

WaterSMART Grant: Small-Scale Water Efficiency Project

Installation of 25 Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers on Flow
Measurement Devices

Applicant:
Truckee-Carson Irrigation District

Physical Address:
2666 Harrigan Rd
Fallon NV 89406

Mailing Address:
PO Box 1356
Fallon NV 89407-1356

Project Manager:
Mike Adams, Systems and Technology Manager

PO Box 1356
Fallon NV 89407-1356
rusty@tcid.org
775-423-2141

TABLE OF CONTENTS

Title Page	1
Table of Contents.....	2
Technical Proposal and Evaluation Criteria	
Executive Summary.....	3
Project Location.....	3
Project Description.....	4
Evaluation Criteria.....	4-8
Project Budget	
Funding Plan and Letters of Commitment.....	9
Budget Proposal.....	9
Budget Narrative.....	9-10
Environmental and Cultural Resources Compliance.....	10-11
Required Permits or Approvals.....	11
Official Resolution.....	11
Appendix A- Estimated Water Saving Table and Map of Meter Locations.....	12-13
Appendix B- Water Releases Lahontan Reservoir 2020	14
Appendix C- Goal Area D: Measurement, Accounting and Reporting.....	15
(Strategic Plan of Contract No. 07-07-20-X0348 Newlands Federal Reclamation Project)	

TECHNICAL PROPOSAL AND EVALUATION CRITERIA

Executive Summary

- Date: March 18, 2021
- Applicant Name: Truckee-Carson Irrigation District
- City: Fallon
- County: Churchill
- State: Nevada
- The applicant, Truckee-Carson Irrigation District (TCID or District), is a Category A applicant. The District is an irrigation district and is a political subdivision of the State of Nevada. TCID operates and maintains the Newlands Federal Reclamation Project under contract with the United States, Bureau of Reclamation, and Lahontan Basin Area Office.

This proposed project will take place in the Lahontan Valley (Carson Division) of the Newlands Federal Reclamation Project located in Churchill County, Fallon, Nevada (Project). The work to be completed will be to install Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at twenty-five (25) sites within the Project and will provide monitoring of real time conditions which will result in water savings through better water management.

Most of the installation can be completed whether or not there is water flowing in the Project. We anticipate programming and installation will take about twenty-four man-hours per meter. The installation phase of the project is estimated to take approximately one (1) year to complete, beginning January 31, 2022 and ending on or before January 31, 2023.

The entire project will take place within federal facilities located in the Lahontan Valley (Carson Division) of the Newlands Federal Reclamation Project located in Churchill County, Fallon, Nevada (Project).

Project Location

This proposed project will take place in the Lahontan Valley (Carson Division) of the Newlands Federal Reclamation Project located in Churchill County, Fallon, Nevada (District). There are currently 157 meters located throughout the District. **Appendix A** includes a map of the locations of the current 157 meter sites. This proposed project includes the installation of Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at twenty-five (25) of the existing meter sites located in the Carson Division.

Project Description

The work to be completed will be installation of Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at twenty-five (25) sites within the District. The planned project is to install each water meter box structure according to the following requirements.

- Purchase new equipment.
- Program each of the Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers with GPS coordinates for each of the selected sites.
- Install Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Logger hardware and GOES-YAGI antennas in each of the twenty-five (25) water meters using schematics provided from the manufacture. Tools used to install the units are basic hand tools and a cutting torch for those performing the labor.
- Connect new equipment to the existing solar panels.
- Download or check meter data from the GOES website to verify connectivity.

Evaluation Criteria

Evaluation Criterion A – Project Benefits

This proposal to install Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at twenty-five (25) meter sites will allow the District to manage the water delivered to the 210 farms served by these meters more efficiently and reduce spills, while using renewable energy to power the Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers. This makes the flow meter project “self-supporting” as it applies to energy.

Installing this new technology will allow the District to monitor water deliveries and flows within an hour of the delivery. The benefits of this project are to enhance our current bi-monthly manual data retrieval system and transform it into a near real time data acquisition system using the GOES 17 satellite and NOAA systems, as well as our own retrieval and decoding systems, and have data available to very quickly notify us as to the status of water flow in any particular part of the system.

We currently have 77 meters connected to GOES by this same method with not only gains in efficiency, but also durability with downtime of .02 of 1% loss of data due to unforeseen circumstances.

The installation of Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers at the water meter will reduce spills or over deliveries and ultimately the amount of water released from Lahontan Reservoir. Last water year, it was calculated that the District had 18,665 acre feet spill over 102 meters in the Carson Division. This figure was calculated using the amount of water measured over the meter when there were no orders. This calculation can only be done after the water season or long after anything can be done to correct it. The Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers will allow the District to see the meter data once every hour. This is invaluable in helping the District analyze the data in the big picture to determine the efficiency of a specific delivery system and the timing of deliveries on that system that would significantly reduce the losses from spilling.

The metered data is currently downloaded after the delivery, most times after several deliveries on the same lateral. A District employee drives to the meter and downloads the data onto a card that is brought back to the office and loaded onto a computer. The time lapse between delivery and download can be as much as a couple of weeks or more. The employee that currently analyzes the data is constantly waiting for downloads to come in and then plays catch-up when all the data comes in at once. There is no time to manage and analyze the data to fix inefficiencies. There is no way to know when water is being over-delivered and/or spilled until the end of the year. A graph is included that accounts for all the water released from Lahontan Reservoir in 2020. See **Appendix B**.

The increased reliability gained from this project will come more from the shortened time frame in discerning of activity and flow analysis for spill reduction as well as quicker analysis for charging deliveries, and reporting on those deliveries, than the quantity of water across the measurement device. The basis and true benefit of this project is quicker response to delivery volume, spillage, and theft of water from near real time monitoring and alerting. Better monitoring, means being more pro-active with situations we currently have no control over. Being alerted of potential over delivery, spillage, or theft, puts more water in Lahontan Reservoir resulting in less water being diverted from the Truckee River to meet storage targets.

With the Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers each delivery will be received an hour from when a water delivery begins and ends to insure that the water orders are accounted for accurately and quickly. Water management would be more efficient with the ability to apply the delivery to the water user's allocation immediately after delivery. This would also, enable the water user to better manage his water more efficiently. This benefits the water user, the District, and the community.

The average annual acre-feet in a normal, to above average run-off from Lahontan Reservoir is 300,000 acre-feet. Last year 288,265.72 acre feet of water was released from Lahontan Reservoir. The amount of releases from Lahontan in a 100% year is between 280,000 and 290,000 acre feet. Of those releases about 31,917.15 acre feet are needed to meet the demands for deliveries that use the twenty-five (25) water meters selected for this project. With a savings of just 26.54% of the acre feet that was spilled in 2020 over the water meters of 11,582.06 acre feet, that would leave that much more stored in Lahontan Reservoir and that much less water that would be supplemented from the Truckee River off the Truckee Canal.

This project to install Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers will provide the above-mentioned water savings through better water management through monitoring of real time conditions. The water savings was determined by comparing the amount of water that flowed over the water meters shown in **Appendix A** without any water orders in the system. **Appendix B** depicts a graph that accounts for all the water for the 2020 water season.

The ability to download the flows across the meters at any time, via the web, such as during a delivery or whenever there is water flowing over the meter, will allow the District to make corrections before the end of the year and closer to the time when the spill occurs.

This water savings can be determined by the use of the same spreadsheet (**Appendix A**) that was used to provide the support for the water savings stated above.

Improved water management is the ultimate purpose of this project through the installation of Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers. Again, the amount of water that was released from Lahontan Reservoir in 2020 was 288,265.72 acre feet. Of that, the total allocation that was allowed for the water users serviced by the twenty-five (25) selected water meters was approximately 31,917.15 acre feet. This is 11.07% of the total water released from Lahontan in the 2020 water season, using the following formula:

Estimated Amount of Water Better Managed = Percentage of Water Better Managed

Average Annual Water Supply (based on normal, to above average run-off)

$$31,917.15 \text{ acre feet} / 288,262.72 \text{ acre feet} = 11.07\%$$

Using the figure calculated in the section above of approximately 11,582.06 acre feet being reduced in releases as a result of this project, the percentage of conserved water relative to total water supply is 4.02%. This number seems insignificant but combined with more efficiently managed water, the use of renewable energy, and the reductions in fossil fuel use, the benefits outweigh the amount of water conserved.

$$11,582.06 \text{ acre feet} / 288,262.72 = 4.02\%$$

Evaluation Criterion B – Planning Efforts Supporting the Project

The District's current 25 year contract with the United States Bureau of Reclamation to operate and maintain the Newlands Federal Reclamation Project will expire on December 31, 2021. The new contract will include a Five Year Strategic Plan. The mission of this Strategic Plan is to collaborate with the Bureau of Reclamation to serve the communities within the Newlands Project by maintaining the conveyance system and maximizing available water supply for all beneficiaries of the Project and its stakeholders. The Strategic Plan identifies Measurement, Accounting and Reporting (Goal Area D), **Appendix C**, as a way to increase operational efficiencies. The following objectives are listed in this goal area and this proposed project will help the District work toward meeting these objectives.

- Increase the percentage of more accurate and timely submitted reports.
- Increase the accuracy and timing of water card delivery.
- Maintain an accurate accounting of water measurement.

In addition, the District's existing Five Year Conservation Plan supports this proposed project. Following are excerpts from the District's current Five Year Water Conservation Plan:

Pursuant to the Contract, the District continues to develop the water measurement program, in order to achieve compliance with the Operation and Maintenance Contract, OCAP, and applicable Decrees. Significant improvements in the water measuring facilities and the actual taking of water measurements have been instituted.

Heretofore, the District and Reclamation, in collaboration with Cal Poly's ITRC, produced an alternative water measurement program as provided for in Article 11 (b)(2) of the O&M Contract to become part of the Water Conservation Plan (Plan). The Board of Directors adopted the ITRC's recommendations in the 2010 Plan on December 7, 2010. The District continues to rely upon the elements of the ITRC Report.

Because the Newlands Project was designed and constructed without measuring devices, the District has installed measuring devices throughout the Project, taking into consideration unique conditions found at specific sites. The rated sections are calibrated by current meter measurements at least once a year. Sites with recorders are visited every two weeks. For purposes of this Plan, the level of accuracy for all such devices is generally accepted at plus or minus 10 (ten) percent of the total volume delivered (See Page 21, Water Measurement, Pricing and Billing Table I-19, Delivery Point Measurement Device Table). Devices such as ramp flumes, Parshall flumes, metered gates, trapezoidal flumes, acoustical meters, among others, have been and continue to be used where practicable.

The ITRC Report indicates that the degree of accuracy of the existing measurement program is unknown because of the wide range of factors that are present on the Project. The report recommends that the accuracy of all measuring devices be verified to determine if modifications need to be made. The District is committed to following the Cal Poly report in order to determine the accuracy of existing measuring devices and to repair, modify or replace those that are not providing accurate information.

Accurate and continual water measurement continues to be a priority for the Newlands Reclamation Project as indicated in the current contract with the Bureau of Reclamation, the upcoming contract, the District's Five Year Water Conservation Plan and OCAP. The expected benefits from the new technology proposed by this project are supported by current and future plans, contracts and decrees that govern the activities of the District.

Evaluation Criterion C – Evaluation Criterion C-Project Implementation

Installation is scheduled to begin January 31, 2022, and be completed by January 31, 2023. Because this project involves meter stations that are already in place, we do not

foresee any requirements to obtain permissions, permits and environmental compliance for the project as a whole or for the individual water meter structures.

Following is the outline of the District's plan to install each water meter box structure:

- Program each of the Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Loggers with GPS coordinates for each of the selected sites.
- Install Sutron SatLink 3 Lite Radios and SDR-001-1SD Data Logger hardware and GOES-YAGI antennas in each of the twenty-five (25) water meters.
- Connect existing solar panels to the new equipment.
- Download or check meter data from the GOES web site.

The project will be monitored and managed with the use of Microsoft Excel 2010. This would allow the District to provide regular and timely reporting to meet the requirements of the grant as well as Reclamation.

There are no permits required for this project. All sites already exist. This new and improved technology will replace existing, outdated technology.

No engineering or design work will be performed in support of this project. Manufacturer's electrical schematics are included with each unit when purchased. Also, experience from previous GOES installation projects puts us in a position to immediately move forward with installation and testing for operation.

There will be no new policies required to implement this project. Administrative action will include approval by the District Board of Directors for grant application.

This proposed project will not impact the surrounding environment. No earth-disturbing work will be required for this project as all sites currently exist.

Evaluation Criterion D – Nexus to Reclamation

The District has been under contract with the Bureau of Reclamation for the Operation and Maintenance of the Newlands Federal Reclamation Project since 1926. The current contract expires on December 31, 2021 and a new contract will become effective as of January 1, 2022. In addition to the items listed in Evaluation Criterion A-Project Benefits which discusses some benefits of the proposed project that will help the District collaborate with the Bureau to reach goals of the Strategic Plan, the proposed project has the potential to benefit other entities as well.

This project can and will benefit both the Pyramid Lake Tribe, as well as the Fallon Paiute-Shoshone Tribe (FPST) through quicker reaction to more timely data. Water saved through efficiency gains from near real time data will put more water into the Lahontan Reservoir for the benefit of the FPST to provide water for additional irrigated acres as defined in Public Law 101-618 providing the FPST with more water in water short years and with fewer diversions from the Truckee River into Lahontan Reservoir, resulting in a storage gain in Pyramid Lake.

PROJECT BUDGET

Funding Plan and Letters of Commitment

Funding for this project will be obtained through the Districts General Fund. The District will not rely on any third-party funding sources for this project and no letters of commitment will be submitted or required. The District will not incur any costs for this project prior to award.

Budget Proposal

Total Project Cost

SOURCE	AMOUNT
Costs to be reimbursed with the requested Federal funding	\$71,670.00
Costs to be paid by the applicant	\$71,670.00
Value of third-party contributions	\$0.00
TOTAL PROJECT COST	\$143,340.00

BUDGET ITEM DESCRIPTION	\$/Unit	Quantity	Quantity Type	TOTAL COST
Salaries and Wages				
Project Manager	\$32.31	200.00	Labor	\$6,462.00
Meter Technician	\$20.00	200.00	Labor	\$4,000.00
Meter Technician	\$16.75	200.00	Labor	\$3,350.00
Fringe Benefits				
Full-Time Employees	\$46.19	200.00	Fringe	\$9,238.00
Equipment				
Truck 332	\$19.90	200.00	Rental Rate	\$3,980.00
Truck 38	\$16.50	200.00	Rental Rate	\$3,300.00
Truck 718	\$16.50	200.00	Rental Rate	\$3,300.00
Supplies and Materials				
Sutron SL Lite	\$2,648.00	25.00	Materials	\$66,200.00
Sutron SDR-0001-1SD	\$1,651.00	25.00	Materials	\$41,275.00
Miscellaneous Parts			Supplies	\$1,935.00
Other				
Other				N/A
TOTAL DIRECT COSTS				\$143,040.00
Indirect Costs				
Type of rate	Percentage	\$base		\$300.00
TOTAL ESTIMATED PROJECT COSTS				\$143,340.00

Budget Narrative

The District's Systems and Technologies Manager has been designated as the Project Manager for this proposed project. Two support staff will be utilized. The hourly wage rates for each employee are the actual labor rates paid to the employees performing work on this project. Fringe benefits are listed separately.

Equipment will include use of District owned vehicles and tools.

All work to be performed on this project will be completed by employees of the District and not by an independent contractor.

There will also be minimal administrative support for reporting duties. The cost for this support is included in indirect costs.

Task	Name	Title	Hourly Wage	Benefit per Hour	Estimated Hours
Purchase new equipment.	Michael Adams	Project Manager	\$32.31	\$16.24	25
Program GPS coordinates	Michael Adams	Project Manager	\$32.31	\$16.24	12.5
Installation	Michael Adams	Project Manager	\$32.31	\$16.24	152.5
Installation	Jay Kearney	Meter Technician	\$20.00	\$14.69	190
Installation	Rachel Enox	Meter Technician	\$16.75	\$14.14	190
Connect to Solar	Jay Kearney	Meter Technician	\$20.00	\$14.69	10
Connect to Solar	Rachel Enox	Meter Technician	\$16.75	\$14.14	10
Check meter data	Michael Adams	Project Manager	\$32.31	\$16.24	10

Environmental and Cultural Resource Considerations

The proposed project will not impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat). No earth-disturbing work will be required for this project.

We are nor aware of any species listed or proposed to be listed as a Federal threatened or endangered species or designated critical habitat in the project area. No wetlands will be impacted.

Construction of the water delivery system began in 1903.

Although there are historical sites located within the Newlands Federal Reclamation Project, the proposed project will not result in any modification of, or effects to, individual features of an irrigation system (e.g., head gates, canals or flumes), no

buildings, structures, or features are affected by creation or installation of this project. There are no known archeological sites in the proposed project area.

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

The proposed project will not limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands.

The proposed project will not contribute to the introduction, continued existence or spread of noxious weeds or non-native invasive species known to occur in the area.

Require Permits or Approvals

No Permits or approvals are required. This project does not result in individual or cumulative significant effects or impacts within the meaning of the National Environmental Policy Act (NEPA), nor does the project constitute a substantial change as defined by contract 7-07-020-x0348 detailed November 26, 1996, for the operation and maintenance of the Newlands Federal Reclamation Project. The project consists of improvements to be made to the existing facilities.

Official Resolution

The official Resolution will be approved at the April 6, 2021 Board of Directors meeting.

Estimated Water Saving Table

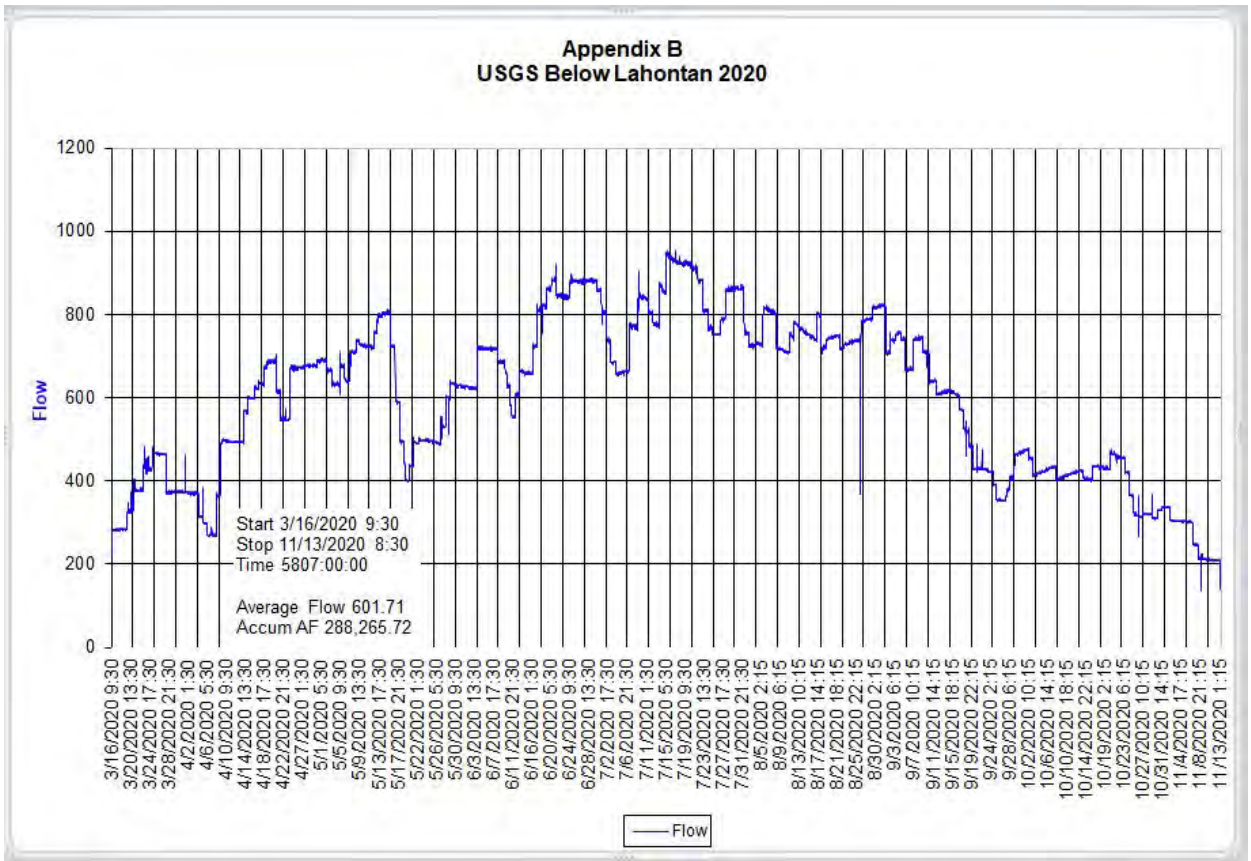
APPENDIX: A

Meter	Total Acre Feet	Delivered	Spillage	Percent Spillage
A5-1-C2	394.11	271.47	122.64	31.12%
A5-C1	2,716.61	1,576.54	1,140.07	41.97%
A5-C11	308.56	272.38	36.18	11.73%
N2	506.69	391.70	114.99	22.69%
N5	420.57	375.56	45.01	10.70%
N6	657.64	632.01	25.63	3.90%
T13	1,227.36	896.86	330.50	26.93%
T7	1,451.20	899.73	551.47	38.00%
T-T5	518.68	480.80	37.88	7.30%
V4	998.84	419.08	579.76	58.04%
V8	2,012.06	1,827.42	184.64	9.18%
L10	1,291.44	768.61	522.83	40.48%
L1-1	2,378.01	1,058.05	1,319.96	55.51%
L1-10	1,053.00	963.19	89.81	8.53%
L1-2	948.16	756.67	191.49	20.20%
L1-4	2,389.27	2,306.46	82.81	3.47%
L1-T6	326.98	322.22	4.76	1.46%
L1-T9	445.58	442.55	3.03	0.68%
L4-C4	3,772.38	880.43	2,891.95	76.66%
L8-C1	2,323.16	664.04	1,659.12	71.42%
L8-C4	2,645.99	1,580.92	1,065.07	40.25%
S4	567.72	516.20	51.52	9.07%
S6-T20	232.48	132.68	99.80	42.93%
S8	1,389.68	966.98	422.70	30.42%
S-T5	940.98	932.54	8.44	0.90%
Totals	31,917.15	20,335.09	11,582.06	Average: 26.54%

Appendix A map of the locations of the current 157 meters throughout the District



Water Release from Lahontan Reservoir 2020



APPENDIX: C - Goal Area D: Measurement, Accounting and Reporting

January 5, 2021

Goal Area D: Measurement, Accounting & Reporting

Accurately measuring water deliveries, accounting to water users, and reporting for the OM&R Contract and OCAP.

	Objectives	Baseline (2020)	5 th Year (2026)
1.	Increase the percentage of deliveries measured to 80%. (See Exhibit K of the 2021 OM&R Contract)	63 percent	80 percent
2.	Increase the percentage of reports submitted on time that do not require revisions to 85%.	75 percent	85 percent
3.	Reach 90% of monthly water cards delivered within 7 days	45 percent	90 percent
4.	Increase the number of water delivery reports per year from 1 to 4	1 report per year	4 reports per year (Target 3 quarterly and 1 annual)
5.	Maintain an accurate accounting of water measurement, including an up-to-date inventory of devices within the Project, volume delivered to headgates for each gage, type of equipment, device maintenance and calibration history, and other pertinent information.	Excel spreadsheet developed by Reclamation	Fully implemented Conservation Management System (CMS). The software program developed to assist the District in providing archival and retrieval of all Water Conservation Measures.

Barriers	Critical Success Factors
	Objective 1

Date 05 Mar 2021
Quotation Number 21-020039
Valid For 30 Days

Bill To:
 TCID - Truckee Carson Irrigation District
 2666 Harrigan Rd.
 Fallon, Nevada 89406
 mike@tcid.org

Ship To:
 TCID - Truckee Carson Irrigation District

No	Part #	Product Description	Qty	Unit Price (USD)	Ext. Price (USD)
1	SL3-Lite	SL3-Lite SatLink 3 Lite logger Transmitter	25.0	2,095.00	52,375.00
2	5000-0155-1	Yagi GOES Antenna	25.0	359.00	8,975.00
3	6411-1162-1	EDAS 2.4 GOES Antenna Cable Assembly - 15 feet. GOES Antenna Cable Assembly - 15 feet.	25.0	142.00	3,550.00
Group Subtotal Price					64,900.00

Notes:

Payment Terms	
Freight Terms	EXW - Ex Works Origin
Expected Delivery Time	
Sales Tax	Proof of tax exempt status or payment of sales tax is the responsibility of the buyer

USD

Total Price :	64,900.00
Tax :	TBD
Freight :	0
Grand Total Price :	64,900.00

If you have any questions or need further information, please don't hesitate to contact me. I look forward to hearing from you soon.

Sincerely,
 Russell Whitney
 Email: russell.whitney@otthydromet.com, Phone:
 Prepared by: Brandt Hellstern

Terms and Conditions

Date 03 Mar 2021
Quotation Number 21-020040
Valid For

Bill To:
 TCID - Truckee Carson Irrigation District
 2666 Harrigan Rd.
 Fallon, Nevada 89406
 mike@tcid.org

Ship To:
 TCID - Truckee Carson Irrigation District

No	Part #	Product Description	Qty	Unit Price (USD)	Ext. Price (USD)
1	SDR-0001-1SD	Stage Discharge Recorder, with shaft encoder only and SD Card Card Slot	25.0	1,617.71	40,442.75
Group Subtotal Price					40,442.75

Notes:

Payment Terms	
Freight Terms	EXW - Ex Works Origin
Expected Delivery Time	
Sales Tax	Proof of tax exempt status or payment of sales tax is the responsibility of the buyer

USD

Total Price :	40,442.75
Tax :	TBD
Freight :	0
Grand Total Price :	40,442.75

If you have any questions or need further information, please don't hesitate to contact me. I look forward to hearing from you soon.

Sincerely,
 Russell Whitney
 Email: russell.whitney@otthydromet.com, Phone:
 Prepared by: Russell Whitney

Terms and Conditions