

Idaho Irrigation District Headgate Automation and Irrigation Flow Measurement Project

APPLICANT:

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Technical Proposal and Evaluation Criteria

Executive Summary

Date: April 27, 2022
Applicant: Idaho Irrigation District
Category: A

City: Idaho Falls
County: Jefferson and Bonneville
State: Idaho

The Idaho Irrigation District proposes to automate three existing headgates, build and automate the headgates to the Meppen Canal, one of the main canals on the system, add five SCADA measuring and logging stations to existing weirs, and construct a new concrete base structure for the Quigg Flume. Automating the headgates will maintain a consistent flow through the main canals and the laterals and help control flooding issues at the end of two of the ditches. Installing additional measuring and logging stations to existing weirs will help provide accurate measurements of the water flowing through the system and allow for better management. These improvements are needed in the Idaho Irrigation System as more efficient management of our water resources is a benefit to everyone in the Snake River Basin.

Project Location

Project Idaho Irrigation District Headgate Automation and Irrigation Flow Measurement Phase 1 will replace four headgates in Bonneville County Idaho, and place four new flow monitors in canals in Bonneville County. The Idaho Irrigation District serves about 1700 patrons and delivers water to approximately 35,995 acres through approximately 118 miles of canals and ditches. The Idaho Canal is our main canal the diverts water from the Snake River approximately 10 miles north of Idaho Falls in Jefferson County. The proposed improvements are noted below with markers as well as the longitude and latitude.



- Meppen Headgates - 43°30'15.01"N 112° 0'28.16"W
- Meppen Weir - 43°29'59.90"N 111°59'39.20"W
- Highline Weir - 43°28'29.30"N 111°58'43.30"W
- Quigg Flume - 43°24'37.35"N 112° 6'19.58"W
- Quigg Headgate - 43°24'36.55"N 112° 5'7.87"W
- German Weir - 43°25'3.10"N 112° 4'8.00"W
- Gustafson Weir - 43°24'37.00"N 112° 2'55.10"W
- Jones Headgate - 43°21'3.50"N 112° 4'50.38"W
- Jones Overflow Measurement - 43°20'50.59"N 112° 4'50.27"W
- Idaho Canal Transfer Pump Automation - 43°19'7.30"N 112° 4'19.10"W

Project Description and Milestones

Idaho Irrigation District has existing headgates and weirs in place. Most of the headgate structures are in good repair and have a structure sufficient for the automated headgate and measurement systems Metcom Inc. has provided bids for.

The Meppen headgate project will be constructed behind the existing headgates. The existing structure is not sufficient to support the new steel headgates that will be installed with automation. The old headgates will be removed to allow for free flow of the water, but the entire structure will not be removed. Replacing the Meppen headgates will take two weeks and require the most labor and machinery out of the projects. The new concrete will be poured and allowed to cure, then the metal gates will be attached to the concrete and the automation system will be installed by Metcom Inc. on the new gates.

The Gustafson weir will need additional concrete poured around its structure for the steel plate to be properly placed into position to measure and monitor the flow of water. This project can be finished in three days. One day to pour the concrete, and one day to install the automation and the steel blade.

The installation of the automation systems on the other weirs and headgates included in this phase vary according to the project. The installation of the monitoring and logging stations at the weirs can each take up to 8 hours for the Metcom Inc. professional. Automation of the headgates can take up to 20 hours for each individual headgate. The automation phase of the projects are completed after the concrete work is done. While the concrete is curing on the Meppen Headgates and the Gustafson Weir, the automation will be installed on the weirs and headgates that don't need additional concrete. We anticipate that all of the concrete work and automation work can be completed in two months, allowing for weather and other issues that may arise. The work on this project will begin April 1, 2023.

Once installed, the automation systems will measure the flow of water and open or close according to the scheduled need of the individual canal or ditch based on water rights. The information recorded by the computers will be sent to the water master and ditch riders and allow them to know in real time how much water is flowing in and through the laterals and allow them to manage the system more efficiently. Automation will also help manage the amount of flow within the individual canals to control flooding and manage outflow.

Evaluation Criteria

E.1.1. Evaluation Criterion A—Project Benefits (35 points) Up to 35 points

All of the proposed headgate automations and measuring systems have been identified as improvements that will modernize and improve the efficiency of our existing infrastructure, allow for better management and direction of the water allowed in our system, and minimize management costs. Although our infrastructure is in sound and operable condition, it can be improved through automation to better control the amount of water diverted into the different canals and ditches on our system and the amount allowed to flow out of the end of our laterals. In the current drought, any water saved by sound and efficient management practices is a good thing for the entire Snake River Basin.

The improvements on the Quigg ditch – the automation of the headgate has been identified to help control flooding at the end of the Quigg ditch. When patrons upstream stop using water in the middle of the night and return it to the ditch, it frequently causes flooding at the end. This is a

waste of precious water resources that can be managed with automation. The Quigg Flume construction is critical. The existing cement base for the flume is beginning to crack and buckle. The wooden beams that hold the Flume in place across the cement base are disintegrating. The proposed project will replace the entire flume support structure with cement. This will increase the life of the structure as well as prevent any issues that will undoubtedly arise if this structure is not improved.

The improvements on the Jones Ditch – automating the headgate for the lower half as well as a flow meter at the end of the ditch will help equalize the water, ensure the patrons are getting the correct amount of water, and minimize flooding that occurs frequently at the end of this ditch.

The improvements on the Highline Canal - the SCADA for the transfer pump from the Idaho Canal into the Highline are being installed to make up for shortfalls at the end of the Highline. This way water can be transferred from the Idaho Canal into the Highline just in case those at the end of the Highline can't receive enough water. The improved flow measurement weir will allow us to make sure all of our patrons are receiving the correct amount of water on the Highline. It will be connected to the transfer pump, and when there is insufficient water at the end, the transfer pump will turn on and put the needed amount into the Highline. The end of the Highline flows into the Idaho Canal downstream of the transfer pump.

The flow measurement weirs on the German and Gustafson canals will allow for better management and control of the water that is put into these systems.

The improvements on the Meppen Canal are perhaps the most important. The Meppen canal is one of two main canals that branch off of the Idaho Canal. The main headgates for the Meppen are not automated. They are old gates that have to be hand cranked to raise them. Once they are raised for the season they are not adjusted. New automated headgate for the Meppen will increase the efficiency of the system by only allowing the amount of water allowed to be in the Meppen to flow into it, rather than trying to manage the system without changing the main headgates once they are opened for the season.

These improvements will regulate the water supply which will encourage our patrons to work together to maximize their watering time while also controlling the flow and improving management of the systems. This will conserve water and reduce strain on the Snake River and other reservoirs which we draw from on occasion.

E.1.2. Evaluation Criterion B—Planning Efforts Supporting the Project (30 points)

We do have other projects planned, but these improvements take precedence. We know how much water we have in our system and where it goes, but with these additional improvements we will be able to manage and direct that water more efficiently. This in turn will allow us to work with our patrons to solve issues such as flooding and water wasting on the Jones and Quigg Ditches, and measure and more efficiently control the water flowing through our other laterals such as the Meppen, Highline, Gustafson, and German Canals. These improvements will allow us to maintain a good relationship with those who rely on us to deliver their water.

This project addresses two objectives in the Idaho Irrigation District Water Conservation and Management plan: Headgate Automation and Increased Flow Measurement Stations. The flow measurement weirs will also help us analyze where water is flowing and give us the information needed to decide if water in one lateral needs to be directed elsewhere. These improvements will help us conserve water by delivering what is needed and directing excess water where it is needed or leaving it in the Snake River.

E.1.3. Evaluation Criterion C—Implementation and Results (20 points)

Implementation Plan - Estimated Project Schedule		
Major tasks	Milestones	Dates
Cement work for Meppen Headgate	Wing walls and extended base poured	Fall 2023
Quigg Flume Construction	Entire cement structure replaced	Fall 2023
Cement work for Gustafson weir	Extend walls	Fall 2023
Installation of steel blades for weirs	All steel blades installed	Fall 2023
Installation of Meppen Headgates	New steel headgates installed	Fall 2023
Metcom Inc. automation installation	All 9 automation projects completed	Fall 2023

All of these projects must be done in the off season when no water is flowing in the canals. Water is diverted by Idaho Irrigation District beginning April 1 of each year. Because of this, these projects will have to be done in the fall when no water is flowing through the canals in the system. The date that the individual canals and ditches are shut out vary from year to year.

We will begin working on installing the automation on the headgates and weirs that don't require any cement work. When the weather permits, we will begin removing the old concrete and pouring new concrete for the Meppen headgate, and pouring the additional concrete needed for the Gustafson weir. We estimate that it will take two weeks to complete the cement work for the new Meppen headgates and three days for the additional cement needed for the Gustafson weir. After the cement has set and cured, we will have Metcom Inc. install the automation system we have selected for the individual weirs and headgates.

We estimate that each measuring and logging station for the weirs will take 8 hours to put in. The five improvements where the automatic measuring and logging stations are being installed will take a week to finish. The concrete for the Gustafson weir will be poured while the other systems are being installed. The automation of the headgates can take up to 20 hours. There are three headgates that are being fully automated, and then the transfer pump from the Idaho Canal to the Highline Canal that will be automated as well. The automation of the Meppen headgate will be completed after the concrete work is complete. The automation of the other headgates will be done after the automatic measuring and logging stations are installed. We estimate that all of these improvements can be finished in two months.

Because all of the work for this project will take place within existing infrastructure or in place of, we do not need to obtain any permits. Metcom Inc. has already visited each of our headgates and given us quotes for each headgate along with recommendations for any alterations or repairs that need to be done in order to install the automation or monitoring and logging systems. We will not be altering anything environmental or cultural and so do not need any compliance documents.

E.1.4. Evaluation Criterion D—Nexus to Reclamation (5 Points)

The Idaho Irrigation District strives to conserve water and make the most efficient use of the water we deliver through our system. Our region has been faced with drought for many years now and it has become clear that our reservoirs will be depleted every year. Our efforts to conserve and more efficiently use water from the Palisades Reservoir and Jackson Lake Reservoir, which are Reclamation facilities, will all contribute to a healthier Snake River Basin.

E.1.5. Evaluation Criterion E—Presidential and Department of the Interior Priorities (10 points)

These projects will strengthen water supply sustainability by improving the management and direction of the water that is diverted by the Idaho Irrigation District from the Snake River. This increased management will allow us to conserve water by measuring how much is flowing through our system and redirecting it where it is needed most. If we can leave some of our allotted storage water in the reservoirs for later use either by us or let other entities rent it, it will increase the entire basins resilience to climate change and help mitigate some of the impacts of the drought conditions we are facing.

Project Budget

Funding Plan and Letters of Commitment

The Idaho Irrigation District receives annual assessments from patrons. With the funds saved from our assessments, we have the full non-Federal \$122,990.70 available to realize this project.

Budget Proposal

Total Project Cost Table	
Source	Amount
Costs to be reimbursed with requested Federal Funding	\$100,000
Costs to be paid by the applicant	\$124,760.70
Total Project Cost	\$224,760.70

Cost of Materials for Automation and Cement Construction Projects				
Improvement	Materials	Price/unit	Quantity	Cost

Monitoring and Automation	Campbell CR-1000X	\$1,895.00	7	\$13,265.00
Monitoring and Automation	Campbell CR-800	\$1,095.00	6	\$ 6,570.00
Monitoring and Automation	Campbell Spread Spectrum Radio Freewave	\$ 995.00	14	\$ 13,930.00
Monitoring and Automation	Cell Modem with cable and antenna	\$ 625.00	9	\$ 5,625.00
Automation of Idaho Canal transfer station	5000 lb Actuators with limit switches and position	\$1,700.00	5	\$ 8,500.00
Automation of Idaho Canal transfer station	Dual display manual to automation switch box	\$1,100.00	2	\$ 2,200.00
Monitoring and Automation	Manual to Automation switch box	\$ 625.00	3	\$1,875.00
Monitoring and Automation	Still well pipe with 2psi transducer	\$ 825.00	15	\$12,375.00
Monitoring and Automation	Insulated Enclosure, Nema 4 with locks	\$1,100.00	14	\$15,400.00
Automation of Idaho Canal transfer station	Enclosure for Contact relay at pump	\$110.00	1	\$ 110.00
Monitoring and Automation	13db spread spectrum antenna, 20 antenna cable, connectors	\$190.00	14	\$2,660.00
Monitoring and Automation	Metal stand for nema box	\$300.00	14	\$4,200.00
Monitoring and Automation	Solar panel regulator	\$150.00	14	\$2,100.00
Monitoring and Automation	100 watt solar panel at gate	\$195.00	2	\$390.00
Monitoring and Automation	50 watt solar panel at gate	\$150.00	3	\$ 450.00
Monitoring and Automation	30 watt solar panel	\$120.00	9	\$1,080.00
Monitoring and Automation	12 volt, 35 amp Gel cell	\$105.00	9	\$945.00
Monitoring and Automation	31 series lead acid battery at gate	\$140.00	3	\$420.00
Monitoring and Automation	Installation materials, conduit, cables, wire, power cables, lug spades, fuses, etc.	varies	varies	\$4,300.00
Monitoring and Automation	Custom programing, programing base, testing, calibration	varies	varies	\$16,400.00
Automation of Meppen Canal Headgates	Joyce Dayton 10 ton actuator position and limit	\$9,400.00	1	\$ 9,400.00

Automation of Meppen Canal Headgates	Gate position sensor for second gate, to calculate total	\$885.00	1	\$ 885.00
Meppen Gate Automation	Concrete	\$ 200.00	37.65	\$ 7,530.00
Meppen Gate Automation	2 New metal gates 3/8" thick by 60"x120" Wide	\$1,331.01	2	\$2,662.02
Meppen Gate Automation	4" Channel Iron	\$115.94	16	\$1,855.00
Meppen Gate Automation	Form Boards	\$ 78.07	24	\$1,873.68
Meppen Gate Automation	1 Gate Lift Nut Stem and Wheel	\$800.00	1	\$ 800.00
Gustafson Weir	Concrete	\$200.00	4	\$800.00
Gustafson Weir	Rebar - feet	\$1.10	66	\$66.00
Gustafson Weir	1'x8' Steel Plate for Weir Blade	\$213.00	1	\$213.00
German Weir	1'x8' Steel Plate for Weir Blade	\$ 213.00	1	\$213.00
Quigg Flume Construction	Bid from Concrete contractor	Multiple	multiple	\$59,000.00
Total cost for materials				\$198,092.70

Cost for Labor				
Position	Price/unit	# of hours	# of Improvements	Cost
Automation expert from Metcom, Inc.	\$ 75.00	Varies	9	\$10,700.00
Richard Lockyer Manager	\$ 35.00	80	2	\$ 2,800.00
Ditch Rider Equipment Operator Construction #1	\$ 27.00	104	2	\$ 2,808.00
Ditch Rider Equipment Operator Construction #2	\$ 24.00	104	2	\$ 2,496.00
Ditch Rider Equipment Operator Construction #3	\$ 23.00	104	2	\$ 2,392.00
Ditch Rider Equipment Operator Construction #4	\$ 21.00	80	1	\$ 1,680.00
Fringe Benefits Full Time employees	\$ 3.00	472		\$ 1,416.00
			Total Labor	\$24,292.00

Machinery Costs				
Machinery	Price/unit	# of Hours	# of projects	Cost
323 Caterpillar Excavator	\$ 105.00	20	2	\$2,100.00
420 F Backhoe Caterpillar	\$ 69.00	4	1	\$276.00
Total Cost				\$2,376.00

Budget Narrative

Salaries and Wages

The Program Manager is Richard Lockyer. Richard is the Manager for the Idaho Irrigation District and directs all construction and repair projects for the District. Idaho Irrigation District has four full time employees that help with construction, repair, and management of the system. Their wage in the proposed budget is the rate they are paid. It is expected that Richard and all four full time employees will be present at the Meppen Headgate cement removal, replacement, and headgate installation project. Richard and three of the full time employees will do the work on the Gustofson weir to increase the height of the cement walls. The professional from Metcom Inc. will install the automation and monitoring and logging systems.

Equipment

Idaho Irrigation District intends to use our own equipment for the Meppen headgate project and the Gustafson weir.

Materials and Supplies

All materials and supplies listed above are needed for construction or for the automation system installation. All costs are estimates based on current material costs, quotes from Metcom Inc., and recent past experience with construction.

Contractual

The two contractual items for this project are the components of the automation systems and the installation, and the construction of the concrete structure supporting the Quigg Flume. Both aspects are accounted for in our budget under materials and labor.

Environmental and Cultural Resources Compliance

We will not be altering anything environmental or cultural and so do not need any compliance documents.

Required permits or approvals

We do not need to obtain any permits for any of the enumerated automation or construction project.

Official Resolution

For Small Scale Water Efficiency Projects FY 2022

April 26, 2022

Whereas, the Idaho Irrigation District, in Idaho Falls, Idaho is a legally organized irrigation district in the State of Idaho, and

Whereas, the Company promotes, supports, and encourages water conservation.

Therefore, be it resolved that the Board of Directors of the Idaho Irrigation Company agrees and authorizes that:

1. The Board has reviewed and supports the application proposal to the waterSMART: Small-Scale Water Efficiency.
2. The Board authorizes the District Manager, Richard Lockyer, the legal authority to enter into the WaterSMART: Small Scale Water Efficiency Grants agreement.
3. The Idaho Irrigation District can provide the matching obligations, and
4. If selected for a Small Scale Water Efficiency Grant, the applicant will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

4-27-2022

Date

Alan D. Kelsch

Alan D Kelsch – Chairman
Idaho Irrigation District