Turlock Irrigation District
Floating Solar on TID Lateral 8 Regulating Reservoir Project

WaterSMART: Water and Energy Efficiency
Grants for FY2024 R24AS00052
Funding Group III

Prepared For:
Bureau of Reclamation
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SECTION 1: TECHNICAL PROPOSAL

A. Executive Summary

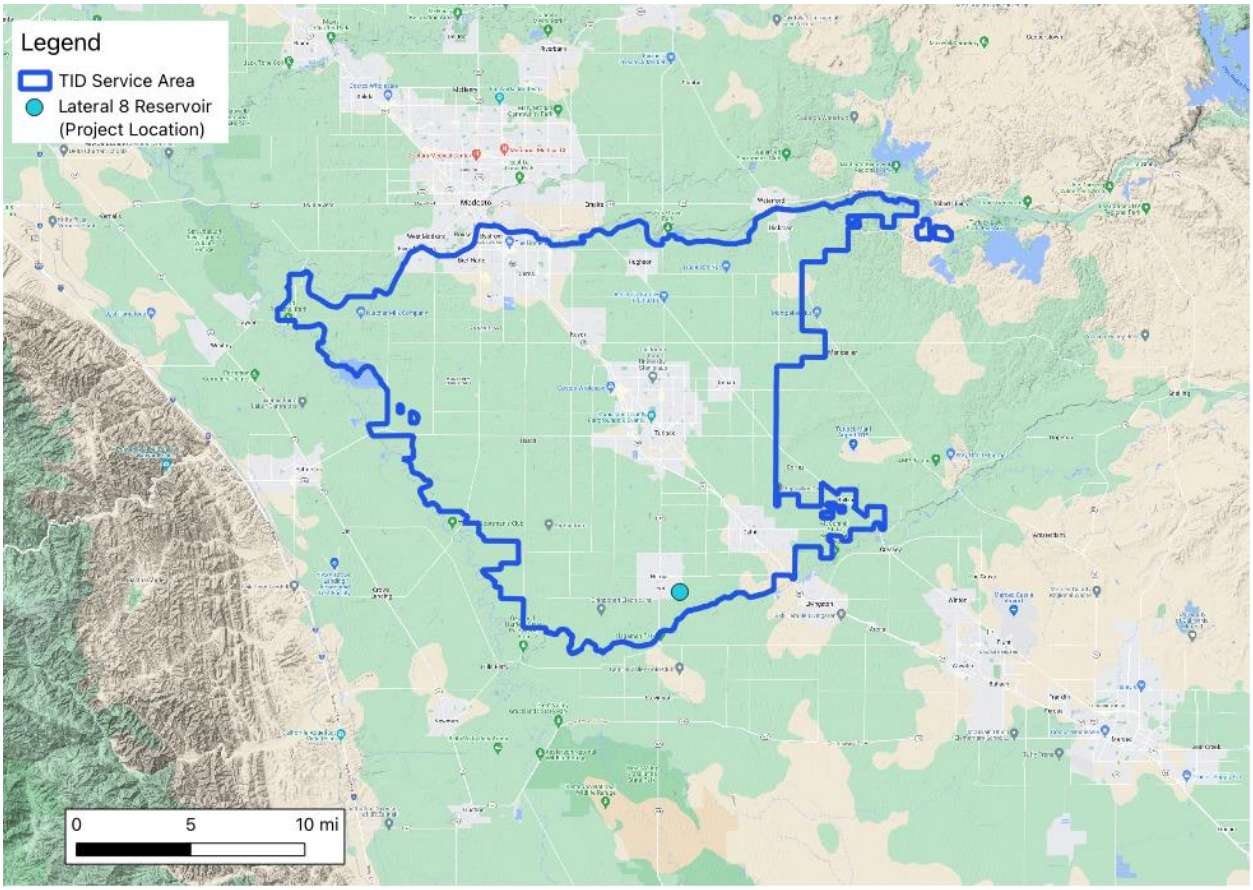
Date: February 22, 2024	**Applicant Name**: Turlock Irrigation District
City: Turlock	**Project Length of Time:** 18 months
County: Stanislaus and Merced	**Estimated Completion Date:** May 2026
State: California	**Located on a Federal Facility:** No

The Turlock Irrigation District (TID) is a community-owned, not-for-profit power and major agricultural irrigation water provider in California's Central Valley that owns and maintains more than 250 miles of gravity-fed canals and laterals. TID provides irrigation water to more than 4,700 agricultural customers and serves approximately 148,000 acres within the Central Valley. Fruit, nut, and table food crop production within the Central Valley contributes to 40% of the United States' fruits, nuts, and table foods. TID relies on a combination of surface water diverted from the Tuolumne River under TID's water rights and groundwater pumped from the overstrained high-priority San Joaquin Valley Basin-Turlock Subbasin. In addition, beginning in 1923 with the completion of the original Don Pedro Dam and powerhouse, TID has been providing safe, reliable, and affordable electric power to its residential, commercial, and industrial customers. TID is also one of only four irrigation districts in the state that also provides electric retail energy directly to homes, farms, and businesses. TID owns and operates an integrated and diverse electric generation, transmission and distribution system that provides power to a population of ~240,000 within a 662 square-mile area. TID is seeking to implement a Floating Solar Photovoltaic (FPV) energy generation system on an existing regulating reservoir (the Project) to offset all of the regulating reservoir's electric load, reduce the associated greenhouse gas (GHG) emissions by shifting to renewable energy, lower TID's electric consumption from the grid, and conserve water through reduced evaporation by shading the reservoir with solar panels and through indirect water savings by producing less fossil fuel derived energy. Specifically, the Project will be installed on the Lateral 8 Regulating Reservoir (the Reservoir) and is expected to generate 8,776,292 kilowatt hours (kWh) in renewable energy, potentially conserve an additional 123,586 kWh per year through reduced groundwater pumping and will conserve up to 110.6 acre-feet per year (AFY) of water. TID is prioritizing this project considering the impacts of drought on its water resources and the need to convert from existing natural gas contracts to renewable energy alternatives while also, optimizing its water service system.

B. Project Location

The Reservoir is located on a 25.5-acre parcel of land (Assessor's Parcel Number 045-0210-083 owned by TID and located at 19167 West Geer Road in Hilmar, in Merced County, CA. The proposed solar panels will be installed on the Lateral 8 regulating reservoir as shown in the map below. The coordinates for the Project location are 37.394827, -120.833810.

Figure 1. Project Location Map



C. Project Description

The Reservoir was completed in 2016 and it regulates up to 130 AF of irrigation water per day by capturing operational fluctuations that would otherwise spill to the local river system. TID now proposes to install a floating solar (photovoltaic) energy generation system atop of the Reservoir's water surface. The proposed Project consists of installing a floating solar system totaling 4.0 MW of AC power in size (5.215 MW of DC power). TID determined the size of the Project by evaluating the hosting capacity of the existing 12.47kV feeder to which the project will interconnect, to maximize solar energy production without requiring additional substation or feeder upgrades. In addition to providing solar energy, floating solar systems have the following advantages over traditional ground-mounted solar systems (Jin et al. 2023):

1. Reduce evaporation of the reservoir it floats upon
2. Increase module energy-efficiency since the solar modules are cooled by the water
3. Avoid using valuable land for solar generation thereby keeping land available for other productive uses
4. Maximize solar production by using reflected light from the water body

TID has completed all planning and design phases of the Project including California Environmental Quality Act (CEQA) compliance consisting of an addendum to an existing Initial

Study/Mitigated Negative Declaration (IS/MND) for the Reservoir (State Clearinghouse # 2015101062). Regarding design, the plans are 100% complete, have been stamped by a licensed Power Engineer (PE) and include low-voltage electrical diagrams, medium-voltage electrical diagrams, structural drawings, and a site plan.

The proposed floating solar system is comprised of two floating solar arrays with accompanying grid-interactive inverters and associated equipment. The solar modules would be attached to a buoyant racking system but otherwise function in the same manner as land-based solar arrays. Specifically, the solar power will be generated by installing a system consisting of photovoltaic (PV) modules mounted on high-density polyethylene (HDPE) floats, floating on the water surface of the Reservoir. The array will contain 9,240 solar modules each producing 565W and 26 inverters each rated at 150kW. The system will span approximately 8.3 acres in surface area. The system will also include two 2500A transformers for stepping up the voltage of the AC power before transmission to TID's electric grid, and a metal-clad switchgear with a 1200-amp photovoltaic breaker and metering cabinet per TID standards. TID will additionally install a pole-mounted recloser (outside the scope of this Project) to ensure adequate line-side protection. Following installation, the Project will be interconnected to TID's electric grid at the nearby TID 12kV August feeder. TID currently owns and operates natural gas power plants with a combined capacity of over 500 MW, and each MWh produced by this FPV installation will directly replace natural gas-based conventional energy. Since 1923, TID has been providing safe, reliable, and affordable electric power to its residential, commercial, and industrial customers, and currently has over 60 MW of distributed solar interconnected to its grid. Therefore, TID will be able to interconnect the Project easily and quickly into its own electric grid.

D. Evaluation Criteria

D.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.*
- *Please include a specific quantifiable water savings estimate; do not include a range of potential water savings.*

TID will conserve approximately 110.6 acre-feet per year (AFY) as a direct result of implementing the Project. This is the amount of water retained within the Reservoir from reduced evaporation losses (35.2 AFY) and through indirect water savings by producing less fossil fuel derived energy (75.4 AFY). The supporting documents and calculations are addressed in more detail in question 3 below.

2. *Describe current losses. Please explain where the water that will be conserved is currently going and how it is being used. Consider the following:*
- *Explain where current losses are going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?*

Currently 110.6 AFY is lost due to evaporation (35.2 AFY) and energy production via fossil fuels

(75.4 AFY). The 110.6 AFY in water savings achieved by implementing the Project will be delivered to TID's growers for agricultural production.

- *If known, please explain how current losses are being used. For example, are current losses returning to the system for use by others? Are current losses entering an impaired groundwater table becoming unsuitable for future use?*

110.6 AFY is lost due to evaporation (35.2 AFY) and energy production via fossil fuels (75.4 AFY).

- *Are there any known benefits associated with where the current losses are going? For example, is seepage water providing additional habitat for fish or animal species?*

There are currently no known benefits associated with the 35.2 AFY in evaporative losses. While 75.4 AFY is currently being used in the production of fossil fuel energy, TID will operate its fossil fuel energy producing assets less frequently once the Project becomes operational.

3. Describe the support/documentation of estimated water savings. Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations.

The Project will conserve water through two mechanisms providing a total of 110.6 AFY of water conserved. The first mechanism is direct water savings associated with reduced evaporative losses. The Lateral 8 regulating reservoir is an open reservoir along the TID irrigation delivery network and has a surface area of 19.3 acres. The Project will install solar panels atop of the Reservoir which has proven to provide water savings through reduced evaporative losses by covering a portion of the reservoir. The solar panels will cover 8.3 acres which translates to 35.2 AFY of water savings.

The current annual evaporative losses for the reservoir was estimated using a modified Penman equation (Equation 1) (Linacre, 1993), considering monthly mean temperature, dew point temperature, solar irradiation, and wind speed in Hilmar, California. Data was acquired via NREL National Solar Radiation Database (NSRDB). The equation resulted in a calculated estimated annual evaporation of 1.718 meters per square meter of the reservoir. Multiplied by the reservoir's surface area of approximately 78,116 square meters, the reservoir's annual evaporation expressed in volume is 134,203 cubic meters per year, or 109 AF per year.

$$E_0 = (0.015 + 0.00042T + 10^{-6}z)[0.8R_s - 40 + 2.5Fu(T - T_d)]\ (\text{mm day}^{-1}) \qquad \text{Equation 1}$$

It has been proven that large footprint FPV systems reduce evaporative losses from the water body in which they cover by reducing irradiation and water temperature; recent literature has modeled that large footprint FPV systems result in a 60-90% reduction in evaporation for the area covered by the FPV system (Durkovíc and Đurišić, 2017) (Melvin, 2015) (Taboada et al., 2017). A recent case study calculating evaporation reduction on an irrigation pond utilized impacts of the FPV on the long and shortwave radiation balance to arrive at a conservative estimate of 75% evaporation reduction for the area the FPV covered (Farrar et al., 2022). This study directly informed the evaporative savings assumptions within our evaporative savings

calculations.

The footprint of the FPV system to be installed for this Project will be approximately 8.3 acres which covers approximately 43% of the 19.3-acre surface area of the reservoir. Based on above studies, it is assumed that evaporation losses will be reduced by 75% for the 43% of the reservoir surface area that is covered by the FPV system, resulting in water losses due to evaporation will be reduced by 35.2 AFY. Table 1 below outlines the calculations used to determine the direct water savings.

The second mechanism for water savings is that each MWh of electricity generated by the project will offset a MWh of electricity generated by a TID natural gas plant. According to the U.S. Energy Information Administration (EIA), in 2021, natural gas combined-cycle generation averaged a water-withdrawal intensity of 2.8 gallons per kWh (EIA, 2023). The Project will generate an estimated 8,776,292 kWh of electricity, which will conserve 75.4 AFY of water through the reduced generation of electricity by TID natural gas plants. Table 1 below outlines the calculations used to determine the water savings via avoided water consumption by natural gas electricity generation.

Table 1. Project Water Savings Calculation

Water Savings	Value	Unit	Calculation	Source
Water Savings from Reduced Evaporation Losses				
Total Surface Area of FPV System	8.3	Acres	Input	Noria Energy (Consultant)
Total Surface Area of Lateral 8 Reservoir	19.3	Acres	Input	TID (Applicant)
Percentage of Reservoir Enclosed	43%	Percentage	8.3 acres / 19.3 acres	Calculation
Reduction in Evaporation Losses from FPV Enclosure	75%	Percentage	Input	Farrar et al., 2022
Total Evaporative Losses at Lateral 8 Reservoir	109.0	AFY	Penman Equation Calculation from Consultant	See application narrative.
Reduced Evaporative Loss from Project Implementation	**35.2**	**AFY**	**109 AFY x 43% x 75%**	**Calculation**
Water Savings from Reduced Consumption of Fossil Fuel Generated Energy				
Generated Solar Energy	8,776,292.00	kWh	Input	Noria Energy
Water Used per kWh Generated	2.8	Gallons	Input	EIA, 2023
Water Conserved (Gallons)	24,573,617.60	Gallons	8,776,292 kWh x 2.8 gallons/kWh	Calculation
Water Conserved from Reduced Consumption of Fossil Fuel Generated Energy (AF)	**75.4**	**AFY**	**24,573,617.6 gallons x 325,851 gallons/AF**	**Conversion**
Total Water Conserved from Project Implementation	**110.6**	**AFY**	**35.2 AFY + 75.4 AFY**	**Calculation**

D.2. Evaluation Criterion B—Renewable Energy (20 points)

E.1.2.1. Subcriterion No. B.1: Implementing Renewable Energy Projects Related to Water Management and Delivery

Describe the amount of energy capacity. *For projects that implement renewable energy systems, state the estimated amount of capacity (in kilowatts) of the system. Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate.*

TID has retained the services of Noria Energy (Consultant) to complete all planning and design documents required to advance the Project to construction bidding. The project will consist of a 5,214kW DC (4,000kW AC) floating solar system installed atop the reservoir expanding 8.3 acres over the 19.3 acres of the reservoir's surface area. The project will consist of 9,230 commercially available modules (565 Wdc Seraphim Solar modules).

Describe the amount of energy generated. *For projects that implement renewable energy systems, state the estimated amount of energy that the system will generate (in kilowatt hours per year). Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate. Please explain how the power generated as a result of this project will be used, including any existing or planned agreements and infrastructure.*

The estimated energy to be generated by the Project is 8,776,292 kWh annually. The Project's annual electricity generation was calculated using PVSyst. PVSyst is the industry standard method for simulating solar system energy production, incorporating historical hourly meteorological data at the project site and the actual project design to model irradiance, shading, and other factors including soiling and interconnection losses. Actual generation is expected to exceed this estimation as PVSyst currently does not account for FPV performance gains owing to the convective cooling of the modules atop the water body.

The energy generated from the Project will be used to power the Lateral 8 pump station, which uses an average of 123,773 kWh annually to pump operational spills conserved in the Reservoir back into TID's irrigation system for use by its growers. It is estimated that 1-2% of electricity generated by the Project will offset the pump station's energy consumption. The remainder of the solar energy will be fed to TID's electrical grid and will directly reduce the purchase and consumption of natural gas for electricity generation.

Describe any other benefits of the renewable energy project. *Please describe and provide sufficient detail on any additional benefits expected to result from the renewable energy project, including:*

How the system will combat/offset the impacts of climate change, including an expected reduction in greenhouse gas emissions.

The Project is expected to generate an estimated 8,776,292 kWh annually through solar energy,

which exceeds the entirety of the Lateral 8 pump station's energy consumption. With TID currently owning and operating over 600 MW of natural gas power plants in the Turlock area, this Project will reduce TID's need to purchase and consume natural gas-derived energy to power the Lateral 8 Pump Station and other energy consumption in its electrical system. Irrigation accounts for 5% of all of California's energy consumption and 80% of freshwater use. By deploying FPV, TID is helping to combat both climate change and save freshwater lost to evaporation in a semi-arid and drought-prone region. According to EPA Greenhouse Gas Equivalencies Calculator, this amount translates to 6,131 Metric Tons of carbon dioxide equivalent of GHG. To offset this amount, it would require 7,311 acres of USA forests in one year or 101,377 tree seedlings grown for 10 years to offset the amount of GHGs released. The proposed Project is a more effective and sustainable solution than these options for GHG reduction.

- *Expected environmental benefits of the renewable energy system.*

The proposed Project is expected to generate 8,776,292 kWh of solar energy on an annual basis. This will result in direct water savings of 35.2 AFY from reduced evaporative losses and 75.4 AFY of indirect water savings from reduced natural gas electricity generation, which will conserve a total of 110.6 AFY (Refer to above Section titled "Quantifiable Water Savings" for calculations).

Electricity production is among the biggest consumers of water in the United States. Energy production by thermoelectric power plants account for the largest share of freshwater withdrawals in United States. This is followed by 37% for irrigation and only 13% for drinking water accounts (USGS, 2019). Renewable energy sources like solar and wind can mitigate our drought issue and set us on a better path to conserving this precious resource that is vital to all life on earth.

The expected energy and water savings from the installation of this renewable energy system will benefit the overall environment, including the following:

- Reduced GHG to counter the global warming trend
- Improved air quality from reduced fossil fuel reliance
- Reduced water pumping from a high priority basin
- Enhanced water reliability and water quality through water conservation
- Improved operational management through additional available water
- Health benefits for humans and all living things and prevention of economic losses
- Installation over an existing facility avoiding additional land use that can harm ecosystems
- Fewer extreme weather events and therefore, improved fire protection
- Improved forests and rural landscapes
- Wildlife preservation

- *Any expected reduction in the use of energy currently supplied through a Reclamation project.*

There is no expected reduction in the use of energy currently supplied through a Reclamation project.

- *Anticipated benefits to other sectors/entities.*

The renewable energy installed in this Project will result in energy savings by expanding green energy via solar power generation. Once implemented, the Project is expected to generate 8,776,292 kWh which, according to the EPA Greenhouse Gas Equivalence Calculator, will reduce GHGs by 6,131 Metric Tons of carbon dioxide equivalent. Therefore, the Project will offset the impacts of climate change and reduce the need for additional pumped groundwater, estimated to be approximately 110.6 AFY, which will benefit all within the TID service area.

According to a study conducted by NASA, Duke University, and Columbia University, titled "Reducing Emissions to Lessen Climate Change Would Yield Dramatic Health Benefits by 2030" improved air quality resulting from reduction in GHGs will benefit human health and prevent economic losses (NASA, 2021). Specifically, this study projects that reducing global GHG emissions over the next 50 years, in accordance with the goals set forth in the Paris Agreement, would prevent 300 million lost workdays, 440 million tons of crop losses, 1.4 million hospitalizations and emergency room visits, and other avoided issues in the Unites States. Considering this Project will install a FPV system capable of generating 8,776,292 kWh of clean, renewable, and carbon-free solar generated energy, the Project will help the U.S. achieve its Paris Agreement GHG goals and associated health and economic benefits within the United States, and particularly the TID service area. Therefore, this Project will have a broad but impactful benefit on many sectors within the TID service area as fewer GHGs are emitted into the atmosphere once this Project is implemented and operational.

Additionally, the Project will conserve an estimated 110.6 AFY through direct water savings resulting from the amount of water retained within the Reservoir from reduced evaporation losses (35.2 AFY) and through indirect water savings by producing less fossil fuel derived energy (75.4 AFY). Therefore, the Project will provide direct benefits to TID's agricultural producers that rely on consistent water resources to irrigate their crops. Agricultural producers within the TID service area and throughout the Central Valley have experienced cuts to their annual water supplies due to drought and legislative measures enacted to preserve groundwater resources. From a surface water perspective, since the year 2000, State Water Project (SWP) Table A contractors have only received 90% or more of their allotments in 5 of the 24 years. During the most recent drought conditions (2020-2022), SWP contractors received as low as 5% of their SWP Table A allocations due to statewide shortages caused by on-going and persistent drought conditions. Due to the ongoing and growing scarcity of surface water supplies, water users throughout the State, including TID agricultural producers, have and continue to turn to groundwater supplies to meet their annual demands. This has led to chronic groundwater overdraft which led to the enactment of the Sustainable Groundwater Management Act (SGMA) in 2014 which prioritizes groundwater basins based on the amount of groundwater overdraft and significance of the Basin based on the number of users that rely on the subject groundwater basin. Groundwater basins that are designated as high or medium priority basins

are required to implement Groundwater Sustainability Plans (GSPs) which identify actions to be implemented to sustainably manage the subject groundwater basin. TID's service area overlies the San Joaquin Valley – Turlock Basin which is designated as a High Priority Basin according to the California Department of Water Resources' SGMA Basin Prioritization Tool. This indicates that the underlying groundwater basin is in overdraft conditions and is required to be sustainably managed as outlined in the San Joaquin Valley – Turlock Groundwater Sustainability Plan. This Project will conserve an estimated 110.6 AFY of water which would otherwise have been extracted from the underlying groundwater basin. Therefore, this Project supports all water users and sectors within the TID service area and other beneficiaries of the San Joaquin Valley – Turlock groundwater basin, including agricultural producers.

In addition, the Tuolumne River and Turlock Lake provide an ideal setting for water-oriented outdoor activities. The recreation area features the lake with its 26 miles of shoreline and the foothill country leased from the TID in 1950. The City of Turlock's Economic Development Strategic Plan states that there is no natural local attraction to draw visitors, other than the Turlock Lake. These recreational opportunities have been providing ideal destinations for visitors that have been an economic vehicle for the disadvantaged community of TID. The proposed Project can help to mitigate the impacts of drought on water levels (via conserved water) of the lake that provides recreational and tourism activities with a direct economic impact on the local community.

- *Expected water needs, if any, of the system.*

There are no water needs of the proposed system.

E.1.2.2. Subcriterion No. 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).

- *If quantifiable energy savings is expected to result from the project, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.*

The Project will conserve an estimated 110.6 AFY by installing floating solar generation facility on the Lateral 8 reservoir. The agricultural producers within TID's service area rely on a combination of surface water diversions supplemented by groundwater pumping from the underlying aquifer when surface water flows are reduced due to ongoing drought conditions. Since TID's canal system is predominantly gravity fed and therefore there are no potential energy savings from surface water deliveries, the energy savings would result from reduced groundwater pumping that occurs when water demand is not met. It is expected that the Project will reduce groundwater pumping by an estimated 110.6 AFY since this project will conserve the same amount. It is estimated that between 2010 and 2020, approximately 174.31 kWh was consumed per AF of groundwater pumped in TID's service area. Therefore, it is expected that 110.6 AFY of conserved groundwater could result in an average total energy savings of 123,586 kWh per year due to reduced pumping in addition to the 8,776,292 kWh per year of carbon-free solar power generated by the Project.

- *How will the energy efficiency improvement combat/offset the impacts of climate change, including an expected reduction in greenhouse gas emissions.*

Groundwater pumping within the TID service area is powered primarily through energy derived from fossil fuels. By implementing the Project, fossil fuel consumption will be reduced by an average of 123,586 kWh per year. Additionally, the Project will generate 8,776,292 kWh of renewable solar-derived energy which will offset the same amount of energy generated from a fossil fuel derived energy source thereby reducing GHG emissions and combating the impacts of climate change.

- *If the project will result in reduced pumping, please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements and energy usage?*

TID overlies the San Joaquin Valley – Turlock groundwater basin, a portion of the San Joaquin Valley Basin. The San Joaquin Valley Basin that is identified as a High-Priority Subbasin by the SGMA's Basin Prioritization Model. Across much of the San Joaquin Valley and other key groundwater basins in California, groundwater resources have historically been withdrawn faster than they can be replenished. This resulted in the enactment of SGMA in 2014 which has required irrigation districts and other groundwater users that overly the basin to reduce groundwater pumping for the groundwater basin to be sustainably managed. Sustainable management of the groundwater basin will mitigate groundwater level decline, reduction of groundwater storage, and subsidence that has and continues to threaten local aquifers.

TID's agricultural customers rely on groundwater pumping when surface water flows are reduced or not available. TID owns and rents many groundwater pumps throughout its irrigation system to supplement surface water supplies during dry years. Given California's recent drought conditions, agricultural producers have had to rely on groundwater pumping primarily through electric powered wells. Considering the impacts of climate change, it is anticipated that that drought conditions will return with greater frequency and intensity (Drought.gov). The Project will conserve an estimated average of 110.6 AFY of groundwater. The conserved water offsets groundwater pumping and its related energy needs. The additional water remaining at source will help prevent potential increases in salinity and algal production, and reduced oxygen levels during times of drought when wildlife, fisheries, and habitats need the water the most. In this way, the proposed Project is expected to improve ecological resiliency to climate change.

- *Please indicate whether your energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.*

The estimated energy savings would not originate from the point of origin. A portion of the estimated energy savings would be from the reduction of groundwater pumped in the TID service area.

- *Does the calculation include any energy required to treat the water, if applicable?*

No, TID only provides irrigation water to its customers which requires no treatment. The energy savings calculations only consider the energy savings from reduced groundwater pumping.

- *Will the project result in reduced vehicle miles driven, in turn reducing greenhouse gas emissions? Please provide supporting details and calculations.*

No, the Project is not expected to result in any reduced vehicle miles driven.

- *Describe any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).*

The proposed Project will create a renewable energy system at the Lateral 8 reservoir in the TID system, to offset the electric load needed to operate this reservoir and reduce the associated GHG emissions. In addition, over 98% of the solar energy produced will be returned to TID's grid system. This renewable solar power will be generated by mounting FPV modules on top of water storage reservoir at the Lateral 8 reservoir and is expected to generate an estimated additional 8,776,292 kWh per year. No auxiliary or minimal energy production systems will be installed.

D.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? Please address the following:*

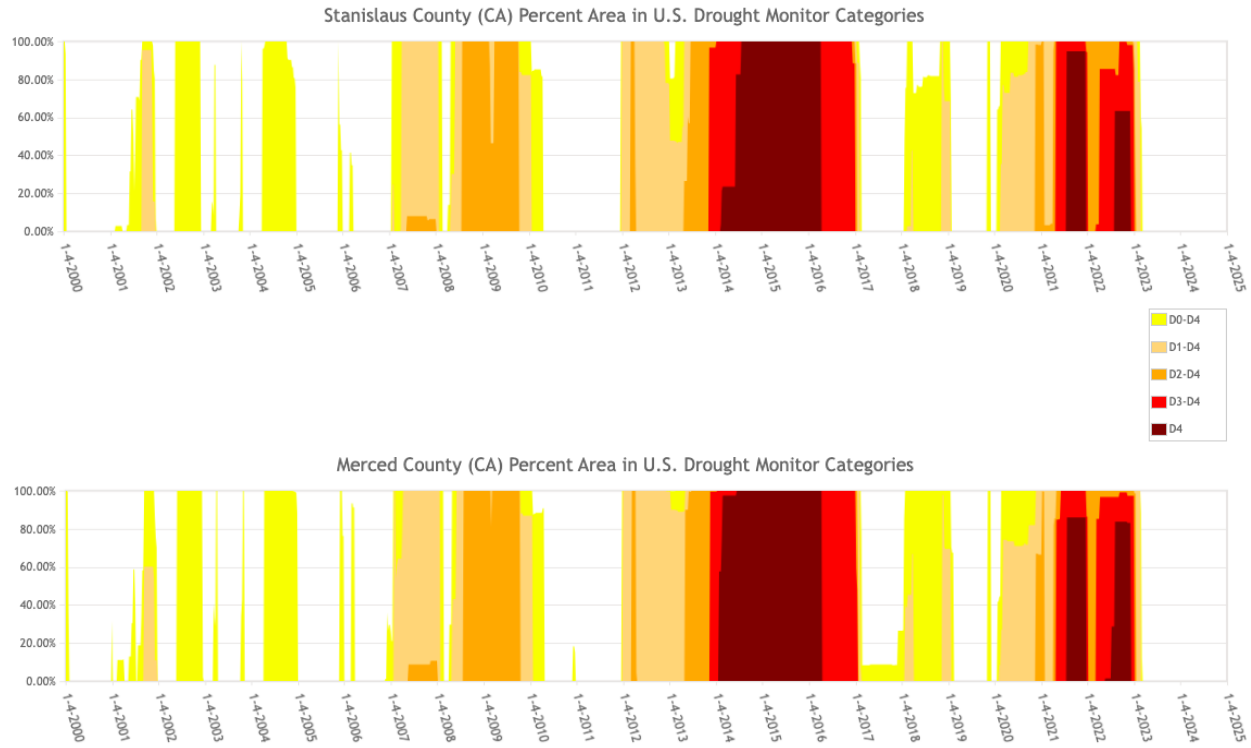
- *Explain and provide detail of the specific issue(s) in the area that is impacting water resilience and sustainability. Consider the following:*
  - *Describe recent, existing, or potential drought or water scarcity conditions in the project area. Is the project in an area that is experiencing, or recently experienced, drought or water scarcity?*

TID is in Stanislaus and Merced Counties which have been severely impacted by recent drought conditions. As shown in Table 2 below, TID's service area has experienced some form of drought conditions in 20 of the past 24 years which has put a strain on TID's available water supplies. In response to the shortage of surface water supplies, irrigators within TID's service area turned to groundwater to meet their water demands which has led to groundwater overdraft within the local groundwater basins.

Scientists have discovered that the pace of groundwater depletion in California's Central Valley has accelerated dramatically during the drought as heavy agricultural pumping has drawn down aquifer levels to new lows and now threatens to devastate the underground water reserves. Jay Famiglietti, a hydrology professor, and executive director of the University of Saskatchewan's Global Institute for Water Security has referred to the current water availability conditions as a "full-on crisis". The rate of groundwater depletion in California's Central Valley has been rapidly accelerating during recent megadroughts, leading to 31% greater withdrawal rates than the last two drought seasons (Liu et al., 2022). The Central Valley is experiencing its driest year in four decades, and farmers are struggling to compensate for the lack of water (Gross, 2021). As noted in Section 6 of the 2020 Agricultural Water Management Plan (AWMP) and shown in Table 2,

TID (Stanislaus and Merced Counties) have experienced record-breaking droughts in terms of frequency, intensity, and duration since the early 2000's, with the most intense drought (large portion of the region being in Category D3-Extreme Drought and Category D4-Exceptional Drought) being in early 2014 spanning until 2017. On May 10, 2021, Governor Gavin Newsom issued an executive order that extended the state of emergency due to severe drought conditions. The Governor found that these conditions "caused by the drought, by reason of their magnitude, are or are likely to be beyond the control of the services, personnel, equipment, and facilities of any single local government and require the combined forces of a mutual aid region or regions to appropriately respond." TID is in a hot-summer Mediterranean climate whose rain deficits have led to alarming droughts. Although heavy snow and rainfall of late 2022 and early 2023 significantly improved drought conditions for the State, in the beginning of the 2023 Water Year (September 2022), 63.45% of Stanislaus County (TID location) was experiencing Category D-4 Extreme Drought, as it has endured for most of the past nine years. Most recently, the National Weather Service issued several excessive heat advisories for the Central Valley for record high temperatures reaching 115 degrees in summer 2023.

Table 2. Stanislaus and Merced Counties: Drought Monitor (2000-Present)



- *Describe any projected increases to the severity or duration of drought or water scarcity in the project area. Provide support for your response (e.g., reference a recent climate informed analysis, if available).*

The National Oceanic and Atmospheric Administration (NOAA) Climate Program Office and NASA states that the current rise in temperature has solidified an elevated risk of drought for

the foreseeable future in the American southwest (Climate.gov). The study puts the likelihood of 21-year mega drought events at a roughly 50% chance through 2100. To discuss the urgency of climate crisis, the National Integrated Drought Information System (NIDIS) hosted a Southwest Drought Virtual Forum in 2021. The forum was a four-day long discussion assembling stakeholders, decision makers and drought experts for a dialogue on worsening drought conditions in the Southwest, as well as response and relief effort. This indicates the extent to which droughts are becoming common and the urgency of the response and actions needed from all the stakeholders.

Although the majority of California received heavy rain and snowfall at the end of 2022 and early 2023, the State endured varying drought conditions with extreme drought conditions from 2012 to 2017 and 2019 to 2022. The ongoing droughts have drastically increased the reliance on imported water supplies for millions of water users throughout the State and nation that made lasting impacts in the available volumes of these surface water supplies. The drought is primarily a consequence of natural climate variability. Scientists have added that the likelihood of any drought becoming acute is rising because of climate change. The Intergovernmental Panel on Climate Change (IPCC) has also concluded that the warming of the climate system is unequivocal. The period from 1983 to 2012 was likely the warmest 30-year period of the last 1400 years in the Northern Hemisphere (IPCC, 2014). California's temperature record reflects global temperature trends. The NOAA Climate Divisional Dataset is a long-term dataset used to generate historical (1895-2024) climate analyses for the contiguous United States. In a recent report covering California, within Climate Division 2 (Sacramento Drainage), the long-term record depicts a dramatic shift in annual average temperature. The three years (2014-2017) are depicted as being some of the warmest and driest years on record followed by three-digit temperatures in this past summer in TID's service area.

Substantial research on climate change points to dryer and hotter conditions to come. Therefore, it is still imperative that water providers, including TID, continue optimize water management efforts to ensure reliability during possible future droughts while also reducing their GHG emissions to reduce the pace of climate change.

- *Explain and provide detail of the specific issue(s) in the area that is impacting energy sustainability, such as reliance on fossil fuels, pollution, or interruptions in service.*

There are a variety of issues in the Project area that are impacting energy sustainability, including impacts resulting from ongoing drought, reliance on fossil fuels and increased pollution. Typically, about 15% of California's electricity needs are provided by hydroelectric power (from dams). In 2015, at the peak of the worst drought in California's recorded history, hydropower supplied only 6%. That loss in electricity generation during the 2012-15 drought cost Pacific Gas & Electric (PG&E) and other California utilities about $5.5 billion. As California's climate becomes more prone to severe droughts, utilities and ultimately ratepayers will likely be forced to bear those future costs. Those increased costs underscore two effects of last decade's drought: the decreased supply of relatively inexpensive power and the increased

consumer demand for electricity. Specific to TID and the Central Valley, TID owns several hydroelectric facilities. The increased incidents of droughts have therefore impacted the reliability and resilience of TID's water supply and power production.

TID also relies heavily on hydro and natural gas to supply reliable electricity to its customers. This Project will directly offset natural gas purchased for TID's power operations, on the magnitude of millions of kWhs annually. This Project will provide a renewable energy supply which will reduce the TID and surrounding areas reliance of fossil-fuel and hydropower derived electricity.

- *Please describe how the project will directly address the concern(s) stated above.*

The Project will provide a sustainable solution to address the water and energy concerns. Specifically, the Project will install a FPV system on its Lateral 8 reservoir which will produce 8,776,292 kWh per year of renewable, clean, and reliable energy. The development and use of solar energy has proven to reduce GHG emissions, be a reliable source of energy, and a viable alternative to fossil fuel derived energy. The installation of this Project will reduce GHG emissions by an estimated 6,131 Metric Tons (EPA Greenhouse Gas Equivalencies Calculator) which will reduce the pace of climate change and ultimately improve TID's energy resiliency.

Additionally, TID will conserve approximately 110.6 acre-feet per year (AFY) as a direct result of implementing the Project. This is estimated that direct water savings resulting from the amount of water retained within the Reservoir from reduced evaporation losses (35.2 AFY) and through indirect water savings by producing less fossil fuel derived energy (75.4 AFY). As mentioned in greater detail above, TID's service area has experienced frequent drought conditions over the past 25 years which has had an impact on surface and groundwater supplies. This Project will conserve water by reducing evaporative losses, the consumption of water associated with fossil fuel derived energy, and reduced groundwater pumping respectively. This Project is a high priority project for TID considering the Project addresses both energy and water supply resiliency with TID's service area. Additionally, this project will act as a model system for irrigation and water districts across the southwest with open surface reservoirs. By demonstrating the viability of both water savings and resilient, localized renewable energy production, this system addresses both major pillars of concern for this grant program.

- *Will the project directly result in more efficient management of the water supply? For example, will the project provide greater flexibility to water managers, resulting in a more efficient use of water supplies?*

As mentioned, the Project is expected to save an average of 110.6 AFY, and over 3,324 AF over the 30-year Project lifetime from reduced evaporative losses and reduced water consumption from fossil-fuel derived energy production, which is efficient management of the water supply. Also, saving thousands of acre feet over the lifetime of the project will strengthen the sustainability of water supplies, which provides greater flexibility to TID and other water managers to make the resource available during drought conditions.

- *Please address where any conserved water as a result of the project will go and how it will be used, including whether the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversions or reduce deliveries, made available for transfer, left in the river system, or used to meet another intended use. Indicate the quantity of conserved water that will be used for the intended purpose(s). Provide a description of the mechanism that will be used, if necessary, to put the conserved water to the intended use.*

The agricultural producers within TID's service area rely on a combination of surface water diversions supplemented by groundwater pumping from the underlying aquifer when surface water flows are reduced due to ongoing drought conditions. Considering the recent drought conditions that have plagued California for the past 20+ years, agricultural producers have had to rely more on groundwater pumping to meet their irrigation needs which has contributed to the overdraft of the underlying groundwater basin. The Project will directly conserve at least ~35.2 AFY and up to ~75.4 AFY indirectly in the surrounding areas which would otherwise have been diverted from local surface water sources or pumped from the underlying aquifer. Therefore the 110.6 AFY of water will either remain in the local surface water sources or within the underlying aquifer which will assist in meeting environmental demands, for crop production if drought conditions intensify, or other purposes within the region. The conserved water will remain in TID's reservoirs or within the underlying aquifer and will be conveyed through its existing distribution system. Therefore, no new mechanism or infrastructure is needed to put the conserved water to its intended use.

- *Will the project assist States and water users in complying with interstate compacts?*

This is not applicable to this Project as TID does not maintain any interstate agreements.

- *Will the project help to prevent a water-related crisis or conflict? Is there frequently tension or litigation over water in the basin?*

Recent drought conditions along the San Joaquin River's tributaries, the State Water Resources Control Board (SWRCB) issued a curtailment order to various water agencies and water districts restricting the amount of water diverted from the Tuolumne and other San Joaquin river tributaries. This curtailment order severely impacted many water users throughout the State (from Turlock to San Francisco). As droughts persist and increase in frequency, water savings from this Project is an incremental step to help keep the water at the source, to ease tension and conflicts over water in the area.

***Ecological Benefits**. In addition to the separate WaterSMART Environmental Water Resources Projects NOFO, this NOFO places a priority on projects that 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, including the following:*

- *Will the project benefit species (e.g., federally threatened, or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance)? Please describe the relationship of the species to the water supply,*

and whether the species is adversely affected by a Reclamation project or is subject to a recovery plan or conservation plan under the Endangered Species Act (ESA).

Yes, through its efficiencies, the Project will allow TID to conserve an estimated average of 110.6 AFY of surface water and/or groundwater. The conserved water will allow TID to reduce its surface water diversions and/or reduce groundwater pumping, particularly during times of drought when wildlife, fisheries, and habitats need the water the most. The conserved water could potentially be used to enhance surface water supply availability for other beneficial purposes, especially during prolonged drought. Water conserved within the TID system will ultimately benefit the species in the San Joaquin River and Tuolumne River that are home to several endangered species such as the Chinook Salmon and Steelhead Trout; their survival depends on maintaining a sustainable hydrologic system which this Project helps to achieve. In addition, the energy conservation will reduce GHG that has been responsible for climate change and its impact on ecosystems within TID service area.

Recent drought conditions have had a tremendous impact on the environment. According to the Pacific Institute, many of the state's environmental flows are unmet during drought periods, affecting aquatic ecosystems and decreased protections for endangered species. The recent drought has caused losses and destruction of fish and wildlife habitat, loss of wetlands, increased wildfires and reduced water levels in reservoirs, lakes, and ponds. The drying of creeks and rivers led 18 fish species to diminish to near extinction. Additionally, wildlife that has historically thrived in urban habitats also struggled to adapt as state and local conservation regulations forced California homeowners to let their lawns and gardens dry and for the vegetation to dry.

A December 2016 study from The Ecological Society of America stated that declining streamflow and the accompanying rising stream temperatures have immediately threatened the health of ecosystems that rely on water. As noted in its AWMP, TID practices resource stewardship as a strategy to mitigate climate change impacts. TID participates in studies of aquatic life and habitat to better understand potential impacts of climate change. Conserving water resources will have a significant positive impact on preserving the long-term habitats for fish and wildlife by optimizing water management. The conserved water left at the source because of this Project will benefit these local ecosystems.

- *Will water remain in the system for longer periods of time? If so, provide details on current/future durations and any expected resulting benefits (e.g., maintaining water temperatures or water levels, recreational benefits, etc.).*

Yes, the Project will conserve an estimated 110.6 AFY from reduced evaporation losses and reduced water consumption associated with fossil fuel generation. This will improve the ability of TID to meet its irrigation services and will improve the operational flexibility, simplify system operations, reduce surface water and groundwater demands, and al lower the amount of groundwater pumping within the area. The conserved water will be able to remain in the system for a longer duration thus reducing the need for seeking alternative supplies. The conserved water will be left at the source (either surface water via rivers) or groundwater within the underlying aquifer) which will therefore be available to address other water needs in the region.

A December 2016 study from The Ecological Society of America stated that declining streamflow and the accompanying rising stream temperatures have immediately threatened the health of ecosystems that rely on water. As noted in its AWMP, TID practices resource stewardship as a strategy to mitigate climate change impacts. TID participates in studies of aquatic life and habitat to better understand potential impacts of climate change. Conserving water resources will have a significant positive impact on preserving the long-term habitats for fish and wildlife by optimizing water management. The conserved water left at the source because of this Project will benefit these local ecosystems.

- *Will the proposed project reduce the likelihood of a species listing or otherwise improve the species status?*

Considering the local surface water resources, namely the San Joaquin River and Tuolumne River, are home to several endangered species such as the Chinook Salmon and Steelhead Trout, the Project may help in marginally preserving river habitat by maintaining higher water levels.

- *Please describe any other ecosystem benefits as a direct result of the project.*

There are no other identified benefits that would result from Project implementation not already discussed in detail above.

***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.*

- *Describe how the project addresses climate change and increases resiliency. For example, does the project help communities adapt to bolster drought resilience?*

As mentioned, the Project will install a FPV system on its Lateral 8 reservoir which will produce 8,776,292 kWh per year of renewable, clean, and reliable solar-derived energy. The development and use of solar energy has proven to reduce GHG emissions, be a reliable source of energy, and a viable alternative to fossil fuel derived energy which has perpetuated climate change and the greenhouse effect. The installation of this Project will reduce GHG emissions by an estimated 6,131 Metric Tons (EPA Greenhouse Gas Equivalencies Calculator) which will reduce the pace of climate change and ultimately improve TID's climate change and energy resiliency.

Placing solar installations atop water bodies, such as this Project, also reduces the need for additional land use and land cover change for renewable energy deployment. By doing so, agricultural land in the area will not be shifted towards solar energy deployments, preserving the economy of the area while also reducing the grading and development of natural lands. FPV installations, such as this project, directly reduce environmental and ecological landscape shifts typically necessary for ground-mounted PV installations. Recent research has demonstrated that FPVs produce 2.3 times more energy per square meter of total project than utility-scale ground-mounted PV systems, indicating the necessary land for this PV system on land could be as high as 19 acres (Cagle et al., 2020). Land cover change, specifically in agricultural regions,

threatens food security and alters a landscape's ability to respond to natural phenomena, such as droughts (Hasan et al., 2020). As such, this project directly bolsters localized resiliency to climate change and drought by minimizing land use change for renewables while simultaneously generating clean energy and saving freshwater resources.

Additionally, both the TID Drought Management Plan (DMP) and AWMP provide tangible strategies to address climate change. In fact, the AWMP devotes an entire section to climate change which is found in Section 6 of the AWMP. The proposed project will also conserve water resources which creates benefits that are consistent with many TID "Strategies to Mitigate Climate Change Impacts" identified in the AWMP including:
1) Improve operational efficiency,
2) Reduce water loss,
3) Increase water supply,
4) Improve water quality,
5) Practice resource stewardship: agricultural lands, aquatic life and habitat, surface, and groundwater supplies,
6) Support long term/ regional water management planning, and
7) Aggressively increase water use efficiency

- *Does the project seek to improve ecological resiliency to climate change?*

Climate change has shown to cause a slew of issues to our ecological resiliency for various ecosystems. For example, climate is expected to perpetuate the duration and frequency of droughts, which threatens several ecosystems throughout the Western United States that rely on water to survive. Additionally, large ground-mounted PV installations alter local ecosystems and environments, causing unintended species shifts and migration. As indicated in multiple reports, climate change is being perpetuated by the burning of fossil fuels and the subsequent GHGs emitted from this process. This Project will shift energy consumption from fossil-fuel derived energy to a renewable energy source which will ultimately reduce TID's carbon emissions, thereby combatting climate change and the threat it poses to several ecosystems throughout the Western United States. Locally, this project preserves local conservation and agricultural lands, thus preserving local ecological systems and therefore increases ecological resiliency.

Specifically, the Project is intended to help provide ecological resilience to climate change by:

- Generating 8,776,292 kWh annually that will reduce the release of 6,131 tons of carbon dioxide per year.
- Saving of over 110.6 AFY of water annually, making these additional water supplies available to other users such as various ecosystems throughout the western United States.
- Offsetting over 10 acres of land use change for a similar ground-mounted PV system (Cagle et al., 2020)

Above alterations will result in benefits to the environment, agriculture, wildlife, forestry and air and water quality, thereby improving ecological resilience.

- *Does the proposed project seek to reduce or mitigate climate pollutions such as air or water pollution?*

Yes, this Project will produce 8,776,292 kWh per year of renewable, clean, and reliable solar-derived energy which will reduce climate pollutants (GHGs) by reducing the consumption of fossil fuel derived energy. The amount of energy generated from the Project will reduce GHG emissions by 6,131 Metric Tons annually in the Central Valley where the natural gas power plants are located.

- *Does the proposed project include green or sustainable infrastructure to improve community climate resilience?*

Yes, the Project will install 8.3 acres of solar panels over TID's Lateral 8 reservoir which will generate up to 8,776,292 kWh annually. Therefore, this Project is a green and sustainable infrastructure project that will improve the community's climate resilience.

- *Does the proposed project contribute to climate change resiliency in other ways not described above?*

All ways in which the project will contribute to climate change resiliency have been discussed above.

D.4. Evaluation Criterion D—Disadvantaged Communities, Insular Activities, and Tribal Benefits (10 points)

D.1. Disadvantaged Communities

The proposed Project directly serves, and benefits disadvantaged communities (DACs) as identified using the CEJST. As shown in Figure 2 below, the Project is located directly within a CEJST DAC designated census tract. Additionally, sing the data from the CEJST, it is estimated that approximately 62% of TID's population resides within DACs. This Project will generate up to 8,776,292 kWh annually which will be used to power the Lateral 8 Pump Station directly, 1-2% of Project energy produced, with the remaining 98-99% of the power generated being released to the grid for other energy users to utilize. The energy users in the direct vicinity of the Project are DAC residents, therefore the excess energy will be directly utilized by DACs. By providing clean, renewable, and sustainable energy to the surrounding DACs, TID will not only bolster the climate change resiliency of this community but will also reduce climate pollutants in the Project area which will mitigate respiratory illness and other negative impacts associated with burning fossil fuels.

Some of the issues classifying census tracts as DACs within TID's service area (as identified by the CEJST tool) include:

- High energy costs (81st percentile): This project provide an affordable source of energy for TID and the surrounding grid.
- PM 2.5 in the air (99th percentile): This Project will reduce GHG emissions which have shown to contribute to PM2.5 concentrations.

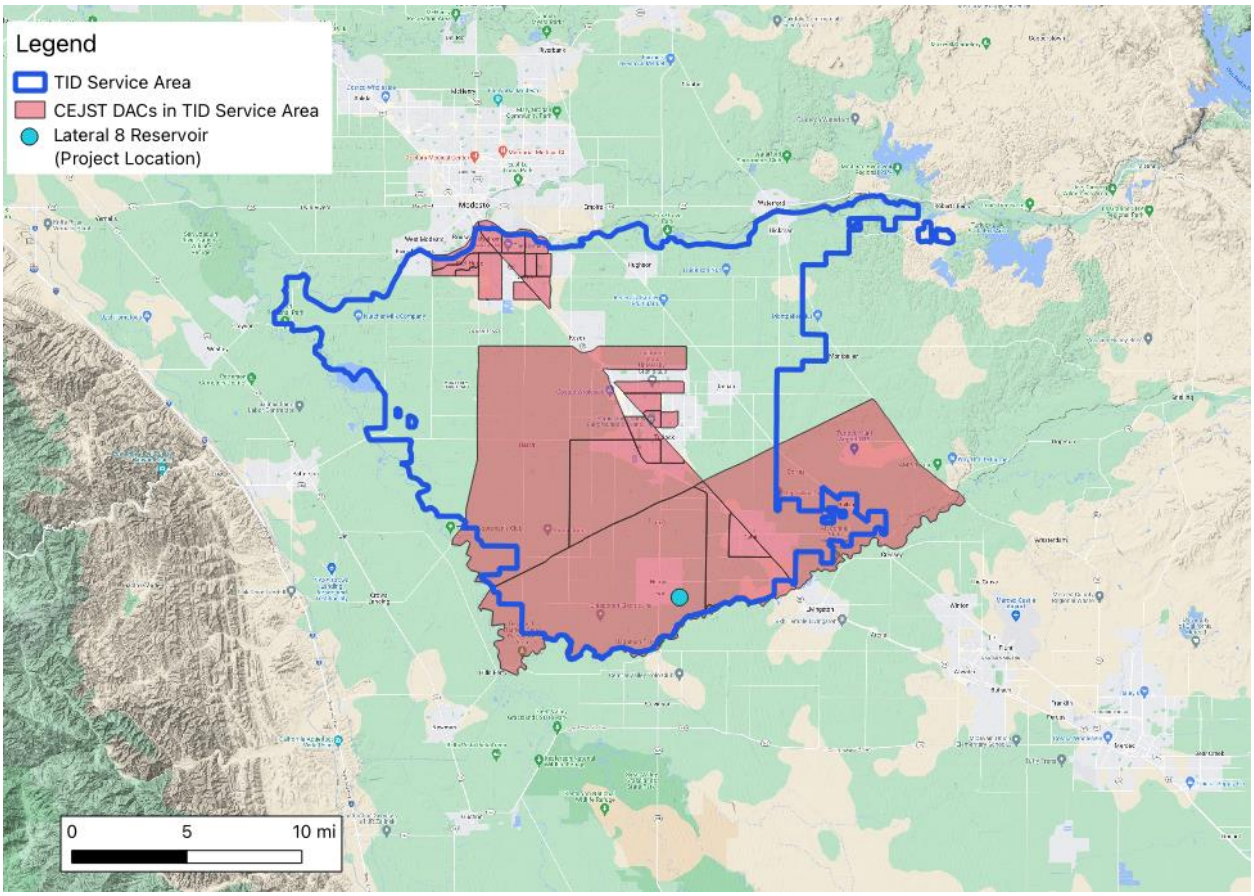
Additionally, the Project will provide significant benefits resulting from an estimated average water savings of 110.6 AFY generating economic savings, creating economic growth opportunities, increased health benefits and reduced detrimental environmental impacts to the surrounding DACs.

The Project will also help to mitigate impacts of drought which can cause the following associated potential public health and social concerns:

- Compromised quantity and quality of drinking water
- Diminished living conditions related to energy, air quality, and sanitation and hygiene
- Compromised food and nutrition
- Increased incidence of illness and disease
- Elevated levels of dust and related particles impacting respiratory complications

The water conservation/savings resulting from this Project will positively impact all customers of the TID, including those that are considered a disadvantaged community, which is approximately 62% of the population within TID's service area.

Figure 2. TID CEJST DAC Map



D.2. Tribal Benefits

- *Does the proposed project directly serve and/or benefit a Tribe? Will the project increase water supply sustainability for an Indian Tribe? Will the project provide renewable energy for an Indian Tribe?*

While there are no tribal communities in the immediate vicinity of the Project site, reduced groundwater pumping through water conservation will allow increased sustainability of water resources that could benefit other tribal communities using these resources. This project will result in reduced groundwater pumping and water conservation, which will benefit the entirety of the Central Valley, including Tribes in this region. TID is the Central Valley's major agricultural water provider and provides the water necessary to grow 40% of the United States fruits, nuts, and other table foods. The water conserved by this Project will allow TID to continue to provide the necessary water to maintain food production for the Central Valley, including Tribal communities.

- *Does the proposed project directly support tribal resilience to climate change and drought impacts or provide other Tribal benefits such as improved public health and safety through water quality improvements, new water supplies, increased renewable energy, or economic growth opportunities? Does the proposed project support Reclamation's Tribal trust responsibilities or a Reclamation activity with a Tribe?*

California's water systems are widely interconnected. Many municipalities throughout the state rely on water resources from the Central Valley via the SWP and other canals. Considering the interconnectedness of California's water systems, TID works in coordination with the City and County of San Francisco, San Joaquin Tributaries Authority (SJTA) and the East San Joaquin Water Quality Coalition (ESJWQCL) as well as various water committees and groups forming at the county and state levels. Each authority and association are involved in activities that relate to different aspects of TID's water management activities. TID has been leading the collective efforts by coordination with other regions to ensure availability of water resources for agricultural and other users. Therefore, any water savings within TID's irrigation service area, such as that anticipated by the proposed Project, will result in benefits including water quality improvements and economic growth to a variety of users throughout the region and California including the tribal communities.

According to the CDC, severe drought conditions coupled with GHG emissions can negatively affect air quality. During drought, there is an increased risk for wildfires and dust storms. Particulate matter suspended in the air from these events can irritate the bronchial passages and lungs. This can make chronic respiratory illnesses worse and increase the risk for respiratory infections like bronchitis and pneumonia. Water savings and GHG reductions from this project are a step towards conserving valuable water sources that is most needed during drought conditions experienced in the region and will reduce harmful GHG emissions. These two benefits of the Project will then generally improve air quality and related public health in the region, including that of tribal communities.

D.5. Evaluation Criterion E—Complementing On-Farm Irrigation Improvements

(8 points)

- *Describe any planned or ongoing projects by farmers/ranchers that receive water from the applicant to improve on-farm efficiencies. Provide a detailed description of the on-farm efficiency improvements. Have the farmers requested technical or financial assistance from NRCS for the on-farm efficiency projects, or do they plan to in the future? If available, provide documentation that the on-farm projects are eligible for NRCS. assistance, that such assistance has or will be requested, and the number or percentage of farms that plan to participate in available NRCS programs. Applicants should provide letters of intent from farmers/ranchers in the affected project areas.*

Many growers in TID's service area use Natural Resource Conservation Service (NRCS) funding for improved water efficiency for their crops. NRCS tracks their funded installations by county, not by an irrigation district service area. Accordingly, from 2016 to 2023, NRCS funded ~300 high-efficiency irrigation systems involving over ~14,000 acres of farmland in Stanislaus County. Since TID serves approximately 50% of the irrigatable land in Stanislaus County, it is estimated that approximately 150 NRCS-fund projects were installed in TID's service area during this timeframe.

TID is supportive of these high-efficiency irrigation systems, however the challenge for TID is that its distribution system was originally designed to supply "macroheads" that involve short, consistent, high-flow (15-20 CFS) deliveries for flood irrigation. The use of high-efficiency irrigation systems has created a new type of customer who now demands "microhead" deliveries that involve long, varying flows at lower rates (2-4 CFS). These microhead demands present operational and scheduling difficulties for TID in that it must meet these demands using a system designed to supply macroheads for conventional flood irrigation. Also, meeting microhead demands results in more operational spill given the varying nature of these demands. The proposed Project will directly complement on-farm improvements funded through NRCS assistance programs by improving TID's ability to **conserve its water resources** and maintain high levels of irrigation service to customers who convert to NRCS-funded high-efficiency systems. Additionally, the Project can support other growers in the Project's service area who wish to implement NRCS-funded high-efficiency systems for their crops. Together, this Project and the NRCS-funded on-farm improvements are expected to encourage continued use of surface water for irrigation in-lieu of groundwater pumping. This Project will provide benefits to ongoing water use efficiency, drought resilience, and groundwater sustainability.

- *Describe how the proposed WaterSMART project would complement any ongoing or planned on-farm improvement.*
  - *Will the proposed WaterSMART project directly facilitate the on-farm improvement? If so, how? For example, installing a pressurized pipe through WaterSMART can help support efficient on-farm irrigation practices, such as drip-irrigation.*

As discussed above, the proposed Project will directly facilitate the on-farm improvements by improving TID's ability to conserve 110.6 AFY of irrigation water which will assist TID in accommodating microhead deliveries and maintain high levels of irrigation service to customers who convert to (NRCS-funded) high-efficiency systems.

- *Will the proposed WaterSMART project complement the on-farm project by maximizing efficiency in the area? If so, how?*

Yes, the Project will produce 8,776,292 kWh per year of renewable, clean, and reliable energy which will maximize energy efficiency in the area. Additionally, the Project will conserve an estimated 110.6 AFY of water which will also optimize water use efficiency in the TID service area and reduce groundwater pumping energy usage by 123,586 kWh per year.

- *Describe the on-farm water conservation or water use efficiency benefits that are expected to result from any on-farm work. Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.*

There is no on-farm work associated with this Project, therefore there are no estimated on-farm water savings expected because of this Project.

- *Please provide a map of your water service area boundaries. If your project is selected for funding under this NOFO, this information will help NRCS identify the irrigated lands that may be approved for NRCS funding and technical assistance to complement funded WaterSMART projects.*

Please refer to Figure 1 in the Project Location section for the project map.

D.6. Evaluation Criterion F—Readiness to Proceed (8 points)

- *Identify and provide a summary description of the major tasks necessary to complete the project. Note: please do not repeat the more detailed technical project description provided in Section D.2.2.4.; this section should focus on a summary of the major tasks to be accomplished as part of the project.*

As noted above, this Project is shovel ready. The Project's design plans have been completed and CEQA compliance was achieved when an addendum to the Reservoir's IS/MND was posted on California's State Clearinghouse website on January 26, 2024 (SCH # 2015101062). Additionally, since TID has over 60 MW of distributed solar interconnected to its grid, TID will utilize its experience with these solar projects to successfully implement the Project as outlined below.

Therefore, TID will be ready to implement the project will require the following major tasks:

- Mobilization and Site Preparation: construction contractor will mobilize and set up operations at site.
- Anchor and Mooring Installation: percussion-driven earth anchors will be installed along shore of reservoir, and connected to steel mooring cables that will attach to floating solar array.
- Array Racking and Module Installation: solar array will be assembled by connecting sections of floating racking with solar modules and pushed onto the reservoir.
- Equipment Pad Installation: underground and above-ground electrical cables will be installed; concrete foundations will be poured for equipment pads.

- On-shore Equipment Installation: equipment will be installed on concrete equipment pads, included low-and medium-voltage switchgears, transformers, and solar inverters.
- DC and AC Electrical Balance of System (EBOS) Installation: all remaining DC wiring, racking cables, and AC connections will be installed.
- Final Testing and Commissioning: the project will be interconnected to TID's feeder, tested, and commissioned by TID.

- *Describe any permits that will be required, along with the process for obtaining such permits.*

It is anticipated that the following permits will be required:

- Electrical Permit from TID. Simple process (self-issuance) provides use of licensed electricians and field inspections for construction.

- *Identify and describe any engineering or design work performed specifically in support of the proposed project.*

TID hired the services of a consultant to provide all planning and design documents required for construction, including issued-for-construction electrical and structural plans for the project.

These include single-line diagrams specifying the solar system and its interconnection to TID's grid, detailed structural calculations for the load-bearing anchors that will support the floating solar system, and a site plan depicting the positions of all components of the system.

TID reviewed and provided comments and feedback on the planning and design documents throughout the consultant's design process. The final issued-for-construction plans are compliant with TID's requirements for construction drawings and include enough information for TID to commence project construction as soon as funding is available.

As shown in the schedule below, it is anticipated that the Project will be advertised to receive competitive construction bids within one month of notice to proceed, and that a construction contractor will be onboarded by April 2025.

- *Describe any new policies or administrative actions required to implement the project.*

There are no new policies or administrative actions required to implement the Project.

- *Describe the current design status of the project. If additional design work is required prior to construction, describe the planned process and timeline for completing the design work.*

The Project is shovel ready and TID has approved the "Issued for Construction" (IFC) plans (Appendix B) prepared by the consultant. TID will start consulting with the Reclamation office for NEPA approval once the notice of funding of this project has been awarded. Advertising for competitive construction bids will follow immediately once the environmental approval has been secured and Notice to Proceed has been given.

- *Please also include an estimated project schedule that shows the stages and duration of the*

proposed work, including major tasks, milestones, and dates. Milestones may include, but are not limited to, the following: complete environmental and cultural compliance; mobilization; begin construction/installation; construction/installation (50% complete); and construction/installation (100% complete). Was the expected timeline for environmental and cultural compliance discussed with the local Reclamation Regional or Area Office?

The below table is estimated based on the current Project status. This schedule is based on the grant being awarded by 12/31/2024. Once an award is provided and an agreement is signed, TID will begin the competitive construction bidding process as per the WEEG FY2024 guidelines. TID will not begin any work to be funded by the grant until a grant agreement is signed.

Table 3. Project Schedule

Task Name	Duration	Start	Finish
Planning and Design	381 days	Fri 9/2/22	Fri 2/16/24
Grant Application	Milestone	Thu 2/22/24	Thu 2/22/24
Notice of Award	Milestone	Tues 12/31/24	Tues 12/31/24
Notice to Proceed	Milestone	Wed 1/1/25	Wed 1/11/25
EPC RFP / Award	60 days	Fri 1/10/25	Thu 4/3/25
TID Solar EPC RFP Process	6 wks	Fri 1/10/25	Thu 2/20/25
EPC Award / Contract Negotiations	6 wks	Fri 2/21/25	Thu 4/3/25
EPC Onboarded	Milestone	Thu 4/3/25	Thu 4/3/25
Procurement	240 days	Fri 4/18/25	Thu 3/19/26
Procure MV Switchgear	12 mons	Fri 4/18/25	Thu 3/19/26
Procure LV Switchgear	8 mons	Fri 4/18/25	Thu 11/27/25
Procure Transformers	8 mons	Fri 4/18/25	Thu 11/27/25
Procure Floating Solar racking	4 mons	Fri 4/18/25	Thu 8/7/25
Construction	159 days	Mon 10/13/25	Thu 5/21/26
Construction Start	Milestone	Mon 10/13/25	Mon 10/13/25
Mobilize	1 wk	Mon 10/13/25	Fri 10/17/25
Site Prep	2 wks	Mon 10/20/25	Fri 10/31/25
Install Anchors	2 wks	Mon 11/3/25	Fri 11/14/25
Assemble and Float Array Racking / Modules	8 wks	Mon 11/17/25	Fri 1/9/26
Install Mooring Cables	4 wks	Mon 1/12/26	Fri 2/6/26
Underground Electric at Equipment Pads	2 wks	Mon 11/3/25	Fri 11/14/25
Form / Pour Concrete Pads	2 wks	Mon 11/17/25	Fri 11/28/25
Install LV Switchgear	1 wk	Mon 12/1/25	Fri 12/5/25
Install Transformers	1 wk	Mon 12/1/25	Fri 12/5/25

Complete DC Wiring, Racking Cables	2 wks	Mon 2/9/26	Fri 2/20/26
Install Inverters and DC Disconnects	2 wks	Mon 2/9/26	Fri 2/20/26
Install MV Switchgear	2 wks	Fri 3/20/26	Thu 4/2/26
Complete all wiring / terminations	3 wks	Fri 4/3/26	Thu 4/23/26
Complete Interconnection	1 wk	Fri 4/24/26	Thu 4/30/26
PTO Issued	Milestone	Thu 4/30/26	Thu 4/30/26
Final Testing / Commissioning	3 wks	Fri 5/1/26	Thu 5/21/26
COD	Milestone	Thu 5/21/26	Thu 5/21/26

D.7. Evaluation Criterion G—Collaboration (5 points)

- *Is there widespread support for the project? Please provide specific details regarding any support and/or partners involved in the project. What is the extent of their involvement in the process?*

As demonstrated in the support letters (Appendix A) and in TID's Board meeting on January 23, 2024, wherein the Board approved the Project's CEQA compliance for, the need for this Project is well recognized in the region. TID is one of only four irrigation districts in the state that also provides electric retail energy directly to homes, farms, and businesses. TID owns and operates an integrated and diverse electric generation, transmission and distribution system that provides power to a population of 240,000 within a 662 square-mile area. Specifically, from an energy provider perspective, TID has been a Northern American Electric Reliability (NERC) certified Balancing Authority since 2005, TID is a member of the Western Power Pool, and TID participates in the Western Energy Imbalance Market. The significance of these memberships and collaborations is discussed in more detail below.

From an agricultural water provider perspective, TID maintains close relationships with irrigation districts on other tributaries of the San Joaquin River and, through those relationships, can share information regarding successes and challenges to help shape effective regional water management programs. TID works and coordinates with the City and County of San Francisco, San Joaquin Tributaries Authority (SJTA), the East San Joaquin Water Quality Coalition (ESJWQC), as well as various water committees and groups forming at the county and state levels. Each authority and association are involved in activities that relate to different aspects of TID's water management and energy efficiency activities. Additionally, the Drought Management Plan (DMP) was developed through a collaborative process with multiple agencies (detailed on page G-16 of the DMP). TID does not have any partners for completing the construction of this Project.

- *What is the significance of the collaboration/support?*

Extensive coordination and collaboration are a vital component of TID operations. TID often reports data to the California Energy Commission, the California Department of Water Resources, and other agencies. As mentioned, TID has been a NERC certified Balancing Authority since 2005. As such, TID is electrically independent, and has the resources in place to follow the minute-by-minute changes in supply and demand, ensuring constant, reliable service

for its customers. TID is a member of the Western Power Pool and shares contingency reserves with multiple Balancing Authorities across the Western Interconnection, allowing access to excess capacity to respond to system contingencies (transmission faults, generator failures, etc.). TID also participates in the Western Energy Imbalance Market (WEIM), which is an energy market that is economically dispatched across a regional footprint every five minutes. There are currently 22 entities participating, which represent well over 75% of both supply and demand in the Western Interconnection.

Additionally, TID and the Modesto Irrigation District (MID) hold joint water rights and ownership of the Don Pedro Reservoir, which results in their close and continuous efforts to coordinate and manage this shared resource. TID also partners with cooperating entities on watershed studies and other efforts surrounding Tuolumne River water supply and demand, including instream flows, snowpack, agricultural and urban demand, climate change, and other considerations. TID also works with regulatory agencies that affect the flexibility with which TID can store and deliver energy and water.

One example of such coordination is TID's role in the formation and ongoing operation of the West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA), an association of local municipal water systems and agencies located in the western portion of the Turlock Subbasin. As a member of the WTSGSA, TID is actively involved in subbasin-wide SGMA-implementation efforts. WTSGSA and the East Turlock Subbasin GSA (ETSGSA) collaborated on and expect to adopt and implement the Turlock Subbasin GSP. TID also meets with local cities and counties regarding groundwater resources, water conservation and recycling projects, and public education and outreach. The Project has been identified as a priority for TID to achieve energy and water efficiency and flexibility in supply management.

- *Will this project increase the possibility/likelihood of future water conservation improvements by other water users?*

Since 1998, the TID has utilized a sophisticated SCADA system to monitor and record measurements of system flow and water quality to better understand the quantity and quality of water within its irrigation system. The data is also useful in determining how canal water quality changes because of different operational scenarios. The SCADA system has been continuously updated/improved with current technology; today TID collects water measurement data from 397 SCADA collection points including flows at the heads of most laterals, main diversion points, and intermediate points in the distribution system, 137 customer turnouts and at 14 operational spill sites. These advantages gained from this Project will serve as an example for other potential floating solar generation projects that TID can utilize to offset its energy demands supplied from fossil fuel derived energy.

- *Will the project benefit multiple sectors and/or users (e.g., agriculture, municipal and industrial, environmental, recreation, or others)?*

The Project will provide direct benefits to TID's agricultural producers that rely on consistent water resources to irrigate their crops. Considering California is the largest agricultural producing state in the country, ensuring that agricultural producers have adequate water supplies has economic and health benefits for the entire country. Therefore, any additional

water savings within TID, such as that anticipated from the proposed Project, will provide agricultural producers in TID's service area more reliable water supplies and thus more reliable agricultural output.

In addition, the Tuolumne River and Turlock Lake provide an ideal setting for water-oriented outdoor activities. The recreation area features the lake with its 26 miles of shoreline and the foothill country leased from the TID in 1950. The City of Turlock Economic Development Strategic Plan states that there is no natural local attraction to draw visitors, other than the Turlock Lake. These recreational opportunities have been providing ideal destinations for visitors that have been an economic vehicle for the disadvantaged community of TID. The proposed Project can help to mitigate the impacts of drought on water levels of the lake that provides recreational and tourism activities with a direct economic impact on the local community.

- *Please attach any relevant supporting documents (e.g., letters of support or memorandum of understanding).*

Please see Appendix A for the letters of support received for this Project.

D.8. Evaluation Criterion H— Nexus to Reclamation (4 Points)

Describe the nexus between the proposed project and a Reclamation project or Reclamation activity. Please consider the following:

- *Does the applicant have a water service, repayment, or O&M contract with Reclamation?*

No, TID does not have a water service, repayment, or O&M contract with Reclamation.

- *If the applicant is not a Reclamation contractor, does the applicant receive Reclamation water through a Reclamation contractor or by any other contractual means?*

No.

- *Will the proposed work benefit a Reclamation project area or activity?*

No.

- *Is the applicant a Tribe?*

No, TID is not a tribe.

E. PERFORMANCE MEASURES

TID proposes to use the following performance measures to quantify the benefits upon completion of the proposed project:

Performance Measure No. 1: Energy Generated

The measure of performance will be the actual amount of energy generated (kWh) resulting from the construction of the Project. It is expected that the project will generate up to 8,776,292 kWh per year. The project will automatically collect and export data on actual energy production exported to the grid via the solar inverters. After construction, and for two years following, the TID will provide energy reports for the actual kWh generated.

Performance Measure No. 2: Water Conserved

The measure of performance will be the actual amount of water consumption reduced after implementation of the Project, quantified as follows:
After project implementation, the TID will monitor its energy savings from evaporation as noted above and will use the latest energy consumption of water data to estimate the amount of water conserved because of reducing dependence on fossil fuel energy.

SECTION 2: BUDGET NARRATIVE

The Project's Budget Narrative is attached as a separate attachment as specified under this NOFO.

SECTION 3: ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

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

No, the Project will install a Floating Photovoltaic solar power generation facility on TID's existing Lateral 8 Reservoir, an existing facility. Therefore, there are no anticipated impacts to the surrounding environment. TID has completed an addendum to the Reservoir's IS/MND to serve as the Project's CEQA compliance and will abide by all required mitigation measures to ensure the Project does not impact the surrounding environment.

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?

No, TID is not 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.

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

No, there are no wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States".

When was the water delivery system constructed?

The Lateral 8 Regulating Reservoir was constructed in 2016.

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

No, the Project will implement FPV solar system atop of the Lateral 8 reservoir which is an existing regulating reservoir in the TID irrigation system. However, this project will not impact the functionality of the Lateral 8 Reservoir.

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.

No, there are no buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places.

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

No, there are no known archeological sites in the proposed project area.

Will the proposed project have a disproportionately high and adverse effect on low-income communities with environmental justice concerns?

No, the Project will not have a disproportionately high and adverse effect on low-income communities with environmental justice concerns. As discussed in the Evaluation Criteria section D, the Project will provide several benefits for DACs within TID's service area.

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

No, the Project will be installed in TID's existing facility and will not limit access to nor hinder the ceremonial use of Indian sacred sites nor result in other impacts on tribal lands.

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

No, 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.

SECTION 4: REQUIRED PERMITS OR APPROVALS

It is anticipated that the following permits will be required:

- Electrical Permit from TID. Simple process (self-issuance) provides use of licensed electricians and field inspections for construction.

SECTION 5: OVERLAP OR DUPLICATION OF EFFORT STATEMENT

TID certifies that there is no overlap between the proposed Project or any other active or anticipated proposals or projects in terms of activities, costs, or commitment of key personnel. TID also certifies that this proposal does not duplicate any proposal or Project that has been submitted for funding consideration to any other potential funding sources.

SECTION 6: CONFLICT OF INTEREST DISCLOSURE STATEMENT

No actual or potential conflicts of interest associated with the implementation of this Project have been identified prior or during the time of submission of this application.

SECTION 7: LETTERS OF SUPPORT

All letters of support for the Project are in Appendix A.

SECTION 8: OFFICIAL RESOLUTION

RESOLUTION NO. 2024 - 7

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE TURLOCK IRRIGATION DISTRICT AUTHORIZING AN APPLICATION FOR GRANT FUNDING BY THE BUREAU OF RECLAMATION'S WATERSMART WATER & ENERGY EFFICIENCY GRANT PROGRAM FOR THE LATERAL 8 REGULATING RESERVOIR FLOATING SOLAR PROJECT; AND AUTHORIZING THE GENERAL MANAGE TO EXECUTE A GRANT AGREEMENT WITH THE BUREAU OF RECLAMATION THAT COMMITS THE DISTRICT TO FUND MATCHING FUNDS SHOULD A GRANT AWARD BE MADE

WHEREAS, the Turlock Irrigation District (the "District") proposes to implement the Lateral 8 Regulating Reservoir Floating Solar Project (the "Project") located on District-owned Lateral 8 Regulating Reservoir; and

WHEREAS, the District has the legal authority and is authorized to enter into a funding agreement with the United States Department of the Interior Bureau of Reclamation; and

WHEREAS, the District approved an Initial Study / Mitigated Negative Declaration (IS/MND) for the Lateral 8 Regulating Reservoir Project on December 8, 2015 via Resolution No. 2015-81; and

WHEREAS, on January 23, 2024, the District adopted an Addendum to the Lateral 8 Regulating Reservoir IS/MND, finding the Addendum as adequate environmental documentation for the Project pursuant to CEQA; and

WHEREAS, the Project would generate competitively priced renewable energy, would save water through reduced evaporation, and would improve water quality; and

WHEREAS, the United States Department of the Interior offers financial assistance in the form of grant funding through its Bureau of Reclamation's WaterSMART (Sustain and Manage America's Resources for Tomorrow) Water & Energy Efficiency Grant Program (WEEG) for this type of project. The WaterSMART WEEG provides funding up to a maximum of $5 million, but not to exceed 50% of the total project cost; and

WHEREAS, the District desires to fund part of the cost of the Project with grant funding from the WaterSMART WEEG Program.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Turlock Irrigation District hereby finds, determines, declares, and resolves as follows:

1. The Board hereby supports a grant application to the WaterSMART WEEG Program for the Project; and

2. The Board hereby authorizes and directs the District's General Manager, or his or her designee, to complete, review, sign, and submit, for and on behalf of the District, a grant application for the Bureau of Reclamation's WaterSMART WEEG Program for the Project in the amount of $5,000,000, and to take such other actions as necessary or appropriate to obtain this grant funding; and

3. The District's General Manager, or his or her designee, is hereby authorized and directed to execute a grant agreement with the United States Department of the Interior Bureau of Reclamation and amendments thereto, and is designated to represent the District in carrying out the District's responsibilities under such grant agreement, including certifying disbursement requests on behalf of the District and compliance with applicable state and federal laws; and

4. If a grant award is made by the Bureau of Reclamation, the District commits to providing matching funds ($5,000,000) for the Project, and up to the balance of funds needed to complete the construction of the Project; and

5. This Resolution shall take effect immediately.

Moved by Director Alamo, seconded by Director Yonan, that the foregoing resolution be adopted.

Upon roll call the following vote was had:

Ayes:	Directors Santos, Alamo, Yonan, and Macedo
Noes:	None
Absent:	Director Frantz

The President declared the resolution adopted.

I, Jennifer Land, Executive Secretary to the Board of Directors of the TURLOCK IRRIGATION DISTRICT, do hereby CERTIFY that the foregoing is a full, true and correct copy of a resolution duly adopted at a regular meeting of said Board of Directors held the 23rd day of January, 2024.

Executive Secretary to the Board of
Directors of the Turlock Irrigation District

SECTION 9: LETTERS OF FUNDING COMMITMENT

As show in the attached Draft resolution, TID is committed to providing the required match funding to complete this project.

SECTION 10: CERTIFICATION REGARDING LOBBYING

Please see attached signed form SF-LLL for certification regarding lobbying.

APPENDICES

Appendix A: Letters of Support
Appendix B: Issued for Construction (IFC) Project Plans

Appendix A: Letters of Support

DocuSign Envelope ID: 164CB5BE-C4BA-40F8-AD2F-0D5B23D14CD0

Idaho National Laboratory

February 16, 2024 CCN 255469

NOFO Team
Bureau of Reclamation
Financial Assistance Operations
P.O. Box 25007, MS 84-27133
Denver, CO 80225

SUBJECT: Support for the Turlock Irrigation District's Application to WaterSMART Water Energy Efficiency Grant Program for Fiscal Year 2024

Dear NOFO Team:

I am pleased to write in support of the Turlock Irrigation District's (TID) application to the WaterSMART Water Energy Efficiency Grant Program for Fiscal Year 2024.

TID has been one of the Central Valley's major agricultural water suppliers since 1887, and its water management practices have turned a once seasonably dry landscape into the fertile agricultural area it is today. TID is now working to reduce its climate impact by increasing its renewable energy sources and by further improving its water efficiency practices. In this regard, TID plans to implement a floating solar project on one of its regulating reservoirs, which will generate renewable energy. TID is currently a partner in an INL-led project in Irrigation Modernization, so we are familiar with the challenges of the region and the need for increased efficiencies in the water-energy nexus.

Instead of a traditional ground-mounted solar system, TID plans to install a floating solar (photovoltaic) energy generation system on the water surface of its existing Lateral 8 Regulating Reservoir. Floating solar systems placed on water bodies such as reservoirs and lakes have several advantages over traditional ground-mounted solar energy systems, including preserving land for other productive uses, reducing evaporation by covering the water body, and improved solar energy production efficiency given the cooling effects of the water.

Currently, Noria Energy is a partner in the INL-led project AquaPV funded by the Department of Energy. Noria's participation has been crucial to support our tool development with their expertise in this nascent area of research and deployment in the U.S. We are supportive of TID's advancements in implementing renewable energy sources and increasing renewable energy generation. We respectfully ask for your support of this application. Thank you for your time and consideration. Please don't hesitate to reach out to Juan Gallego-Calderon at juan.gallegocalderon@inl.gov if you would like more information about our partnership with Noria and the adjacent activities that show their commitment to a clean energy future.

Sincerely,

DocuSigned by:
Ning Kang
A3B3581CB381 A14A

Ning Kang, Department Manager
Power & Energy Systems

JFC/NB

cc: J. F. Gallego-Calderon
N. Kang
S. M. Bragg-Sitton

WATER & POWER
Serving Central California since 1887

JOHN DUARTE
13TH DISTRICT, CALIFORNIA

1535 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-1947

Congress of the United States
House of Representatives
Washington, DC 20515

February 22, 2024

Bureau of Reclamation
Financial Assistance Operations
Attn: NOFO Team
P.O. Box 25007, MS 84-27133
Denver, CO 80225

RE: Support for the Turlock Irrigation District's Application to WaterSMART Water Energy Efficiency Grant Program for Fiscal Year 2024

Dear Mr. German,

I am pleased to write in support of the Turlock Irrigation District's (TID) application to the WaterSMART Water Energy Efficiency Grant Program for Fiscal Year 2024.

TID has been one of the Central Valley's major agricultural water suppliers since 1887, and its water management practices have turned a once seasonably dry landscape into the fertile agricultural area it is today. TID is now working to reduce its climate impact by increasing its renewable energy sources and by further improving its water efficiency practices. In this regard, TID plans to implement a floating solar project on one of its regulating reservoirs, which will generate renewable energy.

Instead of a traditional ground-mounted solar system, TID plans to install a floating solar (photovoltaic) energy generation system on the water surface of its existing Lateral 8 Regulating Reservoir. Floating solar systems placed on water bodies such as reservoirs and lakes have several advantages over traditional ground-mounted solar energy systems, including preserving land for other productive uses, reducing evaporation by covering the water body and improved solar energy production efficiency given the cooling effects of the water.

I am supportive of TID's advancements in implementing renewable energy sources and increasing renewable energy generation. I respectfully ask for your support of this application. Thank you for your time and consideration.

Sincerely,

John S. Duarte
Member of Congress

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SECTION 2: BUDGET NARRATIVE

A. Funding Plan and Letters of Commitment

This Project is a key project for TID as its implementation will result in significant energy and water savings for the region. There has been substantial expenditure to date to complete the Project plans and TID is eager and committed to start and complete the construction of this project upon award of this grant funding. As shown in the TID Board Resolution (Section 8 of the application narrative), TID is committed to providing the remaining matching fund of $5,349,631 towards construction and staff time necessary to complete this project. TID will be providing the match funding with its own fiscal resources and no third-party funding will be required.

B. Budget Proposal

Table 1. Total Project Costs by Source

SOURCE	AMOUNT
Costs to be reimbursed with the requested Federal funding	$5,000,000
Costs to be paid by the applicant	$5,349,631
Value of third-party contributions	$0
Total	**$10,349,631**

Table 2. Summary of Non-Federal and Federal Funding Sources

FUNDING SOURCES	AMOUNT	%
Non-Federal Entities		
TID	$5,349,631	51.7%
Non-Federal Subtotal	**$5,349,631**	**51.7%**
Other Federal Entities		
None	$-	-%
Other Federal Subtotal	**$-**	**-%**
REQUESTED RECLAMATION FUNDING	**$5,000,000**	**48.3%**

Table 3. Project Budget

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	$/Unit	Quantity		
Salaries and Wages				
N/A				
Fringe Benefits				
N/A				
Travel				
N/A				
Equipment				
N/A				
Supplies/Materials				
N/A				
Contractual/Construction				**$ 10,339,632**
Design Consultant				
N/A				
Construction Contractor				
Modules	$ 1,634,328	1	LS	$ 1,634,328
Inverters	$ 183,283	1	LS	$ 183,283
Racking	$ 1,407,559	1	LS	$ 1,407,559
Anchoring	$ 309,543	1	LS	$ 309,543
DC EBOS	$ 908,373	1	LS	$ 908,373
AC EBOS	$ 956,109	1	LS	$ 956,109
Install Labor	$ 1,164,104	1	LS	$ 1,164,104
DAS/SCADA	$ 87,489	1	LS	$ 87,489
General Construction	$ 665,134	1	LS	$ 665,134
Engineering & Construction Management	$ 782,243	1	LS	$ 782,243
Commissioning	$ 156,324	1	LS	$ 156,324
Gen-Tie	$ 188,694	1	LS	$ 188,694
Contractor Overhead	$ 1,896,451	1	LS	$ 1,896,451
Other				
None				
TOTAL DIRECT COSTS				
Indirect Costs				**$ 10,000**
BOR Environmental Review	$ 10,000.00	1	LS	$ 10,000
TOTAL ESTIMATED PROJECT COSTS				**$ 10,349,632**

C. Budget Narrative

Salaries and Wages
Not applicable. TID is not seeking any reimbursement on staff time.

Fringe Benefits
Not applicable. TID is not seeking any reimbursement on staff time.

Travel
Not applicable. TID is not seeking any reimbursement for travel expenses.

Equipment
Not applicable. All equipment costs are included in the construction contract line item.

Materials and Supplies
Not applicable. All materials and supplies costs are included in the construction contract line item.

Contractual/Construction
As noted previously, TID will hire a contractor for construction of the proposed Project. The total costs associated with the construction of FPV facility on the Lateral 8 reservoir is estimated to be $10,339,632. Procurement of all equipment, materials, supplies, goods, and services will be done in accordance with TID's procedures.

Third-Party In-Kind Contributions
Not applicable, there are no third-party in-kind contributions associated with this Project budget.

Environmental and Regulatory Compliance Costs
TID has allocated $10,000 for Reclamation's environmental review.

Other Expenses
Not applicable.

Indirect Costs
Environmental and Regulatory Compliance costs are the only indirect costs associated with Project implementation and can be seen in the table above.