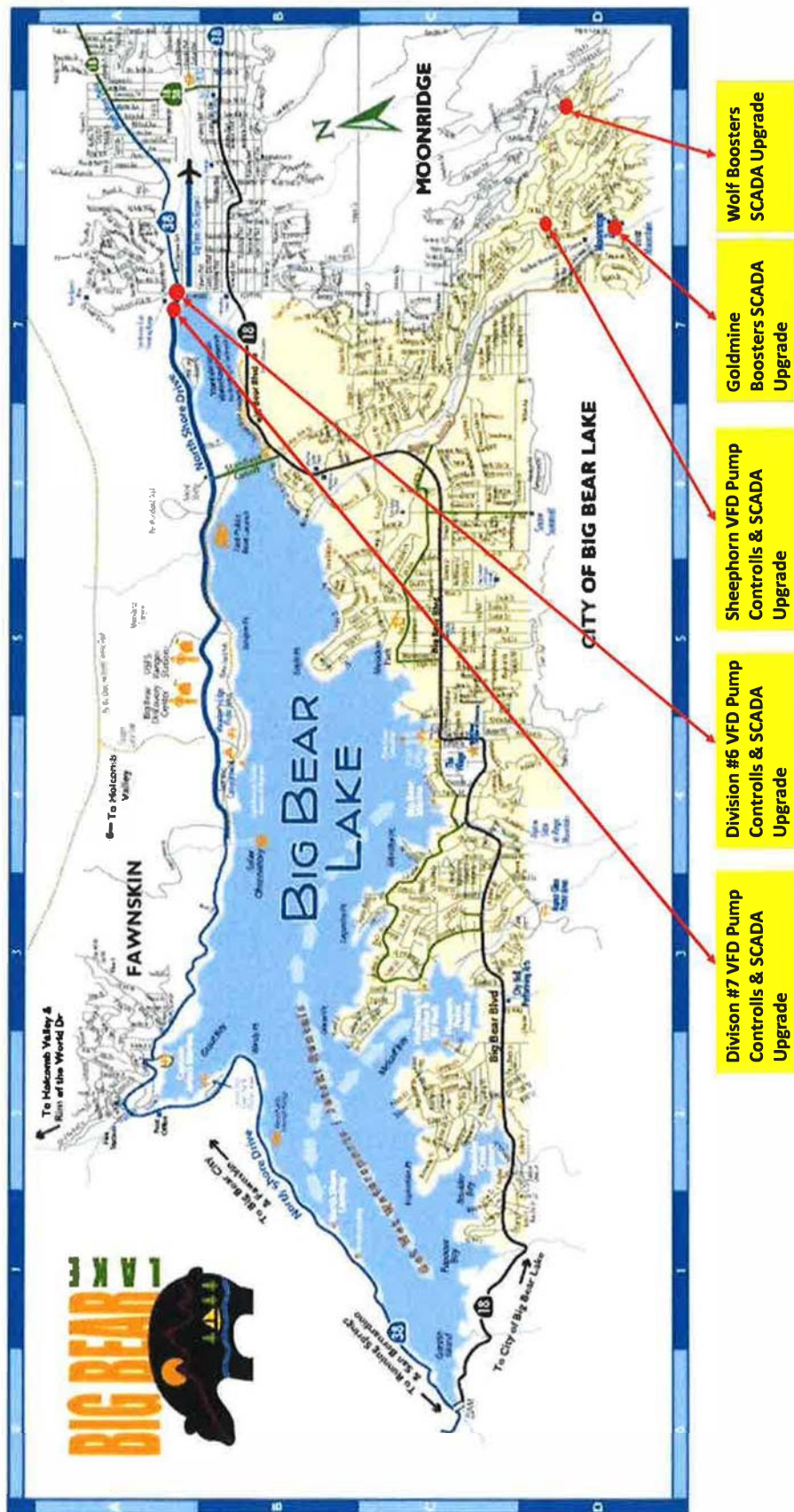
Not applicable.

10. Feedback to Reclamation regarding the WaterSMART Program: *Please let us know if there is anything we can do to improve the WaterSMART program in general, including the process for applying for or completing a WaterSMART project. Your feedback is important to us.*

Our experience in applying for WaterSMART grants is that the Funding Opportunity Announcements provide clear and detailed description of the grant opportunities including example eligible projects and specific application requirements. When we have had the need to ask questions, the USBR contacts provided in the Announcements have been timely responsive and helpful.

11. Attachments: *Please attach the following*

- **Any available data or information relied on in responding to paragraph 7, above;** Not Applicable
- **A map or illustration showing the location of the recipient's facilities (see paragraph 4, above);** Attachment A - Map
- **Maps, sketches, and/or drawings of the features of the completed project, as appropriate (see paragraph 5, above);** Not Applicable
- **Representative before and after photographs, if available;** Attachment B - Photos
- **A table showing the total expenditures for the completed project** Attachment C
- Final Cost Table



Division Well #6

New VFD



Division Well #6

New Telemetry Panel



Division #7 Well

Old Electrical Panel and Telemetry



New Variable Frequency Drive and Scada Panel



Sheephorn Well

New VFD Controls



New Telemetry Panel



Old Well Production Meter



*New Radio Read Well Production Meter
(typical of 13)*



Goldmine Booster Station

New Electrical Panels



New Telemetry Equipment



New Production Meters



New Telemetry Equipment



Wolf Booster Station

New Telemetry Panel



Final Project Cost Table

Budget item description	Computation		Quantity Type (hours/days)	Total Cost
	\$/unit	Quantity		
Salaries and wages				
				-
Fringe Benefits				
				-
Equipment				
				-
Supplies/materials				
Flowcom Digital Register & O-ring – Rebuilt Meter	\$916.28	2	each	\$1,832.56
Flowcom Digital Register & O-ring – Rebuilt Meter	1,207.98	2	each	2,415.96
Flowcom Digital Register & O-ring - Rebuilt Meter	1,311.08	2	each	2,622.16
4” Steel Flange Electronic Meter	2,779.28	1	each	2,779.28
5/8” Accumstream Meter	75.43	1	each	75.43
1” Accumstream Meter	122.84	1	each	122.84
2” Omni R2 Meter	550.70	9	each	4,956.30
2” Omni R2 10” LL Meter	565.69	2	each	1,131.37
MXU 520 Single Radios	113.14	18	each	2,036.49
MXU 520 Single Radio	129.30	1	each	129.30
Total Supplies/materials				\$18,101.69
Contractual/construction				
VFD Division Well #6	\$27,530.00	1	each	\$27,530.00
VFD Division Well #7	24,730.00	1	each	24,730.00
VFD Sheephorn Well	15,705.00	1	each	15,705.00
Subtotal VFDs				\$67,965.00
Telemetry Division Well #6	\$16,421.50	1	each	\$16,421.50
Telemetry Division Well #7	16,421.50	1	each	16,421.50
Telemetry Sheephorn Well	5,675.80	1	each	5,675.80
Telemetry Goldmine Booster	24,470.73	1	each	24,470.73
Telemetry Wolf Booster	7,015.96	1	each	7,015.96
Subtotal Telemetry				\$70,005.49
Total Contractual/construction				\$137,970.49
Total Direct Costs				\$156,072.18
Indirect costs				
Type of rate	Percentage -%	\$ Base		-
Total Project Costs				\$156,072.18