

Grant Application

**Acoustic Doppler Velocity Meter Gaging Stations
Colorado River Irrigation Project**



Submitted to:



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Bureau of Reclamation
Policy and Administration
Denver, Colorado
Attn: Mr. Matthew Reichert

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1 TECHNICAL PROPOSAL AND EVALUATION CRITERIA

Date: April 24, 2019
Applicant: Colorado River Indian Tribes
Address: Parker, La Paz County, AZ

1.1 Executive Summary

The Colorado River Indian Tribes (CRIT) is pleased to submit this proposal to the United States Bureau of Reclamation WaterSMART Small-Scale Water Efficiency Projects grant program. CRIT believes that there is a clear need to take a prominent role in managing the water resources that sustain their culture and livelihoods. The proposed project is located on the Colorado River Irrigation Project, which is owned and operated by the US Bureau of Indian Affairs (BIA) in trust for the Colorado River Indian Tribes. This project’s goal is to install eight Acoustic Doppler Velocity Meter (ADVM) gaging stations at specific sublateral headings and sublateral spill sites on the Colorado River Irrigation Project (CRIP). The purpose is to obtain reliable, real-time discharge data and develop and maintain a continuous record of discharge at prioritized locations not currently equipped with water measurement infrastructure. It is anticipated some of these sites will subsequently be added to the CRIP SCADA system. Expected results of this project are more accurate accounting of water deliveries and spills within the CRIP, which will provide system operators with the information and data to improve water delivery service to water users and reduce water losses, thereby resulting in more efficient water use and overall improved water management and sustainability. Total costs of the proposed project are estimated to be \$185,466. The proposed project is expected to be completed within 18 months of notice to proceed. A start date of October 1, 2019 is requested.

1.2 Project Title and Location

This proposed project is titled: “Acoustic Doppler Velocity Meter Gaging Stations, Colorado River Irrigation Project”, and it is located entirely on the Colorado River Indian Reservation. The Colorado River Indian Tribes are a federally recognized Indian Tribe. The Colorado River Irrigation Project (CRIP) is located in La Paz County, Arizona. The Project latitude is 33°56’N and longitude is 114°26’W. The current Project service area is approximately 80,000 acres (125 square miles). The map presented in Figure 1 shows an overview of the Reservation and the CRIP area as well as its geographic location on the Colorado River in southwest Arizona / southeast California.

1.3 Background Data

The Colorado River Indian Reservation was established March 3, 1865 by the Federal Government for the Indian Tribes of the Colorado River and its tributaries. The collective Colorado River Indians Tribes include the Mohave, whose aboriginal territory includes the Reservation lands along the River; the Chemehuevi, who were displaced when Parker Dam was constructed; and, Navajo and Hopi who were relocated to the Reservation.

The Colorado River Indian Reservation lies entirely within the Lower Colorado River Valley (LCRV) which is the largest, hottest, and driest subdivision of the Sonora and Mohave Deserts (University of Arizona, 2008). The Reservation encompasses a total of 432 square miles (1,119 square kilometers), the majority of which is in the Parker Valley of Arizona (Colorado River Indian Reservation, 2009). The Colorado River runs through the Reservation delineating its Arizona and California land areas. Most of the Reservation is in western La Paz County in Arizona. Parts of





the Reservation also lie in southeastern San Bernardino County and northeastern Riverside County, California. However, the project area only falls within La Paz County, Arizona.

1.3.1 Hydrology

The Colorado River is a significant and, in general, the only source of water for the Reservation providing for agriculture in an arid environment as well as for recreation and tourism (University of Arizona, 2008). The Reservation is located in an area characterized as an arid climate with hot, dry summers, and mild winters. Table 1 presents a summary of weather data for the period 1996-2015 collected at the Arizona Meteorological Network (AZMET) climate station at Parker, Arizona (Parker No. 1). Maximum air temperature averages around 105 °F in July and August, with winter minimum air temperatures averaging around 36-37 °F. Total annual grass reference evapotranspiration (*ET_o*) is estimated at 77.89 inches per year. Total annual precipitation is very low, averaging 3.12 inches per year.

Historically, and currently, surface water diversions from the Colorado River make up the primary source of irrigation water supply for the Reservation. Reclamation prepares annual water accounting reports to provide final records of diversions of water from the mainstream of the Colorado River, return flows to the mainstream, and the consumptive use of such water within the Lower Colorado River Basin States of Arizona, California, and Nevada.

Table 1. Mean Monthly and Annual Average Weather Data and Grass Reference Evapotranspiration, 1996-2015, for the Colorado River Indian Reservation (source: AZMET, <http://ag.arizona.edu/AZMET/08.htm>).

	Max. Temp. (°F)	Min. Temp. (°F)	Precipitation (inches)	Relative Humidity (%)	Wind Speed (mph)	Solar Radiation (Langley's)	ET _o (inches)
Jan	68.46	37.12	0.48	52.40	4.93	289.49	3.04
Feb	71.43	40.52	0.57	53.05	5.26	369.62	3.51
Mar	79.22	45.24	0.29	45.71	5.81	509.94	5.86
Apr	84.56	51.07	0.08	39.41	6.85	622.46	7.64
May	94.47	59.76	0.06	35.30	6.67	692.26	9.68
Jun	101.32	66.12	0.01	34.27	6.46	717.75	10.37
Jul	104.79	74.53	0.23	42.46	6.01	640.49	10.17
Aug	104.73	74.35	0.31	45.19	5.50	592.97	9.17
Sep	100.44	67.31	0.37	46.32	4.63	521.65	7.10
Oct	88.94	54.21	0.22	44.76	4.71	419.67	5.38
Nov	76.58	43.08	0.23	48.31	4.31	313.74	3.35
Dec	66.42	35.90	0.27	54.17	4.76	263.55	2.64
Annual	86.78	54.10	3.12	45.11	5.49	496.13	77.89

Diversions for Colorado River Indian Reservation are reported for both Arizona and California in the USBR decree accounting reports (<https://www.usbr.gov/lc/region/g4000/wtracct.html>). Diversions to Reservation land served by the Colorado River Irrigation Project (CRIP) are made at Headgate Rock Dam and are measured using the US Geological Survey (USGS) gage: 09428500 Colorado River Indian Reservation Main Canal near Parker, Arizona. Other diversions to Reservation lands in Arizona not served by CRIP are also reported for decree accounting





purposes. Return flows of water to the mainstem of the Colorado River are categorized as measured and unmeasured. Measured returns have historically been recorded at multiple spill and wasteway gaging stations operated by the USGS.

There currently is no use of groundwater and wells to supply water for irrigation on the Reservation. The Reservation is situated within the Parker Basin of western Arizona. Groundwater in the floodplain alluvial deposits is hydraulically connected to the River. Shallow groundwater in the floodplain generally reflects the chemical characteristics of Colorado River water (Metzger, Loeltz, & Irelan, 1973). Groundwater development in the basin is small as a consequence of the availability of surface water for irrigation and the low population in the basin. The ADWR estimated that less than 4,000 acre-feet were withdrawn in 1985 (ADWR, 2006). Current groundwater use in the basin is generally not reported and/or records are unavailable.

1.3.2 Water Rights

The Colorado River Indian Tribes have Colorado River water rights decreed by the United States Supreme Court in the case: Arizona v. California, 547 U.S. 150 (2006), also known as the 2006 Consolidated Decree. CRIT’s Colorado River water rights are the lesser of: 719,248 acre-feet of diversions from the mainstream, or, the quantity of mainstream water needed to supply the consumptive use required for irrigation of 107,903 acres of land and satisfaction of related uses. The rights are “present perfected rights” meaning they are considered to be in existence prior to the effective date of the Boulder Canyon Project Act, and that with respect to Federal reserved water rights they are rights to use of water on Federal reserved lands under Federal law whether or not the water has been applied to beneficial use (Arizona v. California, 2006). The Reservation land is divided between the states of Arizona and California, and the water rights are accordingly partitioned for use in the two states. Priority dates are associated with the dates that CRIT land was reserved under Executive Order. The Arizona and California apportionments, land areas, and associated priority dates are summarized in Table 2 below. CRIT has the right to divert the lesser of 662,402 acre-feet of water from the mainstream, or, the quantity of mainstream water needed to supply the consumptive use required for irrigation of 99,375 acres of land and satisfaction of related uses in Arizona; and, the right to divert the lesser of 56,846 acre-feet of water from the mainstream, or, the quantity of mainstream water needed to supply the consumptive use required for irrigation of 8,528 acres of land and satisfaction of related uses in California. A unit diversion quantity of 6.67 ac-ft/ac applies in both states.

Table 2. Summary of CRIT Colorado River Water Rights. Source: Arizona v. California (2006).

State	Annual Diversion (ac-ft)	Area (ac)	Priority Date
Arizona	358,400	53,768	Mar. 3, 1865
Arizona	252,016	37,808	Nov. 22, 1873
Arizona	51,986	7,799	Nov. 16, 1874
Arizona Total	662,402	99,375	
California	10,745	1,612	Nov. 22, 1873
California	40,241	6,037	Nov. 16, 1876
California	5,860	879	May 15, 1876
California Total	56,846	8,528	
CRIT Total	719,248	107,903	





1.3.3 Current and Projected Water Uses

Colorado River Irrigation Project (CRIP)

The primary economic activity on the Reservation has traditionally been dominated by irrigated agriculture. The main crops produced are alfalfa, wheat and other small grains, cotton, Bermuda grass hay, Sudan, and miscellaneous vegetable and other crops (onions, garlic, broccoli, potato, flowers). The Colorado River Irrigation Project (CRIP) was initiated under the 1867 Appropriations Act, which included funding for the construction of canals from the Colorado River to serve the Indians on the Reservation. Major expansion was completed in the 1940's to supply irrigation water to the Japanese internment camp on the Reservation at Poston. This included construction of Headgate Rock Dam in 1942. CRIP is a federal irrigation project governed by 25 USC §381 et seq and 25 CFR Part 171 and is operated by the U.S. Department of Interior Bureau of Indian Affairs (BIA) for the benefit of the Colorado River Indian Tribes. CRIP serves approximately 80,000 acres of land that are assessed an annual fee for irrigation system O&M.

Approximately 232 miles of supply canals, which consist of the Main Canal, laterals, sublaterals, and sub-sublaterals, are used to convey water under primarily gravity flow conditions from Headgate Rock Dam to CRIP farms (BIA, 2002). Of the 232 miles of supply canals, 90 miles are concrete-lined, and 142 miles are unlined earthen channels. The CRIP Main Canal is 18 miles long, 15 miles of which are concrete-lined. There are eight principal lateral canal offtakes from the Main Canal (19R, 19L, 27R, 27L, 42L, 46R, 73 and 90), not including smaller laterals, which are considered to reflect the function of lower order "sublateral" canals. Lateral canals comprise a total of 65 miles of channel, 36 miles of which are concrete-lined. In addition, there are 149 miles of lower order supply canals, of which 39 miles are concrete-lined. There are six principal drains in the CRIP with additional feeder drains and wasteway ditches, comprising a total of 133 miles of drainage channels (BIA, 2002). There are no storage facilities on the CRIP. See Figure 1.

Agricultural Water Use

NRCE (2016) performed an annual water balance at the irrigation project level to estimate overall irrigation efficiencies and to estimate operational water losses on the CRIP. The extent to which such losses are avoidable and recoverable represents a gross quantification of the potential volume of water that may be conserved. The period of study was 1996-2015. Measured diversions of water from the mainstream of the Colorado River into the CRIP Main Canal represent total inflows. Surface return flows to the mainstream are measured at four USGS gages. Diversions from and total return flows to the Colorado River showed a slightly increasing trend over the period. See Figure 2. Return flows tend to follow the same trend as diversions suggesting the annual return flow volumes are responsive to diversion volumes. Consumptive use is computed as diversions minus return flows. The ratio of consumptive use to diversions, a measure of Project irrigation efficiency, shows a generally decreasing trend over the period studied, especially for the latter part of the period (2007-2015).

Estimated consumptive use is noted to decrease over the study period ranging from 296,935 AFY to 425,492 AFY. The estimated consumptive use by this approach lumps crop consumptive use together with open water evaporation losses and water use by phreatophytes and other riparian vegetation that are occurring on the CRIP. Thus, it should be noted that the overall Project





efficiency estimates using this approach will be biased to the high side, since typically the Project agricultural water use efficiency would be computed using only agricultural crop consumptive use.

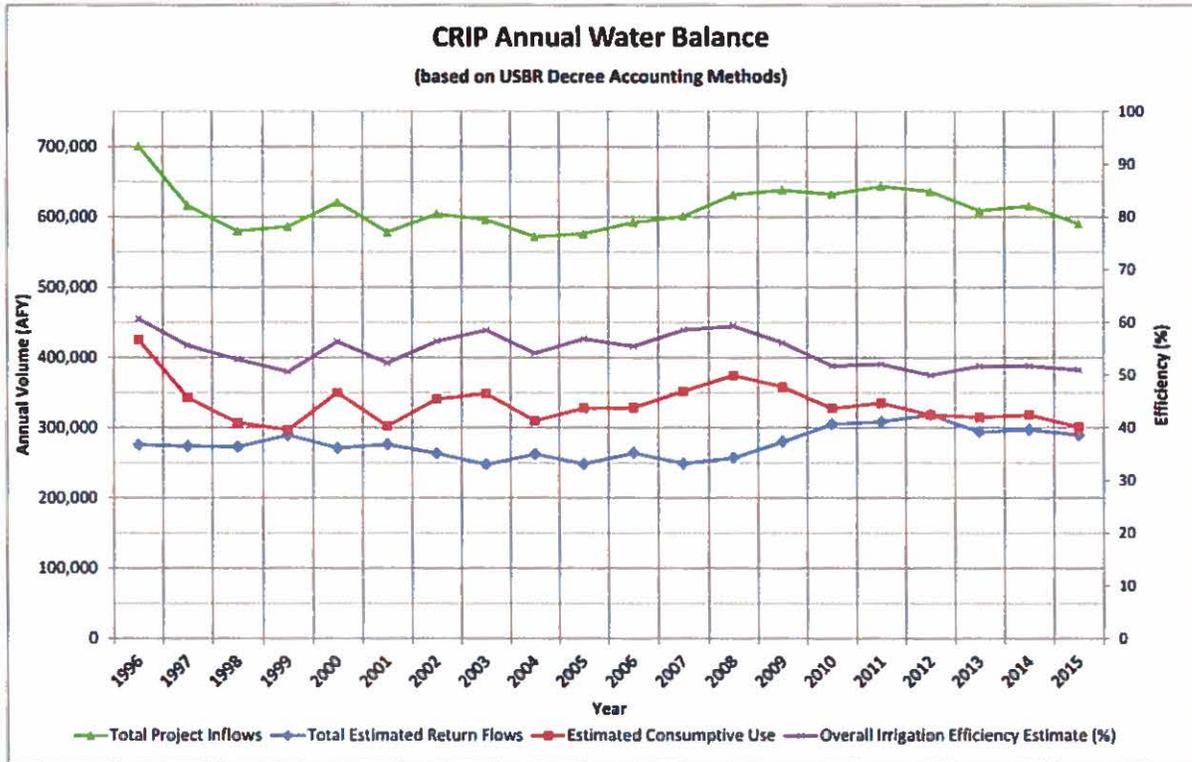


Figure 2. Water balance components and estimated project efficiency based on USBR Decree Accounting methodology for estimated consumptive use.

Past Relationship with USBR

CRIT coordinates regularly with the USBR Yuma Area Office on matters related to maintenance activities in the reach of the Colorado River that passes through the Reservation. These include planning and implementation of projects to improve backwaters and side channels along the reach, removal of alluvial wash sediment outflow fans, etc.

CRIT has and is currently participating in the Pilot Program established by Reclamation and four municipal entities in July 2014 to fund the creation of Colorado River system water through voluntary water conservation. See Table 3 below.

CRIT has worked closely with Reclamation as part of the Ten Tribes Partnership to complete the Colorado River Basin Ten Tribes Partnership Tribal Water Study in October 2018.





Table 3. Summary of CRIT Pilot System Conservation Implementation Agreements (SCIA) with USBR.

Project	Description	Date
No. 16-XX-30-W0606	Water conservation through a reduction of consumptive use on the CRIP by fallowing of 1,591 acres of irrigated cropland for the period October 1, 2016 – September 30, 2018	September 14, 2016
No. 18-XX-30-W0634	Water conservation through a reduction of consumptive use on the CRIP by fallowing of 1,884 acres of irrigated cropland for the period October 1, 2018 – September 30, 2019	September 14, 2018
No. 19-XX-30-W0647	Water conservation through a reduction of consumptive use on the CRIP by fallowing of 3,705 acres of irrigated cropland for the period January 1, 2019 – December 31, 2019	February 25, 2019

1.4 Technical Project Description and Milestones

1.4.1 Problem Statement and Justification for Need

Problem Statement

The accurate measurement of water being delivered and lost from the CRIP is essential to develop the data necessary to support design and implementation of conservation measures to minimize losses to excessive operational spills, seepage, evaporation from standing water, over-delivery and deep percolation of water applied on-farm. The CRIP has several lateral headings, sublateral headings, and minor spill sites that are currently not equipped with flow measurement infrastructure resulting in a lack of data that are needed for decision-making to result in water savings and more sustainable water resource management.

NRCE (2017a; b) has identified and prioritized several sublateral headings and small spill sites where there is currently no water measurement. This project proposes to improve water measurement on the CRIP through the installation of Acoustic Doppler Velocity Meter (ADVM) gaging stations at eight sites, which include two sublateral headings and six sublateral spill sites. These sites were selected based on area served, volume of spill, and other factors.

1.4.2 Status of Existing Water Measurement Infrastructure on the CRIP

NRCE (2017a) provided a review of water measurement infrastructure across the CRIP, identified issues, and developed priorities for making improvements to the overall water measurement program of the CRIP. Among the recommended improvements was to install water measurement infrastructure at lateral and sublateral headings and at spill sites not currently equipped with measurement infrastructure. The typical water measurement structure used on the Project is the broad-crested weir or ramp flume. It has been found through site measurements and modeling that ramp flumes are not feasible at many of the locations not currently equipped due to: relatively flat topography, effects of the first downstream check structure on water surface elevations that cause submergence of the ramp flume, or lack of physical space for installation of a ramp flume (many spill sites).





Several levels of recorded water measurement occur on the CRIP including USGS stations, the CRIP SCADA system, CRIT Water Resources Dept. (WRD) data collection from non-SCADA measurement sites, and CRIT WRD manual measurement of spill sites. SCADA equipment are installed at several locations on the CRIP to provide remote monitoring and control of canal water surface elevations for flow regulation, and to measure and record parameters necessary to determine discharge rates. System operators monitor the stage and rate of flow and remotely operate the SCADA gates to change water level or flow rates to meet irrigation demand in various parts of the system. There are currently 13 CRIP SCADA sites which provide flow measurement and/or upstream water level regulation, including 11 canal headings or along-canal sites, and 2 main spill sites. Many of the existing SCADA sites are over 15 years old and are due for hardware modernization. A SCADA system modernization plan has been developed and CRIT is working towards its implementation.

The water measurement site inventory (NRCE, 2017a) included 76 lateral, sublateral, and sub-sublateral heading sites. Water measurement infrastructure consisting of either a flume or an acoustic Doppler device was found at 30 locations, only 12 of which have continuous measurement either through the CRIP SCADA system or a datalogger operated and maintained by CRIT WRD.

Ramp flumes are the most common flow measurement structure on the CRIP. Direct reading staff gages are present at most ramp flumes at canal headings. Due to poor condition, inconsistency of units, and the lack of information concerning the installation and calibration techniques used for many staff gages, an effort is currently underway to replace the staff gages at all ramp flumes on the CRIP. A first effort to replace staff gages was undertaken during the 2018/2019 dry-up. In this effort, staff gages were replaced at 15 ramp flumes which included all the first order laterals and the largest sublaterals. CRIT WRD plans to replace all remaining staff gages by the end of 2020.

CRIT WRD is in the process of developing a hydrographic discharge measurement program to routinely survey and check elevations of independent primary reference gages and elevations of flume or weir crests; and to routinely perform independent discharge measurements (stage and flow) to check and update stage-discharge relationships at any of the installed water measurement structures at lateral and sub-lateral headings. Such a program has not existed in the past.

Canals and laterals on the CRIP commonly have terminal check structures, which under certain flow conditions allow irrigation water to flow to CRIP spillways or drains. Spills occur due to imbalance between supply and demand for a particular canal resulting in spill of excess water, due to release of canal storage following an irrigation cycle, due to check structure leakage at the spill site, or other reasons. There are several typical structures observed which control discharge of water to spillways or drains, including in-line check structures, perpendicular gate structures, passive overflow weir structures, and combination structures. At most spill sites, staff gages for the direct reading of stage or for verification of independently measured flow depth (or flow) are not present.

Continuous flow measurement is currently made at six spill sites through the CRIP's SCADA system (2 sites) and CRIT WRD datalogger sites (4 sites). There are 35 active minor spill sites that do not have continuous water measurement. Periodic manual measurements of flow conditions (depth, width, date/time) are made at these sites from one to three times per week by a CRIT WRD technician. Discharge is estimated at these sites using these measurements, but there





is considerable uncertainty in the estimated total spill volume at a location when synthesizing a continuous daily record from the periodic manual measurements. Details are provided in NRCE (2017b).

NRCE (2018) provides details regarding general design guidelines for ADVm gage stations and specific designs and cost estimates for sites on the CRIP. In the 2018 technical report, four canal headings and six spill sites were recommended for the initial installations of ADVm gaging stations. This initial list of recommended sites has been modified for various reasons. The eight sites selected for this project proposal are listed in Table 4. These sites were selected based on the area served by the laterals, the estimated annual spill rate, the ease of installation, and other factors.

Table 4. Sites proposed for ADVm installation.

Site No.	Site Name	Site Type	Installation Type	Estimated Annual Spill Volume (AFY) ¹
NA	27R-36	Heading	Culvert	NA
NA	73-36	Heading	Open Channel	NA
2054	19R End	Spill	Culvert	7,776
2145	27R End	Spill	Open Channel	2,024
2172	27R-25 End	Spill	Culvert	2,211
3255	73-36-7 End	Spill	Culvert	1,463
3285	46R Check 8	Spill	Culvert	1,167
3095	73-36-34 End	Spill	Culvert	4,810
			Total spill volume	19,451

¹ from Appendix B, NRCE (2017b).

1.4.3 Project Objectives, Management, and Activities

The objectives of this proposed project are to procure necessary equipment and install eight ADVm gaging stations—two on sublateral headings and six on sublateral spill sites. CRIT WRD will be responsible for the on-going operation and maintenance of the eight gaging stations.

Project Manager will be Ms. Angie Ingram, Acting Director of CRIT WRD. She actively manages and maintains CRIP SCADA equipment as well as operates and maintains eight additional gage station sites with dataloggers and sensors (but which are not on the CRIP SCADA telemetry network).

The proposed project tasks, activities, and implementation schedule are described below in Section 1.5.3.

1.4.4 Expected Outcomes

The installation and operation of the proposed continuous flow measurement sites will provide reliable, real-time flowrate data that will enable more efficient regulation of water distribution. Accurate measurement and control of water being delivered will help to minimize losses due to seepage, evaporation of standing water, over-delivery and deep percolation on irrigated fields, and





excessive operational spills. The accurate measurement of operational spills will provide the data required to identify the causes of avoidable spills and enable preventative actions.

1.5 Evaluation Criteria

1.5.1 Evaluation Criterion A – Project Benefits

NRCE conducted an inventory and assessment of CRIP flow measurement in 2016, including CRIP SCADA sites, continuous record sites, periodic measurement spill sites, and canal heading sites. A comprehensive report has been prepared to summarize findings and recommendations (NRCE, 2017a). A well-designed and maintained water measurement program is required for good water management and efficient water use at all levels of the irrigation project. Maintaining records of flow measurement is required to monitor water use and efficiency in time.

NRCE (2017a, 2017b) has identified approximately 44 sub-lateral headings and 35 active canal spill locations which do not have adequate water measurement infrastructure installed. These include canal headings which serve five or more turnouts, and all active non-SCADA spill locations in the CRIT WRD measurement program. The eight proposed sites for continuous flow measurement were selected according to service acreage, spill volume, ease of device installation, and other factors.

The proposed continuous flow measurement project coupled with future integration into the SCADA system will result in improved data management including data collection, data processing, custom report preparation, and data archival. This will directly benefit the Tribes by providing improved and more accurate accounting of their Colorado River water allocation. This improved control, measurement, and accounting capability is fundamental to successful implementation of current and future CRIP improvements envisioned by the Tribes including fallowing, cropping pattern changes, operational spill capture and use, drainage water reuse, and others, that will allow the Tribes to increase the economic benefit derived from their Colorado River water rights, while also protecting those rights.

CRIT has openly expressed a desire to assist with drought planning and mitigation and has negotiated a key agreement with the State of Arizona to provide conserved water amounting to 50,000 AFY for three years, during 2020-2022, as part of Arizona's Drought Contingency Plan (AZ DCP). This action along with other components of the AZ DCP increase the water supply reliability to the State of AZ and the Lower Colorado River Basin. At the same time, CRIT Tribal Council strongly desires to maintain an agricultural economy on the Reservation, keeping current irrigated acreages in production. The key to this requires the implementation of multiple water conservation interventions to increase efficiencies and reduce losses. The fundamental base for this is the modernization of water control and measurement on the CRIP. This proposed continuous flow measurement project is a necessary step towards modernization.

The majority of acreage on the CRIP is irrigated using low gradient border to near-level basin irrigation methods. Local stakeholders have described that crop scalding can occur with water ponded on fields during high temperature periods, so that fields are preferred to have some slope to avoid ponding. There are approximately 50,000 acres on the CRIP with unimproved conditions with respect to efficient flood irrigation. NRCE (2017b) recommended that the Tribes encourage participation in the NRCS EQIP. Eligible measures related to irrigation include land leveling, ditch lining, large-flow turnouts, sprinkler and drip irrigation systems, irrigation pipelines, and others.





The EQIP program has not been utilized recently on the CRIP, which is mainly attributed to land lease constraints, including inadequate lease duration for the participant to recuperate expenses. NRCE (2017b) recommended that the Tribes consider alternative lease conditions or other means to encourage participation in the EQIP. Farm lands operated and maintained by the CRIT Farms Tribal farming enterprise are not subject to these constraints. A conservation plan for improvements on a 600-acre CRIT Farms tract was submitted in early 2018 but was not accepted to the EQIP program due to an NRCS assessment finding insufficient conservation benefits.

The proposed continuous flow measurement project, coupled with future SCADA integration, is expected to ultimately result in improved farm gate deliveries in terms of flow rate, timing, quantity, and duration of delivery. All of these factors facilitate on-farm water management and improved application efficiencies. The proposed project is but one component towards the improvement of on-farm efficiency and overall project efficiency.

Once tied into the SCADA system, the additional flow measurement data provided from the key delivery and spill sites selected for this proposed project will result in the improvement of monitoring and control of diversions and the distribution of water through the system. Over time, this is expected to result in water savings. A conservation plan for the Imperial Irrigation District estimated 15,400 AFY could be saved after implementing SCADA for 61 laterals and installing new monitoring equipment at 117 spill sites, on average 250 AFY per lateral (Davids Engineering et al., 2009).

Using data available for the period 2011 through 2015, NRCE (2017b) estimated:

- operational spills at the two main spill points on the CRIP (Poston and Tyson wasteways) average approximately 60,000 AFY using flow records recorded by existing SCADA equipment; and,
- the total annual losses due to minor operational spills at 35 active minor spill sites (not currently equipped with water measurement and SCADA) averages 56,000 AFY. These estimates are based on periodic measurements made by CRIT WRD staff to estimate flows at these sites. Periodic measurements were transformed into a synthesized daily record and then aggregated by site and across all sites to monthly and annual estimates. The periodic nature of the measurements and the lack of accurate water measurement infrastructure at most of these sites contributes to a relatively high level of uncertainty in discharge estimates at these sites. NRCE (2017b) studied 13 spill sites considered to have greater certainty in the discharge estimates and found the total average annual spill volume at these was 39,272 AFY. Thus, the range of minor spill volume that could be conserved through various conservation measures was taken as 39,272 AFY to 56,000 AFY. The low end of this range, 39,272 AFY, is considered to be the most reliable current estimate in the absence of actual continuous record across all 35 laterals and sub-laterals. This is equivalent to an average of 1,122 AFY spill volume per lateral.

Various conservation measures to address the minor spill losses are discussed in Section 5, pp 5-2 through 5-8, (NRCE, 2017b). The primary methods considered were improvements in flow measurement and monitoring (the subject of this proposal) and end of lateral interties and flow interception and re-direction from spillways to either re-regulation storage or pumpback to downstream irrigation canals.





The installation of continuous water measurement at the proposed lateral and spill sites and the planned future installation of telemetry equipment at these sites is part of planned expansion of the CRIP SCADA system. Expanded real-time monitoring of flows, especially operational spills, is expected to help system operators improve management and distribution of irrigation water.

Assuming the estimated per lateral savings of 250 AFY from the above referenced study at IID is representative, an estimated 22% percent savings on CRIT laterals (250/1120) is suggested. NRCE adopted a conservation savings of 25% of minor spills that could potentially be achieved due to improved flow measurement and monitoring in real time on the CRIP. For the range of total annual minor site spill volume of 39,272 AFY to 56,000 AFY, the conservation estimate is thus, 9,818 AFY to 14,000 AFY, or, 280 AFY to 400 AFY per minor spill site. For the six spill sites proposed for water measurement improvements in this project, a total potential water savings of 1,680 AFY to 2,400 AFY is estimated. The lower end of this range, 1,680 AFY, is considered to have more certainty.

1.5.2 Evaluation Criterion B – Planning Efforts Supporting the Project

From 2015-2017, NRCE implemented and completed three studies for CRIT Tribal Council which effectively serve the purposes of a Water Conservation Plan for the CRIP. These studies had objectives of assessing water use efficiency, gaining an understanding of opportunities for both conserving water and improving beneficial use of CRIT's water resources, and evaluating the economic returns of various Tribal water uses, while preserving and protecting CRIT's Colorado River water rights. CRIT has expressed a desire to improve the economic return on its Colorado River water allocation as well as to improve irrigation efficiency to conserve water. CRIT is keenly aware of water shortage conditions in the Lower Colorado River Basin and is interested in making conserved water available under different mechanisms to forestall system shortages or to make water available for other system users who may be at risk of shortages are declared.

- *Agricultural Resource Management Plan: Phase I—Integrated Agriculture Inventory and Issues* (NRCE, 2016). The primary focus of the study was to collect baseline information and data on water supply and use on the CRIP. Information and data over the period 1996-2015 were collected and summarized—climate, soil and land resources, total cropped area, cropping patterns, sources and characterization of water supply quantity and quality, CRIP water delivery and distribution system infrastructure, water delivery operations and management, flow distribution and control, methods of water ordering, water rates and allocation, and preliminary identification of potential structural and operational issues. On-farm irrigation methods and practices were characterized. Irrigation water requirements for the crops and cropped areas of the CRIP and water balance of: (1) the CRIP inflows, return flows and consumptive use, and, (2) the Colorado River reach from below Parker dam to below Palo Verde diversion dam were performed to develop estimates of CRIP level agricultural water use efficiency.
- *Water Measurement Inventory, Colorado River Irrigation Project* (2017a). The purpose of this study was to locate and describe all water measurement sites that are on, or, are related to the CRIP. A technical assessment of each water measurement site was performed to develop estimates of the accuracy and reliability of the measured flow rate data, describe any issues/deficiencies of the site (physical infrastructure, measurement location, type of measurement, rating equation used for conversion to flow rate, etc.), and recommend corrective measures. The water measurement data management system—data storage,





archival, backup, processing, reporting, etc.—where do the collected raw data reside, what data QA/QC processes are used, who has access, how, what standard data processing and reporting is in place was evaluated. Water measurement site operation and maintenance procedures were reviewed. Locations on the CRIP where additional water measurements are needed were identified.

- *Agricultural Resource Management Plan: Phase II—Efficiency Analyses and Potential Water Conservation, Colorado River Irrigation Project (NRCE, 2017b)*. This study addressed the conditions and operations of the CRIP and identified potential mechanisms to improve efficiency, with a goal of conserving water to allow expansion of irrigated acreage and/or make water available for alternate uses. Appraisal level estimates of costs and water savings for conveyance and farm level improvements across the CRIP were developed. Of the total average CRIP diversion of 610,000 AFY, and estimated 300,000 AFY spills, seeps, evaporates, or is lost as deep percolation of water applied on-farm. Multiple system infrastructure rehabilitation needs were identified as first priority for improvements to improve system functionality. System modernization and other upgrades, including the expansion of flow measurement and SCADA operations on the CRIP, construction and automation of re-regulation reservoirs, canal lining, and drain water capture and re-use are recommended. Improvements at the on-farm level to address significant water losses and improve crop production were also highlighted.

The proposed project to install continuous water measurement at eight locations, and the eventual planned linkage of these sites with the CRIP SCADA system, is one of the necessary first steps towards operational improvements and reliable water control and measurements. The selected sites were prioritized primarily based on the area served by the laterals and the estimated annual operational spill from spill sites. The proposed project is considered a demonstration of technology with an objective to promote the future installation of many more continuous flow measurement sites from which system operation will continue to improve. To achieve the estimated water savings, SCADA modernization and the expansion of real-time flow measurement and monitoring is required.

1.5.3 Evaluation Criterion C – Project Implementation

NRCE (2018) is a technical report providing details regarding ADVM general design guidelines and specific designs and cost estimates for sites on the CRIP. Three of the sites recommended for ADVM installation in that report have since been improved, and the design and cost estimates of alternative sites have been developed. Reconnaissance level site visits were conducted when preparing NRCE (2018) or in evaluation of substitute sites for this proposal.

The installation of ADVM devices at the eight proposed sites involve the following specific tasks. A project implementation schedule is illustrated in Table 5. A proposed start date of October 1, 2019 is requested. This will allow for site preparation and procurement of equipment, and planned installation of the 73-36 sublateral heading ADVM gage station in February 2020 when the CRIP Lateral 73 service is scheduled for the annual dryup.

Task 1: Site Visits

The CRIT Project Manager, WRD technician, and NRCE's on-site assistant engineer will perform design level site assessments of the proposed locations for ADVM installation. At each site, the site conditions, the materials and equipment required for safe installation, engineering surveys,





final measurement of dimensions, and any preparatory work that must be conducted will be detailed. Preparatory work may include grubbing of vegetation, removal of sediment, vegetation, algae, or scale, patching of concrete structures, installation of rip rap to prevent downstream erosion, or any other preparatory work required for the proper installation of ADVMs. Design level site assessments will be completed in the first three months.

Task 2: Site Preparation and Equipment Procurement

The CRIT Project Manager will request for BIA Irrigation to perform any site preparation work required as this falls under the responsibility of BIA Irrigation towards maintaining the CRIP. In the scenario there is preparatory work BIA Irrigation is not able to perform, the CRIT Project Manager will contract this work as necessary. The Project Manager will procure the required materials and equipment. Site preparation and equipment procurement are expected to be completed over an eight-month period.

Task 3: ADVM Gage Station Installation

The CRIT Project Manager, WRD technician, and NRCE’s on-site assistant engineer will install the ADVM gaging stations—ADVM sensor installation, mounting mast/tower, solar panel, battery, display, necessary enclosures, and all other equipment required for the proper operation of each site. Installation is expected to be completed over an 11-month period. Flow conditions and/or need for site dewatering may delay some installation work.

Task 4: Documentation and Training

The Project Manager with assistance from the on-site NRCE engineer will prepare documentation of the ADVM installations; will prepare protocols for site operation and maintenance, data collection and processing; and provide training to CRIT WRD staff in the operation and maintenance of the ADVM sites.

Table 5. Project Implementation Plan and Schedule

Task No.	Description	Activity Timeline (months after notice to proceed)																					
		3			6			9			12			15			18						
1	Site Visits	█	█	█																			
2	Site Preparation and Equipment Procurement		█	█	█	█	█	█	█	█													
3	ADVM Gage Station Installation				█	█	█	█	█	█	█	█	█	█	█								
4	Documentation and Training														█	█	█	█	█	█	█	█	█

The project qualifies as a Categorical Exclusion (CE) on USBR’s CE checklist (USDOl, not dated). This CE is for project implementation activities which include “Minor construction activities associated with authorized projects which correct unsatisfactory environmental conditions, or which merely augment or supplement, or are enclosed within existing facilities.” Because the project qualifies as a CE, no further NEPA compliance measures are required. Additionally, no negative effects are foreseen on historic properties or to endangered or threatened species because all aspects of the project take place on existing CRIP infrastructure.





Any project implementation activities which will require earth moving will require prior consultation and approval from CRIT's Tribal Historic Preservation Office (THPO). THPO personnel must be on site to monitor any earth moving activity. If the preliminary field site visits conducted in task 1 determine earth moving is required, the CRIT Project Manager will initiate the permitting process with THPO. No other permitting requirements are foreseen.

1.5.4 Evaluation Criterion D – Nexus to Reclamation Project Activities

The proposed project is located on the CRIP which is owned and operated by the US BIA in trust on behalf of CRIT. The proposed project directly benefits CRIT by improving the overall control and efficiency of use of their Colorado River water rights.

The USBR Lower Colorado Region office in Boulder City NV manages operations in the Lower Colorado River Basin. Daily water orders compiled by the CRIP BIA Irrigation office are transmitted to the USBR Boulder Canyon Operations Office for release and delivery scheduling.

The 43 Code of Federal Regulations, Part 417 (Part 417) obligates the Secretary of the Interior to see that releases of Colorado River water to Colorado River tribal entities will not exceed those reasonably required for beneficial use. CRIT prepares and submits an estimate of the Tribes' 12-month Colorado River diversion rate and anticipated monthly diversion schedules to the BIA for the following calendar year. The BIA is directed by Part 417 to consult with Colorado River tribes each year regarding water conservation measures, operating practices, and the beneficial use of Colorado River water. CRIT and BIA engage in the Part 417 Consultation with the USBR in the early Fall of each year.

1.5.5 Evaluation Criterion E – Department of the Interior Priorities

The proposed project directly supports the Department of Interior priority to support of the White House PPP initiative to modernize US infrastructure. The PPP Initiative is significantly enhanced in this proposal as a sovereign Federally recognized Native American Tribe—CRIT is a strong partner in this proposal effort to modernize facilities owned and operated by the US BIA in trust and on behalf of CRIT. Furthermore, the proposed project promotes conservation stewardship as the infrastructure construction is for the purpose of improving the management of water resources.





2 PROJECT BUDGET

2.1 Funding Plan and Letters of Commitment

The estimated total cost of the establishing the eight proposed Acoustic Doppler Velocity Meter Gaging Stations on the Colorado River Irrigation Project is \$185,466. CRIT requests Federal funding in the amount of \$75,000. CRIT is committed to contributing a matching amount equal to \$75,000 as a monetary contribution from the Tribe’s Funds. The remaining balance of \$35,466 are in-kind costs contributed by CRIT under a Professional Services Agreement with Natural Resources Consulting Engineers, Inc. (NRCE) dated May 1, 2019, and, other Federal funding as in-kind cost share under a BIA Colorado River Agency PL93-638 contract with CRIT Water Resources Department for Irrigation Engineering Services. CRIT Water Resources work under the PL93-638 contract is current and on-going. No in-kind contributions or costs will be incurred before the start of the project. There is no other funding received from other Federal partners, and there are no other pending funding requests for this project. Table 6 is a summary of Federal and non-Federal funding sources for the proposed project.

Table 6. Summary of Federal and Non-Federal Funding Sources.

Funding Sources	Funding Amount
Non-Federal Entities	
1. Colorado River Indian Tribes	\$75,000.00
2. Colorado River Indian Tribes PSA with NRCE Inc. (in kind cost share contribution)	\$14,080.00
Non-Federal Subtotal	\$89,080.00
Other Federal Entities	
1. Other Federal Subtotal (PL93-638 contract) (in kind cost share contribution)	\$21,386.00
Other Federal Subtotal	\$21,386.00
Requested Reclamation Funding	\$75,000.00
Total Project Funding	\$185,466.00

2.2 Budget Proposal

Table 7 provides details of the estimated project costs in the format provided in the Funding Opportunity Announcement.





Table 7. Details of Budget Proposal.

Budget Item Description	Computation		Quantity Type	Funding Request (\$)	In-kind Contributions (\$)
	\$/Unit	Quantity			
Salaries and Wages (Labor and Overhead)					
Angie Ingram	165.00	64	Hours		10,560.00
Water Resources Tech	75.00	144	Hours		10,800.00
Water Resources Labor (2)	28.12	16	Hours	424.00	26.00
Fringe Benefits					
Angie Ingram					
Water Resources Tech					
Water Resources Labor (2)					
Equipment					
ADVM gage station for Sub-lateral Heading Sites ¹	19,573.00	2	EA	39,146.00	
ADVM gage station for Sub-lateral Spill Sites ¹	13,748.00	6	EA	82,488.00	
Ring Mount for Culvert Installation	1,145.00	6	EA	8,670.00	
Supplies and Materials					
Shotcrete ¹	3820.00	1	EA	3820.00	
Riprap ¹	1317.00	1	EA	1317.00	
Contracts					
NRCE Assistant Engineer	110.00	128	Hours		14,080.00
(PSA dated 5/1/19)					
Environmental and Regulatory Compliance					
Tribal Historic Preservation	53.00	16	Hours	848.00	
Contingencies/Other					
Inflation (5% of Total Equipment Cost) ¹	6,515.00	1	EA	6,515.00	
Unlisted Items (5% of Total Equipment and Materials Cost) ¹	6,772.00	1	EA	6,772.00	
Total Direct Costs	\$		-	150,000.00	35,466.00
Indirect Costs				0.00	
Total Estimated Projects Costs				\$185,466.00	

¹ See budget narrative for explanation of quantities and costs





2.3 Budget Narrative

2.3.1 Salaries and Wages

The Project Manager is Ms. Angie Ingram, CRIT WRD Acting Director. The Project Manager will procure all materials and equipment required for the ADVN installations. Where necessary, she will coordinate with the BIA Irrigation Office for site preparation including the removal of debris and vegetation and the installation of downstream erosion protection. She will procure shotcrete installation services. The Project Manager will lead and direct the CRIT WRD in the installation and programming of all ADVN sites. Installation of equipment will be performed by a CRIT WRD technician with assistance from an NRCE engineer located on-site at CRIT.

A CRIT WRD technician (to be named) will provide installation assistance. Two CRIT WRD laborers may be employed to provide assistance with site cleanup and preparation.

2.3.2 Fringe Benefits

Fringe and overhead costs are currently not available for CRIT WRD staff. Hourly rates listed in Table 7 include estimated hourly total compensation (salary plus benefits) of CRIT WRD Staff plus overhead fixed costs such as office space, phone support, computer support, vehicle fixed cost, etc.

2.3.3 Travel

None. Travel expenses including mileage for round trip field visits to project sites for CRIT staff as required for Project field support and implementation is considered within the scope of normal duties.

2.3.4 Equipment

Equipment costs per proposed site are listed in Table 8. These costs are based on April 2019 price quotes from equipment suppliers. In general terms, the ADVN gage station configurations for the two lateral headings includes the following: SCADAPack 350 datalogger/controller, ADVN sensor plus display and cable, mounting hardware (mounting ring for the one culvert installation, power supply (solar panel, charging regulator, battery, wiring panel/harness), enclosures, mounting hardware. The ADVN gage station configurations for the six spill sites includes the following: ADVN sensor plus display and cable, mounting hardware (mounting rings for five culvert installations, power supply (solar panel, charging regulator, battery, wiring panel/harness), enclosures, mounting hardware.

2.3.5 Materials and Supplies

Reconnaissance level site assessments indicated the flow and measurement conditions could be improved if the measurement section and/or downstream flow conditions were improved through minor channel shaping and lining a short section with shotcrete at five of the sites. Transitions from lined to earthen channel should be protected with riprap to mitigate potential soil erosion. Quantities were estimated based on preliminary site measurements. Table 7 shows estimated total shotcrete and riprap costs for the five sites. Table 8 shows these costs for each proposed site.

2.3.6 Contractual

NRCE currently is under contract with CRIT in a Professional Services Agreement (PSA) to provide continuing irrigation engineering technical support. Under this PSA, an NRCE Assistant Engineer (to be named) is located on site at CRIT for day to day continuing





Table 8. Equipment and Materials Costs per Proposed ADVM Gage Station Site.

Site	Site Type	Shotcrete ¹	Riprap ¹	SonTek IQ+ ²	SonTek IQ w/ SCADA Pack ³	SonTek Pipe Ring Mount ²	Subtotal
27R-36	Culvert	789	290		19,573	1,445	22,097
73-36	Open Channel	0	0		19,573	0	19,573
46R Ch 8 Spill	Culvert	0	0	13,748		1,445	15,193
73-36-7 Spill	Culvert	0	0	13,748		1,445	15,193
73-36-34 Spill	Culvert	869	320	13,748		1,445	16,381
27R Spill	Open Channel	972	268	13,748		0	14,988
27R-25 Spill	Culvert	463	171	13,748		1,445	15,827
19R Spill	Culvert	728	268	13,748		1,445	16,189
Total		3,820	1,317	82,488	39,146	8,670	135,441

¹ Cost source: RS Means

² Cost source: GeoTech

³ Cost source: Sierra Controls

technical/engineering support to the CRIT WRD. The NRCE Assistant Engineer will assist with all aspects of the implementation of the proposed project including site assessments, site installations, and documentation and training.

2.3.7 Environmental and Regulatory Compliance Costs

Tribal personnel from the Tribes Historic Preservation Office are required to be on site whenever any earth-moving works are in progress. This is expected to be minimal. Monitoring costs are estimated a rate of \$53 per hour and 2 hours per site.

2.3.8 Other Expenses

A contingency of \$6,515 is included to cover price inflation of the necessary gage station equipment. This amount is computed as 5% of total equipment costs. Equipment price quotes given in Section 2.3.4 and summarized in Table 8 are dated April 2019. Prices may increase by the time that orders are placed for the needed equipment.

A contingency of \$6,772 is included to cover unanticipated expenses and costs of unlisted items. This amount is computed as 5% of the total equipment and materials costs before adjusting for the 5% price inflation contingency for equipment.

2.3.9 Indirect Costs

None.

2.3.10 Total Costs

The total cost of this project will be \$185,466.00. CRIT requests Federal funds from the WaterSMART Small Scale Water Efficiency grant program in the amount of \$75,000. CRIT will match this amount with a monetary contribution of \$75,000 to the project. Under CRIT’s PSA with NRCE, an in-kind cost share contribution of \$14,080 will be made. Under CRIT’s PL93-638





contract with the BIA to provide Irrigation Engineering Services, CRIT will contribute \$21,386 as an in-kind cost share toward the project's total costs.

2.4 Budget Form

The completed SF-424B, Budget Information–Non-Construction Programs is attached in Appendix A.

3 ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

3.1 Environmental and Cultural Resources

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

No impacts to the environment are expected. The scope of the disturbance resulting from the installation of ADVN sensors and associated equipment will be negligible. It is possible new conduit wire may need to be buried for encasement of wiring between sensors, data loggers, and solar panels. Any ground disturbance will potentially be: 1) a minimal amount of trenching along ditch banks and/or across existing canal/drain roads and other disturbed lands, and, 2) installation of a tower/mast on the ditch bank for mounting of solar panels, enclosures, and other hardware. Tribal personnel from the Tribes Historic Preservation Office will be on site whenever any earth-moving works are in progress.

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

According to the Fish and Wildlife Services IPAC tool there are a total of seven threatened or endangered species that are potentially affected by activities on the CRIP. These include three bird species (Southwestern Willow Flycatcher, Yellow-billed Cuckoo, and Yuma Clapper Rail), two reptile species (Desert Tortoise, and Northern Mexican Gartersnake), and two fish species (Bonytail Chub, and Razorback Sucker). The CRIP is outside of the final critical habitat published in the Federal Register for five of these species. The critical habitat for the Yuma Clapper Rail has not yet been designated. The CRIP is within the proposed critical habitat of the Yellow-billed Cuckoo published in the Federal Register on August 15, 2014. Yellow-billed cuckoos use wooded habitat with dense cover. In western states, nests are often placed in willows along streams and rivers with nearby cottonwoods serving as foraging sites (USFWS, 2019). The minor scope of field work does not involve the removal of riparian habitat and is not expected to affect critical habitat of the Yellow-billed cuckoo or any other species listed or proposed to be listed as Federal threatened or endangered species.





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

No.

- *When was the water delivery system constructed?*

The water delivery system construction was originally authorized in the late 1860's. Construction and expansion continued through the early 1900s. Major work was initiated in the 1940's. The most recent canals and laterals were completed in the 1960's and early 1970's.

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

One gage station in this proposal will have an ADVN sensor installed in a concrete-lined canal (constructed ca.1960's), one will be in an earthen channel, and the remainder inside of pipe culverts. Dataloggers and solar panels will be installed on road shoulders or canal banks. Modifications to any of these structures is negligible.

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

There are no structures listed or eligible for listing on the National Register of Historic Places within the project area that will be disturbed or modified.

- *Are there any known archeological sites in the proposed project area?*

There are no known archeological sites within the proposed project area that will experience disturbance or modification.

- *Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?*

No.

- *Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?*

No.

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





No.

3.2 Federal Environmental and Cultural Resources Laws

3.2.1 National Environmental Policy Act

The project qualifies as a Categorical Exclusion (CE) on USBR's CE checklist (USDOI, not dated). This CE is for project implementation activities which include "Minor construction activities associated with authorized projects which correct unsatisfactory environmental conditions, or which merely augment or supplement, or are enclosed within existing facilities." Because the project qualifies as a CE, no further NEPA compliance measures are required.

3.2.2 National Historic Preservation Act

The proposed project involves the installation of ADVN's on existing CRIP infrastructure. No negative effects to historic properties are foreseen.

3.2.3 Endangered Species Act

Considering that the proposed project will install ADVN's on existing CRIP infrastructure, no actions of the proposed activities will affect an endangered or threatened species.

4 REQUIRED PERMITS OR APPROVALS

Any project implementation activities which will require earth moving will require prior consultation and approval from CRIT's Tribal Historic Preservation Office (THPO). THPO personnel must be on site to monitor any earth moving activity.

4.1 Letters of Support

Letters of support/partnership are attached in Appendix B.

5 OFFICIAL RESOLUTION

The official resolution of the CRIT Tribal Council approving this WaterSMART grant application was reviewed and approved during a Special meeting on April 22, 2019. A copy is included with this proposal.

6 UNIQUE IDENTIFIER

The Colorado River Indian Tribes is currently registered in the System for Award Management (SAM), and maintains an active registration in SAM. The registration number is 074481706 / 3UHH4.

The organizational DUNS number for the Tribe is 074481706.





REFERENCES

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APPENDIX A: SF-242B BUDGET INFORMATION FOR NON-CONSTRUCTION PROGRAMS





APPENDIX B: LETTERS OF SUPPORT



BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 01/31/2019

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Small Scale Water Efficiency Grant Program for FY2019 FOA No. BOR-DO-19-F005	15.507	\$	\$	\$ 75,000.00	\$	\$ 75,000.00
2. Colorado River Indian Tribes (CRIT) Match					75,000.00	75,000.00
3. BIA CRA PL 93-638 contract with CRIT Water Resources for Irrigation Engineering Services (in-kind cost share contrib)				21,386.00		21,386.00
4. CRIT PSA with NRCE , Inc. (in-kind cost share contrib)					14,080.00	14,080.00
5. Totals		\$	\$	\$ 96,386.00	\$ 89,080.00	\$ 185,466.00

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
	Small Scale Water Efficiency Grant Program for FY2019 FOA No. BOR-DO-19-F005	Colorado River Indian Tribes (CRIT) Match	BIA CRA PL 93-638 contract with CRIT Water Resources for Irrigation Engineering Services (in-kind cost share contrib)	CRIT PSA with NRCE, Inc. (in-kind cost share contrib)	
a. Personnel	\$	\$	\$ 21,386.00	\$ 14,080.00	\$ 35,466.00
b. Fringe Benefits					
c. Travel					
d. Equipment					
e. Supplies					
f. Contractual	75,000.00	75,000.00			150,000.00
g. Construction					
h. Other					
i. Total Direct Charges (sum of 6a-6h)	75,000.00	75,000.00	21,386.00	14,080.00	\$ 185,466.00
j. Indirect Charges					\$
k. TOTALS (sum of 6i and 6j)	\$ 75,000.00	\$ 75,000.00	\$ 21,386.00	\$ 14,080.00	\$ 185,466.00
7. Program Income	\$ 0.00	\$ 0.00	\$ 0.00	\$	\$ 0.00

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SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program		(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS
8.	Small Scale Water Efficiency Grant Program for FY2019 FOA No. BOR-DO-19-F005	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
9.	Colorado River Indian Tribes (CRIT)Match	75,000.00	0.00	0.00	75,000.00
10.	BIA Colo River Agency PL 93-638, contract with CRIT Water Resources for Irrigation Engineering Services	0.00	0.00	0.00	0.00
11.	CRIT PSA with NRCE , Inc. (in-kind cost share contrib)	14,080.00			14,080.00
12. TOTAL (sum of lines 8-11)		\$ 89,080.00	\$ 0.00	\$ 0.00	\$ 89,080.00

SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 91,000.00	\$ 70,000.00	\$ 7,000.00	\$ 7,000.00	\$ 7,000.00
14. Non-Federal	\$ 87,000.00	60,000.00	9,000.00	9,000.00	9,000.00
15. TOTAL (sum of lines 13 and 14)		\$ 178,000.00	\$ 130,000.00	\$ 16,000.00	\$ 16,000.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT					
(a) Grant Program		FUTURE FUNDING PERIODS (YEARS)			
		(b)First	(c) Second	(d) Third	(e) Fourth
16.	Small Scale Water Efficiency Grant Program for FY2019 FOA No. BOR-DO-19-F005	\$ 0.00			
17.	Colorado River Indian Tribes (CRIT)Match	0.00			
18.	BIA Colo River Agency PL 93-638, contract with CRIT Water Resources for Irrigation Engineering Services	5,386.00			
19.	CRIT PSA with NRCE , Inc. (in-kind cost share contrib)	2,080.00			
20. TOTAL (sum of lines 16 - 19)		\$ 7,466.00			

SECTION F - OTHER BUDGET INFORMATION	
21. Direct Charges: \$185,466.00	22. Indirect Charges: 0.00

23. Remarks: This project is proposed as a 1.5 year project

Application for Federal Assistance SF-424

* 1. Type of Submission: <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application	* 2. Type of Application: <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision	* If Revision, select appropriate letter(s): _____ * Other (Specify): _____
---	---	--

* 3. Date Received: 04/24/2019	4. Applicant Identifier: _____
--	--

5a. Federal Entity Identifier: _____	5b. Federal Award Identifier: _____
--	---

State Use Only:

6. Date Received by State: _____	7. State Application Identifier: _____
---	---

8. APPLICANT INFORMATION:

* a. Legal Name: Colorado River Indian Tribes	
* b. Employer/Taxpayer Identification Number (EIN/TIN): _____	* c. Organizational DUNS: 0744817060000

d. Address:

* Street1: 26600 Mohave Road
Street2: _____
* City: Parker
County/Parish: La Paz
* State: AZ: Arizona
Province: _____
* Country: USA: UNITED STATES
* Zip / Postal Code: 85344-7737

e. Organizational Unit:

Department Name: _____	Division Name: _____
----------------------------------	--------------------------------

f. Name and contact information of person to be contacted on matters involving this application:

Prefix: Ms.	* First Name: Angie
Middle Name: _____	
* Last Name: Ingram	
Suffix: _____	

Title: Acting Director

Organizational Affiliation: CRIT Water Resources Department

* Telephone Number: (928) 669-1381	Fax Number: _____
---	--------------------------

* Email: angie.ingram@crit-nsn.gov

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

I: Indian/Native American Tribal Government (Federally Recognized)

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

US Department of the Interior, Bureau of Reclamation

11. Catalog of Federal Domestic Assistance Number:

15.507

CFDA Title:

*** 12. Funding Opportunity Number:**

BOR-DO-19-F005

* Title:

WaterSMART Grants: Small Scale Water Efficiency Projects for FY2019

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment

Delete Attachment

View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Acoustic Doppler Velocity Meter Gaging Stations, Colorado River Irrigation Project

Attach supporting documents as specified in agency instructions.

Add Attachments

Delete Attachments

View Attachments

ASSURANCES - NON-CONSTRUCTION PROGRAMS

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL 	TITLE Chairman, CRIT Tribal Council
APPLICANT ORGANIZATION Colorado River Indian Tribes	DATE SUBMITTED 04/24/2019

Application for Federal Assistance SF-424	
16. Congressional Districts Of:	
* a. Applicant: <input type="text" value="AZ-04"/>	* b. Program/Project: <input type="text" value="AZ-04"/>
Attach an additional list of Program/Project Congressional Districts if needed.	
<input type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
17. Proposed Project:	
* a. Start Date: <input type="text" value="10/01/2019"/>	* b. End Date: <input type="text" value="03/31/2021"/>
18. Estimated Funding (\$):	
* a. Federal	<input type="text" value="75,000.00"/>
* b. Applicant	<input type="text" value="89,080.00"/>
* c. State	<input type="text" value=""/>
* d. Local	<input type="text" value=""/>
* e. Other	<input type="text" value="21,386.00"/>
* f. Program Income	<input type="text" value=""/>
* g. TOTAL	<input type="text" value="185,466.00"/>
* 19. Is Application Subject to Review By State Under Executive Order 12372 Process?	
<input type="checkbox"/> a. This application was made available to the State under the Executive Order 12372 Process for review on <input type="text"/>	
<input type="checkbox"/> b. Program is subject to E.O. 12372 but has not been selected by the State for review.	
<input checked="" type="checkbox"/> c. Program is not covered by E.O. 12372.	
* 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If "Yes", provide explanation and attach	
<input type="text"/>	<input type="button" value="Add Attachment"/> <input type="button" value="Delete Attachment"/> <input type="button" value="View Attachment"/>
21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)	
<input checked="" type="checkbox"/> ** I AGREE	
** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.	
Authorized Representative:	
Prefix: <input type="text" value="Mr."/>	* First Name: <input type="text" value="Dennis"/>
Middle Name: <input type="text"/>	
* Last Name: <input type="text" value="Patch"/>	
Suffix: <input type="text"/>	
* Title: <input type="text" value="Chairman, CRIT Tribal Council"/>	
* Telephone Number: <input type="text" value="(928) 669-1280"/>	Fax Number: <input type="text" value="(928) 669-1391"/>
* Email: <input type="text" value="dennis.patch@crit-nsn.gov"/>	
* Signature of Authorized Representative: 	* Date Signed: <input type="text" value="4/22/2019"/>

Date: 4/18/19 Initials: 

Resolution No. _____

**RESOLUTION
COLORADO RIVER TRIBAL COUNCIL**

A Resolution to Authorize the CRIT Water Resources Department to Apply for the U.S. Bureau of Reclamation WaterSMART Small Scale Water Efficiency Projects Grant Funding Opportunity to support the upgrade, replacement, and modernization of several features of the CRIP SCADA system.

Be it resolved by the Tribal Council of the Colorado River Indian Tribes of the Colorado River Indian Reservation in Regular/Special meeting assembled on April 22, 2019,

WHEREAS, the Colorado River Indian Tribes (hereinafter "CRIT" or "Tribes") is a federally recognized Indian tribe, duly organized with a tribal governing body known as the Tribal Council, according to the provisions contained in the Indian Reorganization Act of June 18, 1934; and

WHEREAS, Article VI, Section 1(f) of the Constitution of the Colorado River Indian Tribes authorizes the Tribal Council to accept grants or donations of money or property from any persons, State or the United States, or from community enterprises; and

WHEREAS, the Colorado River Irrigation Project ("CRIP") is a critical component of the Tribal economy, and its continued operation and efficiency depends on regular maintenance and technological improvements; and

WHEREAS, the Water Resources Department seeks authorization to request Federal funds from the WaterSMART Small Scale Water Efficiency Projects grant program in the amount of \$75,000 for water measurement improvements to the CRIP; and

WHEREAS, this funding will be used to improve the CRIP by procuring sensors and related equipment and constructing eight Acoustic Doppler Velocity Meter gaging stations—two on sublateral headings and six on sublateral spill sites currently not equipped with water measurement infrastructure; and

WHEREAS, CRIT must provide 50% matching funds to take advantage of the USBR WaterSMART Small Scale Water Efficiency Projects grant program funding opportunity, CRIT will match the requested funding amount by a monetary contribution of \$75,000 to the project. CRIT will contribute in-kind cost share in the amount of \$14,080 under CRIT PSA, effective May 1, 2019 with Natural Resources Consulting Engineers, Inc., and, CRIT will contribute in-kind cost share in the amount of \$21,386 under the BIA PL 93-638 contract with CRIT Water Resources for Irrigation Engineering Services toward the

project's total costs which will be \$185,466, as detailed in Table 1, attached hereto as Exhibit A.

NOW THEREFORE BE IT RESOLVED that the Water Resources Department is hereby authorized to apply for grant funds available under the 2019 USBR WaterSMART Small Scale Water Efficiency Program in order to receive project funding in the amount of \$75,000.00 for CRIP water measurement improvements; and

BE IT FURTHER RESOLVED that if additional funding becomes available under the USBR WaterSMART Small Scale Water Efficiency Program in future years. the Water Resources Department is hereby authorized to apply for said funds upon submission in advance to Tribal Council of a revised workplan and budget describing the qualified projects suited to the funding opportunity, and the need for the funds applied for, and

BE IT FURTHER AND FINALLY RESOLVED that the Tribal Council Chairman and Secretary, or their designated representatives, are hereby authorized and directed to execute any and all documents necessary to implement this action.

EXHIBIT A

Budget Worksheet – BOR WaterSMART Small Scale Water Efficiency Projects

CRIT Water Resources Department Funding Proposal – April 2019

Table 1

Funding Sources	Funding Amount
Non-Federal Entities	
1. Colorado River Indian Tribes	\$75,000.00
2. Colorado River Indian Tribes PSA with NRCE Inc. (in kind cost share contribution)	\$14,080.00
Non-Federal Subtotal	\$89,080.00
Other Federal Entities	
1. Other Federal Subtotal (PL93-638 contract) (in kind cost share contribution)	\$21,386.00
Other Federal Subtotal	\$21,386.00
Requested Reclamation Funding	\$75,000.00
Total Project Funding	\$185,466.00