

**Firebaugh Canal Water District  
3<sup>rd</sup> Lift Canal Lining and Modernization Project  
Fairfax to Brannon**



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### **Executive Summary**

**Date:** February 22, 2024  
**Applicant:** Firebaugh Canal Water District  
2412 Dos Palos Road, PO Box 97  
Mendota, CA 93640

**Eligible Applicant:** Category A  
**Funding Level:** Funding Group II  
**Project length:** 3 years  
**UEI #:** CLLYE511NDD7

**Federal Facility:** No

### **Project Summary**

The Proposed 3<sup>rd</sup> Lift Canal Lining and Modernization Project – Fairfax to Brannon (Proposed Project) will include two improvement components:

- Replaced the unlined ditch with a concrete lined canal (approximately 2 miles).
- Construct a Mid-stream storage reservoir connected to the 3<sup>rd</sup> Lift and 2<sup>nd</sup> Lift Canals.

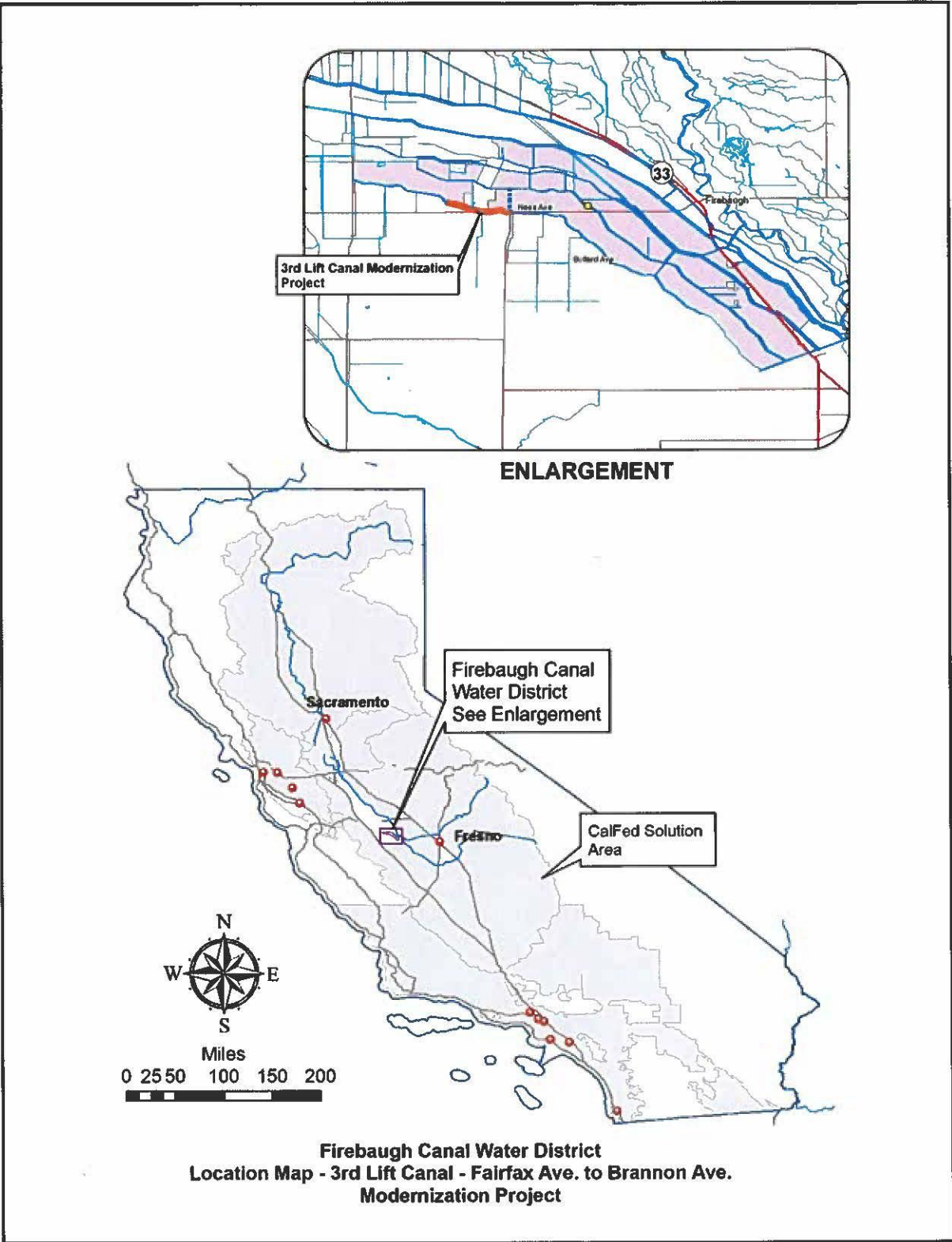
The new lined canal would reduce the existing canal cross section to an estimated width of 20.4 feet, freeing up approximately 13 feet of right of way width for other uses and conserve water through seepage reduction. Based on a 2006 seepage study of the 3<sup>rd</sup> Lift Canal, this project will recover approximately 430 acre feet per year of seepage losses.

The Mid-stream Storage Reservoir would be constructed adjacent to the 3<sup>rd</sup> Lift approximately  $\frac{3}{4}$  of a mile west of Fairfax Avenue. The reservoir would be construed with 6 foot tall levees around a 13 acre field with an estimated storage capacity of approximately 50-60 acre feet. The reservoir floor would be soil-conditioned to prevent seepage. An inlet/outlet facility would allow excess water from the 3<sup>rd</sup> Lift to spill into the reservoir and pump out of the reservoir to meet local demands. Additionally, this reach of the 3<sup>rd</sup> Lift is connected to the 2<sup>nd</sup> Lift Canal through a pipeline along Fairfax Avenue, which will allow the 2<sup>nd</sup> Lift access to this additional water supply flexibility from the reservoir. The Proposed Project will benefit approximately 2380 acres within the 3<sup>rd</sup> Lift Canal service area and approximately 1040 acres within the 2<sup>nd</sup> Lift Canal Service Area (see Figure 2).

### **Project Location**

**Figure 1** shows the project location. The Proposed Project is located in western Fresno County, approximately 7 miles west of the community of Firebaugh, within Firebaugh Canal Water District. The coordinates of the Proposed Project are 36.851749°, -120.581340°.

FIGURE 1





## **Project Description**

Firebaugh Canal Water District's irrigation system begins at the Mendota Pool, at the very south end of the District. The District's Main Lift Canal pumps water from the Mendota Pool and distributes that water to the three lift canals which provide irrigation water supplies to growers within the District. The 3<sup>rd</sup> Lift Canal extends 16.4 miles from its headworks at the Main Lift, to its terminus at the northwest boundary of the District (see **Figure 2**).

Firebaugh Canal Water District is part of the Grassland Drainage Area, which overlies a saline perched water table. Water contained within this perched aquifer is not only too saline for any beneficial use, but also contains elevated levels of selenium, which, when discharged to the environment, creates a potential hazard to wildlife. As irrigation supply water seeps into the shallow water table, either as a result of irrigation deep-percolation or through seepage from unlined canals, this saline water is pushed into regional drains and discharged as subsurface drain water. Drainage discharges from the Grassland Drainage Area are regulated by the Central Valley Regional Water Quality Control Board waste discharge order R5-2019-0077. Growers within the Grassland Drainage Area (including those within Firebaugh Canal Water District) manage the produced subsurface drain water at a considerable expense.

The Proposed Project will be designed to help address two concerns for the District:

1. By lining a segment of the 3<sup>rd</sup> Lift Canal, the District will recover approximately 430 acre feet through seepage reduction. This will not only conserve water (and the associated pumping costs) but also reduce the production of subsurface drain water containing selenium.
2. Because of the long distance from the end of the 3<sup>rd</sup> Lift Canal to its headworks, it takes substantial time for changes in flow to propagate to the end of the canal. The mid-channel storage provided by the proposed reservoir would significantly reduce this lag in delivery flows and improve operational flexibility. Additionally, because the 2<sup>nd</sup> and 3<sup>rd</sup> Lift Canals are connected by a pipeline, the 2<sup>nd</sup> Lift Canal can take advantage of this additional storage.

Design of the Proposed Project will be focused on an interconnected reservoir system with the lined portion of the 3<sup>rd</sup> Lift Canal to incorporate these benefits. The Proposed Project includes two construction components – Installing concrete lining on a portion of the 3<sup>rd</sup> Lift Canal, and constructing a mid-channel storage reservoir adjacent to the 3<sup>rd</sup> Lift Canal. The proposed reservoir will occupy approximately 14 acres of land adjacent to the portion of the 3<sup>rd</sup> Lift Canal that will be lined. The canal lining will be unreinforced concrete with a trapezoid cross section. The cross section is expected to have a total depth of approximately 4.5 feet and a bottom width of six feet. Four turnout structures will be replaced in this segment and a new inlet/outlet structure will connect the proposed reservoir to the 3<sup>rd</sup> Lift Canal. An existing pipeline connecting this segment of the 3<sup>rd</sup> Lift Canal to the 2<sup>nd</sup> Lift Canal along Fairfax Avenue will expand the operational flexibility provided by the proposed reservoir to include both the 3<sup>rd</sup> Lift Canal and 2<sup>nd</sup> Lift Canal service areas. See **Figure 3**.

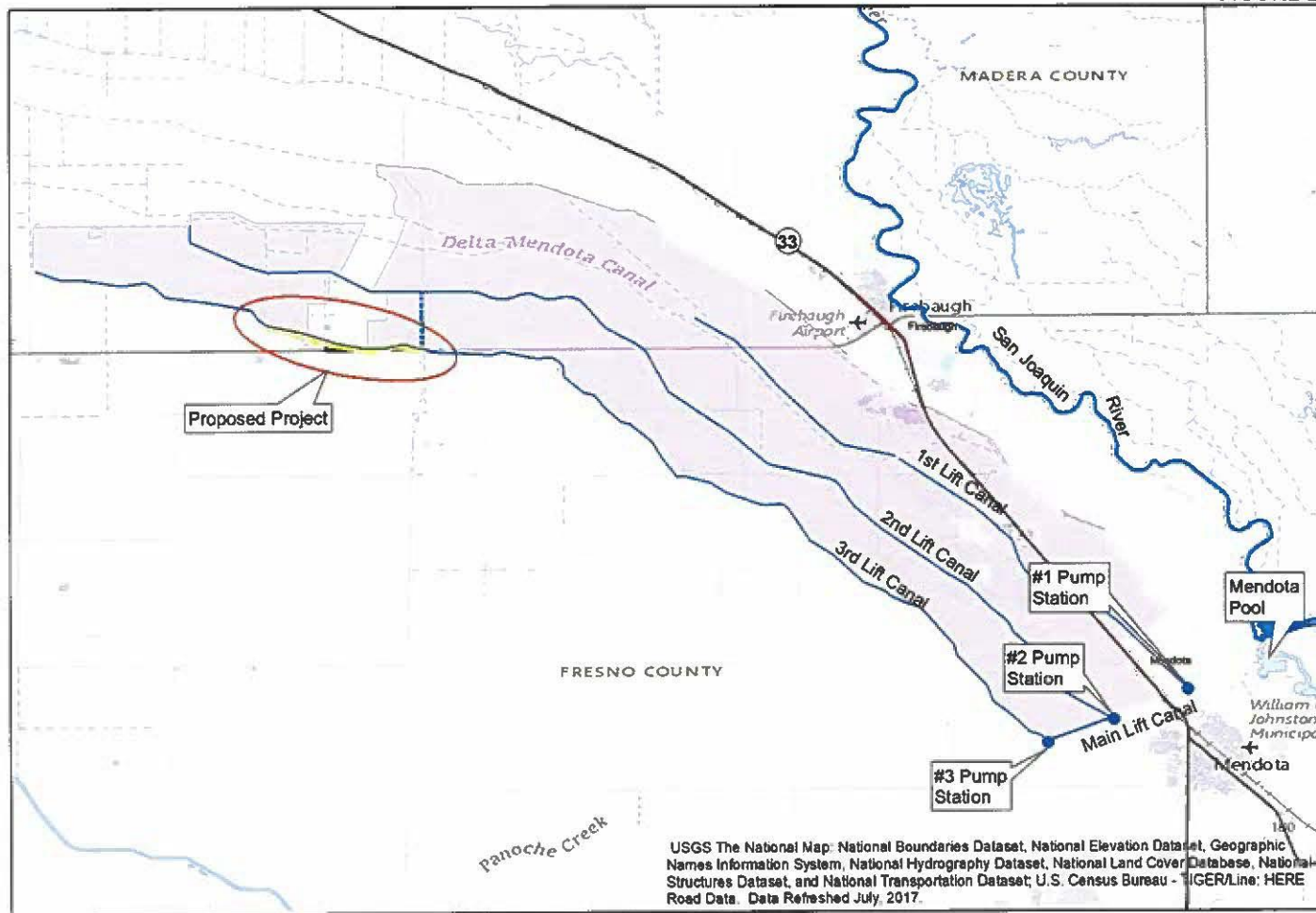
**Project construction elements:**

- **Concrete Lining Component:**
  - Clean out and site preparation. Two to three excavators (Caterpillar 330 or equivalent) and one to two dozers (Caterpillar D3 or equivalent) will be used to clean out the site. This work will include the removal of the four existing turnout structures, excavation of subgrade and general clean-up of the canal alignment. Excavated subgrade will be placed on the existing canal banks to dry. This work will take five to eight days, weather dependent.
  - Placement of compacted embankment. Two to three excavators (Caterpillar 330 or equivalent), one to two dozers (Caterpillar D3 or equivalent) and a sheep's-foot compactor (Caterpillar 825K or equivalent) will be used to place, grade and compact the canal bed. The purpose of this work is to provide a properly compacted subgrade for the canal cross-section excavation. This work will take up to 25 days and may be affected by wet weather conditions.
  - Canal prism excavation. Two excavators and a specially modified dozer will be used to cut the canal prism into the compacted canal bed. Excavators will excavate a trench in the general shape of the canal and the dozer will trim it to the correct dimensions. This work will take up to 20 days and may be affected by the weather.
  - Placement of concrete lining. Concrete lining will be spread along the canal alignment using a slip-form pulled by the dozer. Cement trucks will drive on both canal banks and pour cement into the hoppers on the slip-form as it is pulled. This work will take approximately 5 days and can be affected by the weather.
  - Reinforced Concrete Headwalls. Concrete headwalls will be constructed at Fairfax Avenue and Brannon Avenue to protect the existing culverts and roadway. These will be constructed with hand labor and take approximately 5 days to construct for each wall.
  - Turnout installation. Turnouts will consist of pre-cast concrete structures, canal gates and discharge pipe. These will be installed by an excavator and hand labor. The four turnouts will take approximately 5 days to install.
- **Reservoir Component:**
  - Site cleanup and preparation. A grader (Caterpillar 140GC or equivalent) will scarify the reservoir site, removing weeds and debris. This work will take up to 2 days.
  - Levee construction. Up to three Scrapers (Caterpillar 623 or equivalent) will excavate native material from the interior of the reservoir site and place that material to form the levees. A grader (Caterpillar 140GC or equivalent) will shape the levees and will be compacted by a sheep's-foot compactor (Caterpillar 825K or equivalent).
  - Inlet/outlet facilities. A cast-in-place concrete structure would be constructed to connect the reservoir to the 3<sup>rd</sup> Lift Canal to allow water to flow into the

reservoir or be pumped out of it according to demand. The concrete structure will be formed with hand labor and poured from a typical cement truck.

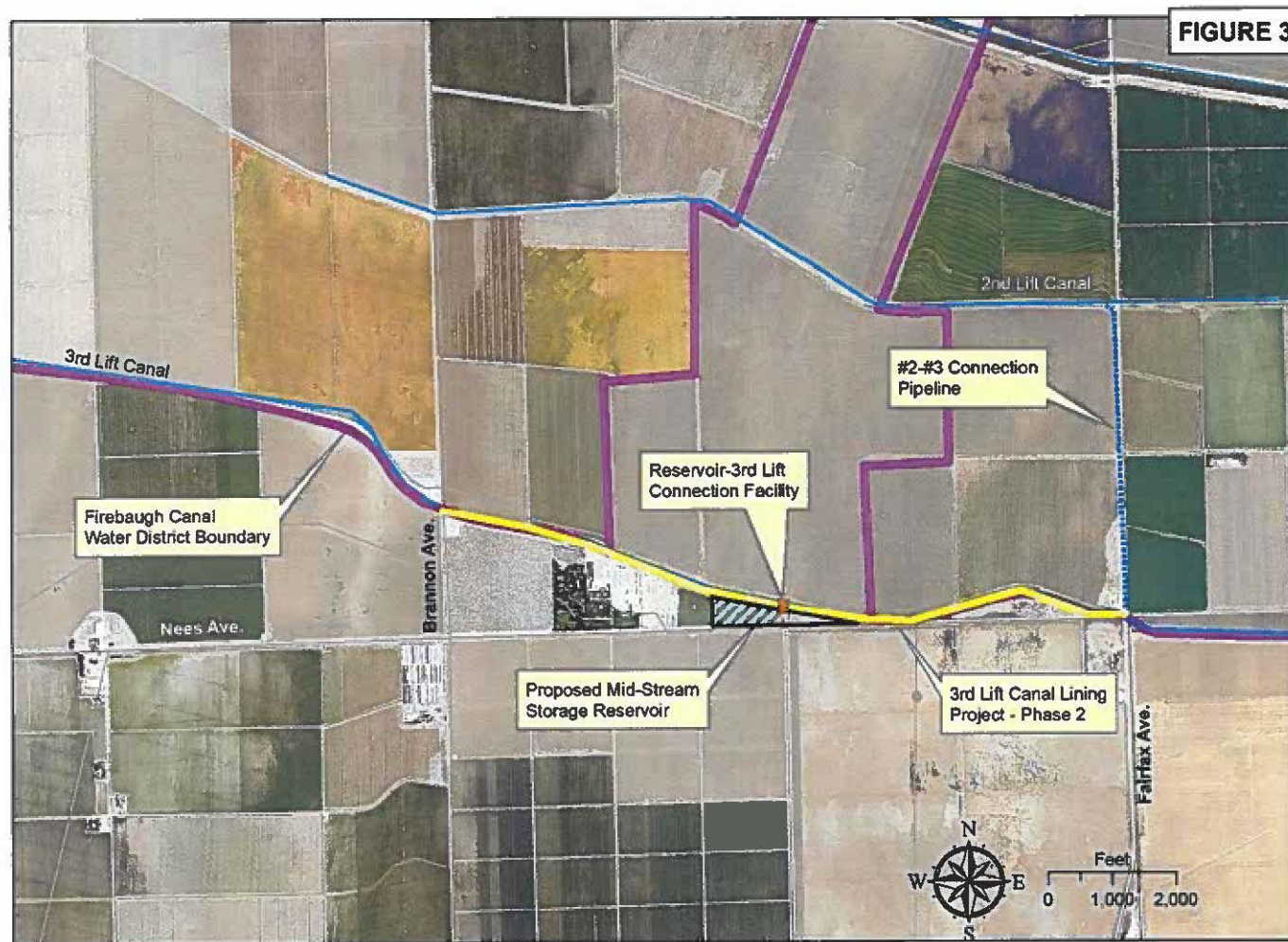
- Basin floor conditioning. The floor of the reservoir will be soil-conditions with lime or other soil-cement materials to prevent seepage from the reservoir. This work will be performed by a soil mixer.

FIGURE 2



**Firebaugh Canal Water District  
Location Map - 3rd Lift Canal Lining Project  
Phase 2**





**Firebaugh Canal Water District - 3rd Lift Canal Lining Project  
Phase 2 - Project Service Area**

## **Evaluation Criteria**

### **E.1.1 Evaluation Criterion A—Quantifiable Water Savings (25 Points)**

*1) Describe the amount of estimated water savings. For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project.*

The District performed a seepage pond study to estimate the seepage rate for the unlined portions of the 3<sup>rd</sup> Lift Canal. Based on the results of that study, the seepage recovered by the proposed project are estimated to be 430 acre feet per year

*2) Describe current losses.*

Currently, all losses associated with the Proposed Project are a result of seepage from the existing, unlined canal to the perched groundwater table. This perched aquifer is very saline and not usable for any beneficial use, with salinity (specific conductance) ranging from 5,000  $\mu\text{S}/\text{cm}$  to more than 8,000  $\mu\text{S}/\text{cm}$ . Water seepage to this aquifer is not only unrecoverable for use but contributes to a shallow groundwater problems that affects adjacent farmland. Farmers within this region, manage shallow groundwater with subsurface drainage systems (tile systems), which draw the shallow groundwater from the soil with a series of perforated tubes. The discharge of this water, which is not only saline but also contains elevated levels of selenium, is regulated through a Waste Discharge Order (Order R5-2019-0077), and requires high levels of management at a substantial cost.

*3) Describe the support/documentation of estimated water savings.*

A seepage pond study was performed in January 2007 at the 3<sup>rd</sup> Lift Canal and Brannon Avenue evaluate the seepage losses for this segment of the Canal. Initially, this seepage pond study was completed to support Phase 1 of the 3<sup>rd</sup> Lift Canal Lining Project (completed in 2008), however its results are applicable to the Proposed Project.

The seepage pond study was performed over a period of 15 days, with measurements made twice a day. The average daily seepage rate was determined to be 0.69 acre feet per mile per day. For the proposed project, affecting 11,000 feet of canal (2.08 miles) and a typical 300 day per year service period, this amounts to  $[0.69 \text{ af}/\text{mi}/\text{day} * 2.08 \text{ miles} * 300 \text{ days}]$  431 acre feet per year. A summary of seepage data is presented in **Appendix A**.

The Proposed Project will line this segment of the 3<sup>rd</sup> Lift Canal with concrete lining which will effectively eliminate all seepage losses. Additionally, the proposed reservoir floor will be conditioned with soil cement to prevent seepage losses.

*4) Please address the following questions according to the type of infrastructure improvement you are proposing for funding.*

**(1) Canal Lining/Piping:** *Canal lining/piping projects can provide water savings when irrigation delivery systems experience significant losses due to canal seepage. Applicants proposing lining/piping projects should address:*

- a. *How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.*

The average annual water savings was based on (1) the calculated seepage loss in acre feet per year per mile of the unlined portion of the 3<sup>rd</sup> Lift Canal and (2) the assumption that concrete lining will effectively eliminate those seepage losses within the Proposed Project's lined segment of the canal. The seepage rate was estimated in 2007 through a ponding test performed at the 3<sup>rd</sup> Lift Canal and Brannon Avenue (the northerly end of the Proposed Project). The seepage ponding test was performed for a period of 15 days and measured an average seepage rate of 0.69 acre feet per mile per day. The details of this seepage study, including the collected data and calculations, are included in **Appendix A**.

For the Proposed Project, a total of 2.08 miles (11,000 linear feet) of the 3<sup>rd</sup> Lift Canal will be lined with concrete to eliminate seepage. Based on the results of the seepage study, this Project will recover [2.08 miles \* 0.69 af/mi/day \* 300 days] 431 acre feet per year in seepage losses.

- b. *How have average annual canal seepage losses been determined? Have ponding and/or inflow/outflow tests been conducted to determine seepage rates under varying conditions? If so, please provide detailed descriptions of testing methods and all results. If not, please provide an explanation of the method(s) used to calculate seepage losses. All estimates should be supported with multiple sets of data/measurements from representative sections of canals.*

A seepage ponding test was performed on the canal from January 8 to January 23, 2007 (a period of 15 days). Seepage and evaporation measurements were collected twice daily and the seepage rate for the pond was calculated and converted to seepage losses per mile of canal per day. The results of the seepage study indicated that the average seepage loss for this segment of the 3<sup>rd</sup> Lift Canal amounted to 0.69 acre feet per mile per day, which totals an average annual loss of 430 acre feet per year recovered by the Proposed Project. Details of this seepage test are included in **Appendix A**.

- c. *What are the expected post-project seepage/leakage losses and how were these estimates determined (e.g., can data specific to the type of material being used in the project be provided)?*

The concrete canal lining installed as part of the Proposed Project will effectively eliminate seepage from this segment of the of the 3<sup>rd</sup> Lift Canal once the lining is installed.

- d. *What are the anticipated annual transit loss reductions in terms of acre-feet per mile for the overall project and for each section of canal included in the project?*

Firebaugh Canal Water District maintains a tightly controlled irrigation conveyance system and rarely operates with any measurable spills. Losses within the 3<sup>rd</sup> Lift Canal service area are largely limited to seepage losses in the unlined segments of the canal, currently amounting to [13.4 miles \* 0.69 af/mi/day \* 300 days] 1567 acre feet per year. The Proposed Project would reduce those annual losses by approximately 430 acre feet per year.

- e. *How will actual canal loss seepage reductions be verified?*

Seepage losses after the installation of the proposed concrete lining are effectively zero. No additional seepage analysis is necessary.

- f. *Include a detailed description of the materials being used.*

The proposed lining material will be unreinforced concrete lining, poured to an average thickness of 2.5". The concrete mix will require high air entrainment and a fibermesh additive (such as sikafiber) to reduce shrinkage cracking. The concrete lining will be applied using a slipform in the shape of the canal design cross-section, which will ensure a smooth and uniform application of lining, and finished with a curing compound to further protect against shrinkage cracking.

## **E.1.2 Evaluation Criterion B—Renewable Energy (20 Points)**

### **E.1.2.2 Subcriterion B.2—Increasing Energy Efficiency in Water Management**

*Describe any energy efficiencies that are expected to result from implementation of the water conservation or water efficiency project (e.g., reduced pumping).*

The Proposed Project does not include any renewable energy sources; however, it will recover seepage losses from water pumped by the District at the headworks of its Main Lift Canal, approximately 16 canal-miles from the Proposed Project. The District's conveyance system relies on three primary lift pumps, each containing three to four lift pumps ranging in size for 100 cfs units to 25 cfs units, which lift water from the Mendota Pool (see **Figure 2**) to each of the 3 lift canals. Water diverted into the 3<sup>rd</sup> Lift Canal is pumped from the Mendota Pool at Pump Station #1, through Pump Station #2 and finally through Pump Station #3 into the 3<sup>rd</sup> Lift Canal, where that water flows by gravity to the end of the 3<sup>rd</sup> Lift Canal. The three pump stations provide a combined



total lift of approximately 25 feet to deliver water to the Proposed Project site. The District utilizes typical lift pumps for canal pumping, with a typical efficiency of 75%. Because the Proposed Project will conserve water at the point of use, the equivalent volume necessary to replace the seepage losses will not need to be pumped from its source at the headworks of the Main Lift Canal.

Based on the volume of water delivered and the lift provided by the District's delivery system, the power saving is estimated at  $[1.024 * 25 \text{ feet} * 430 \text{ afy}]$  14,677 kilowatt hours per year. The power saved by the Proposed Project will occur at the start of the District's irrigation system and reduce carbon emissions by an estimated 10.4 metric tons of CO<sub>2</sub>e per year (USEPA Greenhouse Gas Equivalencies Calculator, [Greenhouse Gas Equivalencies Calculator | US EPA](#)).

No water treatment is required as part of the Proposed Project.

### **E.1.3 Evaluation Criterion C—Other Project Benefits (15 points)**

***Resilience and Sustainability Benefits.*** Will the project address a specific water and/or energy sustainability concern?

The condition of greatest concern affecting water supply sustainability within the region is drought. The entire Central San Joaquin Valley has been severely impacted by recent drought conditions. Federal water districts, including those neighboring FCWD, have had their water allocations reduced to zero in both 2021 and 2022, after receiving only 20% of their water allocation in 2020. These conditions resulted in substantial fallowing of annual (row) croplands and deficit irrigation of permanent crops, resulting in substantial economic losses on the farm level, cascading into reduced reinvestment and job losses.

Drought conditions are a constant and reoccurring concern, with four of the last ten years classified as critically dry and three years classified as dry or below normal.

The Proposed Project will help address some of the strain on water supply by recovering seepage losses that would otherwise be permanently lost to a saline perched groundwater sink. The 430 acre feet per year conserved by the Proposed Project will be utilized to support irrigation demand either within the District or marketed to neighboring districts in need.

***Ecological Benefits.*** In addition to the separate WaterSMART Environmental Water Resources Projects NOFO, this NOFO places a priority on projects that result in ecological benefits, through this

*section and other sections above, consistent with the SECURE Water Act. Please provide information regarding how the project will provide ecosystem benefits.*

The Proposed Project will not have a direct impact on state or federally listed special status species. However, by reducing the seepage contribution to a saline perched water table, the Proposed Project will help prevent the degradation of shallow groundwater quality and help reduce the volume of subsurface drain water (tile water) produced within the Grassland Drainage Area (GDA).

Most of the GDA (including the District) is underlain with a shallow saline aquifer which is high in dissolved solids (salts), boron, and selenium, all of which are considered constituents of concern by the Central Valley Regional Water Quality Control Board. This shallow water table is managed through on-farm subsurface (tile) drainage systems and regional deep drains that intercept deep percolation from irrigation and seepage from unlined canal systems. Currently this drain water is discharged to the San Joaquin River through the Grassland Bypass Project in accordance with a waste discharge permit. Each acre foot of this drainage contains an average of 0.25 lbs of selenium, 18 lbs of boron, and 3.3 tons of salt. Tile systems within the District contribute an average of 4,000 acre feet of saline subsurface drain water to the GBP annually. Tile discharge and water quality estimates are based on District records.

By lining the 2 miles of the 3<sup>rd</sup> Lift Canal as part of the Proposed Project, the seepage contribution to the shallow aquifer will be reduced by approximately 430 acre feet per year, reducing the production of tile drain water by a similar amount, along with the associated 107 pounds of selenium and 1,400 tons of salt. Historically, this tile water would ultimately make its way to the San Joaquin River by way of the Grassland Bypass Project. However source control projects, such as the Proposed Project, as well as other drainage management projects have provided districts within the GDA the tool necessary to manage subsurface drain water without discharging it to the San Joaquin River outside of storm events. These projects have been critical to the continued success of the Grassland Bypass Project and compliance with water quality regulations.

*Climate Change: E.O. 14008 emphasizes the need to prioritize and take robust actions to reduce climate pollution; increase resilience to the impacts of climate change; protect public health and conserve our lands, waters, oceans, and biodiversity.*

The Proposed Project does not include components that will directly affect climate change, although some of the project impacts described earlier (such as reduced pumping as a result of seepage reduction, and water quality improvements due to reduced drainage production) will have an indirect impact on climate change and improve drought resilience.

#### **E.1.4 Evaluation Criterion D—Disadvantaged Communities, Insular Areas, and Tribal Benefits (15 points)**

##### **E.1.4.1 Subcriterion D.1. Disadvantaged Communities**

- *Please use the White House Council on Environmental Quality's interactive Climate and Economic Justice Screening Tool (CEJST), available online at [Explore the map - Climate & Economic Justice Screening Tool \(screeningtool.geoplatform.gov/en/#17.59/36.63278/-105.181329\)](https://www.ejscreeningtool.gov/en/#17.59/36.63278/-105.181329) to identify any disadvantaged communities that will benefit from your project.*

The Proposed Project affects areas in Tract # 060190084201 and 06019008402 within Fresno County. Both of these tracts are identified as Disadvantaged by the Screening Tool because they both meet more than one burden threshold and the associated socioeconomic threshold. Major burdens include low income (above 90th percentile), flooding concerns, air quality issues, health concerns, unemployment and educational issues, among others.

- *If applicable, describe how the proposed project will serve or benefit a disadvantaged community, identified using the tool.*

Recurring drought conditions are a constant threat to rural disadvantaged or underserved communities. There are several rural disadvantaged communities in the vicinity of the Proposed Project, including Dos Palos, South Dos Palos, Oro Loma, Firebaugh, and Mendota, all of which rely on sustained agricultural economies for jobs (both directly and indirectly related to agriculture) and sustainable social and family life. The recovered seepage water and improved water management included in the Proposed Project will help sustain viable agriculture in the community during periods of extended drought.

##### **E.1.4.2 Subcriterion D.2. Tribal Benefits**

The Proposed Project has no impact on Tribal lands or interests.

#### **E.1.5 Evaluation Criterion E—Complementing On-Farm Irrigation Improvements (8 points)**

The vast majority of farmland within Firebaugh Canal Water District is irrigated with high efficiency irrigation systems such as drip or micro-sprinklers. There are approximately 230 acres within the overall service area of this project still irrigated via conventional methods, however this land is ineligible for NRCS funding due to the size of the grower. However, the District offers an irrigation system improvement funding assistance program to all growers within the District. The program provides a grant amounting to a maximum of 25% of the project cost and a low interest loan for the remainder. Funding for this program is provided entirely through District



funds. To date, this program has provided nearly \$10 million in funding assistance to District growers. This funding program provides support similar to the NRCS EQIP program and the District will reach out to the grower with an offer to provide funding assistance to support irrigation system improvements.

#### **E.1.6 Evaluation Criterion F—Readiness to Proceed (8 points)**

The proposed project is ready to proceed. FCWD has many years' experience in canal lining projects and has already prepared a plan to shut down this portion of the 3<sup>rd</sup> Lift Canal for construction.

*Engineering Status:* A preliminary hydraulic review of the canal has been completed to determine demand flowrate and needed features (turnouts, headwalls, reservoir connections, and other components). A detailed survey for final design will be completed in November of 2024, assuming that the project grant is awarded.

*Implementation Schedule:* A preliminary schedule is below. Note that all construction activities have to occur during the non-irrigation season (October through February) and the preliminary schedule is based on the assumption that NEPA compliance is completed by July of 2025. If NEPA compliance is substantially delayed, it is possible that project construction could be delayed until the following non-irrigation season. However, even with this delay the project would be completed within 36 months.

- September 2024 – Assumed notice of grant award. Initiate topographic survey work, biological review and cultural resources review.
- November 2024 – Complete survey work and begin design.
- November 2024 – Complete biological and cultural resources review and provide these reports to Reclamation. Develop CEQA Initial Study and Negative Declaration.
- July 2025 – Complete CEQA and NEPA Process.
- July 2025 – Complete design and publish contract documents.
- September 2025 – Bid project; Select winning bid, issue notice of award and notice to proceed.
- October 2025 – Begin site cleanout and earthwork construction
- November 2025 – Complete canal earthwork and begin canal lining.
- January 2026 – Complete reservoir earthwork, begin reservoir inlet/outlet structure
- February 2026 – Complete canal lining and install turnouts. Complete reservoir construction.
- July 2026 – Submit final invoicing and prepare draft final report.
- September 2026 – Finalize and submit project final report.

No new policies or administrative actions are required to implement the project. No special permits are required.



The Proposed Project is anticipated to comply with the California Environmental Quality Act (CEQA) through an initial environmental study and a negative declaration. The District intends to complete an environmental review, cultural resource review, and a biological survey of the project prior to construction, and file a Negative Declaration to comply with CEQA. Gathered environmental data will be provided to Reclamation to assist with the necessary NEPA documentation.

#### **E.1.7 Evaluation Criterion G—Collaboration (5 points)**

*How does the project promote and encourage collaboration among parties in a way that helps increase the sustainability of the water supply.*

- The Project is supported as a “Source Control Project” by the Westside Regional Drainage Plan (Westside Plan). The Westside Plan was a collaborative plan developed by seven districts on the westside of the San Joaquin Valley to identify practical and scientifically proven projects and activities to reduce and manage subsurface drainage water within the Grassland Drainage Area, of which the District is a part. The Westside Plan identified Source Control Projects a canal lining and pipeline projects that reduce or eliminate the seepage component of subsurface drainage production. The Proposed Project would eliminate an estimated 430 acre feet of seepage per year, which reduce seepage-related drainage production by a like amount.
- The Project is located entirely in the District’s service area and therefore, there are no partners for this proposed Project.
- The proposed Project has support from neighboring districts that benefit from water marked by Firebaugh Canal Water District due to water conservation projects (**Appendix B**)
- By preventing losses, water supplies can be managed more effectively and when there is a surplus, supplies may potentially be marketed to landowners or neighboring districts in need.
- While the proposed Project will not directly prevent water-related crises, improvements in regional water use efficiency will help with long-term water supply sustainability.

#### **E.1.8 Evaluation Criterion H—Nexus to Reclamation (4 points)**

*Describe the nexus between the proposed project and a Reclamation project or Reclamation activity.*

**Reclamation Water Service Agreement:** FCWD is a member of the San Joaquin River Exchange Contractors’ Water Authority and has a water service contract with Reclamation through that Authority. Water is delivered by way of the Delta-Mendota Canal both directly and through the Mendota Pool.

**Reclamation Project Area Benefits:** Through a variety of water conservation projects and well recovery projects, the District markets substantial volumes of water to neighboring Reclamation (federal) districts as a supplement to their federal water supply. These districts include Westlands Water District, Panoche Water District, San Luis Water District,

and Pacheco Water District. The Proposed Project will increase the volume of water available for marketing.

**Tribe:** Firebaugh Canal Water District is not a tribe.

#### **D.2.2.2.7 Performance Measures**

- The primary benefit of the proposed project is the reduction in water lost through seepage of 430 af per year and the associated reduction in drainage water production from that seepage. This benefit was quantified in the seepage pond study included as **Appendix A**. The District does not intend to repeat the seepage test but is able to if required by USBR.
- The canal lining will effectively eliminate seepage losses.

#### **D.2.2.3 Budget Narrative**

A budget overall summary is provided in Table 1, including the local and federal amounts. Table 2 breaks down the budget by work category.

**Table 1: Budget Summary:**

<b>SOURCE</b>	<b>AMOUNT</b>
Federal funding (49%)	\$1,855,140
Match funding paid by FCWD (51% cost share)	\$1,930,860
<b>TOTAL PROJECT COST</b>	<b>\$3,786,000</b>

**Table 2: Project Budget.**

BUDGET ITEM DESCRIPTION	COMPUTATION		Quantity Type	TOTAL COST
	\$/Unit	Quantity		
Design				
Surveying	\$50,000.00	1	Each	\$50,000.00
Engineering Design	\$100,000.00	1	Each	\$100,000.00
Construction				
Cleanup and Site Prep	\$3.00	11,000	Each	\$33,000.00
Compacted Embankment	\$12.00	51,000	Cubic Yard	\$612,000.00
Lined Canal	\$106.00	11,000	Linear Feet	\$1,166,000.00
Turnout Installations	\$20,000.00	4	Each	\$80,000.00
Reservoir Compacted Embankment	\$9.00	30,000	Each	\$270,000.00
Reservoir Floor Treatment	\$2.00	500,000	Each	\$1,000,000.00
Reservoir Connections	\$250,000	1	Each	\$250,000.00
Reinforced Concrete (Headwalls)	\$3,500.00	40	Cubic Yard	\$140,000
CEQA/NEPA Compliance				
Engineering Review	\$15,000.00	1	Each	\$15,000
Biological	\$10,000.00	1	Each	\$10,000
Cultural	\$50,000.00	1	Each	\$50,000
Administration				
Invoicing and Reports	\$1,000	10	days	\$10,000.00
TOTAL DIRECT COSTS				
Indirect Costs				
*None	\$0	0		\$0
TOTAL ESTIMATED PROJECT COSTS				\$3,786,000

**Local Share (51%):       \$   1,930,860**

**Federal Share (49%):     \$   1,855,140**

### **Budget Narrative**

Salaries and Wages. District staff will be engaged in the management of the proposed project but does not intend to separate that time from other regular duties of staff and therefore no staff time will be charged to the project.

Fringe Benefits. The District will not charge fringe benefits associated with District staff to this project.

Travel. No travel is associated with this project.

Equipment. No equipment will be purchased as part of this project.

Materials and Supplies. No materials or supplies will be charged to this project.

Design. The proposed project will utilize several consultants and contractors for its completion:

- Surveyor. A licensed professional surveyor will be used to survey the project alignment and reservoir site, develop topographic data for design, identify right of way limits, and set construction stakes. A surveyor in training (LSIT) and other staff technicians will convert the field data to CAD files for design. The hourly rate depends on the type of work (field work or office work) and the individual performing that work (licensed surveyor, LSIT, or technician). Based on comparisons with similar previous billings on lining projects, the cost of surveying is estimated to be \$50,000 for this portion.
- Engineers. A licensed civil engineer will develop hydraulic evaluation, canal and structure design, reservoir design (including connection facilities), development of design drawings and specifications, project administration, and field review of construction progress. Based on comparisons with similar previous billings on lining projects, a cost of \$100,000 was estimated for the engineering design and reporting tasks associated with this project.

Construction. A general contractor qualified and experienced in earthwork, canal lining projects, and reinforced concrete structures will be used for construction of the reservoir, canal lining and structure construction. Estimated quantities and costs for the construction work are based on the unit costs for recent lining projects within nearby Districts which are similar in size, capacity, and conditions to the proposed project.

- Site Cleanout and Preparation. This line item covers the cost to clean up the site, remove built up silt and lay it out on the bank to dry. During this, existing turnout structures will be removed. The estimated cost is based on the linear foot cost from similar projects, and is estimated at \$3 per linear foot, totaling to \$33,000.
- Compacted Embankment. The existing cross-section will backfilled and compacted to prepare the alignment for canal prism excavation. Excavators will be used to scrape out the silt, remove the existing structures and backfill the existing channel. A compactor and graders will be used to compact the replaced soil. The unit cost (per cubic yard) for this work was compiled from recent projects in nearby districts. Based on preliminary engineering analysis, 82,000 cubic yards of subgrade will need to be excavated and compacted. The estimated cost for this portion is \$612,000.
- Lining Placement. Lining placement would include excavation of the canal prism and placement of unreinforced concrete lining. Since the proposed project capacity and topography are similar to projects in nearby districts, the cost for



lining placement is assumed to be similar at \$85/foot of canal. The estimated cost for this portion is \$1,166,000.

- **Turnout Installation.** Turnout installation includes placement of new pre-cast concrete gate structures, installation of canal gates and PVC turnout pipe, and transition lining placement. Based on similar projects in nearby districts cost for turnout installation is estimated at \$20,000 for each of the four turnouts, totaling \$80,000.
- **Reservoir Compacted Embankment.** This work will be completed by scrapers, graders, and compactors that will excavate material from this interior of the reservoir site and place, compact and grade that material along the boundary to form levees. The estimated quantity for this work is 30,000 cubic yards at a cost of \$9 per cubic yard, for a total of \$270,000.
- **Reservoir floor Treatment.** This work will mix lime and soil cement into the reservoir floor to harden that soil and inhibit seepage from the reservoir. The estimated cost for this work is \$2 per square foot of floor, totaling \$1,000,000.
- **Reservoir Connections.** This will include a reinforced concrete structure, pump system, and piping to allow water to flow into and out of the reservoir. The estimated cost for this is \$250,000.
- **Reinforced Concrete Headwalls.** Headwalls will be required at Fairfax Avenue and Brannon Avenue. These are expected to require a total of 40 cubic yards of reinforced concrete at a cost of \$3,500 per cubic yard for a total of \$140,000.

**Other Costs.** Project Review and Reporting. Project review includes activities such as construction inspection, schedule monitoring and coordination, and other miscellaneous activities associated with construction management and is included in the work provided by the project engineer. Reporting in compliance with the grant agreement is included in Other Costs. The District will utilize a consultant for grant reporting. Over the life of the Project a total of \$10,000 for invoicing reports, semi-annual reports, and a final project report.

**Indirect Costs.** Indirect costs incurred by the District will not be charged to the project.

#### **Environmental and Regulatory Compliance**

- **Engineering Review.** A civil engineer will develop the project description, Area of Potential Impact (APE), and develop the Initial Study for CEQA compliance as well coordinate environmental reviews by other consultants. The estimated cost for this work is \$15,000.
- **Biological review.** In support of both the CEQA and NEPA documentation, the project alignment will be reviewed by a biologist to determine the potential impact to special status species. Based on the biological review for projects in nearby districts, this service was assumed to take several days for a total cost of \$10,000.

- Cultural Resource Consultant. In support of both the CEQA and NEPA documentation, the project alignment will be reviewed by a cultural resource consultant to determine the potential impact to cultural resources. Based on the cultural review for projects in nearby districts, this service was assumed to cost approximately \$50,000.
- Environmental Compliance. The environmental compliance costs are less than 2% of the estimated project cost. The District has sufficient reserves available to cover additional environmental costs should they be required.

Total Cost. The total estimated project cost is \$3,786,000, including \$1,855,140 (49%) in Reclamation funds and \$1,930,860 (51%) in District funds. The District is flexible regarding the potential project award and can scale the Project to match the fund amount awarded.

#### **D.2.2.4 Environmental and Cultural Resources Compliance**

The proposed project will install convert an unlined ditch to a concrete lined canal and construct a small mid-stream storage reservoir on under-utilized lands adjacent to the canal. Under the California Environmental Quality Act (CEQA), this project will require an environmental evaluation in the form of an Initial Study, likely resulting in a Negative Declaration. The District intends to complete an environmental review, cultural resource review, and a biological survey of the project to support both CEQA and NEPA compliance. Gathered environmental data will be provided to Reclamation to assist with the necessary NEPA documentation.

1. *Will the proposed project impact the surrounding environment? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.*

The proposed project will involve the placement of compacted embankment and excavation of earth as required to build the reservoir levees and trim the canal to the required cross-section and the construction of reinforced concrete structures. All work will be performed within the footprint of the existing canal and reservoir site and no habitat will be impacted. Lands surrounding the proposed project are either actively farmed or contain farm support facilities (such as shops and farm houses). The proposed project will result in the conversion of under-utilized farm land to agricultural support facilities as part of the proposed reservoir. The canal will be dewatered during all construction activities and there will be no impact to water quality. There is some potential for dust generation during construction and management practices (such as road watering) will be implemented to minimize those impacts.

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?*

There are a number of special status species that could potentially be in the project area, including the California tiger salamander, the California red-legged frog, Fresno kangaroo rat, and others. Because the proposed project alignment is actively traveled and maintained and

the surrounding area actively farmed, there is limited habitat and it is unlikely that any special status will be in the project area during construction. A qualified biologist will survey the project area prior to construction to determine if there are any special status species in the project area, and will make recommendations for additional actions as required.

3. *Are there wetlands or other surface waters inside the project boundaries potentially fall under CWA jurisdiction as "waters of the United States?"*

There are no wetlands in the project boundary.

4. *When was the water delivery system constructed?*

The 3<sup>rd</sup> Lift Canal was constructed in 1958, as an unlined contour canal to deliver irrigation water to the westerly region of the District. It has been maintained, cleaned, and upgraded on a regular basis since its construction.

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.*

There are approximately 4 turnouts (headgates) that will be replaced by the proposed project. The existing turnouts are precast concrete structures with a common canal gate mounted at the back. These structures are replaced regularly by the District and are no more than 20 years old. The new turnouts installed by the proposed project will be precast concrete structures with additional slots to accommodate trash screens.

6. *Are any building, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?*

There are no buildings, structures or features within the District listed in the National Register. The District is not aware of any features that are eligible for listing.

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

There are no known archeological sites in the proposed project area.

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

The proposed project will have not have an impact on low income or minority populations.

9. *Will the project limit access or ceremonial use of Indian sacred sites or impact tribal lands?*

There are no tribal lands within the project or its service area. The proposed project will have no impact on tribal lands.

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

The project will have no impact on noxious weeds or non-native species compared to existing conditions.

#### **D.2.2.5 Required Permits or Approvals**

No additional permits or special approvals (aside from environmental compliance) are required.

**D.2.2.6 Overlap or Duplication of Effort Statement**

There are no overlap or duplicate efforts associated with the Proposed Project and Firebaugh Canal Water District has not submitted this Proposed Project to any other funding program.

**D.2.2.7 Conflict of Interest Disclosure Statement**

There are no actual or potential conflict of interests related to this project.

**D.2.2.8 Uniform Audit Reporting Statement**

Firebaugh Canal Water District performs an annual audit. A single audit will be performed for the 2023 fiscal year (in progress).

**D.2.2.9 Certification Regarding Lobbying**

The District does not retain a lobbyist.

**D.2.2.10 SF-LLL: Disclosure of Lobbying Activities (if applicable)**

**D.2.2.11 Letters of Support**

Letters of support are included in **Appendix B**.

**D.2.2.13 Official Resolution**

A draft resolution is included in **Appendix C**.



# **FIREBAUGH CANAL WATER DISTRICT**

**RESOLUTION NUMBER - 2024-03**

**DRAFT**

## **RESOLUTION OF THE BOARD OF DIRECTORS APPROVING WATERSMART WATER AND ENERGY EFFICIENCY GRANT**

**WHEREAS**, the Firebaugh Canal Water District Understands the importance of water conservation in its effort to reduce sub-surface drainage throughout the district; and

**WHEREAS**, the Firebaugh Canal Water District is desirous of obtaining grant funding for its Third Lift Canal Lining Project; and

**WHEREAS**, the Firebaugh Canal Water District is capable of providing the amount of funding and / or in-kind contributions specified in the funding programs and the Board of Directors has reviewed and supports the grant applications prepared for the WaterSMART Water and Energy Efficiency Program; and

**WHEREAS**, if the Firebaugh Canal Water District is selected for funding through the aforementioned funding assistance programs the District will cooperate with the Bureau of Reclamation to meet established deadlines.

**NOW, THEREFORE, BE IT RESOLVED**, that the Firebaugh Canal Water District's General Manager is hereby authorized to submit and administer this grant application through the Bureau of Reclamations WaterSMART Water and Energy Efficiency Program.

All the foregoing being on motion of Director \_\_\_\_\_ and seconded by Director \_\_\_\_\_ and authorized by the following vote, to wit:

AYES:

NOES:

ABSENT:

ABSTAINED:

I Hereby Certify that the foregoing resolution is the resolution of said District as duly passed and adopted by said Board of Directors on the 20th day of February, 2024.

WITNESS my hand and seal of said Board of Directors this 20th day of February, 2024.

ATTEST:

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MIKE STEARNS, President  
Firebaugh Canal Water District

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JEFF BRYANT, Secretary  
Firebaugh Canal Water District

\* \* \* \* \*

I hereby certify that the foregoing is a true and correct copy of a resolution duly adopted by Firebaugh Canal Water District, a local public agency organized under Appendix 8 of the California Water Code, at a regular meeting of the Board of Directors thereof duly called and held at the office of the District on the 20th day of February, 2024.

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JEFF BRYANT, Secretary  
Firebaugh Canal Water District



# PANOCHÉ WATER DISTRICT

52027 West Althea Ave, Firebaugh, CA 93622 – (209) 364-6136 – [panochedrainage.specialdistrict.org](http://panochedrainage.specialdistrict.org)

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January 31, 2024

Mr. Jeff Bryant

Firebaugh Canal Water District

PO Box 97

Mendota CA 93640

**SUBJECT: 3<sup>rd</sup> Lift Canal Lining and Modernization Project.**

Dear Jeff,

I wanted to express support by Panoche Water District for the Firebaugh Canal Water District 3<sup>rd</sup> Lift Canal Lining and Modernization Project. Water conservation projects within Firebaugh Canal Water District, such as this proposed project, have allowed your District to market conserved water to its water-starved neighbors. Panoche Water District has been able to acquire an average of 1,000 acre feet per year from your District due to projects like the one proposed.

Please let me know if there is anything we can do to help support this project.

Very truly yours,

Patrick McGowan

General Manager

Panoche Water District



# PACHECO WATER DISTRICT

PO Box 2657, Los Banos, CA 93635 • Telephone (209) 704-5105 • [www.pachecowd.specialdistrict.org](http://www.pachecowd.specialdistrict.org)

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February 2, 2024

Mr. Jeff Bryant  
Firebaugh Canal Water District  
PO Box 97  
Mendota, CA 93640

**SUBJECT: 3<sup>rd</sup> Lift Canal Lining and Modernization Project.**

Dear Jeff,

I wanted to express support from Pacheco Water District for the Firebaugh Canal Water District 3<sup>rd</sup> Lift Canal Lining and Modernization Project. Water conservation projects within Firebaugh Canal Water District, such as this proposed project, have allowed your District to market conserved water to its water-short neighbors. Pacheco Water District has been able to acquire an average of 500 acre feet per year from your District due to projects like the one proposed.

Please let me know if there is anything we can do to help support this project.

Very truly yours,

Chase Hurley  
General Manager  
Pacheco Water District