IV.K.1.3

TITLE PAGE (See Section IV.C.2.3)

WATER AND ENERGY EFFICIENCY GRANTS FOR FISCAL YEAR 2018

BEAR CREEK WATER REGULATING RESERVOIR

MERCED COUNTY

Merced Irrigation District
744 W. 20th Street Merced, Ca 95344-2288
May 10, 2018

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IV.K.1.4

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Executive Summary

Merced Irrigation District
County of Merced, CA
May 10, 2018

The Merced Irrigation District (MID) proposes to construct a 120 acre-foot off-stream water regulating reservoir adjacent to Bear Creek, one of four conveyance facilities MID uses to deliver an adjudicated water delivery commitment to the Stevinson Water District. MID meets this commitment in large part by routing operational discharges throughout portions of its distribution system to Bear Creek, which eventually discharge to the Stevinson Canal. As the four delivery points for this commitment are all located at the tail end of MID's distribution system, MID has historically "over delivered" above its commitment. The Bear Creek Water Regulating Reservoir would allow MID to better control its delivery commitment, thus resulting in significant water savings. The proposed water regulating reservoir will be constructed on approximately 40 acres of existing fields currently under cultivation adjacent to Bear Creek. The project is expected to conserve an average annual volume of approximately 5,300 acre-feet of water over all year types. During dry and critically dry year types, an average annual volume of approximately 9,000 acre-feet of water will be conserved. These enhanced benefits during dry and critical years result in increased water supply reliability when the water is needed the most. If funded, the Project would be completed within 36 months of funding award with a scheduled completion date of August 2021. This Project will not be located on a Federal facility.

Background Data

The MID lies on the eastern side of the San Joaquin Valley in eastern Merced County, approximately 120 miles south of Sacramento and 275 miles north of Los Angeles (see Figure 1). MID was formed as an irrigation district under the Irrigation District Law contained in the California Water Code on December 8, 1919. The District covers a service area of 164,317 gross acres, consisting of approximately 132,000 irrigable acres. Of these, approximately 90,000 acres are irrigated partially or totally with surface water. Eight urban areas, including three incorporated cities, Merced, Atwater and Livingston, are all located within the boundaries of the MID.

MID holds a variety of pre-1914 and post 1914 water rights. The Merced River provides the principal surface water supply for the District and other areas overlaying the Merced Groundwater Basin. With respect to the District, water is diverted from the Merced River at two locations: the Northside Canal diversion and the Main Canal diversion. The earliest diversion into the Main Canal was in 1857. Lake McClure, the District's principal water storage reservoir, is impounded by New Exchequer Dam, and has a storage capacity of 1,024,600 AF. MID's average annual water supply diverted from the Merced River is approximately 450,000 acre-feet.

N W E S

0 25 50 100 Kilometers

0 10 20 40 Miles

FIGURE 1

Bear Creek Water Regulating Reservior

Merced County, CA

Section 3 & 10 8/12 M.D.B.&M.

MERCED IRRIGATION DISTRICT

WATER & POWER

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The MID distribution system includes approximately 851 miles of conveyance facilities. It includes portions of natural streams and drains that convey irrigation water during the irrigation season and flood flows during the off season. These reaches collect and enable reuse of canal operational discharges and return flows during the irrigation season. The District also owns approximately 215 groundwater wells. Additional details of MID's water distribution system are shown below:

Unlined Canals:	399 miles
Natural Channels (creeks and sloughs):	132 miles
Lined Canals:	107 miles
Pipelines:	181 miles
Drains:	32 miles
Total Mileage of System:	**851 miles**

Active Wells 215
Delivery Gates 2547

The District possesses several smaller reservoirs that are used for regulating flows and balancing water supply with demand. These water regulating reservoirs are detailed below:

Regulating Basin	**Total Volume (acre-feet)**	**Regulating Volume (acre-feet)**	**Description**
Lake McSwain	9,740	1,600	Located on the Merced River and serves to re-regulate flow releases from Lake McClure and to help to ensure steady instream releases.
Lake Yosemite	8,201	1,000	Located north of Merced, and serves as a Main Canal regulating reservoir and a popular recreational area for residents in Merced.
Castle Dam Irrigation Pool	570	400	Castle Dam on Canal Creek was completed around 1998 by the Army Corps of Engineers as a multipurpose flood control reservoir including an irrigation pool. The regulating pool has cut nearly 24 hours off the time required to initiate flow changes at the head of the Livingston Canal, located five miles downstream from Castle Dam.
Bear Creek Pool (Crocker Dam)	223	180	Formed by Crocker Dam, which captures runoff from the entire Bear Creek watershed, including Parkinson Creek, Fahrens Creek, Cottonwood Creek, Black Rascal Creek, Bear Creek, and Burns Creek (located approximately xxx miles upstream of the proposed Bear Creek Water Regulating Reservoir).
El Nido Reservoir	196	180	Located on the El Nido Canal
Livingston	95	90	It is currently MID's only off-stream regulating

Regulating Basin	Total Volume (acre-feet)	Regulating Volume (acre-feet)	Description
Automatic No. 2			reservoir, which can be completely bypassed without impacting operations.
Mariposa Creek Pool (El Nido Dam)	66	60	Formed by the El Nido Dam on Mariposa Creek
Puglizevich Dam Poo	29	25	Located along Owens Creek
Livingston Canal Pool	20	20	Formed by Automatic No. 5 on the Livingston Canal
Le Grand/Planada Canal Bifurcation Reservoir	120	120	An off-stream water regulating reservoir, currently in design, planned for construction in 2018. Located on the Le Grand Canal, near the Le Grand and Planada Canal bifurcation in the eastern part of MID's service area.

MID irrigates a total of approximately 90,000 acres consisting of over 60 different crops. The four major crops include the following:

- Almonds: 28,000 acres
- Corn: 17,000 acres
- Permanent Pasture: 10,000 acres
- Alfalfa: 9,000 acres

Other crops include varying acreage of: 1) orchards, including pistachios, walnuts, peaches, nectarines, apricots, pecans, cherries, plums, prunes, and citrus; 2) clover and pasture; 3) field crops, including grain, sorghum, sudangrass, cotton, and safflower; 3) truck crops, including tomatoes, peppers, sweet potatoes, melon, squash, onion, strawberry, and small vegetables; and 4) grape vines for wine and table grapes.

The USBR and MID have worked together on a number of past and current projects. Some of the more recent projects include the following:

1. Arena Canal/Howard Lateral Rehabilitation Water Conservation Project-R11AP20058
   Awarded on 6/8/2009 $1,000,000 Funding Amount

   The purpose of this project was to concrete line and pipeline portions of the Arena and Howard Laterals to reduce or eliminate seepage thus retaining water in the Bay-Delta system. The upgrades were completed to make the system more efficient and easier to manage for all water users in the area.

2. McCoy Rehabilitation Project-R12AP20035
   Awarded on 9/25/2012 $963,000 Funding Amount

   The purpose of this project was to help reduce operational discharges of irrigation water generated by the 1900 and Tin Flume Laterals from spilling into the Atwater Drain, by

creating a bypass system to improve the overall control of the water supply. The goal of the second part of the project was to concrete line a section of the McCoy Lateral to reduce or eliminate seepage and improve efficiency, thus retaining water in the Bay-Delta system.

3. Drought Water Management Model-R15AP00189
   Awarded on 9/18/2015 $280,613 Funding Amount

   The purpose of this project was to develop a real-time simulation water management model that would help the MID analyze, predict, and respond to drought conditions. The project also included the installation of two weather stations and two river gage stations to collect water supply data on precipitation, flows, temperature, and system losses.

4. Merced River Instream & Off-Channel Drought Habitat Project
   Awarded on 9/22/2017 $720,489 Funding Amount

   Restoration of approximately 0.5 acres of in-stream spawning habitat and six acres of riparian and upland seasonal and permanent rearing habitat along a 0.8-mile length of the Lower Merced River. This project will increase the amount and diversity of salmonid habitat.

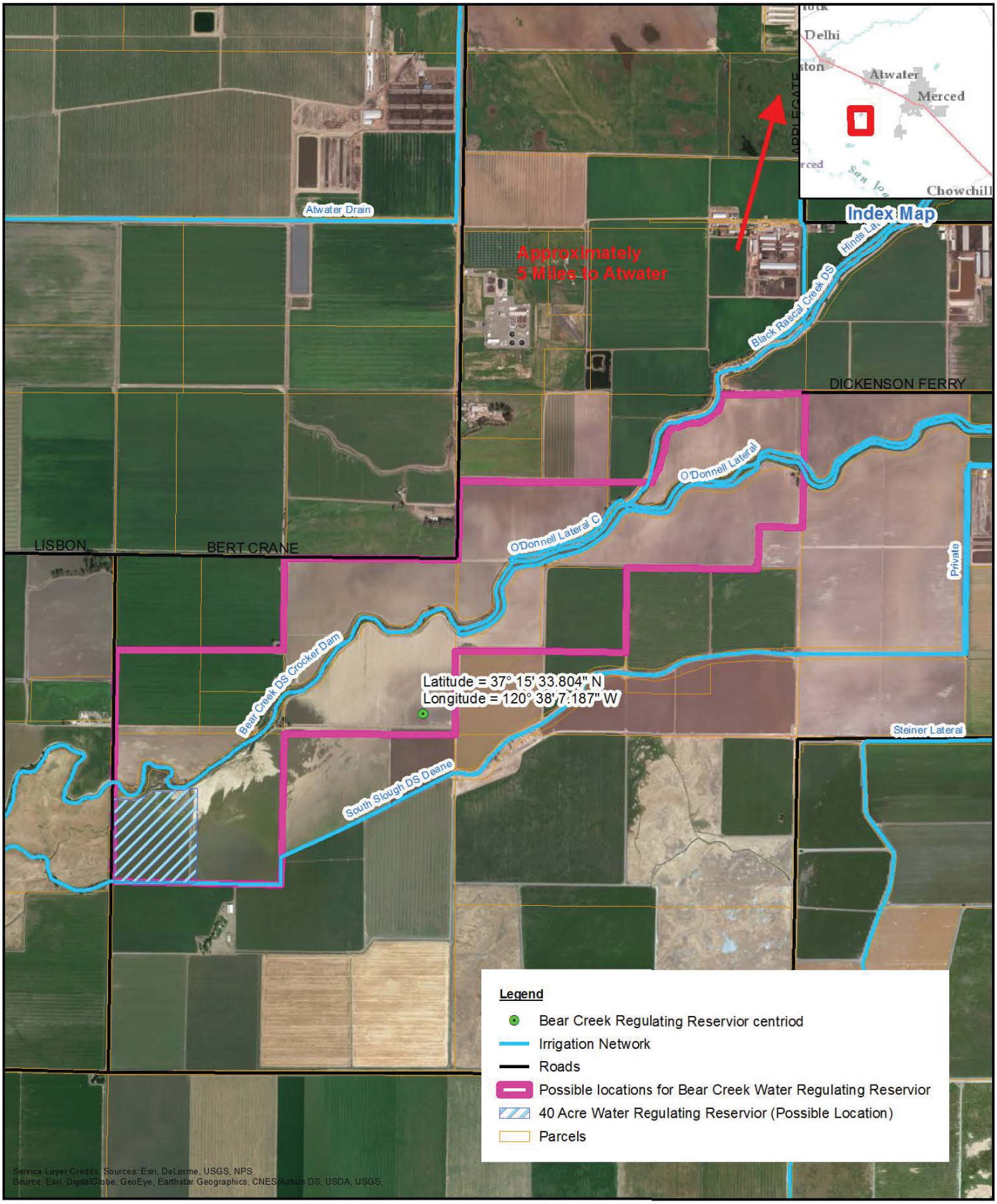
Project Location

The project will be located within Merced County, CA, approximately 5 miles south of the City of Atwater, Ca. A reservoir site location is shown for presentation purposes only. The final location of the reservoir has not yet been determined but will be within the outlined area as shown in Figure 2 below.

Technical Project Description

The Bear Creek Water Regulating Reservoir will be constructed on a 40 acre site adjacent to Bear Creek and will accommodate up to approximately 120 acre-feet of water. The water regulating reservoir will provide for controlled deliveries and reduced spills to the Stevinson Water District, where MID has an adjudicated commitment to deliver 24,000 acre-feet of irrigation water annually.

The majority of water will be pumped into the regulating reservoir from Bear Creek through a number of variable frequency device (VFD) pumps. The water will be released back into Bear Creek through a gravity-fed outlet structure with an automatic flow control gate. Automatic trash screens will be installed directly upstream of the Bear Creek reservoir inlet pumps to prevent trash and debris from entering the pumps; any trash or debris in the water will pass through the flow measurement structure and continue downstream. An emergency float switch will be installed in the reservoir to automatically shut off the reservoir inlet pumps if the water level in the reservoir were to exceed the maximum water level elevation. The existing rated section in Bear Creek for flow measurement to Stevinson Water District will be replaced with a new concrete side contraction Replogle flume for more accurate flow measurement. Figure 3 shows a conceptual layout of the new off-stream water regulating reservoir and its major components.



N W E S

0 250 500 1,000 Meters

0 1,000 2,000 4,000 Feet

FIGURE 2

Bear Creek Water Regulating Reservior

Merced County, CA
Section 3 & 10 8/12 M.D.B.&M.

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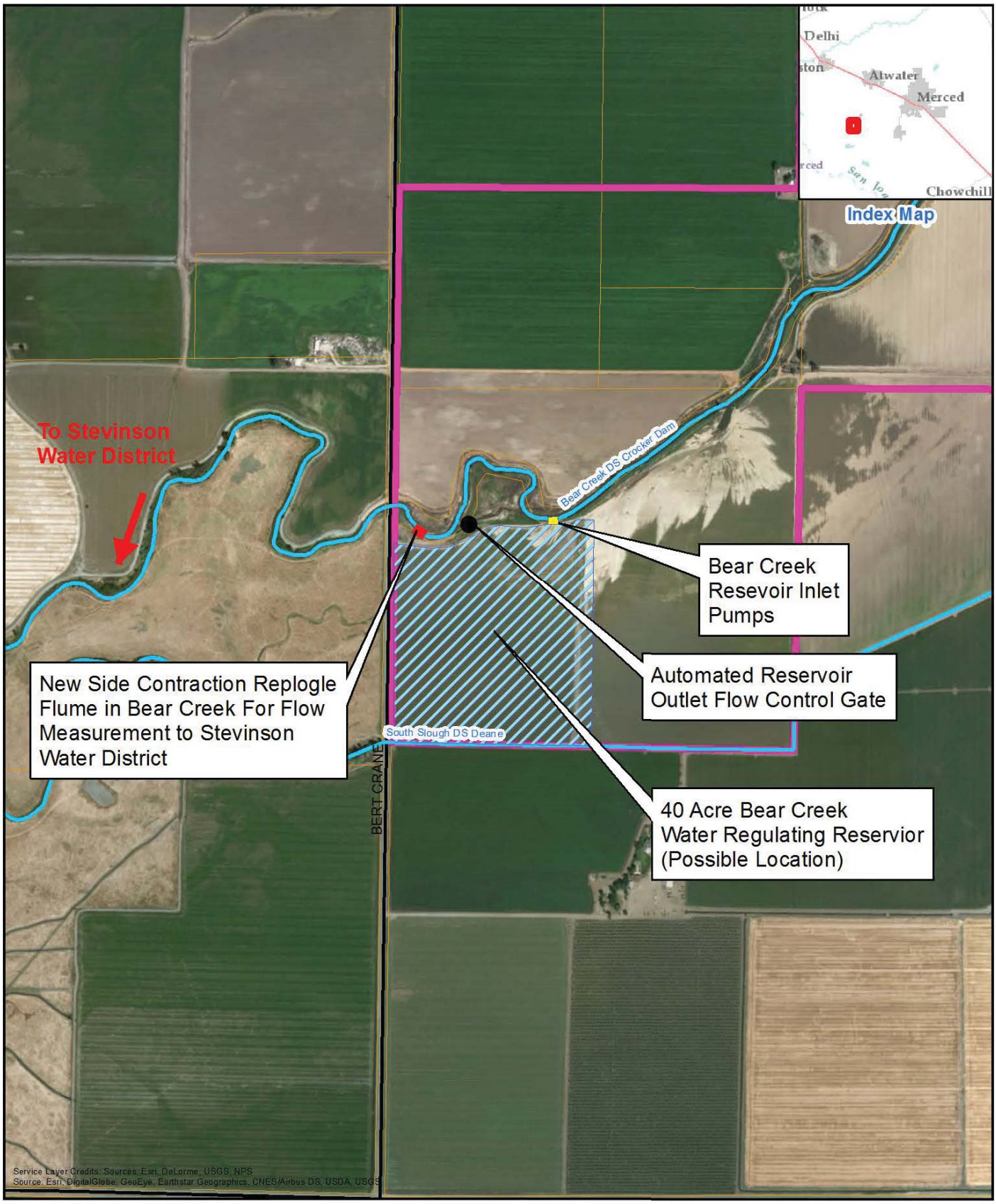

N
W E
S

0 50 100 200 Meters

0 125250 500 Feet

FIGURE 3

Conceptual Design Location of Improvements
Bear Creek Water Regulating Reservior
Merced County, CA
Section 3 & 10 8/12 M.D.B.&M.

MERCED IRRIGATION DISTRICT
WATER & POWER

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E.1. Technical Proposal Evaluation Criteria

E.1.1. Evaluation Criterion A—Quantifiable Water Savings

This project is expected to conserve an average annual volume of approximately 5,300 acre-feet of water over all year types. During dry and critically dry year types, an average annual volume of approximately 9,000 acre-feet of water will be conserved. MID is able to enhance efficiency in dry and critical conditions because of increased available storage, strict conservation management of water supply, and reduced water allocation requirements. These enhanced benefits during dry and critical years result in increased water supply reliability when the water is needed the most.

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

Analysis of Water Savings from the Proposed Bear Creek Water Regulating Reservoir

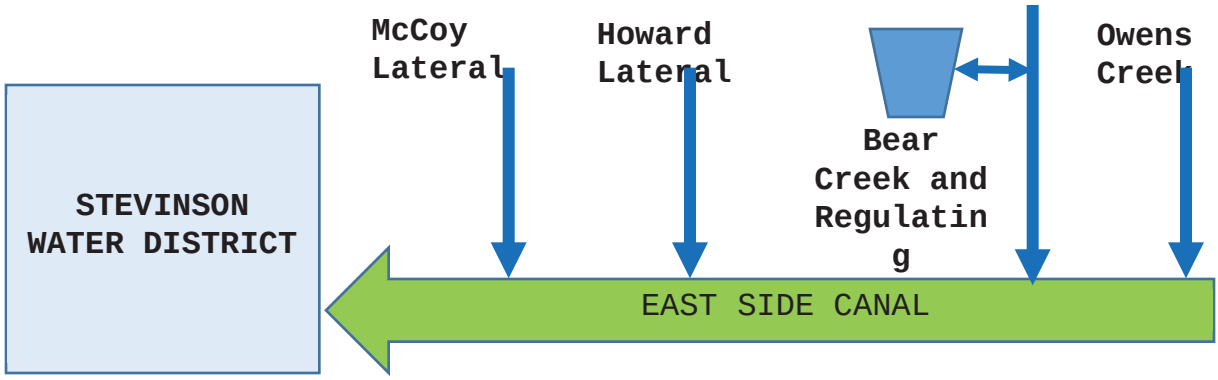
A routing analysis was completed to estimate the potential benefits of the off-stream Bear Creek Water Regulating Reservoir. The assumptions implemented are detailed in this section. Benefits were assumed to equal the required releases from the regulating reservoir because otherwise the releases would be required from upstream sources.

Stevinson Water District Demand

Stevinson demand was based on the adjudicated requirements of the Stevinson Agreement defined as:

Month	Qmin (cfs)	Qmax (cfs)	Qrequired (cfs)	Monthly Volume Required (AF)
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	30	70	50	3,000
5	50	100	75	4,500
6	50	100	75	4,500
7	50	100	75	4,500
8	50	100	75	4,500
9	30	70	50	3,000
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
			TOTALS	**24,000**

The demands were met from four sources, McCoy Lateral Spills, Howard Lateral Spills, Bear Creek flows and Owens Creek flows. These flows enter the East Side Canal and are conveyed to Stevinson Water District.



Bear Creek Regulating Reservoir Size and Inflows

The regulating reservoir was simulated as off-stream where inflows and releases would go to Bear Creek and then be conveyed to Stevinson Water District. Three reservoir sizes were analyzed, 120, 160 and 200 Acre-Feet (AF). The current plan is to use the 120 AF size, although this decision may be revisited during conceptual level design.
Inflows into the reservoir were assumed when all of the following criteria were met:

- Reservoir was not full.
- Stevinson Water District daily requirement was fully met.
- Only water exceeding the Qmax of the Stevinson agreement was available for filling.
- Reservoir was filled to no greater than the maximum capacity.
- A Bear Creek efficiency factor was assumed.

Bear Creek Efficiency Factor

The Bear Creek Efficiency Factor is defined as the percent of water that is stored upstream of Bear Creek west boundary, MID's primary measurement point for Stevinson Water Deliveries. Bear Creek west boundary inflows are stored primarily in the Castle Dam and Crocker Dam irrigation pools and not available for meeting the Stevinson Water District requirements. This is a hypothetical number, but it does show the range of water savings possible. An efficiency of 0% indicates no upstream storage of Bear Creek west boundary inflows and no operational gains in water supply management. An efficiency of 40% indicates that 40% of the Bear Creek west boundary inflows are stored upstream and 60% are used for regulation. Since the reservoirs sizes for regulation are relative small, upstream storage would enhance the benefits of the regulating reservoir. Please note that the 100% efficiency is not realistic, but it does represent an upward boundary. Actual efficiency would depend on MID's ability to manage upstream spills and to store Bear Creek west boundary inflows upstream in Castel and Crocker Dams irrigation pools, as well as on hydrological conditions. Actual efficiencies may vary from 20% to 70%. Hydrological conditions also impact efficiencies. MID is able to enhance efficiency in dry and critical conditions because of increased available storage, strict conservation management of

water supply, and reduced water allocation requirements.

Bear Creek Regulating Reservoir Releases

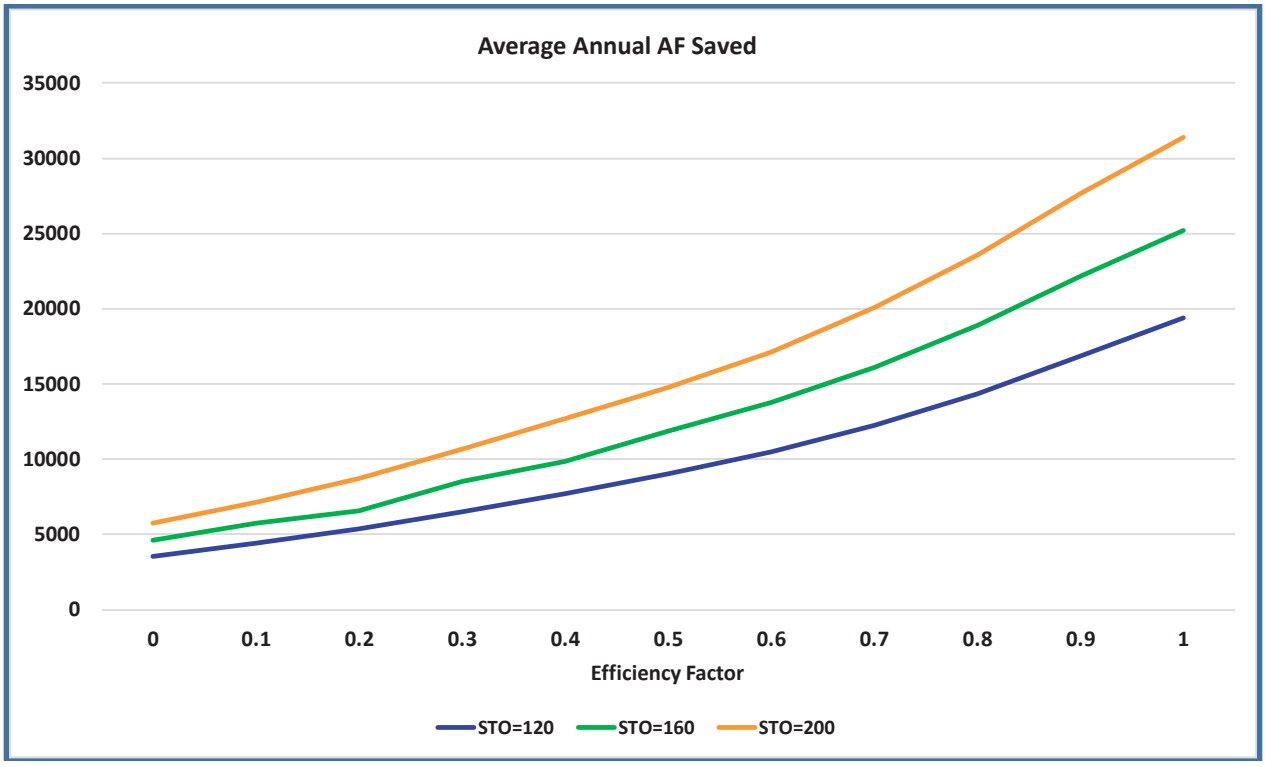
Releases form the reservoir were assumed when all of the following criteria were met:

- Regulating reservoir had available water supply.
- Stevinson Water District daily requirement was not fully met.
- Only water needed to meet the Stevinson agreement was available for release.
- Available water supply for release was limited to the reservoir storage at time of release.
- Stevinson requirements were first met from McCoy Lateral, Howard Lateral, Owens Creek, and Bear Creek. The regulating reservoir was used to meet the remaining Stevinson requirements.

Period of Analysis

The routing analysis was completed on a daily time step beginning on October 1, 1967 and ending on September 30, 2017. This range was selected because they represent years with full data sets. A daily time increment was selected to enhance the precision of the Bear Creek regulating reservoir and to be conservative and ensure we were meeting the Stevinson Water District delivery requirements. Only daily available water above the maximum allowable flow into Stevinson was used for reservoir filling. This represents a buffer of 50 cfs available to meet Stevinson requirements during irrigation season. This buffer could potentially be used in real operations for filling enhancing benefits, but to be conservative, this analyzes does not assume buffer water as a potential benefit.

General Results



Benefits Summary

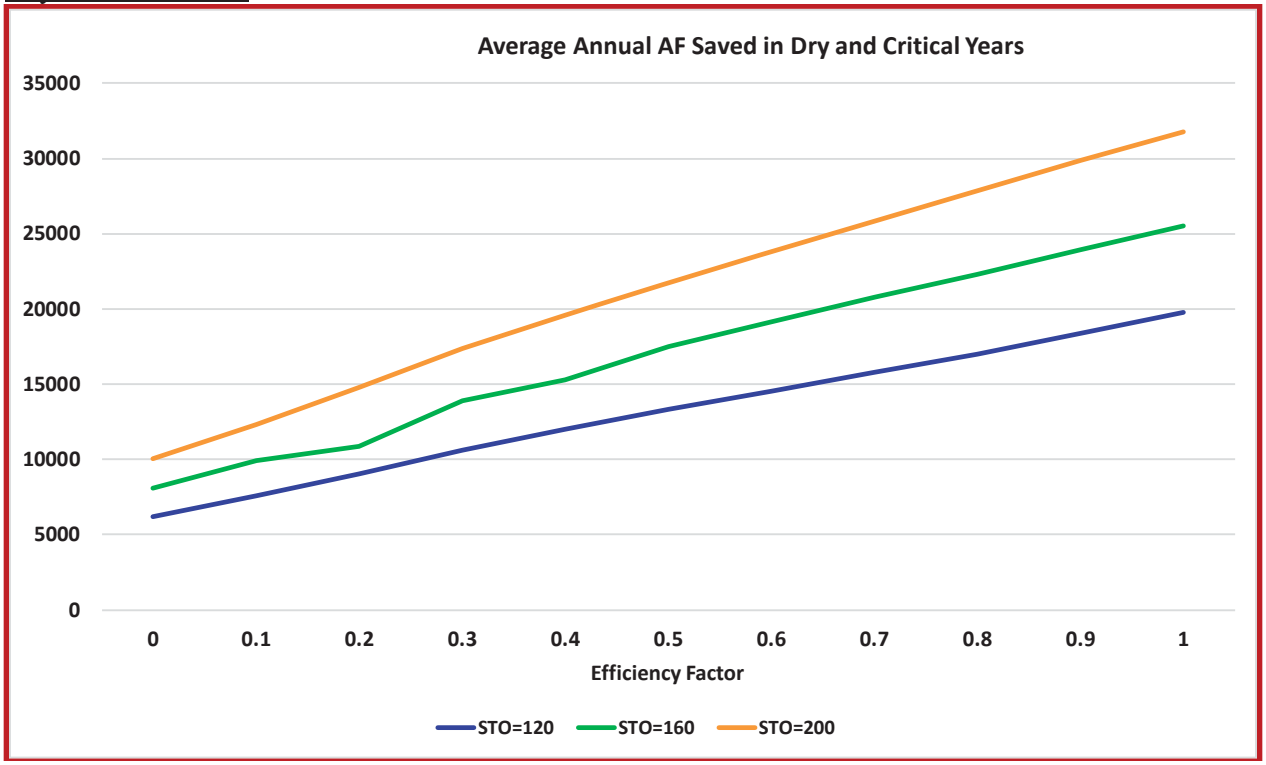
For the 120 AF Regulating Reservoir storage size the 20% to 70% average water supply benefit ranges between 5,359 AF and 12,233 AF respectively. The benefits of the regulating reservoir increase with enhanced operations and increased reservoir size. At the size range analyzed, no diminishing returns were observed.

Dry and Critical Years Results

For the dry periods, the following years were selected for analyses:

DRY	1968
DRY	1972
CRITICAL	1976
CRITICAL	1977
DRY	1981
DRY	1985
CRITICAL	1987
CRITICAL	1988
CRITICAL	1989
CRITICAL	1990
CRITICAL	1991
CRITICAL	1992
CRITICAL	1994
DRY	2001
DRY	2002
DRY	2004
CRITICAL	2007
CRITICAL	2008
DRY	2012
CRITICAL	2013
CRITICAL	2014
CRITICAL	2015
DRY	2016

Dry Period Results



Dry Periods Benefits Summary

For the 120 AF Regulating Reservoir storage size the 20% to 70% average water supply benefit ranges between 9,064 AF and 15,780 AF respectively. The benefits of the regulating reservoir increases during dry years because the regulation operations are exercised more frequently. These enhanced benefits during dry and critical years result in increased water supply reliability when the water is needed the most.

b. Have current operational losses been determined? If water savings are based on a reduction of spills, please provide support for the amount of water currently being lost to spills.

MID has an adjudicated commitment to deliver 24,000 acre-feet of irrigation water annually to the Stevinson Water District. These deliveries are provided by four MID facilities, specifically the McCoy Lateral, Howard Lateral, Owens Creek, and Bear Creek. Spills, intentional diversions and limited natural flows throughout portions of MID's water conveyance system are directed to these four facilities. Bear Creek provides the largest of the required flows. Spills resulting from this operation are lost to MID and translate to a loss of storage in Lake McClure. Recent records of deliveries to Stevinson Water District are summarized below:

	2009	2012	2013	2014	2016
Delivery	33,258	36,283	28,630	23,913	29,111
Commitment	24,000	24,000	24,000	20,999	24,000
Spills	9,258	12,283	4,630	2,914	5,111

Records from 2010, 2011 and 2017 were omitted from the above due to extremely wet years and would misrepresent the results. For example, the total measured at the delivery points for 2017 was over 73,000 acre-feet. In 2015, MID did not provide a water allocation to its growers due to the recent five-year drought, resulting in minimal deliveries to Stevinson Water District associated with an emergency diversion from Lake McClure in early July. Therefore, no record was provided for 2015. In 2014, the MID irrigation season did not start until late April, resulting in a commitment of 20,999 acre-feet, rather than 24,000 acre-feet.

The spill numbers presented in the above section do not include system losses from Lake McClure or from the measurement points to the Stevinson Canal. When taken into account, the benefit to Lake McClure storage will be even greater. MID typically assumes a conservative system loss of 35-percent and a loss below the measurement points of 10-percent.

c. Are flows currently measured at proposed sites and if so what is the accuracy of existing devices? How has the existing measurement accuracy been established?

The McCoy Lateral and Howard Lateral measuring sites are contracted weirs. Flows are calculated using the standard weir equation. The Bear Creek and Owens Creek measurement sites are rated sections. These sites are re-rated on a periodic basis.

d. Provide detailed descriptions of all proposed flow measurement devices, including accuracy and the basis for the accuracy.

The existing rated section in Bear Creek for flow measurement to Stevinson Water District will be replaced with a new concrete side contraction rated section (Replogle flume) for more accurate flow measurement. The bottom of the contraction will be completely flat. The new section will be rated based on the water level in the contraction. Two large-diameter stilling wells will be installed on the left bank of the new flow measurement structure. Two different types of water level sensors will be used to measure the upstream water level in Bear Creek. Any debris or trash in the water will simple pass through the flow measurement structure and continue downstream.

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

Water savings will be documented by comparing actual deliveries to Stevinson Water District to committed deliveries on an annual basis as measured at each delivery point.

E.1.2. Evaluation Criterion B-Water Supply Reliability

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

MID currently diverts Merced River water released from Lake McClure for its irrigation system. Improved storage in Lake McClure results in improved water supply reliability. MID will be able to reuse and redistribute water that has previously been lost due to spills associated with its Stevinson Water District commitment.

b. Will the project benefit rural or economically disadvantaged communities?

MID has several disadvantaged communities within its service area, including the towns of Planada and Winton and the City of Livingston. In addition to being agricultural communities, they all rely on the Merced Groundwater Basin. Improved surface water supply reliability benefits the groundwater basin by reducing the need for agricultural groundwater pumping in years of low surface water availability. Conserved water may also be used for recharge projects in years of adequate water supply.

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

The Merced River Watershed, Merced River service area and the Merced Groundwater Basin are all within the Bay-Delta solution area. Operational functions in these areas have either a direct or indirect impact on the San Joaquin River Basin which ultimately terminates in the Delta. In addition, it could be assumed that reservoirs that maintain higher carryover storage have a higher chance to spill on a given year.

E.1.4. Evaluation Criterion D—Complementing On-Farm Irrigation Improvements (10 points)

Approximately 30,000 acres within MID rely exclusively on groundwater supplies for their water supply needs. Water conservation resulting in increased storage in Lake McClure, thus water supply reliability, may encourage some of these growers to install irrigation ssystems capable of receiving surface water supplies. Using surface water in-lieu of groundwater supplies benefits the Merced Groundwater Basin, a critically over drafted basin as designated by the California Department of Water Resources.

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

a. Ensure American Energy is available to meet our security and economic needs;

MID owns and operates the Merced River Hydroelectric Project, a Federal Energy Regulatory Commission licensed facility. The Merced River Hydroelectric Project is comprised of two hydroelectric powerhouses: New Exchequer and the McSwain Powerhouse. The combined total hydroelectric output for these facilities is over 107 megawatts. Conserved water realized in Lake McClure helps to improve generation over all water year types.

b. Modernizing our infrastructure

MID is in the process of completing its “Water Resources Management Plan,” a 30-year business plan focused on protecting its water rights and ensuring the long-term financial viability of MID. A key component of the plan is a long-term infrastructure plan focused on modernization of MID

facilities. The Bear Creek Water Regulating Reservoir was one of the highest priority recommendations of the modernization plan.

E.1.6. Evaluation Criterion F—Implementation and Results

a. Does the applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place?

On September 3, 2013, the Merced Irrigation District (MID or District) prepared and adopted an Agricultural Water Management Plan (AWMP or Plan) in compliance with California law, SB X7-7. In accordance with law, the development of this update to the Districts previously adopted AWMP has provided MID with an opportunity to further gauge its performance in meeting the District's water resources management goals, which include providing a reliable, high quality and affordable water supply to its customers, which in turn benefits the entire region.

To support its water resources management goals, MID's water management practices are centered on its robust and effective conjunctive use activities and its long standing commitment to water conservation and system efficiency. The effectiveness of these management practices are assessed in this Plan by comparing key metrics to the 2013 Plan. In addition to the requirements outlined in SB X7-7, this plan also complies with the Governor's April 2015 Executive Order regarding agency development of a drought management plan.

In addition, as mentioned above, MID is in the process of completing its "Water Resources Management Plan." A key component of the plan is a long-term infrastructure plan focused on modernization of MID facilities.

E.1.6.2. Subcriterion F.2— Performance Measures

The performance measure for this project is reduced spills associated with MID's Stevinson Waetr Delivery. Water savings will be documented by comparing actual deliveries to Stevinson Water District to committed deliveries.

E.1.7. Evaluation Criterion G— Nexus to Reclamation Project Activities

The Merced River Watershed, Merced River service area and the Merced Groundwater Basin are all within the Bay-Delta solution area. Operational functions in these areas have either a direct or indirect impact on the San Joaquin River Basin which ultimately terminates in the Delta. In addition, it could be assumed that reservoirs that maintain higher carryover storage have a higher chance to spill on a given year.

E.1.8. Evaluation Criterion H— Additional Non-Federal Funding

The non-Federal funding is equal to 76-percent of the estimated total project cost.

$$\frac{\$3{,}194{,}848}{\$4{,}194{,}848} = 76\%$$

D.2.2.5. Project Budget

Funding Plan and Letter of Commitment

The District's share of project cost will be obtained through Board Approval and the source will be through Board approved budgets. There are no third party funding sources associated with the Project at this time. MID will classify this as a capital project and use funds generated from revenue to pay for the project as it has done for similar projects. MID is requesting $1,000,000 and is providing $3,194,848 of cost share contributions. Total Project cost is $4,194,848. The maximum amount offered by the Reclamation of $1,000,000 would amount to 24% of the total cost. The estimated cost of design, permitting, environmental assessment and construction is presented below.

Funding Sources	Amount
Non Federal Entities	
Merced Irrigation District	$3,194,848.50
Non Federal Subtotal	$3,194,848.50
Other Federal Entities	$0.00
NA	$0.00
Other Federal Entities Subtotal	$0.00
Requested Reclamation Funding	$1,000,000.00
Total Project Funding	$4,194,848.50

FOA funds being requested will be assigned to budget categories as follows:

Description	Requested FOA Funds	Matching or Other	Total Cost
Project Management and Development			
Project Management	$0.00	$50,000.00	$50,000.00
Project Design	$0.00	$250,000.00	$250,000.00
Permitting	$0.00	$100,000.00	$100,000.00
ROW Acquisition (40 acres @$35,000/Acre)	$0.00	$1,400,000.00	$1,400,000.00
Construction			
Mobilization	$41,102.80	$57,332.20	$98,435.00
Earthwork - Reservoir	$241,518.36	$336,881.64	$578,400.00
Pump Inlet Structure	$41,756.29	$58,243.71	$100,000.00
Pumps & Manifold	$206,693.62	$288,306.38	$495,000.00
Reservoir Inlet Pipe	$37,580.66	$52,419.34	$90,000.00
Reservoir Inlet Structure	$12,526.89	$17,473.11	$30,000.00
Reservoir Outlet Structure	$12,526.89	$17,473.11	$30,000.00
Reservoir Outlet Pipe	$9,186.38	$12,813.62	$22,000.00
Canal Outlet Structure	$12,526.89	$17,473.11	$30,000.00
Gravel Pump and Ramp Road	$5,010.75	$6,989.25	$12,000.00
Fencing Around Site	$65,265.08	$91,034.92	$156,300.00
Power	$41,756.29	$58,243.71	$100,000.00
SCADA	$41,756.29	$58,243.71	$100,000.00
Demolition	$10,439.07	$14,560.93	$25,000.00
Gate Structure	$41,756.29	$58,243.71	$100,000.00
Sub Critical Contraction Flow Measurement Structure (flow measurement)	$41,756.29	$58,243.71	$100,000.00
Storm Water Pollution Prevention Plan (SWPPP)	$14,614.70	$20,385.30	$35,000.00
Inspection Fees	$31,317.21	$43,682.79	$75,000.00
Subtotal Base Cost	$909,090.72	$3,068,044.28	$3,977,135.00
Contingency (10% of Construction Tasks)	$90,909.28	$126,804.22	$217,713.50
Total Estimated Cost	**$1,000,000.00**	**$3,194,848.50**	**$4,194,848.50**

Budget Proposal

Budget Item Description	Computation		Qt. Type	Total Cost
	$/Unit	Qt.		
MID Salaries and Wages				
Project Manager	$58.00	200	hours	$11,600.00
Associate Engineer	$35.31	200	hours	$7,062.00
Engineering Technician	$30.00	100	hours	$3,000.00
Administrative Coordinator	$30.00	460	hours	$13,800.00
Salary and Wages Subtotal				$35,462.00
MID Fringe Benefits	41%		hours	$14,538.00
Total				**$50,000.00**
ROW Acquisition (40 acres @$35,000/Acre)	$35,000.00	40	per acre	**$1,400,000**
Project Design				
Principal	$218	18	hours	$3,918
Senior Professional	$211	85	hours	$17,935.00
Project Professional	$182	75	hours	$13,650.00
Staff Professional 2	$157	300	hours	$47,100.00
Staff Professional 1	$128	400	hours	$51,200.00
Technician	$139	423	hours	$58,797.00
Office Support	$100	74	hours	$7,400.00
Geotechnical	$50,000	1	Lump Sum	$50,000.00
Permitting/Environmental	$100,000	1	Lump Sum	$100,000.00
Design Total				**$350,000**
Construction Costs				
Mobilization, 4% of sub-totals	1	LS	$ 98,435.00	$ 98,435.00
Earthwork - Reservoir	144,600	CY	$ 4.00	$ 578,400.00
Pump Inlet Structure	1	LS	$ 100,000.00	$ 100,000.00
Pumps & Manifold	1	LS	$ 495,000.00	$ 495,000.00
Reservoir Inlet Pipe	300	LF	$ 300.00	$ 90,000.00
Reservoir Inlet Structure	1	LS	$ 30,000.00	$ 30,000.00
Reservoir Outlet Structure	1	LS	$ 30,000.00	$ 30,000.00
Reservoir Outlet Pipe	110	LF	$ 200.00	$ 22,000.00
Canal Outlet Structure	1	LS	$ 30,000.00	$ 30,000.00
Gravel Pump and Ramp Road	1	LS	$ 12,000.00	$ 12,000.00
Fencing Around Site	5,210	LF	$ 30.00	$ 156,300.00
Power	1	LS	$ 100,000.00	$ 100,000.00
SCADA	1	LS	$ 100,000.00	$ 100,000.00
Demolition	1	LS	$ 25,000.00	$ 25,000.00
Gate Structure	1	LS	$ 100,000.00	$ 100,000.00
Sub Critical Contraction Flow Measurement Structure	1	LS	$ 100,000.00	$ 100,000.00
Storm Water Pollution Prevention Plan (SWPPP)	1	LS	$ 35,000.00	$ 35,000.00
Inspection Fees	1	LS	$ 75,000.00	$ 75,000.00
Construction Total				**$ 2,177,135.00**
Contingency, 10% of Construction Costs				**$ 217,713.50**
Total Estimated Project Cost				**$4,194,848.50**

Budget Narrative

A description of the specific items contained in the budget proposal follows.

Salaries and Wages

MID's salaries and wages were calculated by choosing the average pay from the position's typical range and applying it. The salary could vary depending on available personnel for the project.

Project Manager:	$58.00
Associate Engineer:	$35.31
Engineering Technician:	$30.00
Administrative Coordinator:	$30.00

Fringe benefits

Fringe Benefits were computed at 41%. The benefits were analyzed by MID's budget office and are based upon standard accounting practices. MID's budget is audited annually and certified by an independent accounting firm.

Travel

There are no travel expenses associated with the proposed project.

Equipment

There are no equipment expenses associated with the proposed project.

Materials and Supplies

Materials and supplies are included in the construction costs. Costs shown are based upon current estimates for a similar project being implemented, as well as actual costs from similar MID project components.

Contractual

Design services will be performed by one of MID's selected design consultants. Once design is complete and bid documents prepared, the project will be publicly advertised and construction will be awarded to the lowest qualified bidder.

Environmental and Regulatory Compliance Costs

The environmental/permitting costs were estimated from previous similar jobs.

Other Expenses

N/A

Indirect Costs

There are no indirect costs associated with the project.

Total Costs

Non-Federal cost share amount:	$3,194,848.50
Federal cost share amount:	$1,000,000.00
Total Project Costs:	$4,194,848.50

Bear Creek Water Regulating Reservoir Project Implementation Schedule

Task	Estimated Start	Estimated Completion
ROW Acquisition	6/1/2018	12/1/2018
Conceptual Design	12/1/2018	2/28/2019
CEQA/NEPA	12/1/2018	12/1/2019
Final Design	8/1/2019	1/28/2020
Bid Phase	1/28/2020	3/13/2020
Construction	3/13/2020	8/25/2021

D2.2.6. Environmental and Cultural Resources Compliance

To allow Reclamation to assess the probable environmental and cultural resources impacts and costs associated with this application, the following responses are provided to the list of questions focusing on the NEPA, ESA, and NHPA requirements. MID has provided answers to the list of questions to the best of its knowledge. The majority of responses are based on MID's knowledge of local site conditions and a completed Initial Study and Mitigated Negative Declaration for a similar project being implemented by MID.

Question 1: 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.

Project Description

The Bear Creek Water Regulating Reservoir will be constructed on a 40 acre site adjacent to Bear Creek and will accommodate up to approximately 120 acre-feet of water. The water regulating reservoir will provide for controlled deliveries and reduced spills to the Stevinson Water District, where MID has an adjudicated commitment to deliver 24,000 acre-feet of irrigation water annually.

The majority of water will be pumped into the regulating reservoir from Bear Creek through a number of variable frequency device (VFD) pumps. The water will be released back into Bear Creek through a gravity-fed outlet structure with an automatic flow control gate. Automatic trash screens will be installed directly upstream of the Bear Creek reservoir inlet pumps to prevent trash and debris from entering the pumps; any trash or debris in the water will pass through the flow measurement structure and continue downstream. An emergency float switch will be installed in the reservoir to automatically shut off the reservoir inlet pumps if the water level in the reservoir were to exceed the maximum water level elevation. The existing rated section in Bear Creek for flow measurement to Stevinson Water District will be replaced with a new concrete side contraction Replogle flume for more accurate flow measurement. The reservoir would be constructed of compacted earth (unlined). A security fence would be installed along the perimeter of the site. Supervisory control and data acquisition (SCADA) system equipment would also be installed to allow for automation of the reservoir control structures.

In addition, future onsite stormwater runoff would likely be conveyed via new drainage swales, ditches, or culverts around the proposed reservoir toe of berm. Stormwater would likely be directed toward the area where stormwater currently flows. Stormwater runoff in other areas of the project site would be unaffected by project implementation.

It is expected that project construction would begin in early 2020, and last up to approximately 18 months. It is assumed that work would primarily be conducted Monday through Friday, between 7:00 a.m. and 6:00 p.m., and construction activities would only occur during the evening or weekends with approval of MID.

Required construction equipment is anticipated to include an excavator, scrapers, grader, roller/compactors, dump trucks, and concrete trucks. Up to 10 workers would be onsite each day. Typical daily averages of construction vehicles entering and exiting the site during most of the construction period would range between 8 to 10 vehicles.

Activities requiring maximum workers and truck traffic would include site excavation, backfill, and concrete pours, plus approximately 60 vehicle trips for the delivery of concrete or hauling away excavated material, for a maximum daily total of 90 truck trips.

Although it is expected that a high percentage, or all, of the excavated material would be usable onsite, excess material would be used along existing MID canal banks to support ongoing bank maintenance near the project site.

No additional areas for staging and laydown outside of the construction footprint would be needed.

Potential Impacts on Surrounding Environment and Steps That Could Be Taken To Minimize the Impacts

Air Quality:

The project is not expected to conflict with or obstruct implementation of the applicable air quality plan. The project is in Merced County, in the San Joaquin Valley Air Basin. Air quality in the region is under the jurisdiction of the SJVAPCD. The project is expected to have emissions less than the CEQA thresholds during construction and operation. Construction of the project would comply with the applicable SJVAPCD Regulation VIII requirements for fugitive dust emission control measures, and construction emissions would be offset in accordance with the SJVAPCD Indirect Source Review Rule 9510 (SJVAPCD Rule 9510). Therefore, the project would be consistent with the regional and local air quality planning strategy and would not conflict with or obstruct implementation of the applicable air quality plan. Based on an analysis from a similar project at MID, construction emissions from the project would be well less than the SJVAPCD air quality thresholds of significance. In addition, construction of the project would comply with SJVAPCD Regulation VIII requirements to control fugitive dust emission. Emission control measures included as part of the project would include the following:

- Apply water to unpaved surfaces and areas.
- Use nontoxic chemical or organic dust suppressants on unpaved roads and traffic areas.
- Limit or reduce vehicle speed on unpaved roads and traffic areas.
- Maintain areas in a stabilized condition by restricting vehicle access.
- Install wind barriers, if necessary.
- During high winds, cease outdoor activities that disturb the soil.
- Keep bulk materials sufficiently saturated when handling.
- When storing bulk materials, apply water to the surface or cover the storage pile with a tarp.
- Do not overload haul trucks. Overloaded trucks are likely to spill bulk materials.

- Cover haul trucks with a tarp or other suitable cover; or wet the top of the load enough to limit visible dust emissions.
- Prevent track-out by installing a track-out control device.
- Clean up track-out at least once a day. If along a busy road or highway, clean up track-out immediately.
- Monitor dust-generating activities, and implement appropriate measures for maximum dust control.

Water Quality

The project primarily entails excavating land within the project boundaries and building embankments along the reservoir boundaries. The reservoir is designed to provide an approximate 120 acre-feet of storage. Additionally, a large amount of excess material would be removed and stockpiled in or around the project site during construction. BMPs for erosion and sediment control would be implemented during project construction, as required by the Construction General Permit Order issued by the SWRCB. The order requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) for all projects that disturb 1 or more acres of soil. Measures that may be implemented to minimize erosion include use of straw wattles, silt fences, gravel berms, or a combination of these to prevent sediments from discharging offsite; and revegetating temporarily disturbed sites upon completion of construction. Given the protective measures included in the SWPPP, it is expected that construction impacts would be less than significant.

Animal Habitat

The Bear Creek Water Regulating Reservoir will be constructed on a 40 acre site adjacent to Bear Creek and will accommodate up to approximately 120 acre-feet of water. The project site is likely to be land already in agricultural production and therefore is not expected to significantly impact animal habitat. There will be an inlet structure and outlet structure constructed on Bear Creek to connect to the new water regulating reservoir, which may temporarily impact local plants or animals. MID plans to conduct a CEQA analysis and initial study to ensure that if any species or habitat are potentially impacted, proper mitigation measures are taken.

Question 2: 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?

MID is not aware of any Federal threatened or endangered species, or designated critical habitat in the project area. The project site is likely to be land already in agricultural production. There will be an inlet structure and outlet structure constructed on Bear Creek to connect to the new water regulating reservoir. MID plans to conduct a CEQA analysis and initial study to determine if there are such species or habitat, and if so, to proper mitigation measures are taken.

Question 3: 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.

The project site is likely to be land already in agricultural production. There will be an inlet structure and outlet structure constructed on Bear Creek to connect to the new water regulating reservoir. MID is not aware if the riparian areas or the creek fall under CWA jurisdiction. However, MID plans to conduct a CEQA analysis and initial study to determine this, and if so, ensure proper mitigation measures are taken and appropriate agencies are engaged.

Question 4: When was the water delivery system constructed?

The majority of MID water distribution system was constructed in the late 1800's and early 1900's.

Question 5: 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.

No – as the project includes construction of a new water regulating structure.

Question 6: 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.

Please see, "Section 106 Cultural Resources Assessment McCoy Lateral Relining Project", prepared for the USBR in association with McCoy Rehabilitation Project-R12AP20035, attached by reference only. Please let us know if you would like a copy of the report.

Question 7: Are there any known archeological sites in the proposed project area?

MID is not aware of any. In the event of inadvertent discovery of archaeological or paleontological resources, all such finds shall be subject to Public Resources Code §21083.2 and CEQA Guidelines §15064.5. Procedures for inadvertent discovery include the following:

- If the find is an archaeological resource, all work within 50 feet of the find shall be halted until a professional archaeologist can evaluate the significance of the find in accordance with National Register of Historic Places and California Register of Historical Resources criteria.
- If the find is a paleontological resource, all work within 50 feet of the find shall be halted until a professional paleontologist can evaluate the significance of the resource.
- If any find is determined to be significant by the archaeologist, or paleontologist as appropriate, then representatives of MID shall meet with the archaeologist or paleontologist to determine the appropriate course of action. If necessary, a treatment plan prepared by an archeologist (or paleontologist), outlining recovery of the resource, analysis, and reporting of the find shall be prepared. The treatment plan shall be reviewed and approved by MID prior to resuming construction.
- All significant cultural or paleontological materials recovered shall be subject to scientific analysis and professional curation, and a report prepared by the professional archaeologist or paleontologist according to current professional standards.

In the event that human remains are encountered during construction activities, MID shall comply with §15064.5 (e) (1) of the CEQA Guidelines and Public Resources Code §7050.5. All project-related ground disturbance within 100 feet of the find shall be halted until the county coroner has been notified. If the coroner determines that the remains are Native American, the coroner will notify the NAHC to identify the most likely descendants of the deceased Native Americans. Project-related ground disturbance near the find shall not resume until the process detailed in §15064.5 (e) has been completed.

Question 8: Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?

No, the project will not have an adverse impact on low income or minority populations but may have a positive impact. MID has several disadvantaged communities within its service area, including the towns of Planada and Winton and the City of Livingston. In addition to being agricultural communities, they all rely on the Merced Groundwater Basin. Improved surface water supply reliability benefits the groundwater basin by reducing the need for agricultural groundwater pumping in years of low surface water availability. Conserved water may also be used for recharge projects in years of adequate water supply.

Question 9: Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

Not to MID's knowledge. However, MID plans to conduct a CEQA analysis and initial study to determine this, and if so, ensure proper measures are taken and appropriate agencies are engaged.

Question 10: 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?

Not to MID's knowledge. However, MID plans to conduct a CEQA analysis and initial study to determine this, and if so, ensure proper measures are taken and appropriate agencies are engaged.

Required Permits or Approvals

In addition to meeting requirements of the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA), MID anticipates that a California Department of Fish and Wildlife 1600 Agreement (stream bed alteration agreement) will be required. No other permits or approvals are anticipated at this time.

D.2.2.9. Official Resolution

A draft resolution has been prepared and will be submitted to the MID Board of Directors for approval on June 5, 2018. The MID Board of Directors is scheduled to meet on that day where they will consider a resolution authorizing the commitment of the district to the financial and legal obligations associated with receipt of the WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2018. A copy of the resolution meeting the requirements set forth by the WaterSMART Grant requirements will be provided within 30 days of the grant application due date.

MERCED IRRIGATION DISTRICT

RESOLUTION NO. 2018-XX

Resolution Authorizing Application for WaterSMART Grant through the United States Bureau of Reclamation for the Bear Creek Water Regulating Reservoir Project Under Funding Opportunity Announcement No. BOR-DO-18-F006

WHEREAS, the reliability of water supply is essential to all water users within the Merced Irrigation District (the District); and

WHEREAS, the District is the only public agency in eastern Merced County that relies on the Merced River to meet its customers demand; and

WHEREAS, the District has a progressive history in conserving water, increasing system efficiency, and optimizing its conjunctive use practices; and

WHEREAS, the District efforts not only include calculated reduction in groundwater pumping, but also reducing water quality concerns as well as upgrading, automating and controlling surface water on a real-time basis with the goal of improving the sustainability of the Districts water resources; and

WHEREAS, the Board of Directors for the District (the Board) supports such projects for its local and statewide benefit; and

WHEREAS, the United States Bureau of Reclamation (USBR) has made available funds through its WaterSMART grant program for the purpose of supporting projects that seek to conserve and use water more efficiently, increase the use of renewable energy, protect endangered species or facilitate water markets; and

WHEREAS, the District is interested in construction of a 120 acre-foot water regulating reservoir in a 40 acre site to provide to better control its delivery commitment to the Stevinson Water District, thus resulting in significant water savings. The project would save water and enhance water supply reliability by regulating flows and reducing spill volumes. Water supply reliability would be increased in dry and critically dry conditions.

WHEREAS, the Board desires and hereby determines it to be in the best interests of the District to authorize application for the WaterSMART grant funding described herein and further

desire to authorize and approve execution and delivery of such documents as may be necessary or desirable in connection with the execution and delivery of such documents.

WHEREAS, the Board behooves the USBR to support this effort for its overall perpetual benefit to water and the economy in Merced County at large, which is mainly dependent on water supply.

THEREFORE, BE IT RESOLVED by the Board of Directors of the Merced Irrigation District that pursuant and subject to all of the terms and provisions of the United States Bureau of Reclamation WaterSMART Grant Program, application by the Merced Irrigation District be made to the United States Bureau of Reclamation to obtain a grant to fund a water conservation project consistent with the recitals set forth hereinabove and with the intent of the grant program.

BE IT FURTHER RESOLVED THAT, if the Districts grant application is approved, the Merced Irrigation District will contribute an estimated cost share of $3,200,000 which will be contributed in addition to a $1,000,000 maximum grant funding from the USBR to complete the project, thereby bringing the Merced Irrigation District to 76% of the total project cost of $4,200,000.

BE IT FURTHER RESOLVED THAT, the General Manager or his designee is instructed to work with the USBR to meet established deadlines for entering into a cooperative agreement and further, the Board authorizes the General Manager and such employees or consultants as the General Manager may designate, to execute such other documents, and to take such additional actions as may be necessary or convenient to carry out and implement the intent of this Resolution.