



— BUREAU OF —
RECLAMATION



CITY OF AURORA
SUSTAINABLE TURF
TRANSFORMATION
FOR WATER CONSERVATION
AND HYDROELECTRIC
ENERGY RECOVERY
PROJECT

BUREAU OF RECLAMATION
WATERSMART GRANTS:
WATER AND ENERGY EFFICIENCY
GRANTS FOR FISCAL YEAR 2024
AND FISCAL YEAR 2025

NOTICE OF FUNDING OPPORTUNITY
NO. R24AS00052

FEBRUARY 2024

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Table of Contents

Mandatory Federal Forms	4
Unique Entity Identifier and SAM Registration	4
Technical Proposal	5
Executive Summary	5
<i>Project Summary</i>	5
<i>Project Length and Estimated Completion:</i>	5
Project Location	5
<i>Figure 1: Map of Site Locations</i>	6
<i>Table 1: Park Properties for Turf Replacement</i>	6
Project Description	7
<i>Figure 2: Park Properties with Native Grass Conversion</i>	10
<i>Figure 3: Parks with Bermuda Grass Conversions</i>	12
<i>Figure 4: Existing PRV at 743 Gun Club Road site</i>	13
<i>Figure 5: Proposed Project Layout</i>	13
<i>Figure 6: Average monthly flow rates and energy output</i>	14
<i>Figure 7: A proposed design for the In-PRV in a 10" bypass</i>	15
<i>Figure 8: 3D representation of the system</i>	16
<i>Figure 9: Power Electronics Layout</i>	18
Evaluation Criteria	19
<i>Evaluation Criterion A—Quantifiable Water Savings</i>	19
<i>Evaluation Criterion B—Renewable Energy</i>	20
<i>Evaluation Criterion C—Other Project Benefits</i>	22
<i>Evaluation Criterion D—Disadvantaged Communities, Insular Areas, and Tribal Benefits</i>	24
<i>Table 2: Aurora and Colorado Demographic Information</i>	24
<i>Table 3: Park Property Designation by Census Tract</i>	25
<i>Evaluation Criterion E—Complementing On-Farm Irrigation Improvements</i>	27
<i>Evaluation Criterion F—Readiness to Proceed</i>	27
<i>Evaluation Criterion G—Collaboration</i>	30
<i>Evaluation Criterion H—Nexus to Reclamation</i>	33
Performance Measures	33
Budget Narrative	35
<i>Budget Table 1 – Non-Federal and Federal Funding Sources Summary</i>	35

<i>Budget Table 2: Total Project Cost Summary</i>	35
<i>Budget Table 3: Detailed Budget Proposal</i>	37
Environmental and Cultural Resources Compliance	39
Required Permits or Approvals	40
<i>Table 4: Hydroelectric Project Required Approvals and Permits</i>	40
Overlap or Duplication of Effort Statement	41
Conflict of Interest Disclosure	41
Uniform Audit Reporting Statement	41
Certification Regarding Lobbying	41
Letters of Support	41
Official Resolution	41
Appendix A: Letters of Support	
Appendix B: Draft Resolution	

Mandatory Federal Forms

The following Standard Forms were submitted with a copy of this grant application via the Grants.gov Portal:

- SF-424: Application for Federal Assistance (Office of Management and Budget (OMB))
- SF-424C: Budget Information – Construction Programs (OMB)
- SF-424D Assurances-Construction Programs

Unique Entity Identifier and SAM Registration

The City of Aurora is registered in the System for Award Management (SAM) and will maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.

The City's unique entity identifier is KVZATDBDECG8. The City's CAGE code is 0YKD5.

Technical Proposal

Executive Summary

Date: February 22, 2024
Applicant: Aurora Water, City of Aurora
City: Aurora
County: Arapahoe
State: Colorado
Category: Category A

Project Summary

Aurora Water is committed to enhancing and protecting the quality of life for Aurora citizens by providing safe, dependable and sustainable water, sewer and stormwater services, today and in the future. The City of Aurora Sustainable Turf Transformation and Hydroelectric Energy Recovery Project will help Aurora Water conserve and use water more efficiently and increase the production of renewable energy. The conversion of cool-season bluegrass to warm season native grasses and turfgrass on 23.18 acres in eight City parks and green spaces will **save 31.5-acre feet of water annually and avoid the release of 1.1 metric tons (MT) of carbon dioxide equivalent (MTCO₂e) annually** due to reduced mowing. By replacing traditional turf with warm season grass species, the City aspires to create a more sustainable and ecologically friendly landscape that aligns with the principles of environmental stewardship. At the same time, a new hydroelectric generation unit will recover 229,500 kWh per year, **saving more than \$500,000 in energy costs over the system's lifespan and avoiding the release of 163 metric tons (MT) of carbon dioxide equivalent (MTCO₂e) annually**. The implementation of this new hydro system will not only help Aurora Water save on energy costs and lower its carbon footprint, but also improve energy security and water system resilience.

Project Length and Estimated Completion:

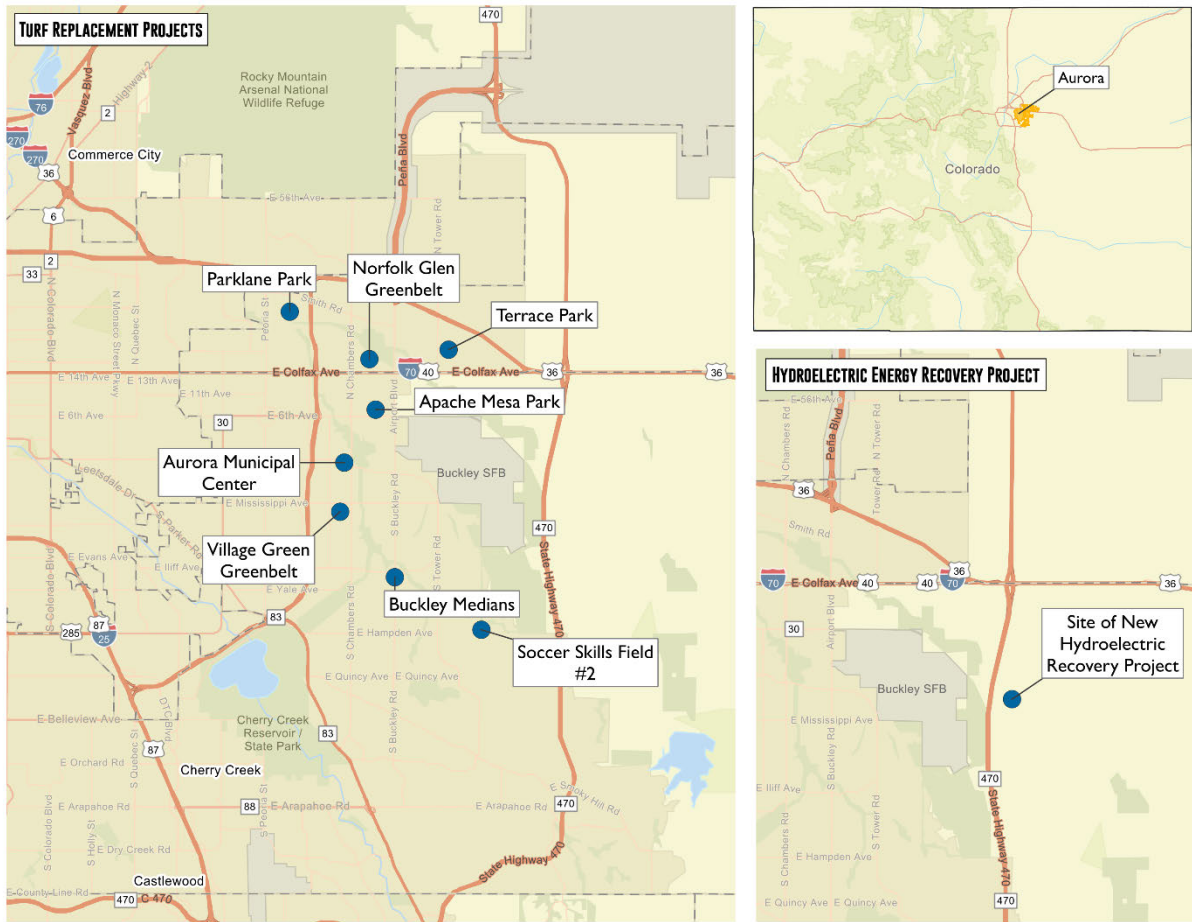
The construction of the new hydroelectric generation unit will take approximately 12 months and is estimated to be complete in December 2025. The turf conversion will begin in May 2025 and continue through the summer of 2025 and 2026. The conversion is estimated to be completed in September 2026.

Federal Facility: The Project is not located on a Federal facility.

Project Location

Aurora is a home-rule city in the State of Colorado. Located mainly in Arapahoe County, Aurora's boundaries extend into both Adams and Douglas counties. Aurora is 180 square miles and is located in central Colorado along the populous Front Range corridor. Aurora is the third largest city in the state. Under the U.S. Census, Aurora is within the Denver-Aurora-Lakewood Metropolitan Statistical Area.

Figure 1 – Map of Site Locations



The turf transformation will be carried out in eight of the City’s municipal parks. Below is a detailed list with addresses and locations.

Table 1 – Park Properties for Turf Replacement

PARK PROPERTIES Bermuda Conversion	Conversion Acres	Address	Location
Aurora Municipal Center	2.03	15151 E Alameda Pkwy, Aurora, CO 80012	39° 42' 38.85" N, 104° 48' 50.45" W
Soccer Skills Field #2	0.81	20101 E Hampden Ave, Aurora, CO 80013	39° 39' 15.39" N, 104° 45' 12.36" W
Parklane Park	4.25	13003 E 30th Ave, Aurora, CO 80011	39° 45' 37.80" N, 104° 50' 12.32" W

PARK PROPERTIES Native Conversion	Conversion Acres	Address	Location
Aurora Municipal Center	1.95	15151 E Alameda Pkwy, Aurora, CO 80012	39° 42' 36.44" N, 104° 48' 46.97" W

Apache Mesa Park	0.48	710 Laredo St, Aurora, CO 80011	39° 43' 40.05" N, 104° 47' 57.88" W
Terrace Park	1.04	18801 E Montview Blvd, Aurora, CO 80011	39° 44' 52.14" N, 104° 46' 3.62" W
Norfolk Glen Greenbelt	3.24	15800 E 17th Pl, Aurora, CO 80011	39° 44' 40.84" N, 104° 48' 7.65" W
Village Green Greenbelt	1.28	1300 S Chambers Cir, Aurora, CO 80012	39° 41' 37.33" N, 104° 48' 53.47" W
Buckley Medians	8.1	S Buckley Road, Aurora, CO 80013	39° 40' 18.65" N, 104° 47' 27.83" W

The hydroelectric energy recovery component of the Project will take place at an existing Aurora Water facility located at 743 S Gun Club Road (S Gun Club and E Exposition Ave), Aurora, CO 80018, at coordinates 39°42'03.15" N, 104°42'48.64" W.

Project Description

Aurora Water (AW) operates the largest water system in Arapahoe County, providing 135 million gallons of piped water to approximately 370,000 people every day. AW is seeking to enhance water and energy efficiency, utilize resources judiciously, achieve additional cost savings, and reduce its greenhouse gas footprint through a two-part project involving both water conservation and energy recovery. The detailed components of the Project are described in the following sections.

Sustainable Turf Transformation for Water Conservation in Park Environments

Colorado has a semi-arid environment and is a drought-prone state. The Front Range receives approximately 15 inches of precipitation in the form of rain and snow on an annual basis, which is insufficient moisture to meet the needs for most non-native landscapes without supplemental irrigation. During water shortages, water must be prioritized to meet potable needs for life, safety and health.

In an effort to conserve water while still providing high quality outdoor spaces for residents to enjoy, the City of Aurora has put into place a number of water conservation efforts, including turf conversion in parks around the city. In parks across the city, Aurora Parks, Recreation and Open Space staff are converting areas of Kentucky bluegrass turf to water-efficient alternatives, such as native grasses in low-usage areas or drought-tolerant Bermuda turf in high-usage areas. This conversion will reduce water usage in these areas by 70 percent, conserving millions of gallons of water while still providing ample space in our parks for public use and enjoyment.



The conversion process began in 2022 and 2023 with a total of 26.94 acres in 18 parks and municipal green spaces. In 2024, the Parks staff plans to convert 22.28 acres, saving 24.22 acre-feet per year (AFY) of water.

Aurora Water is requesting the support of BOR to help continue this project in 2025. AW will work with the City of Aurora Parks Department on a large-scale

conversion of 23.18 acres of cool-season bluegrass to warm season native grasses and turfgrass in park settings, with a primary focus on enhancing water conservation efforts. By replacing traditional turf with warm season grass species, the City aspires to create a more sustainable and ecologically friendly landscape that aligns with the principles of environmental stewardship.

Without the support of the WaterSMART grant funding, Aurora would have to extend the timeline for the project and replace turf based on current available funds, which would narrow the program significantly. Acquiring funding especially for the medians has been a huge challenge as it is very costly. The BOR funding would enable the replacement of all turf in targeted areas without compromising the proposed timeline and project area.

The Project will begin with a Site Assessment. Parks Department staff will conduct a comprehensive analysis of the park's current turf conditions, soil composition, and water usage patterns. Using this information, staff will identify and select native grass species that are well-suited to the park's specific ecosystem. Work will be carried out by a contractor selected in a competitive bidding process, under the direction and oversight by City staff and inspectors.

Conversion Process for Non-Programmed Turf

Aurora Parks will implement a phased approach to replace sections of cool-season bluegrass with native grasses. This will involve soil preparation, seeding, and careful monitoring of the transition process. In addition, the irrigation systems will be audited to ensure efficient coverage.

Existing cool-season grass will be sprayed with a non-selective herbicide when soil temperatures are optimal for cool season turf growth. The areas will then be drill seeded at 30 pounds per acre with a warm-season blend of native grasses. The seed will be watered at appropriate intervals until established. For the first season, the treated areas will be weeded mechanically. In subsequent seasons, a selective herbicide will be used for weed control as needed.

Irrigation will be drastically reduced in season three and possibly eliminated depending on establishment of the native



grasses. Weekly mowing will be reduced to an annual mowing, saving 121 gallons of fuel annually.

The conversion of one acre of turf to native grasses saves 1.6 acre feet, or 521,600 gallons, of water – that is equal to five households’ water usage for a whole year. The conversion of 16.09 acres of turf to native grasses in 2025 will result in a savings of 25.81 AFY, or 8,411 gallons of water annually. The park properties where native grass conversion will take place are as follows:

PARK PROPERTIES Native Conversion	Proposed Conversion Acres	Proposed Conversion Sq Ft	Water Savings KGAL	Water Savings (Acre Feet)	Estimated Cost
Aurora Municipal Center	1.95	84,942	1019	3.13	\$29,250.00
Apache Mesa Park	0.48	20,909	251	0.77	\$7,200.00
Terrace Park	1.04	45,302	544	1.67	\$15,600.00
Norfolk Glen Greenbelt	3.24	141,134	1694	5.2	\$48,600.00
Village Green Greenbelt	1.28	55,757	669	2.05	\$19,200.00
Buckley Medians	8.1	352,836	4234	12.99	\$125,500.00
Total	16.09	700,880	8411	25.81	\$245,350.00

Please see the next page for maps showing the exact location of the turf conversion in each of the abovenamed parks.



Native grass after a turf conversion in Aurora.

Figure 2 – Park Properties with Native Grass Conversion



Conversion Process for Programmed Turf

The conversion for programmed turf will also be approached through phases to replace sections of cool-season bluegrass with warm season Bermuda grass. A full irrigation audit will be performed to maximize efficiency. Existing bluegrass will be mechanically stripped to a depth of ½ inch. The existing soil will be leveled and amendments added as needed. Then the area will be replaced with warm season Bermuda grass sod and watered to establishment.

The conversion of one acre of Kentucky bluegrass turf to Bermuda grass will save approximately 1.2 acre-feet of water, or more than 390,000 gallons. Bermuda grass also has the ability to recover better during the growing months. Its ability to spread laterally allows for it to fill in voided areas naturally, without the expense of labor and additional water for seeding in areas that are worn down. The conversion of 7.09 acres of turf to Bermuda grass will save 5.69 AFY, or 1,854 gallons of water annually.

The park properties where this Bermuda grass conversion will take place are as follows:

PARK PROPERTIES Bermuda Conversion	Conversion Acres	Proposed Conversion Sq Ft	Water Savings KGAL	Water Savings (Acre Feet)	Estimated Cost
Aurora Municipal Center	2.03	88,427	531	1.63	\$260,860.00
Soccer Skills Field #2	0.81	35,284	212	0.65	\$104,086.62
Parklane Park	4.25	185,130	1111	3.41	\$546,133.50
Total	7.09	308,841	1854	5.69	\$911,080.12



Soccer fields in Aurora. Soccer is a very popular sport in the city. Fields replaced with Bermuda grass will need less water to maintain.

Figure 3 – Parks with Bermuda Grass Conversions



Monitoring and Evaluation:

A monitoring framework will be established to assess the effectiveness of the conversion. Regular evaluations will inform adaptive management strategies for ongoing success.

Hydroelectric Energy Recovery Component

The second component of the Project will involve installing a hydroelectric generation unit in an existing water pipeline within the City of Aurora’s distribution system. Each year, thousands of kilowatt-hours of potential energy remain untapped at locations where AW has Pressure Reducing Valves (PRV). Instead of wasting this potential energy, the new hydroelectric generation unit, the PRV Hydro System, recovers most of it and converts it into electricity.

The Hydroelectric implementation is a pilot project that we hope to complete next year. Our team has been working diligently to get data that would assure a successful outcome in order to get this project approved. After the research and planning we have finally received approval; however, with it being an unforeseen expense we are lacking full funding. This grant will give us the necessary funding to get our Hydroelectric pump system fully integrated as part of Aurora Water, in hopes to make it the first of its kind. This grant will give us the opportunity to fully fund this project and hopefully make it the first of many.

The funds requested for this project shall be used for engineering design, equipment procurement and installation of the proposed hydroelectric generation system.

Background Information

Aurora Water is a vital lifeline for the city of Aurora, Colorado, consistently delivering clean and sustainable water to its over 380,000 residents. Aurora’s water supply is derived from the Colorado, Arkansas and South Platte river basins and stored at its five strategically located reservoirs, which boast a combined storage capacity of 50 billion gallons and act as water banks for those residents. These include Cherry Creek, Barr Lake, Aurora Reservoir, Stanley Lake, and

Quincy Reservoirs, ensuring consistent access even during dry periods. Over 2,500 miles of pipelines weave through the city, delivering water to homes, businesses, and vital services.

The Hydroelectric Energy Recovery Project site is supplied by a 24-inch steel water pipeline that

Figure 4 - Existing PRV at 743 Gun Club Road site



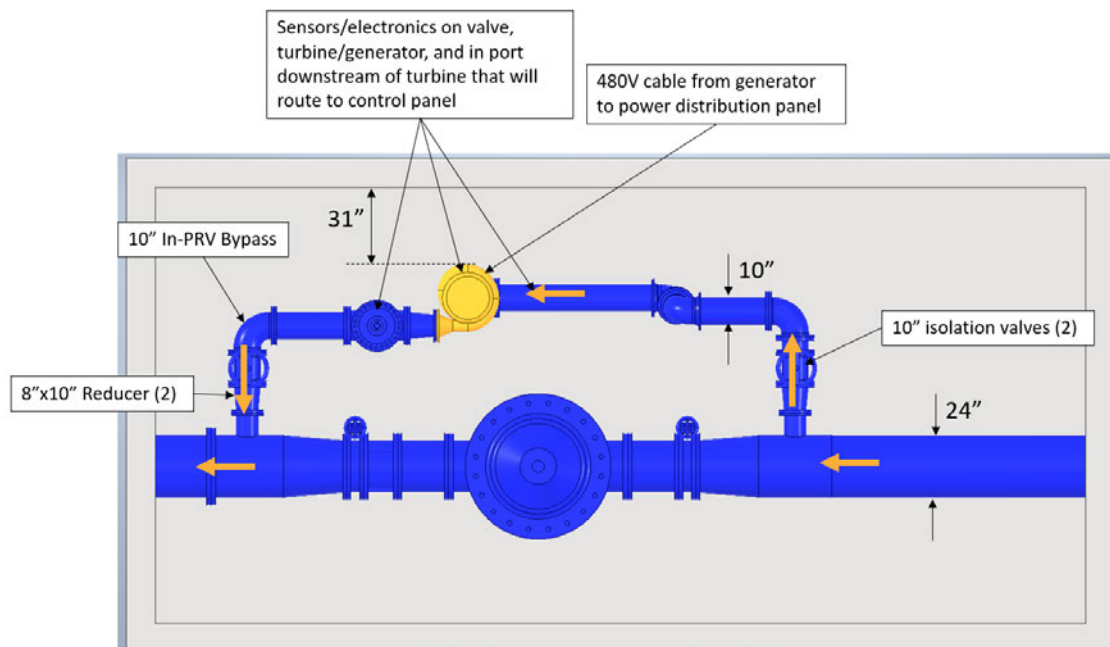
runs six miles from the City of Aurora's Binney Water Purification Plant, which has a treatment capacity of 50 MGD and is fed by water stored at the adjacent Aurora Reservoir.

The City of Aurora's current water distribution system at 743 Gun Club Road contains an existing pressure reducing valve (PRV) (see Figure 4). The hydraulics at the PRV valve are as follows:

- Average flow (cfs): 6
- Average pressure input: 100
- Average pressure output: 50

The proposed project consists of the installation of a redundant PRV system comprised of a hydroelectric turbine that recovers otherwise lost energy through a normal PRV system into electricity. This project will utilize the bypass around the existing pressure reducing valve (see Figure 5) to flow through a hydroelectric power generation system supplied by InPipe Energy.

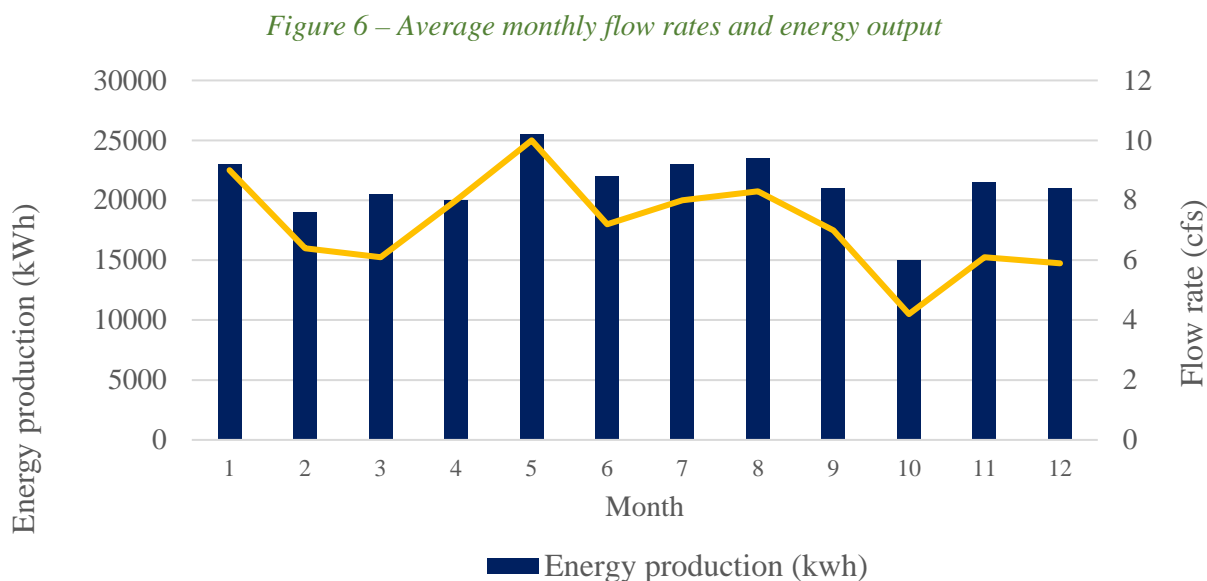
Figure 5 – Proposed Project Layout



This system combines automated software controls and off-the-shelf hardware components (pipes, valves, turbines, and sensors) that work in tandem with the existing flow control valve to accurately manage pressure in the water pipeline and convert excess pressure into hydroelectricity.

InPipe Energy was selected through a competitive bidding process. Decisions were based on its technical knowledge and experience carrying out similar projects around the United States. This company also understands the security risks associated with installation involving SCADA, minimization of water delivery disruptions, and understands AW's level of services for customers.

InPipe Energy's In-PRV includes a digitally enabled control valve that serves as both a pressure recovery valve and a renewable energy generator. This energy recovery valve accurately replicates the functionality of a pressure recovery valve while tapping otherwise wasted energy (vented pressure) to produce carbon-free, renewable energy. The In-PRV selected for this project is rated for 56kW, producing an estimated 255,000 kWh of electricity per year. These values are based on the available head and flow rate through the pipeline. Figure 6 shows the projected energy generation based on the flow forecast.



The In-PRV uses proven hardware components (pipes, valves, turbines, generators and sensors), a proprietary software-based control system with sensors and a 480V 3 phase power distribution cabinet with industry-standard lifecycle expectations.

The proposed Hydroelectric Energy Recovery Project is to be operated automatically based on available pressure and flow (customer demand). Existing water transfer will not be disrupted, but rather through the proposed project or through the existing conduit (existing pressure reducing valve (PRV)). The project will be sited in an existing 15 foot by 32-foot vault. The project is composed of compatible intake and discharge pipes, a single turbine generating unit, control

valves and sensors and meter. The control device will be housed in an appropriate electrical box. The project will be installed in a bypass adjacent to the existing pressure reducing valve.

The system is designed to comply with all utility parallel interconnection rules including power outage protection and auto shut off.

The unit will be controlled by a programmable logic controller. The provided control system is self-contained, including all controllers, relays, ancillary PFCCs and a PLC system. It will be connected to the city's communication system using Modbus TCP Ethernet or Ethernet I/P protocols.

Figures 7 and 8 show a proposed design for the In-PRV in a 10" bypass and 3D representation of the system.

Figure 7- A proposed design for the In-PRV in a 10" bypass

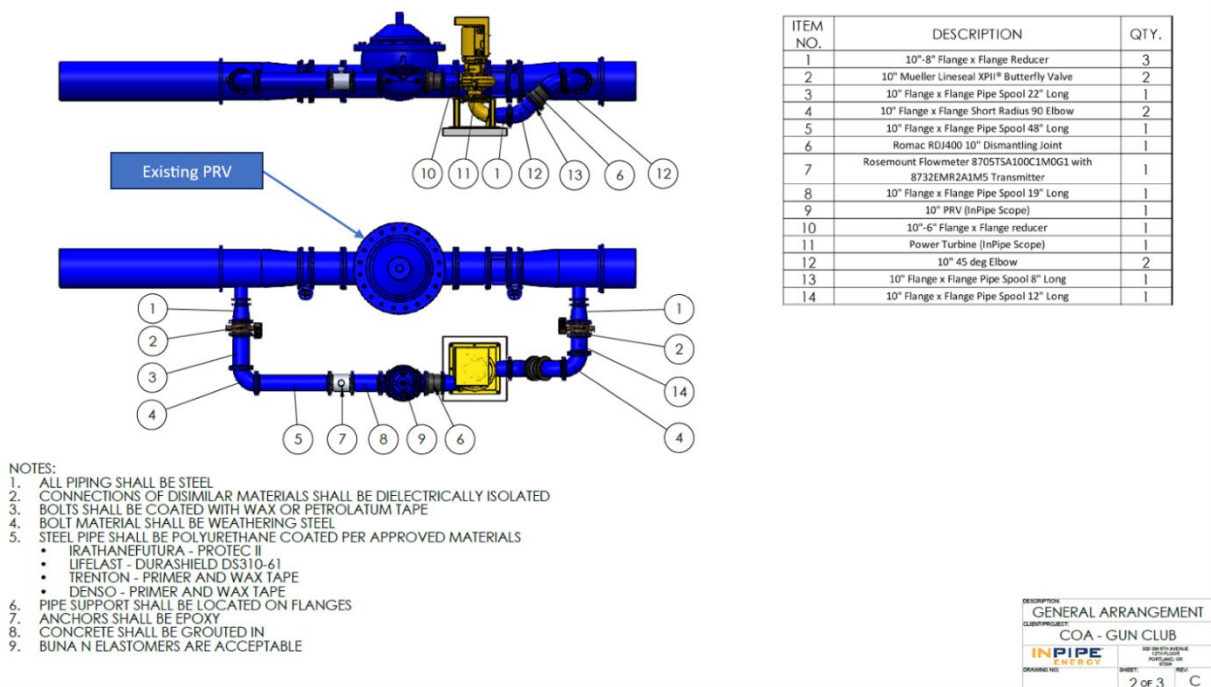
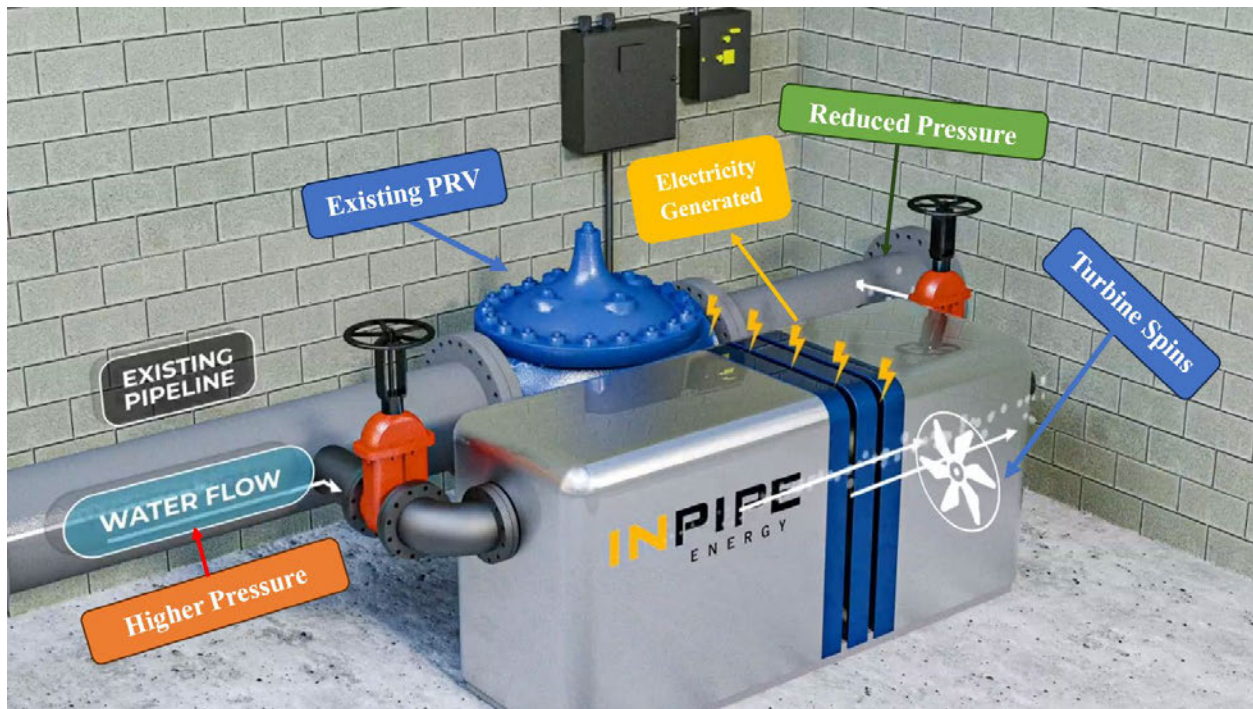


Figure 8 – 3D representation of the system



Product features, capabilities and sub-systems include:

- A hydro turbine with UL-tested induction generator
- PRV valves with electronic solenoid control and pressure transmitter
- A self-contained custom control panel (controllers, relays, ancillary PFCCs and a PCL system) that can be connected to an existing SCADA communication (*It will be connected to the city's communication system using Modbus TCP Ethernet or Ethernet I/P protocols.*)
- Manual isolation valves, visual position indicators
- Constant flow monitoring (+/- 2% accuracy, NIST traceable)
- Automated alarms for flow interruptions, safety measures, and maintenance checks
- Programmable logic controller (PLC) processors, which consolidate control of each In-PRV unit
- Power outage protection
- Automated safe shutoff and restart adhering to IEEE 1574
- 56 kW nameplate capacity

Project Activities

The project will be conducted in the following steps:

- Engineering design;
- Regulatory filings and permitting;
- Product installation;
- Interconnection and Commissioning.

Engineering Design, Regulatory Filings and Permitting

InPipe Energy, with input and oversight by the City of Aurora, shall develop the product design on a turnkey basis. Specific design activities and project deliverables include design proposals, regularly scheduled technical meetings, and contractor procurement. InPipe Energy will develop and present design proposals to the City of Aurora in multiple stages. The proposed design alternatives will be reviewed by the water district and modified according to the review. This collaboration will be achieved through regularly scheduled technical meetings.

Regulatory applications and exemptions are ongoing throughout the engineering design (See Section 8: Required Permits and Approvals).

The facility boundary is confined to the existing vault area, where a functional PRV already exists. The new hydroelectric facility will operate and function similarly to the existing facility, incurring no additional environmental or operational impacts. The vegetative cover around the existing vault area is and will continue to be maintained by the City of Aurora, which oversees facilities and landscaping at the Gun Club PRV site.

Product Installation

The conduit hydroelectric system will be assembled on-site and connected with the City of Aurora's water pipeline utilizing the existing bypass. Power and control conduit is run from the site to the electrical cabinets located above the vault. The control system and grid interconnection boxes will be located alongside the meter it is feeding into.

Installation of the In-PRV System includes three components: the In-PRV, a Control Panel and a Power Distribution Panel. The existing single-phase transformer at the site will be upgraded to 480V 3 phase.

Installation Project Scope

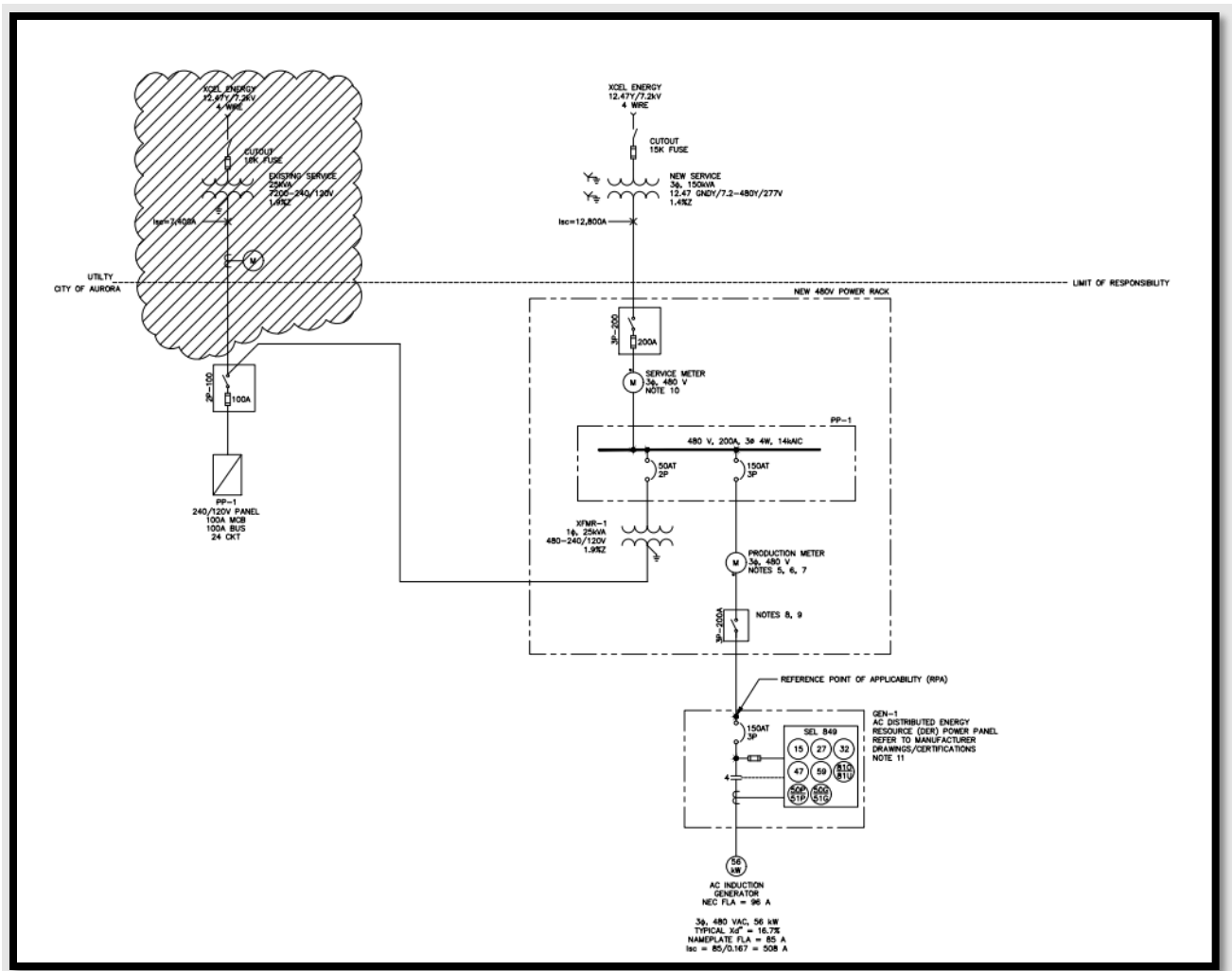
- Removal of existing 8" bypass, valves, piping and apertures.
- Installation of a 10" bypass
- Installation of the In-PRV assembly, valves and piping
- Installation of the In-PRV control panel
- Connection to the grid from the In-PRV power distribution panel and all other necessary wiring connections
- Installation of a new transformer (upgrade to 480V 3 phase)
- Replace and upgrade the current meter
- Apply and manage net metering application
- Apply in collaboration with the City of Aurora for relevant grants
- Provide site specific plans, including one-line (electrical) and panel
- Construction assistance will be required during installation to ensure facilities are installed as intended by InPipe Energy and the City of Aurora

The installation will comply with all rules governing electric utility parallel interconnection, including power outage protection and auto shut off and restart. The In-PRV has a single microprocessor multifunction relay, and the main trip functions are backed up with a dissimilar yet equal trip function.

Interconnection and Commissioning

Start-up and commission will be managed by InPipe Energy. Once fully installed, the hydroelectric system is energized by allowing water flow through the system. The turbine generates power which is regulated by the power equipment. The power electronics layout is reflected in the Figure 9 one-line diagram. This diagram is ultimately part of the utility interconnection agreement and adheres to the safety regulations laid out in IEEE 1547 [Standard for Interconnection of Distributed Energy Resources].

Figure 9 – Power Electronics Layout



Evaluation Criteria

Evaluation Criterion A—Quantifiable Water Savings

1) Describe the amount of estimated water savings.

The conversion of cool-season bluegrass to warm season native grasses and turfgrass on 23.18 acres in eight City parks will save 31.5 acre feet of water annually (AFY).

2) Describe current losses. Explain where current losses are going. If known, please explain how current losses are being used. Are there any known benefits associated with where the current losses are going?

The current annual consumptive rate for the acreage in this Project is approximately 18 gallons per square foot. The only current benefits associated with the irrigation water currently used are for aesthetic purposes for maintaining the park properties and medians. The same areas will be maintained at the same or better levels of aesthetics and recreational use, with significantly less water usage.

3) Describe the support/documentation of estimated water savings – turf removal specific.

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

Annual water savings (WS) estimates are a calculated difference between existing water use (EU), collected through the use of metering, and estimated target water use for the proposed surface type (TU) replacement multiplied by the square footage of the conversion area (SF), this is then divided by 1000 to convert to KGAL and finally is multiplied by the current water rate (\$).

$$WS = [(EU-TU)*SF) / 1000]*(\$)$$

Target Water Use Assumptions

Tahoma 31®: 12 GPSF

Irrigated Native*: 6 GPSF

Note: Native grass stands in urban areas may face disruptions to natural water cycles due to factors like pavement, buildings, and altered drainage patterns. In these situations, periodic watering might be necessary to compensate for the lack of natural water sources.

b. What is the total surface area of turf to be removed and what is the estimated average annual turf consumptive use rate per unit area?

The total surface area of turf to be removed is 23.18 acres or 1,009,720.8 square feet. The annual consumptive rate for this acreage is approximately 18 gallons per square foot.

c. Was historical water consumption data evaluated to estimate average annual turf consumptive use per unit area? If so, did the evaluation include a weather adjustment component?

Historical water consumption data was scrutinized to gauge the average annual turf consumption, although the current estimates do not incorporate adjustments for weather variations.

d. Will site audits be performed before applicants are accepted into the program?

Historical water consumption data serves as the foundation for pinpointing crucial target locations, which are subsequently assessed through audits focusing on turf utilization, the effectiveness of existing irrigation systems, and the suitability of surfacing types. These target zones encompass areas characterized by excessive water usage, ineffective irrigation practices, and non-functional turf sections.

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

Actual water savings will be confirmed through the examination of monthly and annual consumption data.

Evaluation Criterion B—Renewable Energy

Subcriterion B.1—Implementing Renewable Energy Projects Related to Water Management and Delivery

Describe the amount of energy capacity.

The hydraulics at the PRV valve are as follows:

- Average flow (cfs): 6
- Average pressure input: 100
- Average pressure output: 50

The capacity for the proposed hydroelectric generator shall be 56 Kilowatts nameplate. This is based on the available head and flow rate through the pipeline.

Describe the amount of energy generated.

The hydraulics at the PRV valve are as follows:

- Average flow (cfs): 6
- Average pressure input: 100
- Average pressure output: 50

The proposed project shall have a capacity of 56 kilowatts (kW) based on an analysis performed using the past year of system pressure and flow data for the project location. The annual production will be 255,000 kilowatt-hours (kWh). Based on a minimum expected operating life, the proposed project will produce over 7,650,000 kWh over 30 yrs.

Describe the status of a mothballed hydropower plant.

N/A

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

The energy produced by this system is entirely derived from renewable sources. The annual generation of 255,000 kWh is intended to replace the grid-powered energy consumption of the site. However, due to site limitations, only 10% of the anticipated renewable energy output can be utilized locally, with the remaining 90% allocated to offset the electrical consumption of the Aurora Water pump station (Prairie Waters Pump Station #3).

According to the Greenhouse Gas Equivalencies Calculator provided by EPA.GOV, the annual avoidance of 255,000 kWh translates to a reduction of 178 metric tons of carbon dioxide (CO₂). This underscores the significant environmental impact and contribution to sustainability achieved by this renewable energy initiative.

Expected environmental benefits of the renewable energy system.

According to the Greenhouse Gas Equivalencies Calculator provided by EPA.GOV, the annual avoidance of 255,000 kWh equates to a reduction of 178 metric tons of carbon dioxide (CO₂). To put this into perspective, it's equivalent to the emissions from 39.6 gasoline-powered passenger vehicles driven for one year, the consumption of 20,045 gallons of gasoline, the burning of 199,545 pounds of coal, and the electricity use of 34.7 homes for one year. This comparison vividly illustrates the positive environmental impact and diverse benefits of the renewable energy initiative.

Expected water needs, if any, of the system.

There are no expected water needs of the system.

The primary benefit of the Hydroelectric Energy Recovery Project is Implementing Hydropower in the City of Aurora. This project shall utilize a high potential method of capturing the significant hydroelectric generating potential in pressurized water systems, which are common but remain largely untapped in terms of energy generation, throughout the Western US and the territories supplied and supported by Bureau of Reclamation projects.

The proposed Project shall have a capacity of 56 kilowatts (kW) based on an analysis performed using the past year of system pressure and flow data for the project location. The annual production will be 255,000 kilowatt-hours (kWh). Based on a minimum expected operating life, the proposed project will produce over 7,650,000 kWh over 30 yrs. See Figure 6 (page 21) for a summary of the energy production calculated using the City of Aurora's pressure and flow data.

The energy generated by the proposed project shall contribute to reducing the operating costs of operating pumps at various pumping facilities utilized by the city. The capability to use wasted excess pressure to power pumps shall improve the resiliency of the City of Aurora's water distribution system.

Evaluation Criterion C—Other Project Benefits

Resilience, Sustainability, Ecological and Climate Benefits

Aurora Water is the state leader in innovative water solutions. We must be. Aurora is the third largest city in Colorado, yet it's not located by a major water source. To plan for the current and future water needs for the city, Aurora Water takes a proactive, integrated approach to the planning and execution of water management and water-related capital improvement projects. Aurora Water's innovative water solutions can also be seen in our strong history of water reuse and water conservation, which are important aspects of how we plan for now and into the future.

Colorado is also a drought-prone state. Drought conditions have continued to cause more frequent wildfires in the mountains, impacting water quality and quantity and causing post-fire that reduces existing water storage capacity. In fact, seven of the 10 largest wildfires in Colorado history have occurred in the last decade. This frequent occurrence has resulted in increased difficulty in acquiring water and led to increased costs for treatment, which are especially critical during the drought years when wildfires occur.

Aurora Water receives approximately 50 percent of its water supplies from the Colorado and Arkansas River basins combined, which have been prone to wildfire conditions and are experiencing additional severe drought conditions. According to the U.S. Drought Monitor, "Since 2000, the Colorado River basin has been experiencing a historic, extended drought that has impacted regional water supply and other resources, such as hydropower, recreation, and ecological goods and services." This Project would help with our community's resilience and sustainability efforts to address the challenges related to drought conditions.

The two components of this Project will help address these challenges in many ways. By reducing the need for water in city-managed parks and municipal areas, the turf conversion

component will lower the amount of water used by the City of Aurora to maintain its parks, recreation facilities and open spaces.



The selection of plant material more suitable to the Colorado Front Range will also provide improved resilience of the landscape to local climate conditions. The introduction of native grasses fosters a healthier ecosystem by providing habitat and sustenance

for local wildlife. This will contribute to the overall biodiversity of the park, promoting a balanced and resilient environment, and lead to increased biodiversity and habitat quality for local flora and fauna.

The reduction in mowing created by the turf replacement will also avoid the release of 1.1 metric tons (MT) of carbon dioxide equivalent (MTCO₂e) annually.

Further, these projects will help serve as a model for local businesses and residents, who will be encouraged to convert their own landscapes, further lowering the area's water consumption and mowing-related greenhouse gas emissions. Utilizing Aurora Parks' success as a demonstration for achievable results will enhance community awareness and involvement in sustainable practices. It will also create opportunities for community members to actively participate in the conversion process through volunteer programs, fostering a sense of ownership and pride in the park's transformation. This will create additional opportunities for stakeholder engagement, involving Park visitors, local residents, and relevant community organizations in the decision-making process.

Finally, the water savings can be used for other programming and projects by the Parks, Recreation and Open Spaces Department. By undertaking this project, we envision a greener, more sustainable park that serves as a model for responsible environmental management, setting the stage for future conservation initiatives in urban green spaces.

The implementation of the new hydroelectric generation system will add redundancy to AW's PRV system, reducing water waste and providing an added level of service for Aurora residents in the event of primary PRV failure. The newly added hydro PRV would serve as the primary feed for water transmission, effectively extending the useful life of the existing PRV.

An In-PRV system, like the one proposed, is expected to have a useful life of more than 30 years and is projected to save AW over \$500,000 in energy costs over the system's lifespan. These savings directly enable AW to invest resources in addressing failing water infrastructure throughout the system.

The energy generated by the proposed project shall contribute to reducing the operating costs of operating pumps at various pumping facilities utilized by the city. The capability to use wasted excess pressure to power pumps will improve the resiliency of the City of Aurora's water distribution system.

The new hydroelectric generation unit will recover 229,500 kWh per year and will also avoid the release of 163 metric tons (MT) of carbon dioxide equivalent (MTCO₂e) annually, helping to improve the City's carbon footprint for the future.

Evaluation Criterion D—Disadvantaged Communities, Insular Areas, and Tribal Benefits

Subcriterion D.1. Disadvantaged Communities

Aurora is a diverse and growing community. In the 2020 Census, Aurora recorded a population of 386,261, up nearly 20% from 2010. In 2022, the population was estimated to be more than 393,000 and comprised of more than 45% non-white residents.

Table 2 - Aurora and Colorado Demographic Information

Race and Hispanic Origin	Aurora city, Colorado		Colorado
White alone, percent	52.2%		86.2%
Black or African American alone, percent	16.6%		4.7%
American Indian and Alaska Native alone, percent	1.1%		1.7%
Asian alone, percent	6.0%		3.8%
Native Hawaiian and Other Pacific Islander alone, percent	0.3%		0.2%
Two or More Races, percent	13.3%		3.4%
Hispanic or Latino, percent	29.7%		22.5%
White alone, not Hispanic or Latino, percent	42.8%		66.5%
Age			
Persons under 18 years, percent	24.2%		20.8%
Population Characteristics			
Foreign born persons, percent, 2018-2022	21.0%		9.5%

Source: U.S. Census 2022 American Community Survey 5-Year Estimates

Nearly a third of the city’s residents identify as Hispanic or Latino, and 21% are foreign-born. Approximately 32% speak a language other than English at home. According to the Aurora Planning Department, using data from the Census Bureau, the City’s largest foreign-born populations come from Latin American and Asia, with approximately half of foreign-born residents from Latin America and just under a quarter from Asia. Most residents that can speak a language other than English either speak Spanish or Asian and Pacific Islander languages. Aurora is considered the first in Colorado for immigrant and refugee support and the local workforce are comprised of almost 25% immigrants. In addition, the City of Aurora has a demonstrated commitment to accepting and welcoming immigrants and refugees. Aurora has been ranked No. 1 overall in Colorado on the New American Economy Cities Index for its commitment to support its immigrant population. Aurora approved the “Immigrant Integration Plan,” that includes 12 stated goal areas, including promoting healthy lifestyles and housing to the immigrant and refugee population.

Nearly a quarter of Aurora’s population is under 18 years old; 24.2% according to the 2022 Census American Community Survey estimates, compared to 20.8% for the state of Colorado. Just over 16% of children under 18 live in poverty, compared to 10% of adults and 6.5% of seniors. This makes accessibility to parks and recreation even more critical for Aurora, and the water and cost savings that the turf replacement will provide will help the City allocate its limited resources to other parks and recreation improvements in the future.

The City of Aurora meets the definition in Section 1015 of the Cooperative Watershed Act as a community with a median household income that is less than 100 percent of the statewide annual median household income. The city's median household income is \$78,685, compared to the state of Colorado at \$87,598 (source: US Census Bureau, 2018-2022 figures in 2022 dollars, American Community Survey).

The City's per capita income is \$38,047, compared to Colorado's \$47,346. The City's poverty rate is 10.5%, and slightly more than 13% of residents over the age of 25 do not have a high school diploma, compared to 7.5% of Coloradans as a whole.

The hydroelectric project proposed in this application will benefit the City of Aurora as a whole, helping to reduce water costs and allowing additional investment in the water system.

While the water, cost and GHG savings from the turf replacement will also provide city-wide benefits, the following locations slated for turf replacement are located in disadvantaged census tracts as defined by the Climate and Economic Justice Screening Tool (CEJST).

Table 3 – Park Property Designation by Census Tract

PARK PROPERTIES Bermuda Conversion	Conversion Acres	Census Tract Number	Identified as disadvantaged?
Aurora Municipal Center	2.03	8005081000	YES
Soccer Skills Field #2	0.81	8005081600	NO
Parklane Park	4.25	8001008309	YES
PARK PROPERTIES Native Conversion	Proposed Conversion Acres	Census Tract Number	Identified as disadvantaged?
Aurora Municipal Center	1.95	8005081000	YES
Apache Mesa Park	0.48	8005081900	YES
Terrace Park	1.04	8001008353	NO
Norfolk Glen Greenbelt	3.24	8001008309	YES
Village Green Greenbelt	1.28	8005081300	NO
Buckley Medians	8.1	Multiple	YES & NO



Aurora Municipal Center

The **Aurora Municipal Center**, which will have a number of turf conversions, is located in a census tract that faces a number of climate, economic justice and socioeconomic burdens. The area is in the 86th percentile for low income residents (people in households where income is less than or equal to twice the federal poverty level), as well as facing both climate change burdens (90th percentile for expected building loss rate) and housing cost burden (97th percental for share of households making less than 80% of the area median family income and spending more than 30% of income on housing). The tract is also in the 93rd percentile for linguistic isolation (share of households where no one over age 14 speaks English very well) while 23% of people ages 25 years or older have less than a high school diploma.

Apache Mesa Park is also located in a disadvantaged census tract. The 3-acre park features a playground, two sets of tot swings and a restroom. The census tract in which the park is located has four identified burdens: it is in the 90th percentile for expected building loss rate, housing cost and transportation barriers, along with the 81st percentile for low-income households. It is also in the 90th percentile for low median income and 24% of the population over 25 years old does not have a high school diploma.

The **Buckley Medians** project stretches along a long length of South Buckley Road. Much of the area is not in a disadvantaged census tract, but one section – near E Iliff Avenue – is in census tract 08005082400, which is considered disadvantaged due to the expected building loss rate (90th percentile) and low-income households (72nd percentile).



CEJST Screening:
Aurora Municipal Center
*Climate or Economic Justice Burden and
 Associated Socioeconomic Threshold*

Climate Change Burden
Expected Building Loss Rate:
90th percentile
*Economic loss to building value resulting from
 natural hazards each year
 and*

Housing Burden
Housing Cost: 97th Percentile
*Share of households making less than 80% of
 the area median family income and spending
 more than 30% of income on housing
 and*

Low Income: 86th percentile

Workforce Development Burden
Linguistic Isolation: 93rd percentile
*Share of households where no one over age
 14 speaks English very well
 and*

High School Education: 23%
*Percent of people ages 25 years or older
 whose high school education is less than a
 high school diploma*

CEJST Screening:
Apache Mesa Park

Climate Change Burden
Expected Building Loss Rate:
90th percentile
and

Housing Burden
Housing Cost: 90th Percentile
and

Transportation Burden
**Transportation barriers: 90th
 Percentile**
*Average of relative cost and time spent
 on transportation
 and*

Low Income: 81st percentile

Workforce Development Burden
**Low Median Income: 90th
 Percentile**
*Comparison of median income in the
 tract to median incomes in the area*

Parklane Park is also located in a disadvantaged census tract. The 4.2 acre-park offers a picnic shelter, outdoor pool and access to Sand Creek Greenway Trail to local residents. However, according to the CEJST, the area is burdened with legacy pollution due to its proximity to Risk Management Plan (RMP) facilities and the traffic proximity and volume. The area is also in the 71st percentile for low-income households.

Norfolk Glen Greenbelt is in a disadvantaged census tract with a high legacy pollution burden (proximity to RMP facilities - 95th percentile) and a high percentage of low-income households (81st percentile), as well as high linguistic isolation (95th percentile) and a high level of residents without a high school diploma (28%).

CEJST Screening:
Parklane Park

Legacy Pollution Burden
Proximity to Risk Management Plan facilities: 90th percentile
Count of Risk Management Plan (RMP) facilities within 5 kilometers
and
Transportation Burden
Traffic proximity and volume: 93rd Percentile
Count of vehicles at major roads within 500 meters
and
Low Income: 71st percentile

CEJST Screening:
Norfolk Glen Greenbelt

Legacy Pollution Burden
Proximity to RMP facilities: 95th percentile
And **Low Income: 81st percentile**

Workforce Development Burden
Linguistic Isolation: 95th percentile
And **High School Education: 28%**

CEJST Screening:
Buckley Medians

(Census tract 08005082400 only)

Climate Change Burden
Expected Building Loss Rate: 90th percentile
and
Low Income: 72nd percentile

Evaluation Criterion E—Complementing On-Farm Irrigation Improvements

Not applicable.

Evaluation Criterion F—Readiness to Proceed

The City of Aurora is ready to proceed with both components of this Project. Please see below a task breakdown, permit summary, engineering and design description, and project schedule for each component.

Sustainable Turf Conversion

Current Status

The parks and open spaces, along with the areas within the parks targeted for turf replacement, have been selected by Aurora Parks staff. The exact plant species for each site will be determined based on the site assessment.

Major Tasks

Site Assessment: Conduct a comprehensive analysis of the park's current turf conditions, soil composition, and water usage patterns.

Species Selection: Identify and select native grass species that are well-suited to the park's specific ecosystem.

Conversion process for non-programmed turf:

- Implement a phased approach to replace sections of cool-season bluegrass with native grasses. This will involve soil preparation, seeding, and careful monitoring of the transition process.
- The irrigation systems will be audited to ensure efficient coverage of the water.
- Existing cool season grass will be sprayed with a non-selective herbicide when soil temperatures are optimal for cool season turf growth. The areas will then be drill seeded at 30 pounds per acre of a warm season blend of native grasses.
- The seed will be watered at appropriate intervals until established.
- For the first season, the treated areas will be weeded mechanically. In subsequent seasons, a selective herbicide will be used for weed control as needed.
- Irrigation will be drastically reduced in season three and possibly eliminated depending on establishment of the native grasses.
- Weekly mowing will be reduced to an annual mowing, saving 121 gallons of fuel annually.

Conversion process for programmed turf:

- Implement a phased approach to replace sections of cool-season bluegrass with warm season Bermuda grass.
- A full irrigation audit will be performed to maximize efficiency.
- Mechanically strip existing bluegrass to a depth of ½ inch.
- Level existing soil and add amendments as needed.
- Replace with warm season Bermuda grass sod.
- Water to establishment.

Monitoring and Evaluation: Establish a monitoring framework to assess the effectiveness of the conversion. Regular evaluations will inform adaptive management strategies for ongoing success.

Permits and Policies

The turf replacement project does not require any local or federal permits since the work will be conducted entirely on city-owned existing parks, recreation and municipal facilities.

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

Project Schedule

The conversions will begin in May 2025, when the soil temperature is favorable with soil preparation and planting and will continue the following summer. There will be a period of grow-in and weed control for the first year. The project will commence in September 2026 with full establishment.

Project Administration, including contractor selection process	January 2025 – May 2025
Conversion prep and execution	May 2025 – November 2025
Establishment, reseeding and weed control	December 2025 – September 2026

Hydroelectric Energy Recovery Component

Current Status

The City of Aurora has already begun project administration and the design builder contracting for the Hydroelectric Energy Recovery Project. The city has selected an equipment supplier, who has performed a site visit and performed a hydraulic analysis. The findings indicate that the infrastructure layout is highly suitable for the proposed project given the pre-plumbed bypass, space availability and the ability to interconnect electrically to the grid.

Major Tasks

The project will be conducted in the following steps:

- Engineering design;
- Regulatory filings and permitting;
- Product installation;
- Interconnection and Commissioning.

Engineering Design: InPipe Energy with input and oversight by the City of Aurora shall develop the product design on a turnkey basis. Specific design activities and project deliverables include design proposals, regularly scheduled technical meetings, and contractor procurement. Deliverables include engineering designs for the piping layout, hydrokinetic generations system and electrical/controls.

Regulatory filings and permitting: Regulatory applications and exemptions are ongoing throughout the engineering design.

Product Installation: Installation of the In-PRV System includes three components: the In-PRV, a Control Panel and a Power Distribution Panel. The existing single-phase transformer at the site will be upgraded to 480V 3 phase. The product installation includes mobilization, prep, equipment installation, and the electrical and controls installation and configuration. The Scope of Work includes the following:

- Removal of existing 8" by-pass, valves, piping and apertures.
- Installation of a 10" by-pass
- Installation of the In-PRV assembly, valves and piping
- Installation of the In-PRV control panel
- Connection to the grid from the In-PRV power distribution panel and all other necessary wiring connections
- Installation of a new transformer (upgrade to 480V 3 phase)
- Replace and upgrade the current meter
- Apply and manage net metering application
- Provide site specific plans, including one-line (electrical) and panel
- Construction assistance will be required during installation to ensure facilities are installed as intended by InPipe Energy and the City of Aurora

Interconnection and Commissioning: Once fully installed, the hydroelectric system is energized by allowing water flow through the system. The turbine generates power which is regulated by the power equipment. Start-up and commission will be managed by InPipe Energy.

Permits and Policies

As described on page 33, *Required Approvals and Permits*, the proposed project benefits from multiple favorable elements in terms of permits and approvals. As a conduit hydro project in a municipal water system, the project qualifies for highly favorable exemptions from both the FERC and State environmental review processes. Plan approvals can be conducted by the City of Aurora itself. Please see page 33 for specific permitting details.

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

Project Schedule

The general project timeline for the Hydroelectric Energy Recovery Project is as follows:

Project Administration	January 2022 – December 2025
Design-Builder Contracting	January 2022 – December 2025
Construction Implementation	January 2025 – December 2025

Purchasing and Procedures

The Project, including both components, will follow all purchasing and bidding requirements required by the City of Aurora and state of Colorado and managed by the Office of Purchasing Services. It is the stated mission of the Office of Purchasing Services to bring the “best value” to the city of Aurora by acquiring quality goods, services, and construction at a fair price through contracts with commercial sources. The City also follows the Small Business Enterprise Program for contracts over \$250,000 that requires large businesses make a good faith effort to award no less than 10 percent of their subcontracting dollars to Small Business Enterprises and to document their effort.

Evaluation Criterion G—Collaboration

Please describe how the project promotes and encourages collaboration.

Water conservation is extremely important to residents in our area. The City of Aurora is dedicated to making necessary improvements to preserve this important resource for generations to come. The projects outlined in this application were designed to benefit multiple sectors within our city, including environmental, recreational and municipal.

Both components of the Project have widespread support internally among all stakeholders, as they not only result in significant water and cost savings, but also align with the City's overarching goal of reducing greenhouse gas emissions.

The sustainable turf transformation component of this Project was developed in collaboration with the Aurora Parks, Recreation and Open Space (PROS) Department, and we will continue to work closely with this department to enhance water conservation efforts. PROS Department staff will conduct a comprehensive analysis of the park's current turf conditions, soil composition, and water usage patterns. Using this information, staff will identify and select native grass species that are well-suited to the park's specific ecosystem and usage.



Signage at project sites will help encourage residents and businesses to consider water-wise landscaping.

The turf conversion project will help encourage Aurora businesses and residents to undertake similar improvements for their properties. Through added signage, social media posts and communication on the city website, we expect the success of this Project to inspire local residents and businesses.

Aurora Water offers a variety of resources to property owners interested in converting their traditional turf lawns to water-wise landscaping. Aurora's WaterWise website offers an array of resources and

information to local property owners. Aurora Water also offers free water-wise landscape designs by a professional designer, classes on water-wise landscaping, and a water-wise plant list with more than 400 species of plants.

The City also offers incentives to property owners. Aurora Water's Grass Replacement Incentive Program (GRIP) incentivizes the conversion of water-guzzling turf lawns to water-wise landscapes through a rebate of up to \$4,000 for residential projects that convert existing, maintained Kentucky blue-grass yards to plant-based, water-wise or native grass landscapes. The City also works with commercial and large property owners, including homeowners' associations, on larger projects through agreements that create new permanent water allocation agreements based on the needs of the property's landscape type. These agreements allow Aurora Water to approve larger rebates while holding the property responsible for meeting water efficiency standards or otherwise gradually reimbursing the rebate funds. In addition, the City's GreatScapes program offers income-qualified residents a free water-wise landscape replacement.

Seeing the success of the park conversion projects will help prompt others to take advantage of the support and resources offered by the City to undertake similar projects at their own home or business.

The Hydroelectric Energy Recovery component will be carried out in partnership with Xcel Energy and InPipe Energy. Each were selected based on their knowledge of water and energy conservation methods and proven track record of carrying out similar projects around the United States.

Xcel Energy supported Aurora Water through the Partners in Energy Program to implement an Energy Master Plan in 2023 that thoroughly evaluated all energy efficiency and renewable energy initiatives within the utility. Collaborating closely, Xcel Energy assisted Aurora Water in conducting



A home in Aurora with water-wise landscaping.

audits of various facilities, identifying potential energy efficiency measures, and exploring renewable energy options. The proposed project is a key outcome of these efforts, representing a significant renewable energy opportunity aimed at reducing energy costs and mitigating greenhouse gas emissions.

Furthermore, Xcel Energy proactively adapted its net-metering rules to enable Aurora Water and other entities to leverage virtual net-metering. This innovation allows entities to offset electrical consumption anywhere within the system by utilizing the renewable energy generated at specific sites. This strategic modification enhances flexibility and efficiency in sustainable energy practices. A production meter will be installed by Xcel Energy and the project will utilize Xcel Energy's interconnection process for virtual net metered distributed generation projects. The excess energy produced through this project will be credited by Xcel Energy to offset energy costs related to Aurora Water's Prairie Water Pump Station #3.

InPipe Energy will provide the In-PRV product that will allow Aurora Water to recover energy within the system into electricity. InPipe Energy will assist with engineering design, product installation, and ongoing assistance as needed. The following evaluation criteria was used to select InPipe Energy for the Project through a competitive bidding process:

<u>Criteria</u>	<u>Max Points</u> (80 points)
1. Team's methodology, approach and understanding of the project	20 points
2. Team's experience and past record of performance on similar projects, including past specific team experience	20 points
3. References and Past Performance	20 points
4. Grant writing experience for similar projects	20 Points

- 1. Team's methodology, approach, and understanding of the project:** Given the uniqueness of this project, AW needed a contractor that truly understands the needs, has a proven approach and methodology to help AW predict the outcome. This includes understanding the security risks associated with installation involving SCADA, minimization of water delivery disruptions, and understanding AW's level of services for customers.
- 2. Team's experience and past record of performance on similar projects,** including past specific team experience: AW evaluated all submitted proposals based on their experience with similar projects. InPipe Energy had completed several similar projects for other utilities around the United States and matched the RFP scope of work for AW. The other proponents had completed general Hydro Electric projects, including the generation of electricity from Dam output, but this project was very specific to a PRV valve.
- 3. References and past performance:** Similar to the team experience evaluated in Criteria #2 above, reference calls were made to the top-ranked firms to ensure their past performance was satisfactory.
- 4. Grant writing experience for similar projects:** AW anticipated applying for various grants, thus selecting a contractor with past grant writing experience would help AW with those application needs.

Evaluation Criterion H—Nexus to Reclamation

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

Aurora Water has an ongoing relationship with the BOR on several storage and exchange contracts. AW is in regular contact with the Pueblo BOR office regarding ongoing water storage issues. These include:

Pueblo Reservoir

In 2007, Aurora followed up a series of one-year contracts for excess capacity storage in Pueblo Reservoir with a long-term storage contract in Pueblo Reservoir. This contract gives Aurora 10,000 AF of excess capacity storage in that has a proportional share of the operations, maintenance, and replacement costs of the east slope Fryingpan/Arkansas Project facilities.

Ruedi Reservoir

Aurora is in discussions with BOR regarding a storage contract in Ruedi Reservoir along with Pitkin County. BOR has started the NEPA process. Pueblo Reservoir as well as 10,000 AF of exchange from Pueblo Reservoir to the upper Arkansas Basin, Twin Lakes, and Turquoise reservoirs. This contract has an escalating annual fee for this storage as well as a responsibility for a percentage of the ongoing maintenance and replacement costs each year. This contract will be up for renewal in 2048.

Turquoise Reservoir

Owned by the BOR, Aurora Water has a storage contract with the BOR for the Turquoise Reservoir that is in conjunction with Aurora's Homestake project. Aurora has 50% share of a 15,000 AF storage contract in Turquoise Reservoir for storing Homestake project water along with Colorado Springs Utilities. Aurora Water also has an additional storage contract for 5,000 AF of storage in Reclamations Turquoise Reservoir that it purchased from CF&I company.

Twin Lakes Reservoir

Owned by the BOR, Aurora has storage in BOR's Twin Lakes Reservoir through its ownership of Twin Lakes Reservoir and Canal company stock. This is a permanent storage contract.

North Campus Radial Collector Well Drought Resilience Initiative

Aurora Water has also received support from the BOR on its North Campus Radial Collector Well Drought Resilience Initiative. AW received a grant for this project from the WaterSMART Drought Response Program in FY2022. The North Campus system reduces the impacts from drought conditions by indirectly recycling treated water effluent and reducing reliance on decreasing surface water supplies.

Performance Measures

Turf Conversion Component

The reduction in water consumption for park maintenance will result in a water savings of 31.5 Acre-Feet per Year (AFY).

Historical water consumption data was scrutinized to gauge the average annual turf consumption, although the current estimates do not incorporate adjustments for weather variations. The total surface area of turf to be removed is 23.18 acres or 1,009,720.8 square feet. The annual consumptive rate for this acreage is approximately 18 gallons per square foot.

Annual water savings (WS) estimates are a calculated difference between existing water use (EU), collected through the use of metering, and estimated target water use for the proposed surface type (TU) replacement multiplied by the square footage of the conversion area (SF). This is then divided by 1000 to convert to KGAL and finally is multiplied by the current water rate (\$).

$$WS = [((EU-TU)*SF) / 1000]*(\$)$$

Target Water Use Assumptions

[Tahoma 31®](#): 12 GPSF

Irrigated Native*: 6 GPSF

**Native grass stands in urban areas may face disruptions to natural water cycles due to factors like pavement, buildings, and altered drainage patterns. In these situations, periodic watering might be necessary to compensate for the lack of natural water sources.*

Actual water savings will be confirmed through the examination of monthly and annual consumption data.

Hydroelectric Component

The total electricity produced by the PRV Hydro Turbine will be measured in two different ways: a production meter installed by Xcel Energy and a production monitor connected to AW's SCADA system by InPipe Energy. The current estimated production from the 56 kW system is 255,000 kWh per year. An estimated 10% (25,500 kWh) will be consumed by the site to run SCADA communication and valve actuators. The remaining energy (229,500 kWh per year) will be sent back to the grid. The excess energy produced will be credited by Xcel Energy as an offset to a highly energy-intensive facility of Aurora Water (Prairie Water Pump Station #3). Thus, the performance measures will be directly based on production meters installed at the site.

Budget Narrative

Funding Plan

The non-Federal share of the project costs will be provided by the City of Aurora. The City will make its contribution to the cost share requirement through a monetary contribution.

The source of the funding for the turf replacement component will be provided by both the City Parks department and Aurora Water. The Parks Department turf conversion capital budget is funded by the Open Space Fund and Conservation Trust Fund. Neither of these funds can be used on public buildings, such as the Aurora Municipal Center, or medians. For this reason, the department has partnered with Aurora Water for these areas, and the matching funds for these areas (Aurora Municipal Center and South Buckley Medians) will be provided by Aurora Water.

The source of funding for the hydroelectric component is the Aurora Water Fund, which is included in the City of Aurora's approved Capital Budget. The Water Fund is an enterprise fund that provides for the acquisition, development, and protection of water and water rights and the operation and maintenance of the water purification facilities and distribution system.

With the opportunity for federal funding under the Bureau of Reclamation WaterSMART grant program, Aurora Water will be able to carry out priority projects to conserve water for future generations and convert untapped potential energy into electricity.

Budget Table 1 – Non-Federal and Federal Funding Sources Summary

FUNDING SOURCE	% OF PROJECT	FUNDING AMOUNT
Non-Federal Entities		
City of Aurora	50%	\$785,016
Non-Federal Subtotal	50%	\$785,016
Federal Entities		
Other Federal Entities		\$0
Requested BOR Funding		\$785,016
Federal Subtotal	50%	\$785,016
TOTAL PROJECT FUNDING	100%	\$1,570,032

Budget Table 2 – Total Project Cost Summary

SOURCE	FUNDING AMOUNT
Costs to be reimbursed with the requested federal funds	\$785,016
Costs to be paid by the applicant	\$785,016
Value of third-party contributions	\$0
TOTAL PROJECT COST	\$1,570,032

Proposed Budget Details

Turf Conversion Component

The turf conversion component costs include administration by a Project Manager and inspection costs by a Project Inspector. The majority of other costs are contractual and include the following cost classifications as set out in form SF-424C – Construction Programs:

- **Administrative and Legal Expenses** - \$3,132 – includes salary and fringe benefits for a Project Manager
- **Project Inspection Fees** - \$4,680 – includes salary and fringe benefits for a Project Inspector
- **Site Work** – \$46,966 – includes irrigation audit and leveling of the construction area
- **Demolition and Removal** – \$344,107 – includes removal of existing turf, sod cutting, herbicide
- **Construction** – \$748,858 – includes seeding and/or sodding 23.18 acres of municipal property in eight different locations
- **Miscellaneous** – \$16,489 – includes post-planting weed control and establishment
- **Contingency** – \$5,800

The contractor will be selected using competitive bid procedures, with the award made to the lowest qualified bidder, following the City’s purchasing procedures and guidelines.

Hydroelectric Component

The hydroelectric component contractor has already been selected using a competitive bid process. The winning bidder, InPipe Energy, is providing a turn-key project at a lump-sum of \$400,000. The cost classifications in this budget are as follows:

- **Equipment** - \$160,650 – including the Energy Recovery System with power and controls panel; a 10” Control valve; and a 480v Transformer
- **Contractual** - \$35,000 – including project engineering and design
- **Construction** - \$204,350 – including construction materials (10” Iron Piping) and the installation of pipe, equipment and electrical

Budget Table 3 – Detailed Budget Proposal

All figures below align with cost categories in Attachment B-Budget Narrative.

Budget Object Category	Turf Component	Hydro Component	Total Project Cost
Personnel			\$5,740
Project Manager	\$2,320		\$2,320
Project Inspector	\$3,420		\$3,420
Fringe Benefits			\$2,072
Project Manager	\$812		\$812
Project Inspector	\$1,260		\$1,260
Travel			\$0
N/A			\$0
Equipment			\$160,650
Energy Recovery System		\$106,450	\$106,450
Control valve (10')		\$31,200	\$31,200
480v Transformer		\$23,000	\$23,000
Supplies			\$0
N/A			\$0
Contractual			\$35,000
Hydro: Project engineering and design		35,000	\$35,000
Construction			\$1,366,570
Materials: Iron Piping (10')		\$19,155	\$19,155
Hydro: Contract to install pipe, equipment and perform electrical installation		\$185,195	\$185,195
Turf: Removal of existing turf, sod cutting, herbicide applications	\$344,107		\$344,107
Turf: Irrigation audit, level area	\$46,966		\$46,966
Turf: Seed and/or sod	\$748,858		\$748,858
Turf: Post planting weed control and establishment monitoring	\$16,489		\$16,489
Contingencies	\$5,800		\$5,800
Other direct costs		-	\$0
N/A			\$0
TOTAL DIRECT COSTS			\$1,570,032
Indirect Costs			\$0
N/A			\$0
TOTAL ESTIMATED PROJECT COSTS			\$1,570,032

Combined Budget Narrative

Personnel

The Turf Replacement Project requests funds to cover the cost of working with a project manager and project inspector. The Hydroelectric Energy Recovery Project is not requesting funds for personnel.

Fringe Benefits

The Turf Replacement Project requests funds to cover fringe benefits for the Project Manager and Project Inspector. The Hydroelectric Energy Recovery Project is not requesting funds for fringe benefits.

Travel

The Project is not requesting funds for travel.

Equipment

The Project is requesting funds for equipment, which consists of an Energy Recovery System (which includes power and controls panel), a 10-inch control valve, and a 480v Transformer.

Supplies

The Project is not requesting funds for supplies.

Contractual

Aurora Water is requesting funds to cover the costs of the project engineering and design for the Hydroelectric Energy Recovery Project, which will be carried out by InPipe Energy. This provider was selected through a competitive RFP process.

Construction

The Project is requesting funding for a construction contract with Velocity Constructors, Inc. to install pipe, equipment and perform electrical installation for the Hydroelectric Energy Recovery Project. This construction company was selected through a competitive RFP. Construction costs related to this project will include new 10-inch iron piping for the by-pass to replace the current 8-inch by-pass. Funds are also requested to cover contractor costs for the following projects: 1) removal of existing turf, sod cutting, herbicide applications; 2) irrigation audit, level area; 3) seed and/or sod; 4) post planting weed control and establishment monitoring 5) contractor contingency costs.

Other Direct Costs - The Project does not request funding for any additional direct costs.

Indirect Costs - The Project is not requesting funds for indirect costs.

Total Costs

The total project cost for the Project is estimated at **\$1,570,032.00**. The City of Aurora can provide \$785,016 to fund the project. Aurora Water is seeking **\$785,016** in grant funds through the Bureau of Reclamation WaterSMART grant program.

Environmental and Cultural Resources Compliance

The responses to these questions have been broken down by their impact on the turf replacement component (“Turf”) and the hydroelectric replacement component (“Hydro”) for easier reference.

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

Turf: The establishment phase will include a brief period of exposed soil while the native grasses grow to maturity. Any dust will be mitigated through judicious use of irrigation. Once established, the native areas will provide better cover and more food sources for local avian species.

Hydro: Not Applicable. Scope of work solely takes place in an underground vault or on top of an existing concrete slab.

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?

Turf: No.

Hydro: No.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as “Waters of the United States”?

Turf: No. Scope of work takes place on existing parks, recreation and municipal lands, including medians.

Hydro: No. Scope of work solely takes place in an underground vault or on top of an existing concrete slab.

When was the water delivery system constructed?

Turf: Not applicable.

Hydro: 2011 (As Built Stamped Date for Gun Club Water Line)

Will the proposed project result in any modification of or effects to, individual features of an irrigation system?

Turf: Each native conversion area will have the irrigation zones adjusted to deliver just the needed water and no more. Some zones will be modified to deliver different rates to trees versus the native grasses.

Hydro: No. Scope of work solely takes place in an underground vault or on top of an existing concrete slab.

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

Turf: No. Scope of work takes place on existing parks, recreation and municipal lands, including medians.

Hydro: No. Scope of work solely takes place in an underground vault or on top of an existing concrete slab.

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

Turf: No. Scope of work takes place in existing parks, recreation and municipal facilities.

Hydro: No. Scope of work solely takes place in an underground vault or on top of an existing concrete slab.

Will the proposed project have a disproportionate and adverse effect on any communities with environmental justice concerns?

Turf: No. This Project will provide long-term cost savings to the City's Parks and Recreation Department, which will allow the Department to offer more improvements and programs in the future.

Hydro: No. Scope of work solely takes place in an underground vault or on top of an existing concrete slab.

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

Turf: No. Scope of work takes place on existing parks, recreation and municipal lands, including medians.

Hydro: No. Scope of work solely takes place in an underground vault or on top of an existing concrete slab.

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?

Turf: No. The Project involves replacing turf with native species. Weeding will continue to take place on the properties as needed.

Hydro: No. Scope of work solely takes place in an underground vault or on top of an existing concrete slab.

Required Permits or Approvals

The turf replacement project does not require any local or federal permits since the work will be conducted entirely on city-owned existing parks, recreation and municipal facilities.

The hydroelectric project benefits from multiple favorable elements in terms of permits and approvals. As a conduit hydro project in a municipal water system, the project qualifies for highly favorable exemptions from both the FERC and State environmental review processes. Plan approvals can be conducted by the City of Aurora itself.

Table 4- Hydroelectric Project Required Approvals and Permits

Agency	Required Approval or Permit	Recommended Responsible Party	Approximate Processing Time
Federal Energy Regulatory Commission (FERC)	Exemption from licensing approvals	City of Aurora	60 Days
Xcel Energy	Interconnection Approvals	InPipe Energy	180 Days
City of Aurora	Building permit	City of Aurora	14 Days

The Federal Energy Regulatory Commission (FERC) allows for an exemption from licensing approvals for small conduit hydroelectric projects such as the proposed. An application for this exemption for the proposed project has been filed with FERC and was approved per Docket No. CD23-1-000.

Approvals for the project mechanical and electrical designs can be approved internally by City of Aurora as a public agency.

This project shall utilize Xcel Energy's interconnection process for virtual net metered distributed generation projects.

Overlap or Duplication of Effort Statement

The City of Aurora is not seeking funding for the proposed projects in this application from other Federal or non-Federal sources.

Conflict of Interest Disclosure

There are no conflicts of interest. The City of Aurora utilizes internal controls to ensure compliance with all Federal purchasing requirements.

Uniform Audit Reporting Statement

The City of Aurora complies with the Single Audit requirements in accordance with 2 CFR §200 subpart F.

Certification Regarding Lobbying

The authorized official's signature on the appropriate SF-424 form represents our certification of the statements in 43 CFR § 18, Appendix A.

Letters of Support

Please see Appendix A for letters of support from the following:

- Mayor Mike Coffman, City of Aurora
- Representative Jason Crow (CO-06)
- State Representative Iman M. Jodeh (House District 41)
- State Senator Janet Buckner (Senate District 29)
- Lindsay Rogers, Policy Manager for Municipal Conservation, Western Resource Advocates

Official Resolution

The official resolution has been drafted and will be submitted to the Aurora City Council for consideration and approval at their meeting on April 22, 2024. The resolution will be sent to the BOR upon final approval. Please see a copy of the draft resolution in Appendix B.

Appendix A: Letters of Support

Please see attached letters of support from the following:

- Mayor Mike Coffman, City of Aurora
- Representative Jason Crow (CO-06)
- State Representative Iman M. Jodeh (House District 41)
- State Senator Janet Buckner (Senate District 29)
- Lindsay Rogers, Policy Manager for Municipal Conservation, Western Resource Advocates



Mayor
15151 E. Alameda Parkway, 5th Floor
Aurora, Colorado 80012
office 303.739.7015
fax 303.739.7594
email mcoffman@auroragov.org

Worth Discovering • AuroraGov.org

February 22, 2024

Camille Calimlim Touton
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington DC 20240-0001

Re: City of Aurora Sustainable Turf Transformation for Water Conservation and Hydroelectric Energy Recovery Grant Request - WaterSMART: Water and Energy Efficiency FY24 (R24AS00052)

Dear Commissioner:

This letter is in support of WaterSMART grant funding for City of Aurora's *Sustainable Turf Transformation for Water Conservation and Hydroelectric Energy Recovery* project.

The City of Aurora is Colorado's third-largest city and is home to aerospace, energy, medical, and biosciences industries, including Buckley Space Force Base. One in five residents is internationally born, adding to a strong and diverse community of cultures and ideas. Aurora is a global gateway to Colorado, with air, rail, and highways bisecting and connecting the city. Sustainable water supplies and energy are foundational to public health and continuing a vibrant community that supports our nation.

Aurora is a leader in water conservation, reuse and innovative water solutions. In August 2022, Aurora Water signed onto the *Memorandum of Understanding by and among Colorado River Basin Municipal and Public Water Providers* in recognition of the Colorado River basin experiencing the worst drought in 1200 years and a commitment to increasing wise and efficient water use. In October 2022, Aurora set a statewide example by adopting a strict Water Conservation Ordinance. Aurora is seeking innovative ways to include efficient hydroelectric production within its system.

The City of Aurora is seeking grant funding for public space transformations that will create new standards for the community. The climate appropriate and low water installations are supported by the Colorado Water Plan and recent Urban Landscape Conservation Task Force report. In addition, grant funding is being sought for installation of a micro-hydro system at pressure reducing valve (PRV) locations. The PRV hydro system will be able to recover most of this untapped energy source and convert it to electricity. Through this grant opportunity, the City of Aurora will achieve quantifiable water savings and implement a renewable energy component that can be reproduced in other locations for a sustainable future.

I request that the Bureau of Reclamation award the funding for this transformational water conservation and innovative hydroelectric project.

Sincerely,

Mike Coffman
Mayor, Aurora

JASON CROW
6TH DISTRICT, COLORADO

WASHINGTON OFFICE
1323 LONGWORTH HOB
WASHINGTON, DC 20515
(202) 225-7882

DISTRICT OFFICE
2170 S. PARKER ROAD, SUITE 280
AURORA, CO 80231
(720) 748-7514

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

February 22, 2024

Camille Calimlim Touton
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1849 C Street NW
Washington DC 20240-0001

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Aurora will achieve quantifiable water savings and implement a renewable energy component that can be reproduced in other locations for a sustainable future.

I request that the Bureau of Reclamation provide full and fair consideration for this transformational water conservation and innovative hydroelectric project.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jason Crow', with a stylized, flowing script.

Jason Crow
Member of Congress

State Representative Member: IMAN M. JODEH Colorado
State Capitol 200 East Colfax Avenue, Room 307 Denver,
Colorado 80203
Office: 303-866-2919
Business: 720-808-0892
Email: officeofimanjodeh@gmail.com



COLORADO
HOUSE OF REPRESENTATIVES
State Capitol
Denver
80203

February 22, 2024

Camille Calimlim Touton
Commissioner
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Through this grant opportunity, the City of Aurora will achieve quantifiable water savings and implement a renewable energy component that can be reproduced in other locations for a sustainable future.

I request that the Bureau of Reclamation award the funding for this transformational water conservation and innovative hydroelectric project.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Iman M. Jodeh', enclosed within a light gray rectangular border.

Iman M. Jodeh
State Representative
House District 41

Janet Buckner
State Senator
Senate District 29
200 E. Colfax Avenue
Denver, Colorado 80203
Capitol: (303) 866-4878



COMMITTEES
Chair of Education
Finance
Majority Caucus Chair

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I request that the Bureau of Reclamation award the funding for this transformational water conservation and innovative hydroelectric project

Sincerely,

A handwritten signature in cursive script that reads "Janet P. Buckner".

February 22, 2024

Camille Calimlim Touton
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington DC 20240-0001

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I request that the Bureau of Reclamation award the funding for this transformational water conservation and innovative hydroelectric project.

Sincerely,



Lindsay Rogers
Policy Manager for Municipal Conservation

Rhonda Fields
State Senator
200 E. Colfax Avenue
Denver, Colorado 80203
Capitol: (303) 866-4878



COLORADO STATE SENATE
STATE CAPITOL
DENVER

COMMITTEES
Health & Human Services, Chair
Education, Member

February 22, 2024

Camille Calimlim Touton
Commissioner
Bureau of Reclamation
1849 C Street NW

Washington DC 20240-0001

Re: City of Aurora Sustainable Turf Transformation for Water Conservation and Hydroelectric Energy Recovery
Grant Request - WaterSMART: Water and Energy Efficiency FY24 (R24AS00052)

Dear Commissioner:

I am writing to express support for the City of Aurora's grant application for the Sustainable Turf Transformation for Water Conservation and Hydroelectric Energy Recovery project under the WaterSMART program.

Aurora, as Colorado's third-largest city, plays a pivotal role in various industries, including aerospace, energy, and biosciences. The city is home to a diverse population, contributing to a vibrant community. Sustainable water resources and energy are vital for public health and maintaining a thriving community.

Aurora has demonstrated leadership in water conservation and innovation. The city has committed to increasing efficient water use in response to the Colorado River basin's severe drought and has adopted strict water conservation ordinances. Seeking innovative solutions, Aurora aims to integrate efficient hydroelectric production within its water system.

The grant funding will support public space transformations aligned with climate-appropriate and water-efficient installations, in line with the Colorado Water Plan and Urban Landscape Conservation Task Force recommendations. Additionally, funding will facilitate the installation of micro-hydro systems at pressure reducing valve (PRV) locations to recover untapped energy and generate electricity. This project will lead to measurable water savings and promote renewable energy practices for a sustainable future.

I urge the Bureau of Reclamation to award funding for this transformative water conservation and innovative hydroelectric project.

Sincerely,

A handwritten signature in black ink, appearing to be "Rhonda Fields", with a long, sweeping horizontal line extending to the right.

Rhonda Fields
Colorado State Senate
District 28

Appendix B: Draft Resolution

RESOLUTION NO. R2024- ____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AURORA, COLORADO, EXPRESSING THE AURORA CITY COUNCIL'S SUPPORT OF A BUREAU OF RECLAMATION GRANT FOR THE SUSTAINABLE TURF TRANSFORMATION FOR WATER CONSERVATION AND HYDROELECTRIC ENERGY RECOVERY PROJECT.

WHEREAS, The City of Aurora and its Utility Enterprise, Aurora Water ("The City") supports its WaterSMART Grants: Water and Energy Efficiency Grant application ("Application") to the United States Bureau of Reclamation ("BOR"); and

WHEREAS, The grant will assist the City in enhancing water and energy efficiency, utilize resources judiciously, achieve additional cost savings, reduce its greenhouse gas foot print, enhance water conservation, and enhance biodiversity through the Sustainable Turf Transformation for Water Conservation and Hydroelectric Energy Recovery Project with help from the Department of the Interior, Bureau of Reclamation, Water Resources and Planning Office. Notice of Funding Opportunity is issued under the authority of Section 9504(a) of the Secure Water Act, Subtitle F of Title IX of the Omnibus Public Land Management Act of 2009, Public Law (P.L.) 111-11 (42 United States Code [U.S.C.] 10364). WaterSMART Water and Energy Efficiency Grants provide support for priorities identified in Presidential Executive Order (E.O.) 14008: Tackling the Climate Crisis at Home and Abroad (E.O. 14008). WaterSMART Water and Energy Efficiency Grants will advance the Biden-Harris Administration's Justice40 Initiative. Established by E.O. 14008, the Justice40.

WHEREAS, The City of Aurora Water Department is seeking grant funding in the amount of \$785,016 with a non-federal fund match from the Water Fund to complete the Sustainable Turf Transformation for Water Conservation and Hydroelectric Energy Recovery Project; and

WHEREAS, Aurora Water is seeking grant funding to replace traditional turf with warm season grass species, as we aspire to create a more sustainable and ecologically friendly landscape that aligns with the principles of environmental stewardship as well as help Aurora Water save on energy costs and lower its carbon footprint, improve energy security. Additionally, it would add redundancy to Aurora Waters's PRV system, reducing water waste and providing an added level of service for Aurora residents,

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF AURORA, COLORADO, THAT:

Section 1. City Council approves Aurora Water applying for a Bureau of Reclamation Grant for the Sustainable turf Transformation for Water Conservation and Hydroelectric Energy Recovery Project between The City and BOR in a form not inconsistent with this Resolution.

Section 2. All resolutions or parts of resolutions of the City in conflict herewith are hereby rescinded.

Section 3. This Resolution shall take effect immediately without reconsideration.

RESOLVED AND PASSED this MONDAY day of APRIL 22, 2024.

MIKE COFFMAN, Mayor

ATTEST:

KADEE RODRIGUEZ, City Clerk

APPROVED AS TO FORM:

RACHEL ALLEN, Client Group Manager