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

Pollock Pines and Camino, El Dorado County, California

Funding Opportunity Announcement No. R16-FOA-DO-004

El Dorado Irrigation District Main Ditch Piping

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Date: *January 20, 2016*

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El Dorado Irrigation District Upper Main Ditch Piping Project

Submittal Date: January 20, 2016

Submitted by: El Dorado Irrigation District
Placerville, El Dorado County, CA

The purpose of the El Dorado Irrigation District (District or EID) Upper Main Ditch Piping Project (Project) is to conserve and use water more efficiently and effectively, improve water quality, conserve energy and improve energy efficiency, increase the generation of renewable energy, and assist in preventing water-related crises. The project will result in a quantifiable water savings of about 1,300 ac-ft annually, improved raw water quality and reduced need for new water supplies. It is anticipated the project will be accomplished in a phased approach with construction complete within 24-months after initial funding is provided.

The project is located in El Dorado County near Pollock Pines, California. The Upper Main Ditch is approximately 3 miles long and conveys a maximum of 15,080 ac-ft annually of raw water (40 cfs maximum) from the Forebay Reservoir (450 ac-ft capacity) to the Reservoir 1 Water Treatment Plant (WTP). Most of the ditch is earthen and unlined, therefore, a portion of the water is lost to seepage and evapotranspiration. Flow loss measurement studies have shown that the ditch losses are up to 1,300 ac-ft per year or more, depending on flow rates, weather conditions and burrowing animal activity. The work associated with this Grant Proposal is to pipe the entire 3-mile length of the Main Ditch to prevent seepage, evapotranspiration, and carriage losses comprising up to 1,300 ac-ft annually. The reduction in conveyance losses and associated water quality improvements will:

- improve water supply reliability during critically dry years and periods of drought;
- reduce reliance on Central Valley Project (CVP) supplies at Folsom Reservoir;
- assist in complying with California's 20% water conservation by 2020 mandate;
- maintain existing water supplies for future needs;
- retain water in the river system;
- reduce energy consumption and other costs for WTP operations/maintenance; and
- provide water for renewable hydroelectric power generation.

Because the Main Ditch project is a larger, on-the-ground project that will take 2 years from funding to complete, it has been and will be conducted in a three-phase approach, as follows:

Project Phasing and Status

Phase 1	Design	Underway
Phase 2	Environmental Review/Permitting Process	Underway
Phase 3	Construction	Spring 2017-Spring 2018

Each phase of the project is expected to be substantially complete within the timeframes outlined in the attached schedule and funding will be requested annually, for a period of up to 2 years.

The Main Ditch is a critical link in the District's infrastructure, conveying one-third of the water supply. The Main Ditch is not a Federal facility although it is linked to Folsom Reservoir and associated CVP water supply, through a contiguous distribution system.

Background Data

Thousands of miles of earthen/open ditches were constructed in the American River Watershed in the 1800's, for the gold mining industry. Today, this extensive system supplies both treated and raw water to thousands of customers in the region and downstream users in the California Bay Delta. High water loss, due to water seepage and evapotranspiration, occurs within these ditches. Substantial maintenance must be done on the aging water infrastructure system in order to maintain operations and meet increasing customer demand. In addition, the ditches are susceptible to contamination and failure, putting drinking water supplies at risk and resulting in erosion and water quality issues.

Seepage and evapotranspiration from earthen ditches is a serious management problem in the mountain counties of California and contributes to unnecessary diversions from natural waterways feeding the California Bay Delta. In the late 1970's, the District recognized the need to pipe the Main Ditch which was confirmed by the California Department of Health Services (Attachment A). Since then, the District has applied for several grants to offset the project cost. With the recent heightened awareness for drought issues, the project has received funding support from the California Department of Water Resources and the El Dorado County Water Agency. With the California 20% water conservation mandate, piping the ditch is now more critical. It is estimated that there is up to 10% water loss at 40 cfs, the maximum flow rate, associated with the Main Ditch, based on studies and reports conducted in previous years (See Attachment B). In recent decades, the need for improved water system reliability has increased as rural areas continue to grow, water delivery systems age and deteriorate, and water purveyors prepare for drought conditions/climate variability. The

efficient use of current water supplies is one of the most economical and politically acceptable methods of increasing water supply availability to meet conservation goals and future demands. When purveyors use their current supplies more efficiently, less new water will be required in the future.

Earthen ditches have been constructed, in most areas, in soils which allow significant seepage and evapotranspiration. Piping provides a means for eliminating these water losses. The technical feasibility and scientific merit for this type of project has been well-documented in the following plans and studies:

- Water Resources Development and Master Plan – El Dorado County Water Agency
- Water System Reliability Study – Georgetown Divide Public Utilities District
- Integrated Water Resources Master Plan – El Dorado Irrigation District
- Ditch System Master Plan – El Dorado Irrigation District
- Nevada Irrigation District Raw Water Master Plan – Nevada Irrigation District
- Nevada Irrigation District Strategic Plan – Nevada Irrigation District
- Water System Improvement Preliminary Engineering Report – Grizzly Flats CSD
- Urban Water Management Plans – GDPUD, EID, NID
- California Water Plan Update 2005 – State of California

The California Water Plan has developed Efficient Water Management Practices that outline conservation measures and practices. Those specific to infrastructure improvements that contribute to the overall efficiency of water distribution systems include piping ditches and modifying distribution systems to increase the flexibility of water deliveries.

The Project, which will pipe and automate 3 miles of ditch, will assist in meeting CALFED Bay-Delta Program Goals, through: eliminating otherwise irrecoverable losses through excessive seepage, carriage losses, and evapotranspiration from open ditches; optimizing the efficient use of existing water supplies; promoting local water supply conservation to serve the needs of local and future domestic and irrigation customers.

The water delivery system in the region conveys raw water from surface water sources to treatment plants for domestic use and/or provides the distribution mechanism for supplying raw water for irrigation and agricultural purposes. These open earthen ditches are the sole source of drinking water supply for thousands of customers in El Dorado, Nevada, and Placer counties. They are in varying states of repair and provide differing levels of reliability.

El Dorado Irrigation District Water System

The District serves a population of more than 100,000 people through more than 38,000 active water meter connections. Two hundred pressure-regulating stations are needed for reliable operation due to varying topography. The potable water system contains more than

1,250 miles of pipe, 27 miles of ditches, 5 water treatment plants, 37 storage tanks/reservoirs, and 37 pumping stations. The District relies on surface water to meet its entire potable water demand. In the eastern region, where the Main Ditch is located, storage and treatment facilities include the El Dorado Forebay and Reservoir 1 Water Treatment Plant, and Jenkinson Lake and Reservoir A WTP. The water is used for municipal, domestic and agricultural purposes.

Piping the Main Ditch will provide the District flexibility to meet water supply needs during critically dry years when the District is subject to Reclamation supply shortages. As an example, in the summer of 2001 the District experienced a near crisis in supplying water to the community of El Dorado Hills due to a Reclamation cutback in Central Valley Project (CVP) supply from Folsom Lake. The District avoided the crisis by releasing a portion of the 15,080 ac-ft conveyed by the Main Ditch back into the South Fork American River and re-diverting it at Folsom Lake to augment the El Dorado Hills supply provided under the CVP contract.

The District acquired the FERC El Dorado Project 184 from Pacific Gas & Electric in 1999. Project 184 includes reservoirs and associated dams, 22 miles of canal, a 21 MW renewable hydroelectric powerhouse, and other ancillary facilities. Prior to the transfer of ownership and water rights, the District purchased water from PG&E and its predecessor, Western States Gas and Electric Co. The original water rights claims date back to 1856, with additional claims being filed in the 1860s and 1870s. The water rights for diversions from Echo Lake were established in 1880 in a California Supreme Court decision. Then, in 1918, the California Railroad Commission (predecessor to the California Public Utilities Commission) recognized the use of water from the El Dorado Canal for irrigation and domestic purposes. Water used for generation at the El Dorado Powerhouse is returned to the South Fork American River which eventually flows to Folsom Reservoir, a Reclamation facility. Water conserved by piping the Main Ditch will be used to generate power at this powerhouse. Renewable energy generated at the El Dorado Powerhouse is sold to PG&E and distributed through the California ISO grid. The powerhouse generates enough power to serve the equivalent of 100 households annually with certified renewable energy. Figure 1 provides a map of the area showing the geographic location of the Main Ditch.

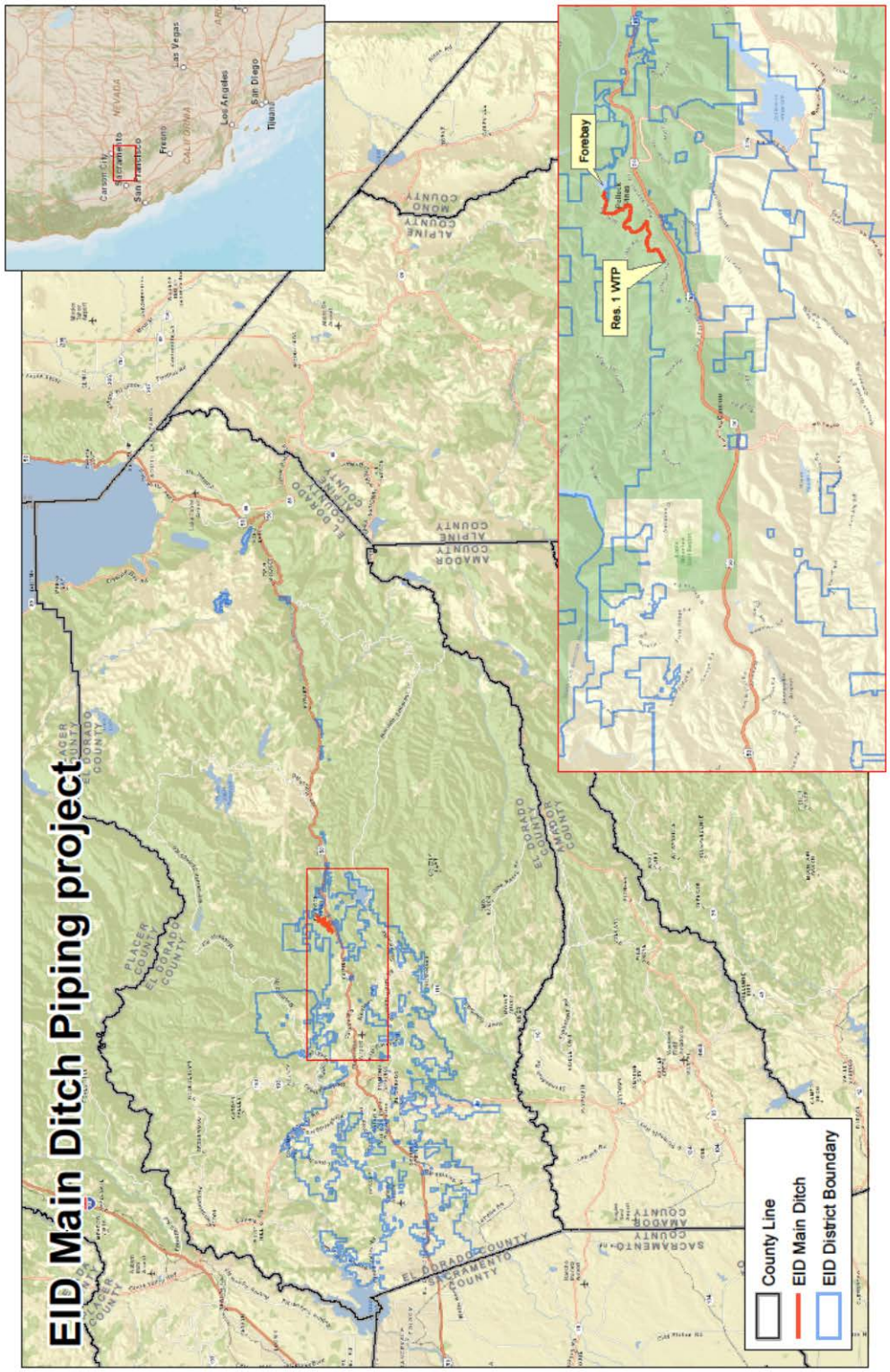


Figure 1 – Main Ditch Geographic Location Map

El Dorado Forebay and Reservoir 1 Water Treatment Plant

The District takes consumptive use of the water supply at the Main Ditch diversion, located at the El Dorado Forebay. This particular supply contributes 15,080 ac-ft per year to the District's system firm yield. Over the past 5 years, the District's annual diversions from Project 184 – Forebay Reservoir have averaged approximately 11,300 ac-ft per year. The District's maximum and minimum diversions from this particular water source during this five-year period were 15,080 and 8,424 ac-ft per year, respectively. Conserved water from piping the Main Ditch represents approximately 9% of the maximum water supply. The sources of this water supply include natural flows in the South Fork American River and its tributaries, and stored water in Silver, Aloha, Echo, and Caples Lakes. Some additional water is obtained by small diversions into the El Dorado Canal from streams tributary to the South Fork American River. The supply is diverted from the South Fork American River at Kyburz and conveyed via the El Dorado Canal to the El Dorado Forebay. Water stored in the El Dorado Forebay is then diverted to either the Main Ditch for treatment at Reservoir 1 WTP or diverted to the El Dorado Powerhouse for renewable hydroelectric power generation.

The Reservoir 1 WTP treats water from the South Fork American River via the El Dorado Forebay and supplies up to 26 million gallons per day (mgd) of potable water to customers throughout the service area. Raw water is diverted at the El Dorado Forebay where it travels through the 3-miles of Main Ditch to the Reservoir 1 WTP. The Main Ditch also includes customers receiving raw water directly from the ditch. Treated water is stored in the adjacent Reservoir 1 storage reservoir which then flows by gravity to Reservoir 2/2A and the town of Camino or is pumped to the Pollock Pines Reservoir to customers at higher elevations.

A raw water pump station at the Reservoir A WTP allows raw water from Jenkinson Lake to be pumped to the Reservoir 1 WTP via the Sly Park Intertie pipe during emergency situations. Or Sly Park supply delivered to Reservoirs 2/2A and can be pumped via the Moose Hall Pump Station to Reservoir 1 WTP providing a backup supply at times when the El Dorado Forebay supply is not available.

From Reservoir 2/2A, El Dorado Main EDM 1 and EDM 2 continue westward conveying water through Placerville into the Gold Hill area. Prior to reaching the Gold Hill area, three major storage facilities (Reservoirs 3, 4, and 5) are situated along EDM 1 and 2. These storage facilities are utilized to reduce the pressure in the pipeline and provide system storage. At Reservoir 3, a lateral of EDM 1 begins and continues in a southerly direction around the southeastern edge of Placerville through Reservoir 6. The City of Placerville has turnouts along this lateral that divert water to the City water system. EDM 2 begins at Reservoir 2A in Camino and extends in a westerly direction, generally following the alignment of EDM 1. EDM 2 also terminates in the Gold Hill area. Reservoir 2A is supplied from Jenkinson Lake via the Camino Conduit and from the Forebay Subsystem via the

Moose Hall Transmission Main. The Highway 49 Intertie connects downstream of Reservoir 6 and extends in a southerly direction to the Diamond Spring's Main (DSM) near Diamond Springs.

The Gold Hill Intertie (GHI) connects to EDM 2 in the Gold Hill area and extends to the El Dorado Hills area along Green Valley Road. This pipeline provides water to the Cameron Park/Shingle Springs service zones. "Leg A" of the GHI connects with the DSM and extends from Green Valley Road to Reservoir 12 in Cameron Park. Another extension of the GHI, extends from Bass Lake Road to the Bass Lake Tanks and to the Oakridge Tanks in the El Dorado Hills service zone. This connection provides the link between Forebay supply and CVP supplies from Folsom Lake that serve the El Dorado Hills area. A schematic of the entire District water system is provided as Figure 3.

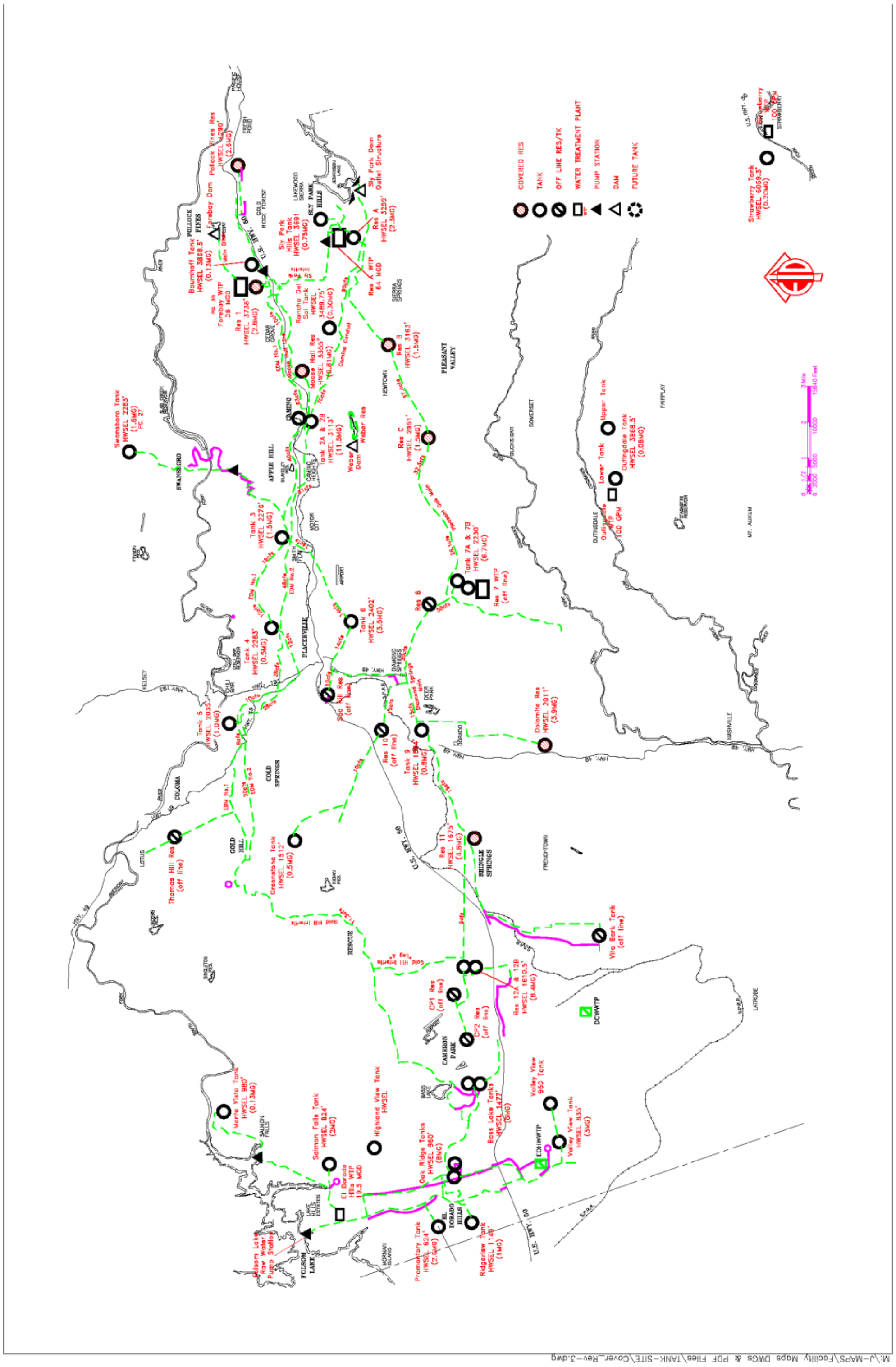


Figure 2– El Dorado Irrigation District Water System

Reclamation Relationships

The District has worked successfully with Reclamation to obtain and implement grant programs over the last 20 years. Some of the more recent grants include:

Water Conservation Field Service Program – Agreement 07FG2000042

- Residential/Multi-Family Toilet Replacement Voucher Project – $50,000 funded distribution of 400 high-efficiency toilets.

Water Conservation Field Service Program – Agreement 06FG204109

- Agricultural Urban Weather Stations – $13,750 funded the purchase and installation of two weather stations; one for agriculture and one for urban to identify microclimates that would benefit from added ET information within the District.
- Agricultural Soil Moisture Measurement – $7,500 funded an agricultural measurement project to compare moisture readings from in-ground soil moisture sensors to those received from a neutron probe. The project compared various sensors in a variety of soil types against the neutron probe.
- Smart Water Application Technology North American Initiative – $11,250 funded commercial landscape irrigation research and strategy development. Under contract with PMSI, their final report dated November 21, 2006 assisted EID and the region in understanding the specific needs and attitudes of CII property and facility managers towards weather-based irrigation controllers.

Urban Water Conservation Best Management Practices – Agreement 05FG201011

- EID Full System Water Audit (AwwaRF Study) – $5,000 assisted with the funding of a system-wide water audit for EID that was performed under contract with Water Systems Optimization. The audit used 2003 data, and the final report was issued in September 2005.
- Urban Water Management Plan Update – $5,000 assisted with the funding of the 2005 UWMP.
- CII ULFT & Waterless Urinal Rebate/Retrofit Program – $10,000 funded a water efficiency rebate and direct installation program during 2005 – 2007 for ultra-low flow toilets and waterless urinals for CII customers.
- Water Wise Gardening in the Gold Country Region – $10,000 funded a collaborative and regional effort to produce an interactive CD-ROM garden and plant database. The project was started in 2004, and the popular CD was distributed through 2010, after which the database was converted to web-based access.

Urban Water Conservation Best Management Practices – Agreement 04FG201036

- Residential/Multi Family High Efficiency Clothes Washer Rebates – $15,000 assisted with funding EID's residential HECW rebates during this period.
- CII SIC Code & Survey Program – $5,000 funded temporary labor to code CII water service accounts with their appropriate Standardized Industrial Codes; as well as surveying CII sites with GPS to determine irrigated areas.

Water Conservation Field Service Program – Agreement 03FG201028

- Ag & Urban Water Irrigation Training Program – $4,000 funded the training of two EID employees at the Irrigation Training and Research Center at California Polytechnic State University.
- Residential/Multi Family Water Efficient Clothes Washer Rebate – $5,000 funded approximately 100 high-efficiency clothes washer rebates for residential customers during this calendar year.
- Schools Waterless Urinal Retrofit Pilot Project – $6,000 funded a trial program of approximately 25 waterless urinal retrofits in schools receiving EID water service.

Technical Project Description

The specific goals of piping the Main Ditch (i.e., Project objectives) are to:

- improve the reliability of raw water conveyance and storage through conversion of an open ditch to a pressurized pipe using proven material and technology;
- construct conveyance improvements and metered turnouts to raw water customers;
- installing water service meters;
- conserve water lost through seepage, evapotranspiration and carriage;
- contribute to compliance with the State of California mandated 20% water conservation by 2020;
- maintain the capacity of raw water conveyance and storage to meet anticipated future demands;
- install SCADA components that allow remote monitoring and operation of raw water delivery;
- increase renewable hydroelectric power generation;
- assist the State of California in meeting its goal of 33% renewable energy production by 2020;
- improve/protect source raw water quality for downstream municipal water users; and
- reduce energy consumption and other costs for WTP operations/maintenance associated with sediment removal.

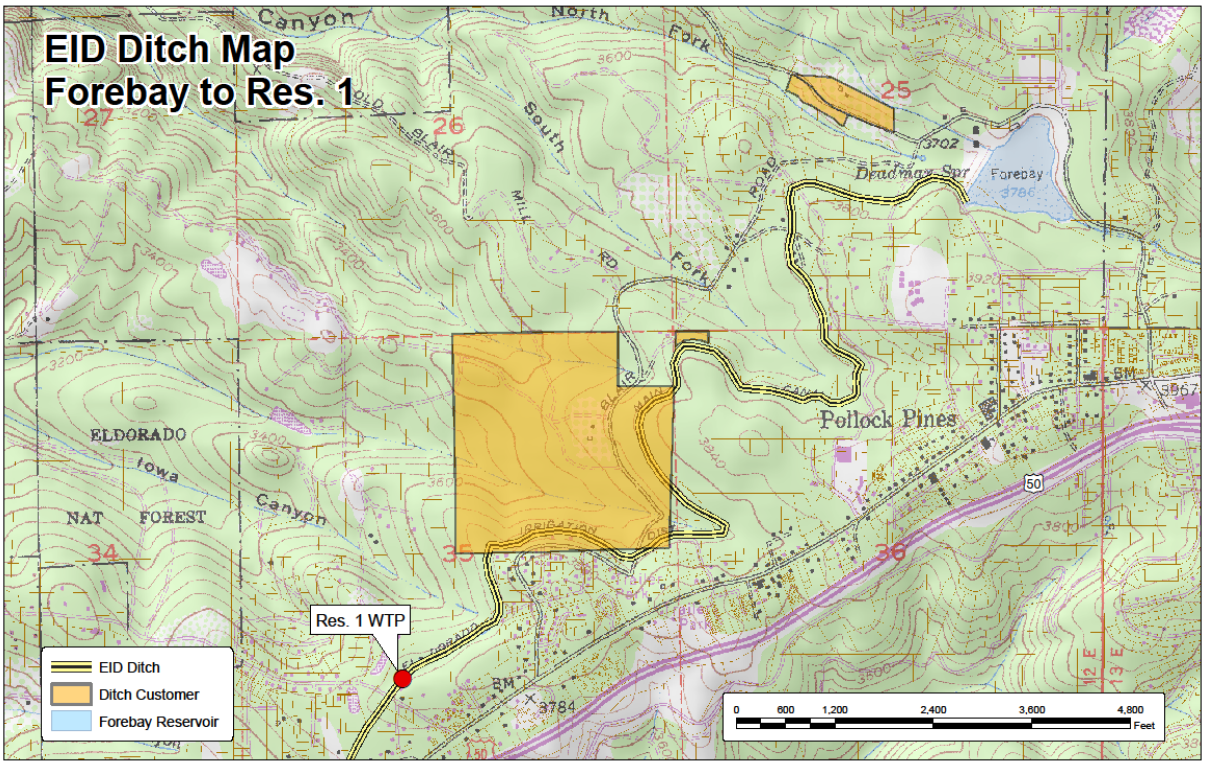
The Main Ditch was constructed in the mid 1870's and remains an unlined earthen ditch for most of its 3-mile length. Figure 4 provides a USGS map of the alignment of the Main Ditch from Forebay Reservoir to Reservoir 1 WTP and depicts the entire length of the ditch to be piped. Figure 5 shows the relationship of Forebay Reservoir diversion to the El Dorado Powerhouse and Reservoir 1 WTP and connection to the South Fork of the American River.

Carrying raw water through a rural setting, the Main Ditch runs adjacent to many homes and backyards. The ditch was originally a source of raw water to many customers, but over the years most have turned to potable water to meet their needs. Currently, there are three

remaining raw water customers along the 3-mile stretch prior to the WTP.

Because the Main Ditch is open, animals and humans have direct access to the water in the ditch prior to it reaching the Reservoir 1 WTP. All homes neighboring the Main Ditch rely on a septic system for waste disposal, as there is no public sewer collection system in the area. All sediment and impurities, such as coliform and debris that enter the waterway must be removed through the coagulation, sedimentation and filtration treatment processes at the Reservoir 1 WTP to produce potable water for consumptive use. In 2103, under a separate grant, the District surveyed the area for the locations of wells and septic systems adjacent to the ditch. The survey shows that many septic systems are directly adjacent to the ditch. That map and accompanying report is provided as Attachment C.

Figure 4 – Main Ditch Alignment



Flows at the point of diversion from Forebay Reservoir and the head works of Reservoir 1 WTP were collected and are summarized in Figure 6. The data shows that during the summer months (June – October), water losses are approximately 350 ac-ft or 5% of the summer flows. In addition, water quality sampling was conducted that shows the increase in turbidity, total coliform, and E-coli as the water travels through the earthen ditch to the Reservoir 1 WTP. Total coliform increases are summarized in Figure 7 and E-coli increases

are summarized in Figure 8.

Areas along the ditch have been subject to erosion and the accumulated sediment is transported to the Reservoir 1 WTP. See Photographs 1and 2 for examples of eroded banks. The Reservoir 1 WTP removes several hundred thousand pounds of solids from the treatment process each year. Based on turbidity comparisons at the Forebay Reservoir and the Reservoir 1 WTP, it is estimated that half or more of the solids come directly from ditch bank erosion. There are also crossings and bridges along the ditch alignment which are used by the general public for access to properties. Bank erosion has started to jeopardize the abutments for these crossings. At the bridge on Blair Road, a large diameter culvert, capturing storm and roadway drainage from the road and surrounding area, carries contaminates and sediment into the ditch. Examples are provided as Photographs 3 –5. Because of the open channel ditch, debris and sediment can enter Reservoir 1 WTP at the intake as shown in Photograph 6.

Figure 5 – Forebay Reservoir Water Diversions

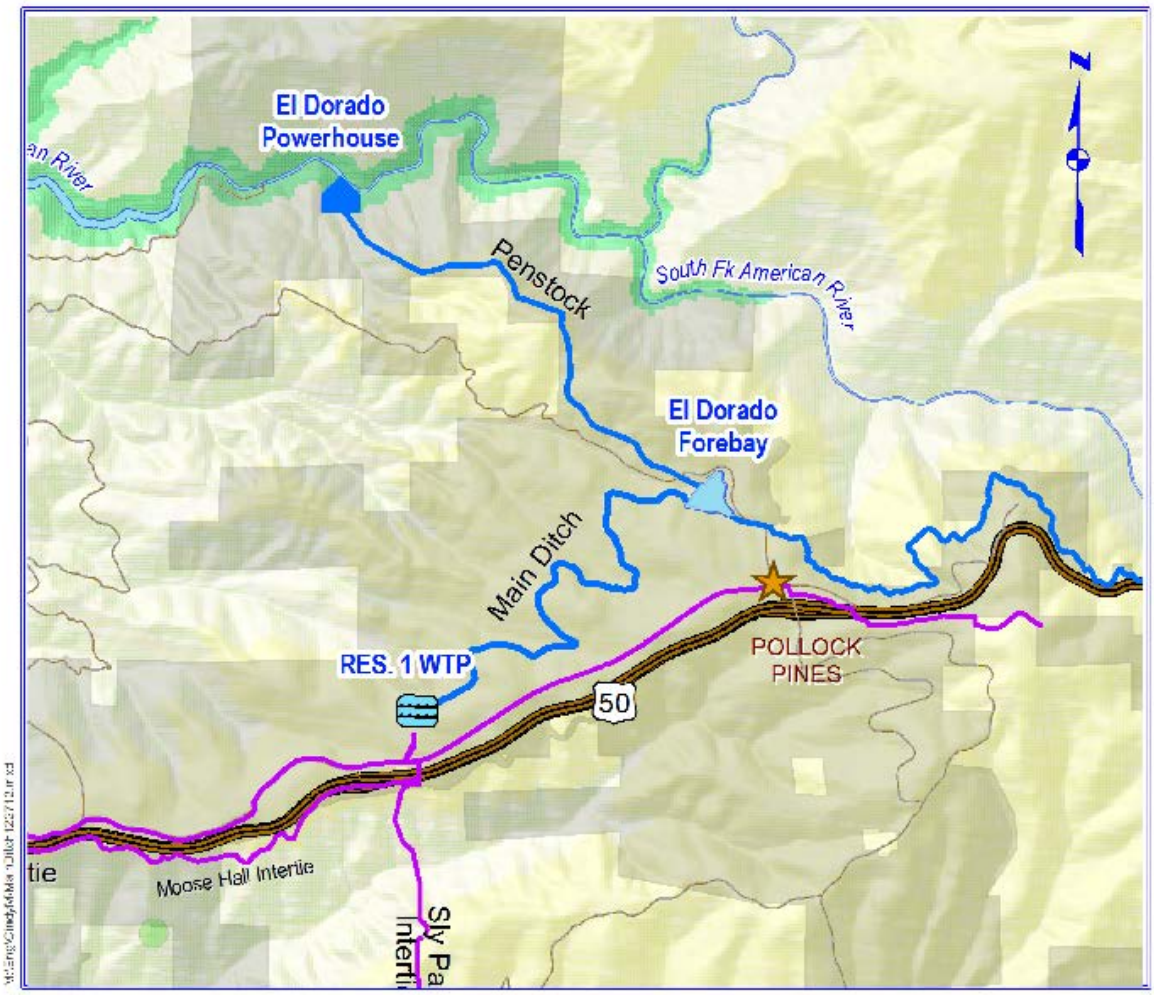


Figure 6 – Water losses from Forebay Diversion to Reservoir 1 WTP

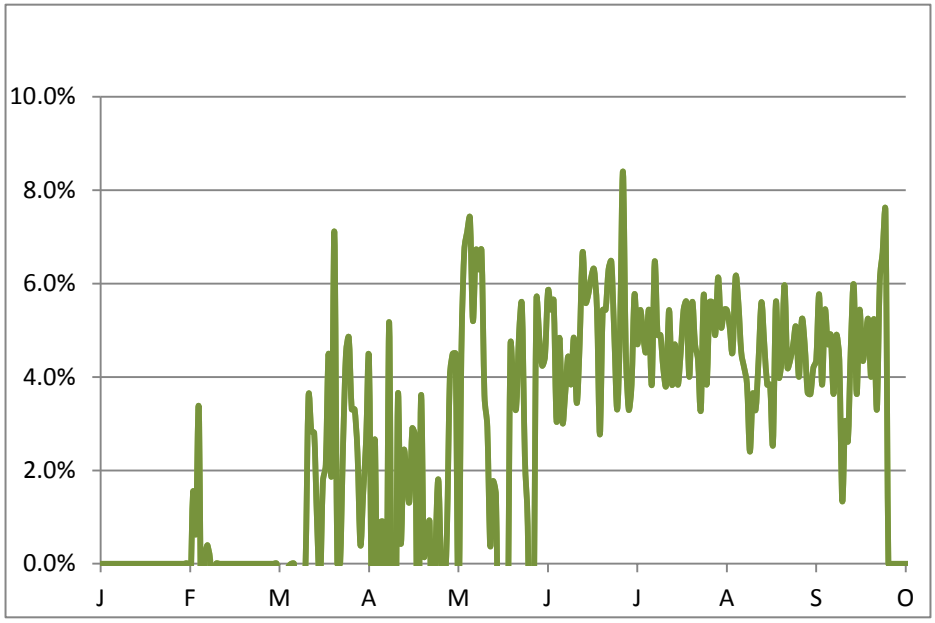


Figure 7 – Turbidity increases from Forebay Diversion to Reservoir 1 WTP

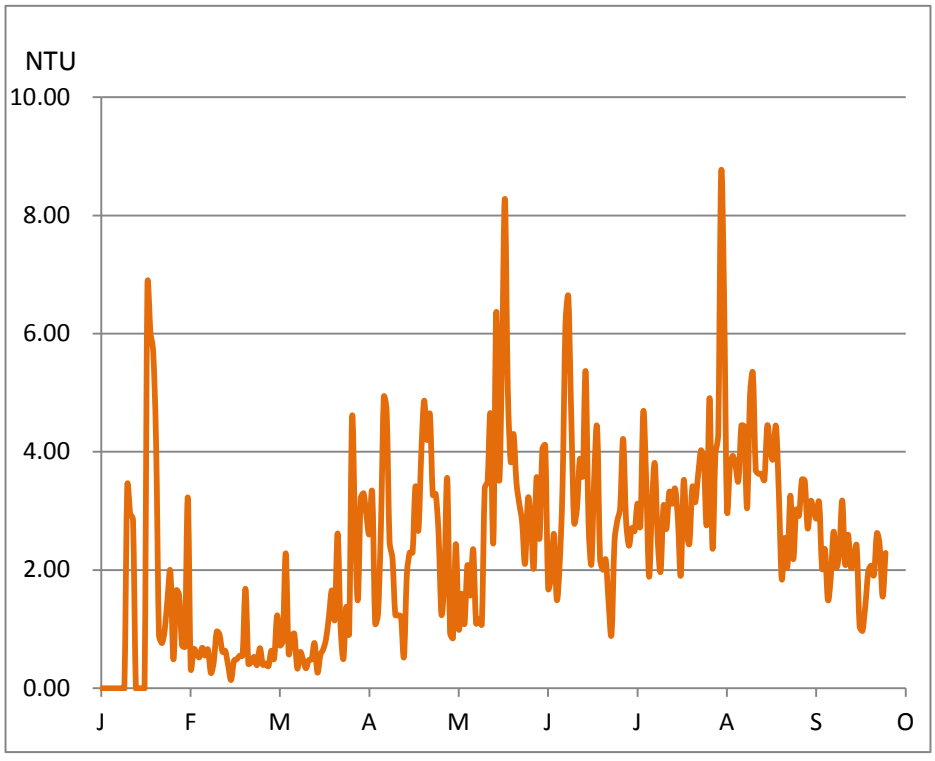


Figure 8 – Total coliform increases from Forebay Diversion to Reservoir 1 WTP

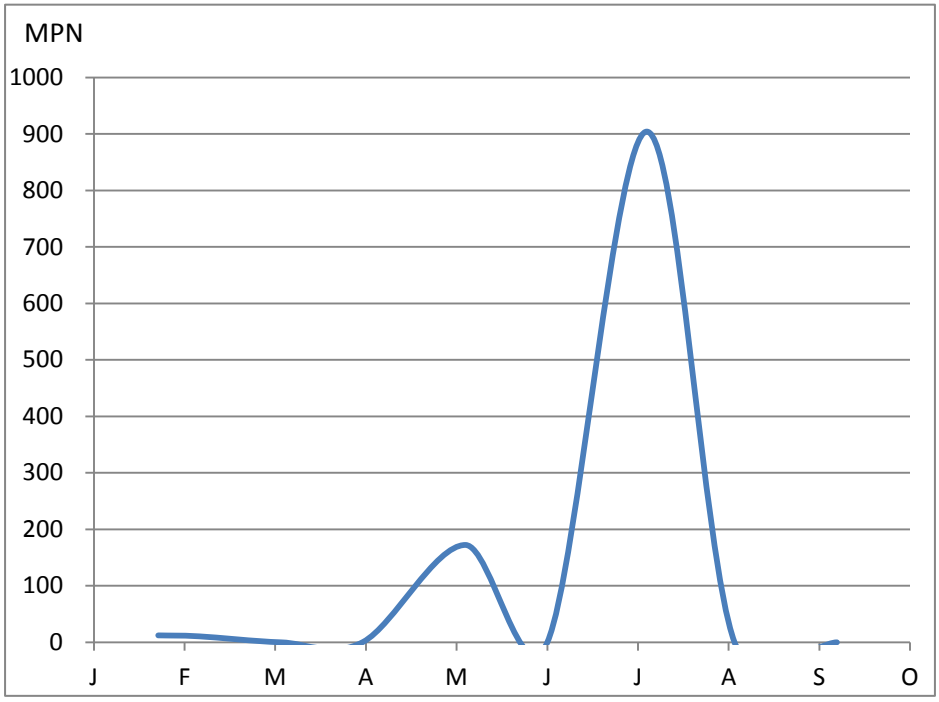
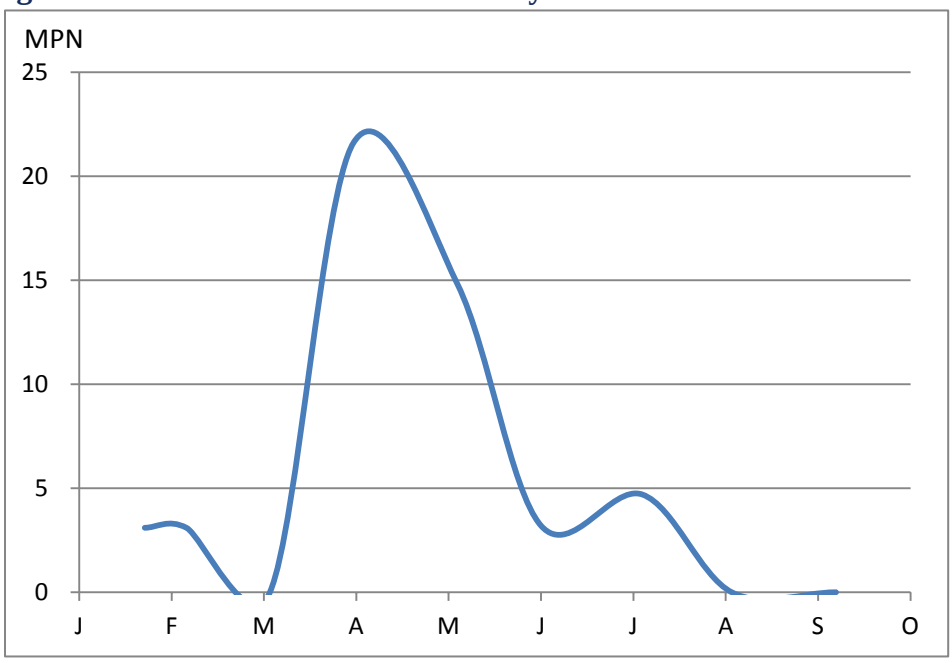


Figure 9 – E-coli increases from Forebay Diversion to Reservoir 1 WTP



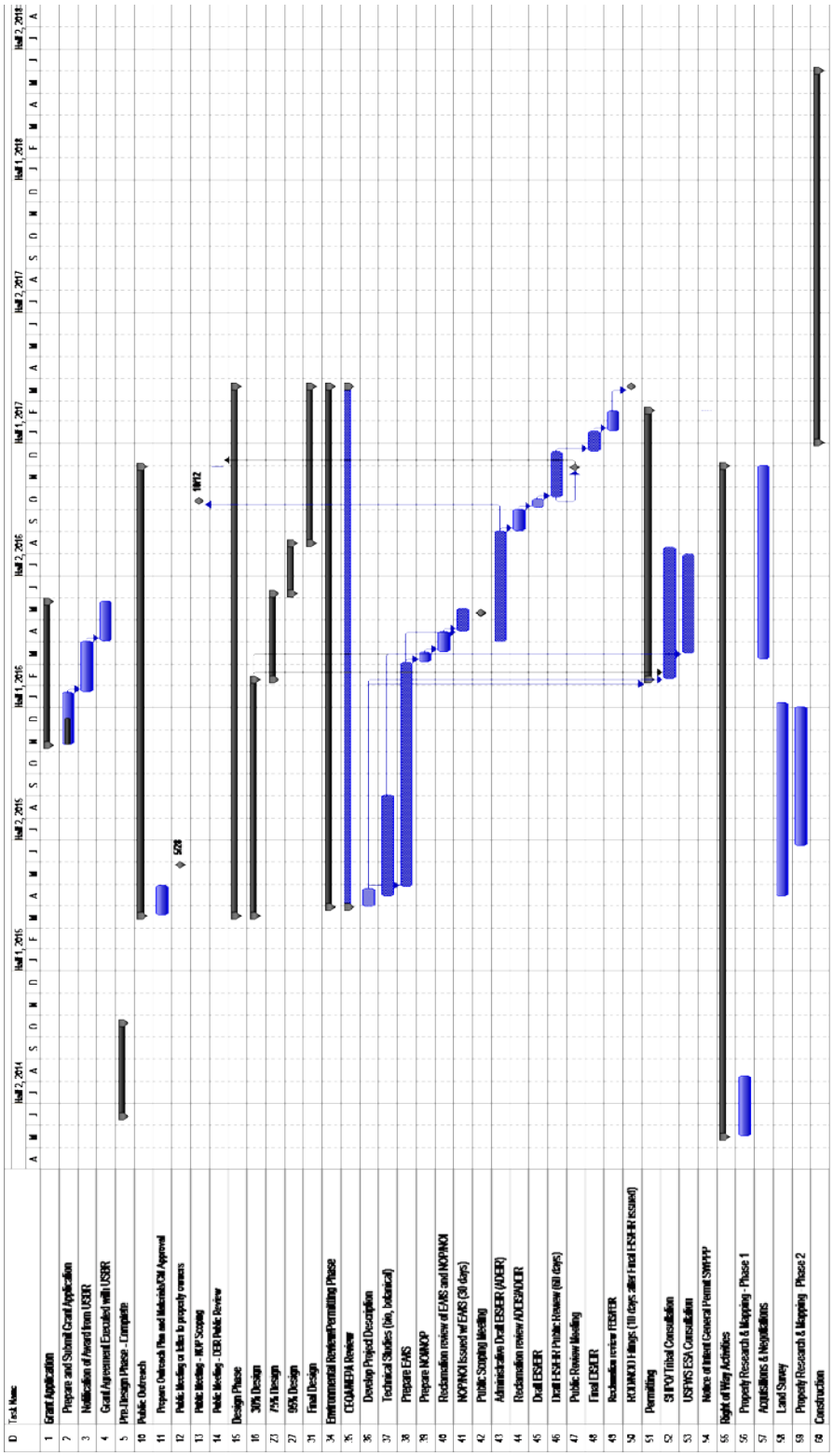


Figure 10 – Project Schedule

Photo1 – Ditch Section Adjacent to Backyard
Erosion undercutting wall of bank

Photo 2 – Erosion along Ditch Alignment with Rock Stabilization

Photo 3 – Culvert Pipe/Road Crossing

Photo 4 – Bridge Crossing – Erosion Jeopardizing Abutments

Photo 5 – Storm Drain Culvert Inlet
Street runoff enters raw water source in Ditch

Photo 6 – Intake at Reservoir 1 WTP

Construction Elements

Actual construction of the proposed 3 mile pipeline will be fairly simple, utilizing industry standard methods for bedding, joining, backfilling and testing the pipe. It is anticipated that the piping of the Main Ditch will include the following project components and will be refined with the full design which is now underway.

- Regrading and compacting of the ditch bed
- Installation of 15,000 lineal feet of 42-inch pipe
- Installation of appurtenances such as; access manholes, turnouts, meters, valves, etc.
- Relocation of existing storm drain connections
- Improvements to the outlet at Forebay Reservoir
- Improvements to the Reservoir 1 WTP headworks
- Installation of a new flow meter the Res 1 WTP headworks
- SCADA system automation for flow and water quality measurements
- Offsite drainage improvements

Construction tasks will be affected by the pipe trench design, site accessibility, and other factors. To prevent degradation of the proposed pipe due to root intrusion, all existing woody vegetation within 10-feet of the ditch will be removed. In addition, minor earthwork will be required to improve channel geometry, and prevent groundwater from undermining the pipe. The method employed for construction of the pipe will utilize heavy equipment to grade the ditch section to a uniform slope, fill areas that have eroded, and compact the soil to prevent settlement.

Progress of the project will be monitored throughout the process by the project manager who will be a California Registered Professional Civil Engineer. Continuous environmental compliance support will be provided by a District Environmental Review Analyst. Progress reports will be generated documenting activities, expenditures, and schedule updates. Weekly construction meetings will be held with the contractor and project team to coordinate activities. Inspection will be provided on a daily basis with detailed reports and photographs of construction activities. Milestones will be monitored and adjustments made as necessary. A scope of work for the entire project is provided below.

Scope of Work

Because the Main Ditch project is a larger, on-the-ground project, it is being conducted in over multiple years, as follows:

Phase 1	Design	Underway
Phase 2	Environmental Review/Permitting Process	Underway
Phase 3	Construction	Summer 2017 – Spring 2018

Each phase of the project is expected to be substantially complete within the timeframes outlined in the schedule and funding requirements will be requested annually, for a period of up to 2 years from grant award. Details of the Scope of Work for each phase are described below.

Phase 1 – Design

Task 1 – Grant Administration and Management

This task will focus on overall project administration and management of tasks associated with the project. A project manager (PM) will be responsible for reporting to Reclamation and updating project status, as well as significant milestones and deliverables achieved. The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the objectives of the project on time and within budget.

1.1 Select Consultants

EID will prepare requests for proposals using standard procedures and policies for all work to be performed by consultants. Selection will be based on experience, scope of work, and costs.

1.2 Prepare Financial Reports

Financial reports will be prepared by the PM using the SF-425, Federal Financial Report, at the interval required by Reclamation. The reports will provide sufficient detail for Reclamation to approve of all expenditures.

1.3 Prepare Program Performance Reports

The objectives of this task are to summarize activities performed during the reporting period, to compare actual accomplishments to milestones, provide reasons why established milestones were not met, provide status of milestones, discuss schedule and budget activities, and to form the basis for determining whether invoices are consistent with work performed. The performance report will be submitted semi-annually.

1.4 Prepare Final Report

A final report will be prepared by the PM in a format acceptable to Reclamation and will

summarize activities performed during the duration and provide the amount of water conserved. The report will provide sufficient detail to show how the project objectives and goals were met.

1.5 Monitor Budget

The PM will monitor expenditures and match funding. Financial reports will be prepared by the PM using the District financial system. The reports will provide sufficient detail for Reclamation to approve of all expenditures.

Deliverables: Financial and Program Performance Reports, Consultant Contracts, and Final Report

Task 2 – Right-Of-Way Activities

Under funds provided in a separate grant, the District has prepared a map outlining all parcels adjacent to the Main Ditch and has prepared a Basis of Design Report. Property title research has also been completed that will be used for ownership information and easement acquisition. A topographic survey is underway that will be used to prepare the detailed design of the project and execution of easement. This task will work to acquire easements for new alignments or where insufficient easements exist for current alignments as applicable to the project site construction.

2.1 Perform land survey for ditch alignment

2.2 Perform title research of parcels

2.3 Determine easement acquisition needs

2.4 Property Valuation: appraisal of land value associated with acquisition needs

2.5 Review property valuations

2.6 Prepare all legal documents associated with each proposed easement acquisition

2.7 Conduct negotiations with property owners associated with all required easements.

Deliverables: Land survey, preliminary title reports, map of parcels, land value appraisals, legal documents, and fully executed grants of easement (48 parcels assumed)

Task 3 – Conduct Well and Septic System Investigation

Under a prior grant, a map was prepared identifying wells and septic systems in the adjacent area through the use of El Dorado County records and on-site surveys. A final report was prepared identifying the location of each well and septic system in relationship to the ditch

alignment. See Attachment C.

Deliverables: Well and septic system report and map

Task 4 – Determine Pre-Project Water Accounting

One of the early tasks of this project is to estimate the water conservation component for the ditch segment. Flow was and will continue to be measured at the Forebay Reservoir diversion point (gage A18) and at the Reservoir 1 WTP inlet. The flow measurements are remotely monitored by SCADA, and logged at periodic intervals. All outflow connections along the three mile stretch are metered.

Baseline water delivery quantities and unaccounted-for water levels will be determined with in-ditch flow monitoring equipment and water balance calculations. This information coupled with post-project accounting will confirm actual versus estimated water savings.

4.1 Estimate potential water savings

4.2 Quantify existing ditch seepage through inflow/outflow data

4.3 Prepare water accounting report

Deliverable: Water Accounting Report

Task 5 – Engineering Plans

Under a separate grant, a Basis of Design Report (10% level of design) has been completed, which lists the design parameters, identifies the piping methods, alignment, recommended materials for construction, and criteria for final design. A 30 % design technical memorandum is currently being prepared that is addressing construction issues and one alternative alignment that may be less costly. This task involves developing environmental exhibits for environmental review documentation and permits based on the design parameters will be developed for use in the environmental phase of the work. Plans and specifications for bidding will be prepared based on the final 30% technical memorandum.

5.1 Prepare Environmental Exhibits

5.2 Prepare 30% Technical Memorandums

5.3 Prepare 50% Plans and Specifications

5.4 Prepare 90% Plans and Specifications

5.5 Prepare final bid documents

5.6 Prepare Environmental Exhibits

5.7 Prepare 30% Technical Memorandums

5.8 Prepare 50% Plans and Specifications

5.9 Prepare 90% Plans and Specifications

5.10 Prepare final bid documents

Deliverables: Environmental exhibits, 30% documents, 50% documents, 90% documents, and final bid documents

Phase 2 – Environmental Review/Permitting Process

A key measure of the success of the project will be achieved through the environmental review, permitting, and public outreach processes. The public, as well as applicable federal, state, and local resource and permitting agencies must be satisfied that all environmental constraints are being addressed to the maximum extent practicable while still accomplishing the stated project objectives. Therefore a significant effort must be and has already been dedicated to the environmental and public outreach activities. The resources to complete the environmental review are fully accounted for in the schedule and cost breakdown provided in this proposal.

Task 6 – Federal and State Environmental Review

Reclamation will be the lead federal agency for this project under the National Environmental Policy Act (NEPA). As such, the NEPA environmental review process will follow Reclamation's most recent NEPA Handbook (February 2012 or its successor). In addition to the NEPA review requirement associated with funding of the federal action from Reclamation, a California Environmental Quality Act (CEQA) environmental review process must be completed by EID as the lead public agency within the state of California. This CEQA documentation will also be used, if necessary, by the resource agencies acting as CEQA responsible agencies when issuing their respective approvals and/or permits for the project. At this time it is anticipated that the environmental review process will be completed

as a joint NEPA/CEQA document and will include combining NEPA/CEQA public review and meetings, as applicable.

As a federal undertaking, the project will also require compliance with other applicable federal regulations including, among others, Section 106 of the National Historic Preservation Act and Section 7 of the Endangered Species Act. Reclamation will act as the lead federal agency for these processes. However, EID will prepare the appropriate documentation on Reclamation's behalf for review and approval given our extensive experience in completing these processes in support of Reclamation on previous projects as well as additional projects for the Federal Energy Regulatory Commission and U.S. Forest Service. To this end, under a separate grant EID has completed a full cultural resources evaluation of the project area including consultation with the Native American Heritage Commission. This report will facilitate completion of Task 7.1 below. Additionally, EID has also conducted a protocol-level habitat assessment for California red-legged frog, which determined this species has a low potential to occur on the project site. This assessment will facilitate completion of Task 7.2 below. Finally, EID has conducted a wetland delineation of the anticipated project area including likely staging areas, which determined that no jurisdictional waters will be affected by the project

In addition to those regulations outlined above, EID will also work closely with Reclamation to address compliance with the following regulations for the Project consistent with the Reclamation NEPA Handbook: Clean Water Act, Clean Air Act, Fish and Wildlife Coordination Act, Magnuson-Stevens Fishery Conservation and Management Act, Migratory Bird Treaty Act, Indian Trust Assets, Indian Sacred Sites, Pollution Prevention, Environmental Justice, Executive orders, and other tribal, state, and local laws, rules, and regulations as they apply to the project. Based upon EID's understanding of the environmental setting, it is not anticipated that additional detailed analysis will be required to demonstrate compliance with these regulations.

The following subtasks outline how EID will work with Reclamation to prepare a joint NEPA/CEQA document and conduct the appropriate public review and outreach processes. These subtasks will also illustrate how the required technical studies and environmental consultations will be completed and how the anticipated permits will be obtained. Based upon EID's understanding of the environmental setting, it is anticipated that the NEPA process will either be completed with an Environmental Assessment/Finding of No Significant Impact (EA/FONSI) or Environmental Impact Statement/Record of Decision (EIS/ROD) and the CEQA process will be completed with Initial Study/Negative Declaration (IS/ND) or an Environmental Impact Report/Notice of Determination (EIR/NOD). For the purposes of this scope of work it is assumed that Reclamation will prepare an EIS and EID will prepare an EIR for this project. However, the final determination will be made by Reclamation and EID, respectively, after each agency conducts its own independent analysis of the project in the EA/IS.

6.1 Environmental Assessment/Initial Study

EID will prepare a combined EA/IS of the proposed action to inform the public of potential environmental impacts associated with action. The EA/IS will identify potentially significant environmental effects that will be carried forward for further analysis in the EIS/EIR. Alternatives to the proposed action as well as the purpose and need of the action will be discussed to meet NEPA requirements. Additionally, in other locations where the NEPA and CEQA implementing regulations differ, the more conservative approach will be followed in the document to ensure the document's legal defensibility. EID will provide an administrative draft of the EA/IS to Reclamation with adequate time for review and comment prior to public circulation by either agency as described below.

EID will maintain regular communication with Reclamation during preparation of the EA/IS to ensure a clear understanding of the scope of the analysis and level of detail, develop feasible and effective mitigation if appropriate, and maintain schedule. The following steps will be completed during this subtask: collect and review existing documentation; conduct project site inspection with Reclamation, if desired; prepare the NEPA/CEQA project description; prepare draft EA/IS checklist for review and comment; and prepare final EA/IS for public circulation.

Deliverables: Draft EA/IS, Final EA/IS

6.2 Technical Studies

Cultural Resources Inventory and Evaluation

Under a separate grant, EID retained a qualified archeologist meeting the Secretary of Interior's standards to complete a full inventory and evaluation of all potential resources that may be present within the project area including: pedestrian survey, site recording, records search at the Northern California Information Center (NCIC), sacred lands search through the Native American Heritage Commission (NAHC), and outreach to groups and individuals identified by the NAHC, and evaluation for eligibility to National Register of Historic Places (NRHP) or the California Register of Historic Resources (CRHR). The evaluation included within this report determined that the only resource identified in the project area, the Main Ditch, does not meet the eligibility requirements for inclusion on either the NRHP and/or CRHR. The results of this evaluation will be incorporated into the EA/IS and Draft EIS/EIR.

Deliverable: Cultural resource inventory and evaluation report (complete). See Attachment D.

Wetland Delineation

Under a separate grant, EID retained a qualified and trained botanist to conduct a wetland delineation following the *1987 Corps of Engineers Wetlands Delineation Manual* (USACE, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACE, 2010). The delineation, which included the proposed pipeline alignment as well as all potential staging areas and appropriate buffers, determined that no jurisdictional waters will be affected by the project. Through an approved jurisdictional determination the Army Corps of Engineers Sacramento District Regulatory Program has verified the findings (SPK-2013-00049). The results of the delineation will be incorporated into the EA/IS and Draft EIS/EIR.

Deliverable: Wetland delineation of project area and approved jurisdictional determination (complete). See Attachment E.

Botanical Survey

Under this subtask a qualified botanist will survey the main ditch and potential staging areas to confirm the lack of potentially sensitive plant species as indicated by previous database searches and the plant species noted during the wetland delineation of the full project alignment and staging areas. This survey will be conducted at the appropriate time of spring during maximum bloom when the chances of detecting unanticipated species are greatest. The results of this survey will be incorporated into the EA/IS and the survey report will be included as a technical appendix to the Draft EIS/EIR.

Deliverable: Botanical survey report

California Red-Legged Frog Habitat Assessment

Under a separate grant, EID retained a qualified biologist to conduct a habitat assessment of the project area for California red-legged frog utilizing current United States Fish and Wildlife Service protocols (USFWS, August 2005). The habitat assessment found that California red-legged frog has a low potential to occur on the project site. Potential nonbreeding aquatic habitat is located in and adjacent to the project area; however, because of the lack of suitable breeding habitat and the presence of dispersal barriers and isolation from known occurrences of the species, the project area is unlikely to support a permanent population of California red-legged frog. The results of this assessment will be incorporated into the EA/IS and the assessment will be included as a technical appendix to the Draft EIS/EIR.

Deliverable: California red-legged frog habitat assessment (complete). See Attachment F.

6.3 Notice of Preparation/Notice of Intent (NOP/NOI) and Public Scoping Meeting

EID will prepare draft and final public review materials for distribution/publication including but not limited to the NOP/NOI and the Federal Register notice. EID will consult with Reclamation during preparation of the NOP/NOI and incorporate comments from Reclamation into the draft materials and prepare final materials for EID's and Reclamation's respective noticing. EID will then distribute the NOP/NOI together with the EA/IS as appropriate consistent with each agency's noticing requirements. EID and Reclamation (if desired) will then conduct a public scoping meeting within the 30-day NOP/NOI review period.

Deliverables: Draft NOP/NOI, Final NOP/NOI, public scoping meeting and materials, Federal Register preparation, and distribution of Final EA/IS and NOP/NOI

6.4 Draft EIS/EIR and Public Review Meeting

EID will prepare a draft EIS/EIR for public review. Initially, EID will prepare an administrative draft for review by Reclamation. EID will then incorporate all comments received from Reclamation on the administrative draft to ensure the draft EIS/EIR meets Reclamation standards and requirements for public circulation. EID will prepare the Notice of Completion (NOC) / Notice of Availability (NOA) for the Draft EIS/EIR and will deliver copies of the document together with the NOC to the State Clearinghouse to initiate the CEQA public review period. EID will also prepare hard and electronic copies of the joint document and the Federal Register notice to assist Reclamation with the NEPA public review. EID and Reclamation (if desired) will also hold a public review meeting during the review period to facilitate public input on the project.

Deliverables: Draft EIS/EIR, NOC/NOA, public review meeting and materials, Federal Register preparation, and distribution of draft EIS/EIR

6.5 Final EIS/EIR

Following closely after the NEPA and CEQA public review periods, EID will sort and catalogue the comments received according to subject and then meet with Reclamation to review the comments and develop a general strategy for preparation of responses. EID will then prepare the Final EIS/EIR consisting of comments received on the Draft EIS/EIR and written responses; text edits, which will include: additions, corrections, and deletions made to the Draft EIS/EIR shown in strikeout and underline text; technical appendices; and Mitigation Monitoring and Reporting Plan (MMRP) for CEQA purposes. EID will also prepare a draft NEPA Environmental Commitments statement. All documents will be submitted to Reclamation for review to ensure all NEPA requirements are met.

Deliverables: Final EIS/EIR, MMRP, NEPA Environmental Commitments Statement

6.6 NEPA/CEQA Project Approval

Following completion of the Final EIS/EIR, EID will prepare a draft Record of Decision (ROD) for Reclamation's review. EID will then prepare a final ROD for Reclamation signature and publishing as appropriate. EID will also prepare a Notice of Determination (NOD), which will be filed with the county clerk and State Clearinghouse following EID Board of Directors CEQA approval of the project.

Deliverables: Draft and Final ROD and NOD

Task 7 – Environmental Consultations and Permitting

This task includes the anticipated environmental consultations and permitting requirements associated with the project. As described in Task 6.2, this list has been streamlined due to the previously completed cultural resources evaluation, California red-legged frog habitat assessment, and wetland delineation. The cultural resources inventory and evaluation concluded that there are no resources meeting the NRHP and/or CRHR listing eligibility requirements within the project area. The California red-legged frog habitat assessment concluded this species has a low potential to occur on the project site. Additionally, the wetland delineation recently completed in anticipation of this grant proposal submittal determined that no jurisdictional waters will be affected by the project.

7.1 NRHP/CRHR Evaluation, Section 106 NHPA, and Tribal Consultation

As the lead federal agency for the action, Reclamation will be required to comply with Section 106 of the National Historic Preservation Act (Section 106) regarding potential effects to listed or eligible properties for listing to the NRHP. EID maintains extensive experience in these evaluations due to the authority granted by the Federal Energy Regulatory Commission (FERC) for EID to consult with the State Historic Preservation Officer (SHPO) for EID's Hydroelectric Project 184 in addition to experience obtained through projects requiring Reclamation or United States Forest Service approval. As such, this expertise will facilitate preparation of the necessary documentation for Reclamation to comply with Section 106.

As outlined under Task 6.2 above, under a previous grant EID conducted a thorough cultural resources inventory and evaluation for eligibility for listing of identified resources on the NRHP and CRHR. Upon Reclamation's acceptance, these documents are ready to be submitted to the SHPO for concurrence.

Under this task, EID will also assist Reclamation in completing the tribal consultation required for the federal undertaking. In preparation for this grant proposal submittal, EID has already completed a cultural resources evaluation including submittal of a Sacred Lands Search request to the Native American Heritage Commission (NAHC). No sacred

lands were identified within the project area. Letters were submitted to interested groups and individuals identified by the NAHC; no responses were received.

Deliverables: NCIC records search results, NAHC sacred lands search and letters, pedestrian survey report, completed SHPO site recordation forms, and eligibility evaluation report (all complete), as well as draft tribal consultation letters.

7.2 Section 7 ESA

As the lead federal agency for the action Reclamation will be required to comply with Section 7 of Endangered Species Act (ESA) regarding potential effects to threatened or endangered species as well as their designated critical habitat, if applicable. EID will utilize its extensive experience in preparation of biological assessments (BA) for water-related actions with Reclamation to prepare a BA for consultation with the U.S. Fish and Wildlife Service (USFWS) regarding potential effects of the project to listed species or their designated critical habitat. Given the location of the project and lack of potential for listed salmonids to be present in the project area, no consultation with National Marine Fisheries Service is proposed as part of the project. However, Reclamation will make the final determination whether a no effect determination is appropriate.

An administrative draft BA will be prepared for Reclamation review. Using those comments received on the administrative BA, EID will finalize the BA for Reclamation to provide to USFWS. Reclamation will transmit the final BA to USFWS and request concurrence. EID will assist Reclamation by providing any additional information USFWS requests to complete the consultation. Additionally, EID will maintain regular communication with its regular USFWS staffing contacts throughout the duration of the consultation to ensure timely review and evaluation of the BA. Given EID's extensive experience with ESA consultation in this geographic area, it is anticipated that informal consultation will be appropriate and USFWS will issue a concurrence letter in lieu of a biological opinion for the project.

Deliverables: Administrative draft BA, Final BA

7.3 Storm Water Pollution Prevention Plan (SWPPP)

Due to the amount of ground disturbance associated with the project, the District will apply to comply with the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities from the State Water Resources Control Board (Storm Water Pollution Prevention Plan or SWPPP).

Deliverable: Notice of Intent to comply with Permit 2009-0009 and SWPPP

Phase 3 – Construction

Task 8 –Bid Process and Contractor Selection

This task will complete the bid process for obtaining a licensed engineering contractor to perform the work associated with construction of the project. Contractors will be screened through a pre-qualification process and solicited for bid. A pre-bid meeting will be held which will allow all potential bidders to view the project site and provide questions regarding the work. The lowest responsive responsible contactor bid will be recommended to the Board of Directors for award and a contract will be executed.

Deliverable: Executed construction contract

Task 9 – Construction

This task involves the construction of the project and the construction management and administration related activities. Construction Management activities include the following:

9.1 Conduct weekly construction meetings

9.2 Review submittals and requests for information

9.3 Approve construction change orders

9.4 Oversee inspection work

9.5 Periodic site visits

9.6 Specialty inspections

Deliverable: Weekly construction meetings, submittal review, RFI response, change order review, and completed construction project

Task 10 – Post-Project Monitoring and Water Accounting

At the end of construction, flow monitoring will be conducted between Forebay Reservoir and Reservoir 1 and compared to water losses before construction to determine the amount of water conserved. This final assessment will be memorialized along with a comprehensive report complete with picture documentation to assess the final success of the project.

This task will include post-project inspection and determination of actual water savings by comparing baseline delivery quantities and unaccounted-for water levels with actual water savings resulting from the project. All newly constructed pipe and piping will be monitored for leakage and water quality at the inlet/outlet of the structure. Water quality parameters at the water treatment plant will be compared with pre-project data. Estimates of treatment

related chemical savings and savings resulting from reductions in the amount of solids removed and handled will also be evaluated.

10.1 Calculate post-project benefits

10.2 Review water quality data

10.3 Conduct water flow measurements

10.4 Prepare post-project report

Deliverables: Post-project report describing the post-project benefits and water quality and quantity outcomes.

Evaluation Criteria

Evaluation Criterion A: Water Conservation

Subcriterion No. A.1 – Water Conservation

This project is piping of an earthen canal and has easily quantifiable criteria for evaluation of sustained water savings and improvements to water quality, reduction of water treatment costs, reduced solids handling requirements, and improved water management. Responses to Subcriterion No. A.1 and A.2 are provided as follows:

Subcriterion No. A.1 – Quantifiable Water Savings

Conversion from open stream gages to in-line flow meters with accuracies of less than 1% error will increase the precision and accuracy of flow measurements, helping to quantify and better manage transport of almost one third of the District's water source. As a direct result of piping of the Main Ditch, conservation of approximately 1,300 ac-ft of raw water annually, which is otherwise lost to seepage and evapotranspiration, can then be used for consumptive purposes at the Reservoir 1 water treatment plant (WTP), to generate renewable hydroelectric energy at the El Dorado Powerhouse, and later to offset the need for new supplies to meet projected growth.

Estimates of water losses were performed by independent professional engineering consultants in 1977 (**Attachment B**) during the preparation of an Environmental Impact Report for the Main Ditch and by trained EID staff in 2012. Water losses have also been quantified during the summer months based on SCADA readings and weir measurements. Please see **Figure 6** for details on the water loss field measurements performed. Perc tests along the ditch and permeability modeling were also performed in 2015 (**Attachment B**) that confirm the physical measurements of loss are within the theoretical bounds of what would

be expected give soil type and ditch conditions.

The 5-year average annual supply from this water source is 11,500 ac-ft delivered to the Reservoir 1 WTP. This facility treats water diverted from the South Fork American River via Forebay Reservoir and supplies up to 26 mgd of potable water to customers throughout the service area. Because of this integrated water system network, water from the Reservoir 1 WTP can be supplied down to the El Dorado Hills area, which can reduce the need for pumping of water from the Reclamation Folsom Reservoir. A map of the water system is provided as **Figure 3.**

(1) Canal Lining/Piping

This Main Ditch piping project will result in water savings by elimination of current ditch seepage and evapotranspiration. The estimated average annual water savings that will result from the project has been determined to be 1,300 ac-ft annually (see discussion above). The expected post-project losses are expected to be near zero, since the entire open unlined earthen ditch will be piped as a closed system. Canal loss reduction will be verified by comparing SCADA data at the beginning of the ditch and SCADA data from a new full bore magnetic meter installed within the pipeline at the end of the ditch.

Under full annual diversion of 15,080 ac-ft, annual losses are estimated at 445 ac-ft per mile. Actual ditch flows will continue to be measured using SCADA readings to compare beginning and end point diversion amounts. Piping will be constructed using approximately 15,400 lf of 42-inch diameter PVC pipe and appurtenant isolation and air valves, blow offs and meters. New valve structures will be constructed at the beginning and end of the ditch. Design and construction will conform to American Water Works Association and EID Design and Construction Standards.

Turbidity, total coliform, and E-coli were measured at both the diversion and 3-miles downstream at the inlet to the Reservoir 1 WTP. The measurements show the trend of decreased water quality along the 3-mile stretch before entering the WTP, all a result of soil erosion impacting water quality, increased water color from deteriorating leaves and organic matter, and greatly increased levels of bacteria and coliform. See **Figures 7 – 9**. Turbidity increases, a measure of water clarity implies increased treatment costs solids handling requirements. Measured in nephelometric turbidity units (ntu), turbidity is easily monitored via traditional instrumentation and linked to SCADA monitoring.

(4) SCADA and Automation

Closed pipe systems lend themselves to easy installation of full diameter flow meters with accuracies of within 0.5 to 1.0 percent. SCADA and automation components for flow measurement will be included in the design and construction of the project to confirm the reduction of water losses. Instrumentation for measurement of water quality is in use at the

water treatment plant and will remain in service for evaluation and performance monitoring. These systems will allow confirmation of the water savings actually received at completion of the project construction. Operational losses are anticipated to be reduced to zero, as no seepage or evaporation will occur with installation of the pipe.

The SCADA automation will allow flow and water quality measurements to be captured and logged into the database system or be viewed by operations staff in real-time. Real-time data allows operations to respond to issues or changes in the system quickly, thereby maintaining water supply and quality to our customers.

Subcriterion No. A.2 – Percentage of Total Supply

The percentage of water supply conserved is estimated to be 9% when the total Forebay water supply is conveyed through the Main Ditch annually for consumptive and irrigation uses.

$$\frac{\text{1,300 ac-ft Annual Estimated Amount of Water Conserved}}{\text{15, 080 ac-ft Annual Water Supply}} = \mathbf{9\%}$$

The percentage of water supply conserved compared to overall District water supply firm yield is approximately 2%.

$$\frac{\text{1,300 ac-ft Annual Estimated Amount of Water Conserved}}{\text{63,500 ac-ft Annual Water Supply}} = \mathbf{2\%}$$

Evaluation Criterion B: Energy-Water Nexus

Subcriterion No. B.2 – Implementing Renewable Energy Projects Related to Water Management and Delivery

The capacity of the existing El Dorado Powerhouse is 21 MW of renewable hydroelectric energy as identified in the current license for the El Dorado FERC Project 184 (Project 184). Water conserved as a result of piping the ditch can diverted to the Project 184 powerhouse.

The amount of energy that can be generated by the water conserved is equal to 780 Megawatt-hour (MWhr) annually. This calculation is based on the efficiency rating of the El Dorado Powerhouse of 0.6 ac-ft/MWhr.

0.6 ac-ft/MWhr x 1 ,300 ac-ft Annual Water Conserved = **780 Megawatt-hour**

This is enough energy to serve more than 100 households with certified renewable energy. The hydroelectric power generated at the El Dorado Powerhouse is sold under contract to

PG&E and will assist them in meeting the State of California mandate of holding an energy portfolio that includes 33% renewable energy by the year 2020.

All water that passes through the El Dorado Powerhouse is sent back into the South Fork American River (providing in-stream environmental benefits), eventually entering Folsom Reservoir. No water consumption is necessary for the production of the certified renewable energy. **Figure 5** depicts the flow of water through the system, which eventually returns to Folsom Reservoir, a Reclamation facility.

Subcriterion No. B.2 – Increasing Energy Efficiency in Water Management

Energy efficiencies that are expected to result from implementation of the project include reduced pumping needs. Current operations require water to be pumped from Folsom Reservoir into El Dorado Hills at a cost of more than $178 per ac-ft. Long term, this pumping need can be greatly reduced through the conservation of 1,300 ac-ft annually.

Because the integrated water system, as described previously, can provide gravity water to El Dorado Hills, the 1,300 ac-ft of conserved water can be delivered by gravity rather than being pumping from Folsom Reservoir. The current pumping requirement at Folsom Reservoir is approximately 650 kWh per acre-foot for the pumping equipment shown in the following table.

Facility	# of Pumps	Size
Folsom Raw Water Pump Station	2	100 HP
	3	200 HP
El Dorado Hills Water Treatment Plant		
820 Zone	3	125 HP
960 Zone	2	150 HP

Energy consumption at the Folsom Raw Water Pump Station and the El Dorado Hill WTP can be reduced by 845MWh/yr annually and save over $230,000 in electrical costs. Energy use associated with treatment is not included in these values.

650 kilowatt-hour/ac-ft x 1 ,300 ac-ft Annual Water Conserved = **845 MW-hours**

The project will also reduce vehicle miles driven each year to dispose of sediment that is picked up along the earthen ditch that will be piped. In 2014, 3,468 vehicle miles were driven to dispose of 385 tons of sediment resulting from conveyance of 8,900 acre-feet of water (**Attachment N**). It is estimated that the amount of sediment will be reduced by 50% based on the difference in turbidity at the beginning of the ditch compared to the end of the ditch. At delivery of the full 15,080 water entitlement, the extrapolated sediment quantity is estimated to be 652 tons of sediment that would have to be trucked. The resultant annual and life cycle (100 years) carbon dioxide equivalent in metric tons is shown in the following table.

Annual Delivery (acre-feet)	**Sediment** (tons)	**Mileage**	**Annual Greenhouse Gas Reduction** ($MTCO_2$)	**Life Cycle Greenhouse Gas Reduction** ($MTCO_2$)
8,900	385	3,468	7.97	797
15,080	652	5,916	13.44	1,344

Evaluation Criterion C: Benefits to Endangered Species

The project is not anticipated to have any adverse effects on federally listed or candidate species or their designated critical habitat. California red-legged frog is the only listed or candidate species known to be present near the project area (although within another subwatershed) and there is no suitable breeding habitat for this species present within the project area as described above. In the event an unanticipated discovery of a federally listed or candidate species occurs during the environmental review for this project or critical habitat is designated, EID will identify how the project may benefit the species and/or its critical habitat. Conversely, if the project has the potential to negatively affect such species of their critical habitat, EID will determine how modifications to the project design could reduce or eliminate this potential should it exist. Analysis of either such modification would be included within the Biological Assessment. However, since the project will not affect any relatively permanent water source, which is needed for California red-legged frog, no effects to endangered species are anticipated as a result of the project.

Given that the project will result in an additional 1,300 acre-feet annually that will be released back to the South Fork American River, the project will have a beneficial effect to listed and/or candidate species that may be present outside of the project area, but within the South Fork American River and lower American River. At this time the only listed species

known to be present in the lower American River is the Central Valley Steelhead Distinct Population Segment, Central Valley Fall and Late Fall Run Chinook Salmon Evolutionary Significant Unit is currently designated as a Species of Concern. Both of these species will benefit from additional conserved water that will be available in the lower American River. No listed or candidate species are known to be present within the South Fork American River upstream of Folsom Dam.

Evaluation Criterion D: Water Marketing

The water saved through piping of the Main Ditch originates from a pre-1914 water right, which allows great flexibility in marketing of the water. In 2015, the District marketed another portion of this water supply to Westlands Water District. Upon completion of this project, the District would seek opportunities to market all of the water conserved by the project (as much as 1,300 acre-feet per year by current estimates) to Westlands Water District or other agricultural or urban water users downstream, either within the Sacramento region or south of the Delta. Transfers would likely be short-term (one year duration), although the District would consider long-term arrangements in exchange for additional capital funding for this project. Water to be transferred would first be routed through the District's El Dorado Powerhouse to generate state-certified "green" energy, from which it flows into Reclamation's Folsom Reservoir. The District would expect to be able to maintain this marketing program for ten years or more, until increased customer demands require a gradual reduction of transferable surplus amounts.

Evaluation Criterion E: Other Contributions to Water Supply Sustainability

Subcriterion No. E.1 – Addressing Adaptation Strategies in a WaterSMART Basin Study

In 2012, Reclamation funded a 50/50 cost share with the non-Federal Partners for the Sacramento-San Joaquin Basin Study with a total of $2.4 million dollars. The Sacramento-San Joaquin River Basin Study is a partnership between the California Department of Water Resources, California Partnership for the San Joaquin Valley, Stockton East Water District, El Dorado County Water Agency (representing EID and other El Dorado County water purveyors), the Madera County Resources Management Agency and the Bureau of Reclamation. Utilizing broad partner and stakeholder involvement, the Basin Study recommends adaptation strategies in response to climate change.

The Sacramento-San Joaquin Rivers Basin Study encompasses the entire Central Valley of California with an area of more than 22,500 square miles from the Tehachapi Range in the South to the Klamath Mountains in the north. The study area covers extensive areas of national forests, parks and wildlife refuges, irrigated agricultural lands, and many rapidly

growing urban areas. The Draft Sacramento-San Joaquin Rivers Basin Study has assessed potential climate change impacts to the Basin's water supplies and demands and has specifically evaluated potential changes to agriculture and urban water supplies and demand, flood control, hydropower generation, recreation, fisheries, wildlife and their habitats, water quality and water-dependent ecological systems.

How project relates to a completed WaterSMART Basin Study

The Study has identified mitigation or adaptation strategies to address negative impacts to these resources. Among them is "raw water conveyance efficiency improvements, including canal lining/piping and automation to eliminate water losses." **Piping the Main Ditch directly supports this adaptation strategy**. Improving raw water conveyance, by piping the ditch will extend existing water supplies and reduce the imbalance between supply and demand within the Basin Study project area.

Further collaboration and follow on cooperation between Reclamation and other American River Basin water agencies, such as EID and Placer County Water Agency, is identified in the Basin Study to further investigate water water use efficiency measures such as raw water conveyance improvements and other adaption strategies that can be implemented locally.

Subcriterion No. E.2– Expediting Future On-Farm Irrigation Improvements

The proposed project will not help to expedite future on-farm irrigation improvements.

Subcriterion No. E.3 – Other Water Supply Sustainability Benefits

According to the National Weather Service (NWS), much of California, including El Dorado County and the EID service area remains in an "Exceptional Drought" after four years of below normal rainfall and snow pack accumulation. The District has experienced dry conditions since 2012. The District's largest reservoir, Jenkinson Lake in the Cosumnes River basin has not filled in two consecutive years despite importation of approximately 8,000 acre-feet of water from Project 184. The capacity of the District's primary water supply reservoirs is shown in the following table.

Reservoir Capacity - 2015 Year End

Reservoir	Current Capacity
Jenkinson Lake	68%
Caples Lake	64%
Folsom Lake (USBR)	25%

In 2014 and 2015, Reclamation implemented its shortage policy and imposed 50% cutbacks on Municipal and Industrial CVP supplies including the District's CVP Water Supply

Contract at Folsom Reservoir. In 2014 and 2015, the State Water Resources Control Board (Water Board) adopted mandatory regulations requiring local agencies to adopt mandatory conservation measures. The District is currently required to conserve 28% from 2013 urban water consumption levels beginning June 2015. The District customers have responded and exceeded the State Board mandate with 30% cumulative conservation since June 2015. In May of 2015 the Water Board also issued mandatory curtailment notices affecting all post-1914 consumptive water rights. This notice did not affect the source water for the Main Ditch but does affect other District water rights.

The American River and Project 184 is the source of supply for the Main Ditch. The unimpaired runoff in the American River basin was 74% of normal in 2012, 41% of normal in 2013, 32% of normal in 2013, and 32% of normal in 2014. Caples Lake is the primary storage reservoir for Project 184 and the Main Ditch. Storage in the lake was at 62% of the historic end of month average for December 2015.

Alleviate Water Supply Shortages

The Main Ditch is a critical link in the District's infrastructure, conveying approximatelyone-third of the District's water supply. Water supply conserved as a result of piping the ditch can be used in several ways to improve the reliability of the District's water supplies during times of drought. It can be transferred into Jenkinson Lake to be stored for later delivery, released back to the river and diverted at Folsom Reservoir to supplement CVP supplies when Reclamation imposes shortages, and can be held in the upper lakes improved supply reliability and/or releases for power generation. As an example, in the summer of 2001 the District experienced a near crisis in supplying water to the community of El Dorado Hills due to a Reclamation cutback in CVP supply from Folsom Lake. The District avoided the crisis by releasing a portion of the 15,080 ac-ft conveyed by the Main Ditch back into the South Fork American River and re-diverting it at Folsom Lake to augment the El Dorado Hills supply provided under the CVP contract. Another example is the transfer of approximately 17,600 acre-feet of Main Ditch Supply water over the last 4 years from Project 184 to storage in Jenkinson Lake. The additional water conserved as a result of piping the Main Ditch can be transferred, as described above, to at least two other supply source locations to strategically improve overall supply reliability during times of drought.

Other water supply benefits will accrue from piping the Main Ditch such as water quality benefits resulting from reduced potential from water supply contamination from adjacent residential septic system leach fields and surface water runoff inflow. Reductions in water losses over time translate into the more efficient use of water and reduced new water supply need. The beneficiary will be the South Fork of the American River system that eventually benefits the Sacramento/San Joaquin River Basin and the Bay/Delta.

Addresses Specific Concerns

The project will directly address heightened competition for finite water supplies by continuing to seek opportunity to market conserved water as described in Evaluation Criterion D above. The District implemented a water transfer of a small portion of its water supply in 2015 to Westlands Water District (WWD). WWD is a large agricultural district in the Central Valley dependent on CVP contract supplies. Its water supply has been severely curtailed by Reclamation during the drought, and for 2015 its CVP allocation was cut to zero. Upon completion of this project, the District would seek opportunities to market all of the water conserved by the project to Westlands Water District or other agricultural or urban water users downstream affected by the drought. The conserved water originates from a pre-1914 water right, which allows great flexibility in marketing of the water.

Promote and Encourage Collaboration

Many foothill water delivery systems in the region utilize historic ditches to convey raw water from surface water sources to water treatment plants for domestic use and/or provides the distribution mechanism for supplying raw water for irrigation and agricultural purposes. In many cases, these earthen ditches and open ditches are the sole source of drinking water supply for thousands of customers in El Dorado, Nevada, and Placer counties. They are in varying states of disrepair and provide differing levels of reliability. The water agencies in the region have invested millions of dollars in the maintenance of the historic conveyance system to meet growing demands on water supply, and improving these facilities is essential for the continued delivery of water in an effective and efficient manner. Therefore, piping of the Main Ditch has been included as a project in the Cosumnes, American, Bear, and Yuba and Regional Water Authority Integrated Regional Water Management Plans.

The project will assist in meeting CALFED Bay-Delta Program Goals, through reducing existing irrecoverable losses through excessive seepage of earthen ditches and evapotranspiration from open ditches, optimizing the efficient use of water supply, promoting the local conservation of water supply to serve the needs of local consumers, with availability to sell water to meet growing demands for domestic and raw water use, and increasing the efficiency of water supply to customers. Folsom Reservoir is the first responder to the Sacramento-San Joaquin Bay Delta for holding back salinity for environmental benefit. Folsom Reservoir is also instrumental in managing temperature in the lower American River for fall-run Chinook salmon and steelhead which has been the subject of litigation over the Operation Criteria and Plan for the long term operation of the CVP. Any conserved water above Folsom Reservoir will contribute to supplies available for temperature and salinity management.

The project will help prevent water-related crisis and conflict by making the conserved water available for use at Folsom Reservoir and market to those with lower priority water rights/contracts that are severely curtailed.

Local and state agencies have recognized the value of this project and are collaborating with

the District through financial assistance. Local cost share funding from the El Dorado County Water Agency has been secured to perform environmental studies and preliminary engineering. The project is included in the Cosumnes, American, Bear, and Yuba and Regional Water Authority American River Basin Integrated Regional Water Management Plans and has received a $1,000,000 Proposition 84 grant from the California Department of Water Resources. Letters of support from the El Dorado County Water Agency and El Dorado County Citizens for Water are provided in **Attachment G**. Also included in **Attachment G** is the notification of Proposition 84 match funding award from the Department of Water Resources.

Increase Awareness of Water/Energy Conservation/Efficiency

This project will also serve as an example of water and energy conservation/efficiency within El Dorado County for other mountain county water agencies that have similar open unlined earthen ditches and power generation facilities.

Evaluation Criterion F: Implementation and Results

Subcriterion No. F.1 – Project Planning

The project supports the District's 2013 Integrated Water Resources Master Plan, Water Conservation Program, Drought Contingency Plan, Urban Water Management Plan, Five-Year Water Management Plan, and Ditch System Master Plan that are currently in-place. A copy of each is provided as **Attachments H – L**.

The CABY Integrated Water Resources Master Plan has identified several mountain county ditches that can benefit from a project such as this and has included it as a supporting project in the Plan. Piping of the Main Ditch also provides the means for the District to meet the State of California goal of 20% water conservation by 2020 and the energy goal of 33% renewable energy production by 2020.

Subcriterion No. F.2 – Readiness to Proceed

The project is ready to proceed. Multiple preparatory tasks have been completed, including a well and septic system proximity evaluation, wetlands delineation, California red-legged frog habitat assessment and cultural resources survey, initial topographic survey control documentation, and Basis of Design Report (10% design) and 30% design alternative analysis were previously completed utilizing two separate grants from the El Dorado County Water Agency. Separately, in depth research into the history of easements and title to the Main Ditch properties has been completed for all 49 properties through which the ditch adjoins or crosses. This study is critical to establishing the District's historical rights to move forward with easements allowing construction of the pipeline within the District's own ditch

right-of-way. The District has conducting a detailed topographic survey of the entire 3-mile reach of the Main Ditch, and a consultant has been retained to complete final design that will be complete in September of 2016. The project is ready to proceed beyond the current 30% design level, and detailed plan and profile sheets are currently being developed for the entire length of the Main Ditch. Initial Environmental Impact Report public scoping has been completed and the District is currently soliciting Proposals for the preparation of an Environmental Impact Report/Environmental Impact Statement

An estimated project schedule outlining the individual tasks of each phase is provided as **Figure 10.** The schedule shows that the project can be completed over a two-year period while meeting all requirements for design and environmental compliance activities before construction begins.

Because the project is within an existing water system and the El Dorado Powerhouse is a FERC licensed certified renewable energy producer, no new permits are needed other than environmental permits which are described in detail in the Environmental Compliance discussion and the time-line for each is outlined in the project schedule.

Subcriterion No. F.3 – Performance Measures

The performance measures that will be used to quantify actual benefits upon completion of the project include:

1) quantifiable water saved and better managed,
2) increased water quality,
3) increased renewable energy production, and
4) energy savings.

Each measure is described in greater detail in the Performance Measures section, Section VIII.A.

Subcriterion No. F.4 – Reasonableness of Costs

The total project cost is estimated at $7,960,000 with 1,300 annual acre-feet of water conserved and better managed. The expected life of the improvement is 100 years based on the industry accepted life-expectancy of PVC pipe with proper installation and maintenance. Given the potential external loadings during construction the pipe wall thickness will be increased and provide additional safety factor ensuring 100 years or greater for the pipe's useful service life. These criteria calculate to a 61.23 ratio of project costs divided by water saved times improvement life.

$$\frac{\$7{,}960{,}000 \text{ Total Project Cost}}{1{,}300 \text{ Acre-Feet Conserved and Better Managed x 100 year Life}} = 61.23$$

Evaluation Criterion G: Additional Non-Federal Funding

Non-federal funding will be provided for the project in the amount of $7,660,000, including the sources identified in the table below:

Funding Sources

Proposed Federal Funding	**Amount** ($)
USBR WaterSMART grant (Group I)	**300,000**
Non Federal Funding Sources:	
CA Department of Water Resources Prop 84 Grant, Letter of award received November, 2014	1,000,000
El Dorado County Water Agency Grant, Funds received 2012	40,000
El Dorado County Water Agency Grant, Funds received 2013	195,000
El Dorado County Water Agency, under contract for 2016	365,000
El Dorado Irrigation District Capital Improvement Plan	6,060,000
Total Non-Federal Funding:	**7,660,000**
Total Project Cost [1]	7,960,000

[1] Source: Total Project Cost from the Upper Main Ditch Piping Basis of Design Report Update Technical Memorandum, Domenichelli and Associates, October, 2015.

Therefore the percentage of non-Federal funding proposed is:

$$\frac{\$7{,}660{,}000 \text{ Non-Federal Funding}}{\$7{,}960{,}000 \text{ Total Project Cost}^{(1)}} = 96\%$$

Evaluation Criterion H: Connection to Reclamation Project Activities

(1) This project is connected to Reclamation project activities such that water not diverted to the Reservoir 1 WTP via the Main Ditch can be left or returned to the South Fork American River, after use for renewable power generation, which eventually returns to

Folsom Reservoir.

(2) El Dorado Irrigation District relies on 7,550 ac-ft annually through CVP Water Service Contract No. 14-06-200-1357A-LTR1 with Reclamation.

(3) The Project is not located on Reclamation project lands and does not involve Reclamation facilities.

(4) The project is in the South Fork of the American River basin above Reclamations Folsom Reservoir.

(5) The proposed work could contribute water to Folsom Reservoir which is a Reclamation project by leaving or returning water to the South Fork of the American River.

(6) The proposed work will not help meet Reclamation trust responsibilities to Tribes.

VIII.A: Performance Measures

Performance Measure No. A. – Projects with Quantifiable Water Savings

Performance Measure No. A.1. – Canal Lining/ Piping

Piping the Main Ditch will lead to a decrease in ditch seepage and evapotranspiration and sustain the high quality of the raw water source. Monitoring of the following performance measures will provide quantifiable data to verify the pre-project amount of water lost due to seepage and evapotranspiration and the total post project amount of water saved; and enhancement of water quality characteristics, resulting in reduced treatment and solids handling costs.

Pre-project estimations of baseline data:

Physical inflow/outflow measurements of losses have been made prior to construction of the project to determine current losses in the Main Ditch. Upon receipt of confirmation from Reclamation that the District will be a recipient of funding under the WaterSMART grant, the District will formalize compiling flow measurements at the Forebay Reservoir diversion to the Main Ditch. At the same time, the District will compile the data of the water made available at the downstream end of the Main Ditch as it enters Reservoir 1. Gages, weirs, and SCADA will be used to capture flow data. Perc tests along the ditch and permeability modeling have also been completed to estimate the theoretical range of expected seepage given the soil types, flow rates and evapotranspiration rates alone the ditch.

Points along the ditch may also be selected to determine which reaches are the most vulnerable to seepage and evapotranspiration. Estimated historical flow measurements will

also be collected and compiled for comparison to actual measurements. By beginning the measurement at the onset of the project, more than 2 years of data can be collected for comparison to post-project flows.

Post-project methods for quantifying the benefits of canal piping or piping projects:

Using tests listed above, compare pre-project and post-project test results to calculate water savings. Because this is a ditch piping project, evaporation will be calculated based on weather data available at the Camino CIMIS Station and subtracted from the total loss measured by testing.

As a back check, the estimated historical seepage and evaporation for the Main Ditch will be compared to the post-project seepage and evaporation with documentation of the method of measuring or estimating post-project provided. Results will be verified using a ratio of historical diversion-delivery rates and will include a comparison of historical ditch efficiencies and current ditch efficiencies. The output indicator will be a conservation of approximately 1,000 – 1,300 ac-ft annually after ditch improvements as measured by gages, weirs, SCADA system, and manual measuring at inflow and outflow points.

Performance Measure No. A.2. – Measuring Devices

Measuring Devices: a. Municipal Metering

Full bore magnetic flow meters which span the full diameter of the pipe are standard in the industry, highly accurate, and easily connected to SCADA for monitoring and recording of flow data.

New flow meters are a very small cost component and will be installed as part of the Main Ditch piping project.

Separately, three raw water customers are served along the Main Ditch prior to the water treatment plant. Customer use is currently measured in miner's inches using a turn out including a V-notch weir with ditch operators manually turning service on and off. Once piping has been completed, these customers will be served by new, highly accurate individual meters equipped with continuous automatic read devices.

The newly installed meters will allow for accurate reliable water accounting and billing rather than using archaic assumed flows with manual operation. The previously assumed deliveries will be compared to the meter reads to determine actual amount of water delivered.

Performance Measure No. A.3. – SCADA and Geographic Information Systems

Along with the installation of pipe within the open earthen ditch, the existing SCADA system

that monitors flows in the Main Ditch will be expanded to provide real-time data on the flow and volume of water at key points along the water delivery system. Access to such data will allow the District to make accurate and timely deliveries of water and reduce over-deliveries.

SCADA and automation components will be included in the design and construction of the project to measure water delivered. This measurement system will allow confirmation of the water savings actually received at completion of the project construction. Current operational losses have been determined using weirs and gages and will be reduced to zero, as no seepage or evaporation will occur with installation of the pipe.

The SCADA implementation will differ from pre-project operations through the installation of full bore magnetic meters at the beginning and end of the ditch and providing improved data availability to operations personnel.

The District currently employs SCADA system technicians who will perform regular preventive maintenance and calibration of the system to maintain reliable data gathering. This additional SCADA component will allow improved response to unanticipated events and enhance productivity of labor resources. Response to SCADA failures/outages will continue to be made by on-staff SCADA technicians and on-call personnel after hours.

Pre-project estimations of baseline data:

Baseline data will include the data collected on diversions and deliveries to water users, making estimates as necessary and document employee pre-project time spent on ditch/ditch monitoring and water control.

Post-project methods for quantifying benefits of SCADA or SCADA/GIS system projects:

Track and record the diversions to water users and compare to pre-project diversions using meter data and SCADA data. This will show results of improved management if yearly fluctuations in weather are accounted for. Other benefits such as less mileage by operators on dusty roads (which saves time and influences air quality) and less damage to ditch banks will be tracked in the District maintenance tracking system. Reduced maintenance requirements will be achieved due to elimination of pest and vegetation management needs along the ditch banks.

Performance Measure No. A.4. – Automation

Piping the complete length of the Main Ditch will result in a closed system and totally eliminate the possibility of spillage, breaches, or overflowing of the ditch. Automation aimed at preventing spillage from the ditch will not be required.

The flow monitoring and SCADA systems described above will assist District operations

with continuously determining the best use for the water to balance between potable water demands and power generation.

Performance Measure No. A.5. – Groundwater Recharge (Conjunctive Use)

Not Applicable

Performance Measure No. A.6. – Irrigation Drainage Reuse Projects

Not Applicable

Performance Measure No. A.7. – Landscape Irrigation Measures

Not Applicable

Performance Measure No. B. – Projects with Quantifiable Energy Savings

The piping of the Main Ditch will increase the availability of renewable energy and increase overall energy efficiency in the management and delivery of water through making more water available for renewable power generation and reducing pumping. Energy efficiencies that are expected to result from implementation of the project include reduced pumping needs. Current operations require water to be pumped from Folsom Reservoir. These pumping needs can be greatly reduced or eliminated and because the water system is integrated, the 1,300 ac-ft of water can be delivered by gravity rather than pumping from Folsom Reservoir.

Performance Measure No. B.1. – Implementation of Renewable Energy Improvements Related to Water Management and Delivery

The water conserved through piping the Main Ditch can be used for renewable hydroelectric power generation at the existing El Dorado Powerhouse until such time as the water is needed for consumptive purposes. Build-out of the area is not expected for several decades and therefore, the water can be used for renewable energy production until that time. Until the water is delivered to customers, the amount of energy that can be generated by the 1,300 ac-ft of water conserved is equal to 780 MWhr annually if diverted to the El Dorado Powerhouse. This calculation is based on the efficiency rating of the El Dorado Powerhouse at 0.60 ac-ft/ MWhr and 1,300 ac-ft of conserved water. This is enough energy to serve over 100 households with certified renewable energy. The hydroelectric power generated at the El Dorado Powerhouse is currently sold under contract to PG&E and will assist them in meeting the State of California mandate of holding an energy portfolio that includes 33% renewable energy. After power generation, the water is released to the South Fork of the American River, eventually reaching Folsom Reservoir, a Reclamation facility.

The water used for renewable power generation rather than being lost through seepage and evapotranspiration will be measured and the local economic impacts will be assessed through the income provided by the power generation revenue.

Performance Measure No. B.2. – Increasing Energy Efficiency in Water Management

If water is served to customers by gravity rather than pumped from Folsom Reservoir at a cost of more than $178 per ac-ft, pumping needs can be greatly reduced or eliminated through the conservation of 1,300 ac-ft annually. Energy consumption at the Folsom Raw Water Pump Station and the El Dorado Hill WTP can be reduced by 845MWh/yr annually and save over $230,000 in electrical costs. Energy use associated with treatment is not included in these values.

The project will also reduce vehicle miles driven each year to dispose of sediment that is picked up along the earthen ditch that will be piped. A comparison of pre- project hauling and post project hauling will be completed upon completion of the project to verify the estimated reduction in greenhouse gases.

Performance Measure No. C. – Projects that Benefit Endangered Species and/or Critical Habitat

The project is not anticipated to have any effect on federally listed or candidate species or their designated critical habitat. California red-legged frog is the only listed or candidate species known to be present near the project area (although within another subwatershed) and there is no suitable breeding habitat for this species present within the project area. In the event of an unanticipated discovery of a federally listed or candidate species occurs during the environmental review for this project or critical habitat is designated, EID will identify how the project may benefit the species and/or its critical habitat. Conversely, if the project has the potential to negatively affect such species of their critical habitat, EID will determine how modifications to the project design could reduce or eliminate this potential should it exist. However, since the project will not affect any relatively permanent water source, which is needed for California red-legged frog, no effect to endangered species are anticipated as a result of the project.

Given that the project will result in an additional 1,300 acre-feet annually to be released back to the South Fork American River, the project will have a beneficial effect to listed and/or candidate species that may be present outside of the action area, but within in the South Fork American River and lower American River. At this time the only listed species known to be present in the lower American River is the Central Valley Steelhead Distinct Population Segment, Central Valley Fall and Late Fall Run Chinook Salmon Evolutionary Significant Unit is currently designated as a Species of Concern. Both of these species will benefit from

additional conserved water that will be available in the lower American River. No listed or candidate species are known to be present within the South Fork American River upstream of Folsom Dam.

Performance Measure No. D. – Projects that Establish a Water Market

The water saved through piping of the Main Ditch is a Pre-1914 water right and therefore solely owned by the District. This allows great flexibility in use or marketing of the water. Conserved water will be aggressively marketed as described in the Evaluation Criteria D, Water Marketing. Pre and post project marketing transactions and quantity of water made available will be reported.

Performance Measure No. D.1. – Groundwater Substitution Transfers

Not Applicable

Performance Measure No. D.2. – Crop Shifting or Idling Transfers

Not Applicable

Performance Measure No. D.3. – Other Transfers

Not Applicable

Environmental and Cultural Resources Compliance

To allow Reclamation to assess the probable environmental impacts and costs associated with this Grant application, the following list of questions has been answered to the best of EID's ability based upon performance of many similar projects and the level of project information known at this time. If the District is successful in receiving this Grant, no ground-disturbing activities will begin before all applicable environmental compliance requirements are complete and the work is authorized by Reclamation. Environmental compliance has been integrated in the cost and schedule of the grant proposal.

(1) Will the project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)?

Construction of the project will require preparation of the pipeline alignment. Such activities may including grading the existing ditch alignment for proper grade, compaction of the pipeline trench to meet current engineering standards, installation of proper pipeline bedding, and backfilling and compaction of the pipeline trench according to accepted engineering standards. Construction activities will also require staging of materials and equipment to perform this work. Staging is anticipated to occur at existing District facilities along the upstream (El Dorado Forebay) and/or downstream (Reservoir 1 Water Treatment Plant) end of the project and other non-sensitive nearby areas. Each of these areas has already been assessed for cultural resources and potentially jurisdictional waters as described above in the Scope of Work and no sensitive resources were identified. Operation of the project will only require minimal maintenance of large woody vegetation to prevent damage to the pipeline. Regular maintenance activities associated with debris clearing in the ditch and herbaceous vegetation will no longer be necessary.

During construction of the project there could be temporary air and water quality impacts associated with installation of the pipeline and appurtenances. However, based upon the nature of the activities it is anticipated that these impacts can be mitigated utilizing standard best management practices associated with emissions and dust and erosion control for underground linear features such as pipelines. During operation of the project there will be less air and water quality impacts than baseline conditions because ditch clearing and maintenance activities such as vegetation clearing will no longer be necessary, regular patrols of the ditch would no longer be necessary, and the water within the pipeline will be protected against potential water quality impacts as described in this grant submittal.

Marginal wildlife habitat exists surrounding the project. Given that the ditch is regularly dewatered for maintenance activities, there is no permanent source of water present. Additionally, herbaceous vegetation is regularly maintained to avoid obstructions of flow and facilitate inspections for the presence of burrowing rodents that could compromise the integrity and cause failure of the ditch embankment. From its upstream to downstream

extents, the ditch winds through coniferous overstory in a rural residential neighborhood. There are a few ephemeral stream channels that intersect the ditch along its length, but none are diverted into the ditch. Therefore, potential impacts to wildlife and migration routes are anticipated to be low and temporary in nature. The loss of a temporary water source during the diversion season is not considered significant since there are unaffected natural water sources (e.g., springs and small streams) and the El Dorado Forebay present in the area.

Given the type of vegetation present, raptors and other migratory birds have the potential to occur within the project area. Appropriate mitigation measures will be implemented including pre-construction surveys, exclusion areas, and modified construction schedule if necessary to avoid impacts to nesting raptors and migratory birds. The project occurs approximately one-third to one-half mile north of designated critical habitat for the California red-legged frog. However, the critical habitat is located in a different watershed and is separated by a four lane highway (Highway 50). Additionally, a California red-legged frog habitat assessment determined that no breeding habitat existing within the Project area. Therefore, California red-legged frog are not anticipated to be affected by the project (see Phase 2 Task 6.2 of the Scope of Work for more details).

Construction activities will generate temporary sources of noise and traffic. The highest level of noise and traffic will be anticipated at the staging area(s), which is (are) existing EID facilities and other biologically non-sensitive areas in direct proximity to the proposed pipeline alignment. Some noise and traffic will also occur along the pipeline alignment as construction progresses. However, given the nature of the project along with a standard daytime construction limitation, these impacts are not anticipated to be significant. Appropriate traffic control measures will be implemented at any road crossings or equipment access points from county roads.

Construction will be timed to avoid any loss of water service or fire suppression capability to the surrounding community. Although the artificial water source of the canal is considered an aesthetic amenity to some, the facility is not an authorized recreational feature. The nearby El Dorado Forebay does have a designated day use recreational area and the Sly Park Recreation Area south of Highway 50 has many types of recreational opportunities.

(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?

As indicated above, the project site is located north of designated critical habitat for California red-legged frog. A previous survey of the Project area found that no suitable breeding habitat for red-legged frog was present. No other listed or proposed to be federally-listed species or designated critical habitat is present within the project area.

Given that the project will result in an additional 1,300 acre-feet annually to be released back

to the South Fork American River, the project will have a beneficial effect to listed and/or candidate species that may be present outside of the action area, but within in the South Fork American River and lower American River downstream of the project area. At this time the only listed species known to be present in the lower American River is the Central Valley Steelhead Distinct Population Segment, Central Valley Fall and Late Fall Run Chinook Salmon Evolutionary Significant Unit is currently designated as a Species of Concern. Both of these species will benefit from additional conserved water that will be available in the lower American River. No listed or candidate species are known to be present within the South Fork American River upstream of Folsom Dam.

(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 project may have.

Based upon a wetland delineation performed by a qualified botanist, there are no wetlands or other surface water inside the project boundaries that fall under CWA jurisdiction as waters of the U.S **(Attachment E)**. Through an approved jurisdictional determination the Army Corps of Engineers Sacramento District Regulatory Program has verified the findings (SPK-2013-00049). The ditch is not considered a Water of the U.S. because it has no downstream connectivity to Waters of the U.S. – all water in the ditch enters the Reservoir 1 Water Treatment Plant for treatment and domestic consumption.

(4) When was the water delivery system constructed?

The Main Ditch was originally constructed in the 1870's.

(5) Will the 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.

Piping of the Main Ditch will involve the conversion of an earthen lined opened ditch to a piped system. This conversion will require modification of the Forebay outlet works to the ditch and Reservoir 1 WTP inlet as described within the scope of work. The Forebay outlet works were likely constructed at the time of the Forebay completion, which was 1922. The Reservoir 1 WTP inlet was re-constructed in 1988. However, as stated previously a recently completed cultural resources evaluation found that the ditch and its associated appurtenances are not eligible for the NRHP or CRHR.

(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.

Given the rich history of the area associated with the gold mining era, there are a number of facilities within the District boundaries that have been determined to be or may be eligible for listing under the National Register. However, none of these facilities are anticipated to be affected by the project. There is one ditch, Crawford Ditch, within the irrigation district that is listed on the National Register of Historic Places (NRHP). However this ditch is located in a different watershed and is not connected and has no interaction with the Main Ditch

Under a separate grant EID retained a qualified archeologist meeting the Secretary of Interior's standards to complete a thorough cultural resources investigation of the project. This investigation included an evaluation of this section of the Main Ditch for the NRHP and CRHR, which determined that although this section of ditch (referred to as El Dorado Canal CA-ELD-511H/P-9-599) appears to follow its original alignment and continues to be used as originally designed, the integrity of setting, feeling, association, design, materials, and workmanship of the canal are compromised. Consequently, the archeologist concluded that CA-ELD-511H/P-9-599 does not meet the eligibility criteria for inclusion on the NRHP or CRHR (Attachment D). As such, the archeologist determined that a "No Historic Properties Affected" appears appropriate for the project under NRHP and the project would not impact any historical resources as defined by CEQA. This report is ready to be transmitted to the SHPO for concurrence that the project will not impact any eligible properties following Reclamation's determination that the report meets all applicable standards.

(7) Are there any known archeological sites in the proposed project area?

There are no known archeological sites in the proposed project area. A sacred lands search and a list of Native American contacts for the project were requested from the Native American Heritage Commission (NAHC). The sacred lands search did not identify any sensitive Native American cultural resources either within or near the project's area of potential effect (APE). Letters soliciting information regarding the project area were sent to all the groups and individuals identified by the NAHC as part of the sacred lands search. No responses were received.

(8) Will the project have a disproportionately high and adverse effect on low income or minority populations?

No, the project will not have a disproportionately high and adverse effect on low income or minority populations.

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

No, the project does not limit access to any lands including access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands.

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

No, the project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area. During construction the contractor will be responsible for complying with all applicable local regulations regarding the spread, control, and removal of noxious weeds. Operation of the project following construction will decrease this potential by eliminating the open ditch as a potential source of seed dispersal through passive means such as water, human, and wildlife transport, as well as decreasing the amount of maintenance, which has potential to introduce seed through foot and equipment traffic.

Required Permits or Approvals

There are no other permits or approvals required for the project other than those discussed in the Environmental Compliance Requirements section. As stated above, EID has already completed a wetland delineation, California red-legged frog habitat assessment, and cultural resources evaluation to eliminate three potentially significant environmental constraints that could be associated with building the proposed project. Completion of these studies through a separate grant has significantly reduced the complexity of this project. No ground disturbing work will begin until CEQA and NEPA compliance have been met and Reclamation approval has been granted.

Letters of Project Support

The Project is supported by the El Dorado County Water Agency (EDCWA) and the El Dorado County Citizens for Water. Copies of each letter of support are provided as Attachment G. In addition to the letters of support the EDCWA also committed $40,000 in 2012, $195,000 in 2013 and $365,000 in 2015 through a grant to assist with funding the environmental studies, preliminary design, land survey, design and environmental for the Main Ditch Piping project. The work performed under those grant opportunities have been

incorporated into this Proposal.

Official Resolution

At the January 11, 2016 El Dorado Irrigation District Board of Directors meeting, an official resolution was adopted. The resolution commits the District to the financial and legal obligations associated with receipt of WaterSMART Grant financial assistance, verifying:

- The identity of the official with legal authority to enter into an agreement
- The Board of Directors have reviewed and support the application submitted
- The District capability to provide the amount of funding specified in the funding plan, and
- That the District will work with Reclamation to meet established deadlines for entering into a cooperative agreement

The official resolution is submitted with this proposal as **Attachment M**.

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY

EDMUND G. BROWN JR., Governor

DEPARTMENT OF HEALTH
714-744 P STREET
SACRAMENTO, CALIFORNIA 95814
(916) 445-1736

July 25, 1977

El Dorado Irrigation District
P. O. Box 1047
Placerville, California 95667

Attention Mr. Harry Dunlop, Secretary-Manager

SYSTEM NO. 09-001

The purpose of this letter is to comment on the District's proposed project to replace the El Dorado Main Canal from Forebay Reservoir to Reservoir 2 with a pipeline.

The Department of Health is convinced there are compelling public health reasons for proceeding with this pipeline project. The foremost reason for replacing the open canal with a pipeline is to protect the water source from contamination and pollution by septic tank seepage and storm water runoff in the Pollock Pines-Camino area.

This area is growing rapidly and the local population has increased dramatically in the last few years. There is no community sewage collection and disposal system in the area traversed by the canal. All domestic wastewater in the area is disposed of by individual septic tank leaching systems, many of which are uphill from the canal in locations where the natural flow would carry seepage into the canal. Likewise, nearly all of the residential and commercial area of Pollock Pines is uphill from the canal and surface water draining from streets, yards, and pastures flows naturally into the canal. This situation constitutes a serious hazard of actual and potential pollution of the canal waters.

A second reason for replacing the canal with pipeline is related to the current drought and water shortage. The canal is old and poorly constructed, and large amounts of water are lost by leakage and evapo-transpiration. These losses are significant because they represent water usage that must be foregone by customers downstream. These customers would normally use the water for domestic activities like washing and bathing, preparing food, drinking, and laundering clothes; for irrigation of landscaping and gardens; and for watering animals and livestock.

When the normal water supply is not available for these uses, the population resorts to other sources of water supply such as purchased drinking water and beverages, hauled water from other systems, individual wells and springs, natural flows in streams, graywater captured from household plumbing, and reclaimed sewage effluent. The safety and healthfulness of these alternate water supplies is questionable and can certainly have an adverse effect on the health of users. The inconvenience and increased expense of providing another water supply is additional evidence of a decreased standard of living. Thus we believe it is important and worthwhile to make a maximum effort to

maintain the District's normal water supply and extend its availability as long as possible. Eliminating the existing water losses in the canal by installing a pipeline would be a very effective step toward accomplishing these goals.

In summary, completion of the pipeline project would eliminate the serious public health hazard created by runoff of septic tank seepage and surface water into the canal and it will help maintain normal water service to downstream customers.

Therefore, the Department of Health requests that El Dorado Irrigation District diligently pursue a project for replacing the Main Canal with an enclosed pipeline and accomplish it as soon as possible.

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In evaluating any of the proposed actions, it is useful to compare each to the project objectives to determine the degree to which each meets this set of objectives. This comparison is presented in the section on environmental impacts.

Project Need

The need for the project relates directly to each of the foregoing objectives. The purpose of this section is to describe the nature and extent of the need for some action by EID and to present all available information that substantiates and reinforces that need.

Water Losses

Various estimates of water losses from the ditch have been made, but until recently none was substantiated by actual field measurements or tests. On June 7, 1977, Mr. E. M. Padjen, a licensed civil engineer experienced in the measurement of surface flows, was retained by several property owners residing in the Blair Road area to quantify losses in the EID ditch. Mr. Padjen made one set of measurements using a current meter at Pine Wood Lane and another set at the Blair Road crossing of the EID canal. His figures indicate that, at a flow of approximately 15 cfs, losses from the ditch in that 1.7-mile stretch would equal approximately 3 percent of the flow, or slightly less than 0.5 cfs.

In June and July 1977, the EID staff was trained by the U. S. Bureau of Reclamation in the use of current meters to estimate the discharge in the canal. The EID staff took several sets of measurements on the ditch at locations immediately downstream from Forebay Reservoir, at the Pinewood Lane crossing of the ditch, and at the Blair Road crossing of the ditch. While there are some variations in the computed losses, the tests seem to show that at a discharge of 40 cfs that the ditch loses about 9 percent of its flow between Forebay and the Blair Road bridge (about 3.5 cfs). The figures further show that about two-thirds of this loss (6 percent of the ditch flow) is lost between Pinewood Lane and Blair Road at this flow. These figures indicate that at full deliveries to the ditch under the PG&E contract, losses would amount to about 1,260 acre-feet per year in this section. Appendix G further explains these loss estimates.

When considering the test results, it is important to note that the measurement of flowing water in an irregularly-shaped ditch using a current meter is subject to error. Each individual measurement may be off from 5 to 8 percent. It is

possible (although not probable) that errors in measuring could account for part or all of the indicated losses. It is also possible that the losses could be greater than those measured. However, it is known that discharges in downstream springs in the Blair Road area increase following an increase in flow in the ditch. This response of the springs is the reverse of the normal rainfall pattern in the area, thus indicating a strong relationship between these spring flows and flows in the ditch, as well as indicating that the seepage losses from the ditch do increase as the water level in the ditch increases.

Estimates of losses for the rest of the ditch are not presently available. Two series of flow measurements were made to evaluate losses downstream from the Blair Road crossing. However, during the days the measurements were made, PG&E changed the flows out of Forebay Reservoir several times. As a result, the measurements are not usable, although they do indicate that some losses may occur. Between Blair Road crossing and Reservoir No. 1, seepage is evident downhill from the canal. No seepage was observed downstream from Reservoir No. 1 along the canal.

As a result, the 1,260 acre-foot per year estimate does understate the losses, to an unknown degree.

Maximize Use of Available Water

During the severe 1977 drought year, EID has had to cut back total district-wide water use by approximately 42 percent. This is one of the greatest reductions in water supply that has had to be imposed in any area of California during the drought. Both domestic and agricultural uses have been cut back significantly. Most dramatic however, has been the effect on the non-commercial agricultural uses which have not been allocated any water whatsoever. Only property owners who are able to demonstrate a commercial and viable agricultural operation have been allocated water for agricultural purposes. This has been necessary to provide adequate water for domestic, commercial, agricultural and industrial endeavors in the district.

The situation is further pointed up by the fact that Sly Park Reservoir had an average annual inflow from 1960 to 1976 of about 35,000 acre-feet. At the end of last year, Sly Park contained only 7,675 acre-feet of water in its 41,000 acre-foot capacity. Inflow for the year amounted to only 3,167 acre-feet -- a new record low. As a result, the principal water supply for EID in 1977 is the flow from Forebay Reservoir through the main canal.

APPENDIX G

COMPUTATION OF SEEPAGE LOSSES FROM EID MAIN CANAL

Flow measurements were made by E. M. Padjen on June 7, 1977 and by EID staff in June and July 1977. The Padjen measurements indicate a loss of 3 percent of the flow between Pinewood Lane and the Blair Road crossing at a flow of 18 cfs. The EID measurements indicate a loss of between 9 and 10 percent between Forebay and Blair Road crossing, with about a 6 percent loss in the reach measured by Padjen, at flows of 40 cfs.

By prorating Padjen's loss estimate back to Forebay, including the Forebay-Pinewood Lane reach which he did not measure, a total of 4.5 percent loss at 18 cfs flow could be postulated. It should then be possible to plot the losses, both by percent loss and by cfs loss, to extrapolate losses for this reach of the canal at any flow. These assumptions are plotted on the attached figures.

The data upon which these charts are based may be in error. The measured flows vary enough from actual flows to account for a good portion of the measured losses, or to substantially understate the losses. Since other evidence corroborates that seepage losses do occur, and that the degree of loss varies with the flow in the canal, the charts have been drawn up and are used as the best available data. They must be used cautiously, however, and accepted as a guide only, not as a definitive answer.

These charts were used to determine the losses used in the assessment, based on the following computations:

Loss at full flow:

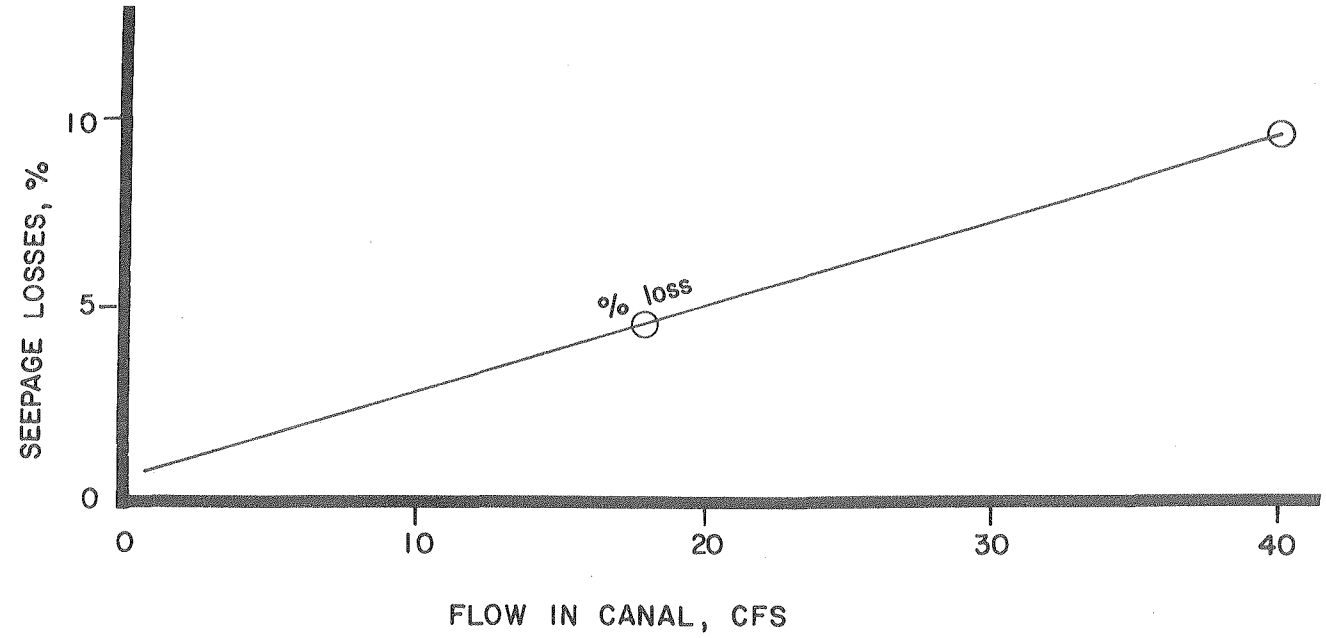
May 15-Oct 15:	4 cfs x 1.98 acre-feet/cfs-day x 152 days	= 1,200 acre-feet
Oct 15-May 15:	0.15 cfs x 1.98 acre-feet/cfs-day x 213 days	= 63 acre-feet
		1,263 acre-feet

Use 1,260 acre-feet

Loss at 7 cfs flow year-around:

0.15 cfs x 1.98 acre-feet/cfs-day x 365 days = 108 acre-feet

Use 110 acre-feet



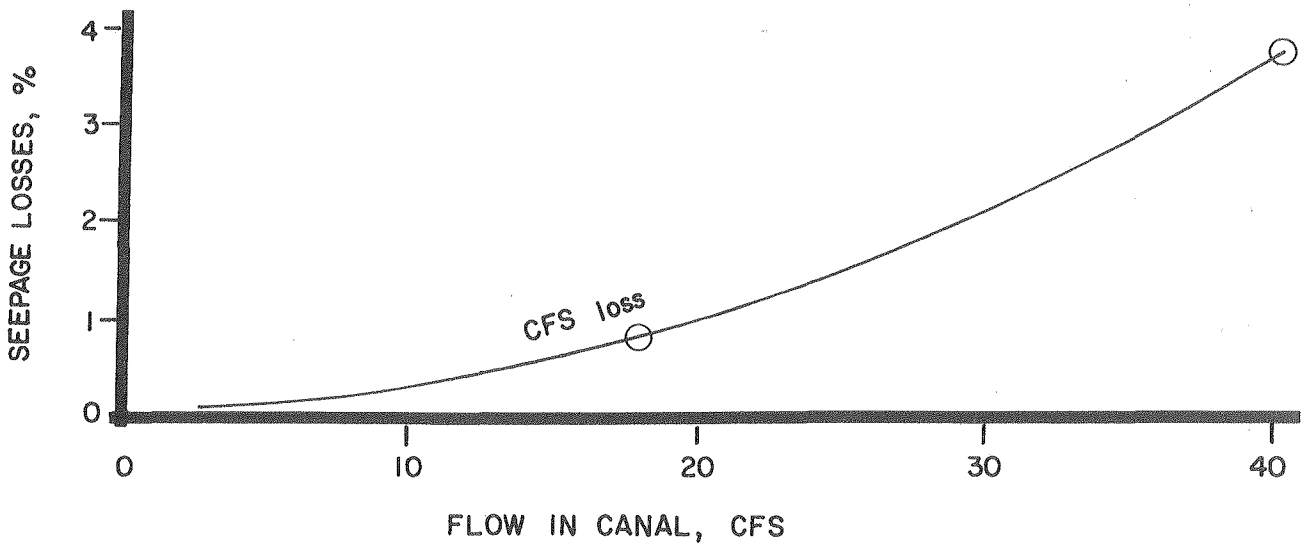
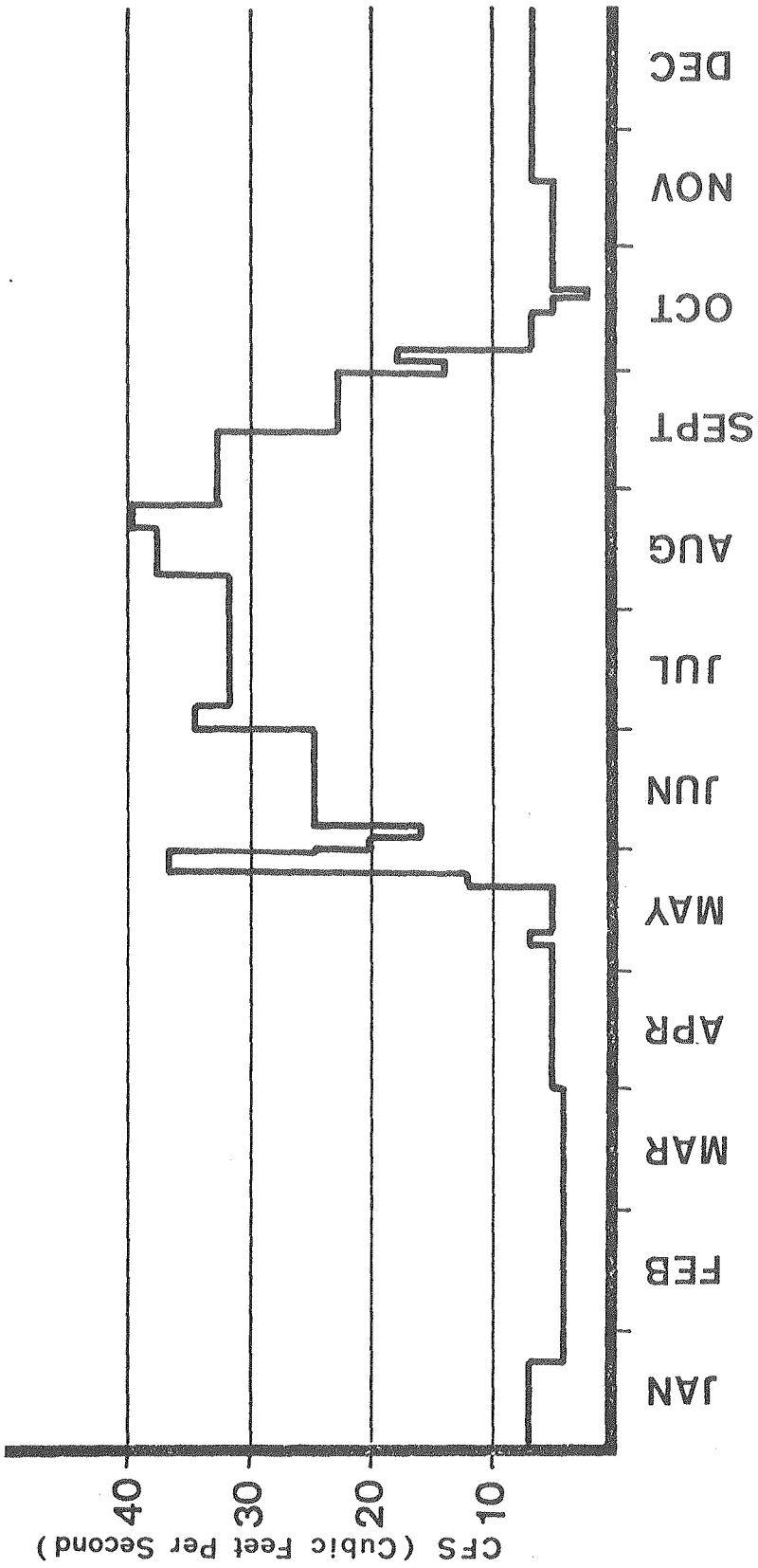


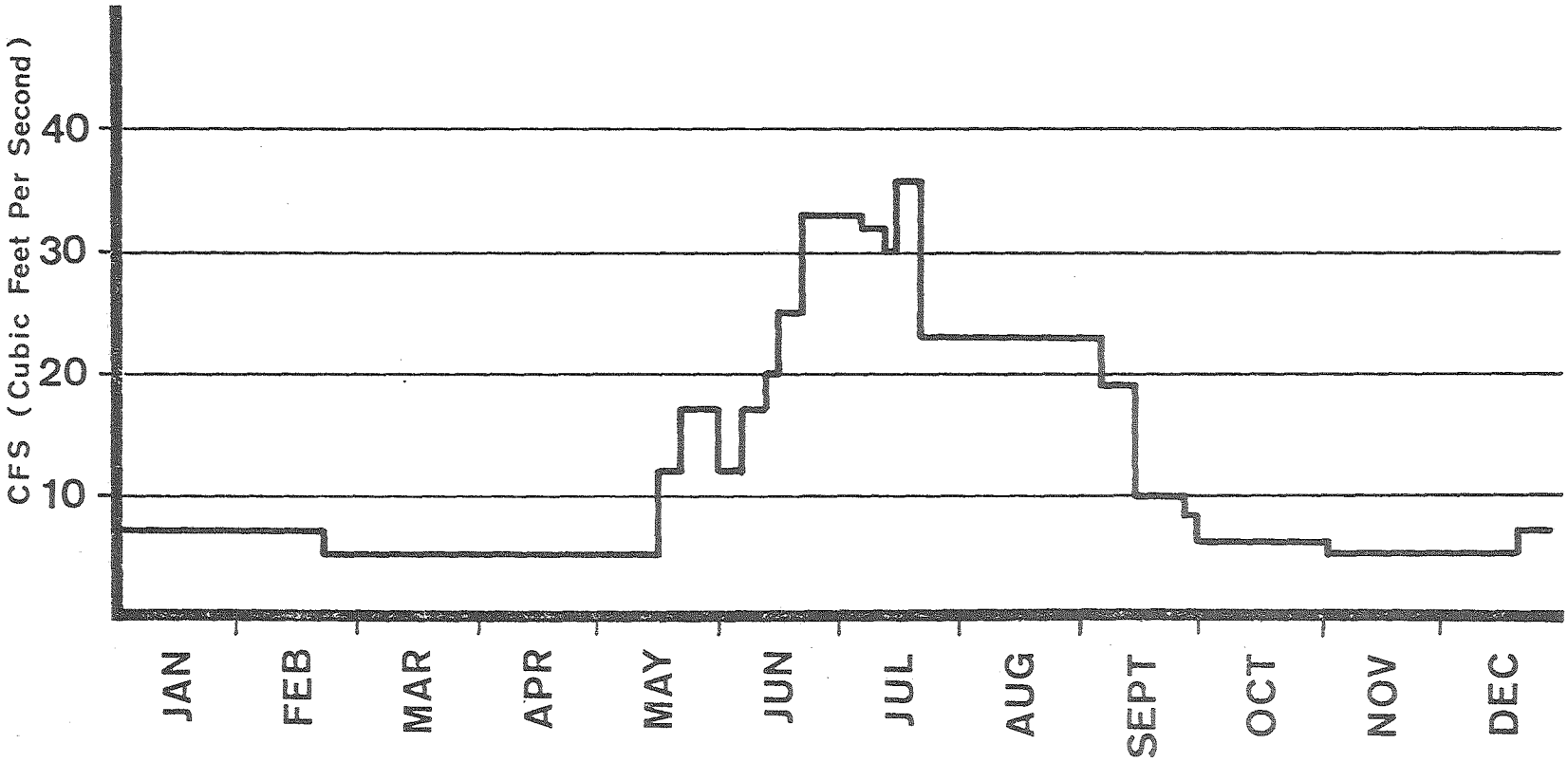
FIGURE G1. APPROXIMATE SEEPAGE LOSSES IN EL DORADO MAIN CANAL, FOREBAY TO BLAIR ROAD CROSSING

APPENDIX H



Recorded discharge from Forebay Reservoir in the EID Main Canal for Calendar Year 1969

Recorded discharge from Forebay Reservoir in the EID Main Canal for Calendar Year 1970



Recorded discharge from Forebay Reservoir in the EID Main Canal for Calendar Year 1971