CITY OF TACOMA / ENVIRONMENTAL SERVICES DEPARTMENT

REQUEST FOR INFORMATION

ARTIFICIAL INTELLIGENCE TO OPTIMIZE PERFORMANCE OF WASTEWATER TREATMENT PLANT OPERATIONS

SPECIFICATION NO. ES21-0639F
City of Tacoma
Environmental Services Department

REQUEST FOR INFORMATION ES21-0639F
Artificial Intelligence to Optimize Performance of Wastewater Treatment Plant Operations

Submittal Deadline: 11:00 a.m., Pacific Time, Tuesday, January 18, 2022

Submittals must be received by the City’s Procurement and Payables Division prior to 11:00 a.m. Pacific Time. For electronic submittals, the City of Tacoma will designate the time of receipt recorded by our email, bids@cityoftacoma.org, as the official time of receipt. This clock will be used as the official time of receipt of all parts of electronic bid submittals.

Submittal Delivery: Sealed submittals will be received as follows:

By Email:
bids@cityoftacoma.org
Maximum file size: 35 MB. Multiple emails may be sent for each submittal.

Bid Opening: Held virtually each Tuesday at 11AM. Attend via this link or call 1 (253) 215 8782. Submittals in response to a RFI will be recorded as received. As soon as possible, after 1:00 PM, on the day of submittal deadline, preliminary results will be posted to www.TacomaPurchasing.org.

Solicitation Documents: An electronic copy of the complete solicitation documents may be viewed and obtained by accessing the City of Tacoma Purchasing website at www.TacomaPurchasing.org.

- Register for the Bid Holders List to receive notices of addenda, questions and answers and related updates.
- Click here to see a list of vendors registered for this solicitation.

Pre-Proposal Meeting: A pre-proposal meeting will not be held.

Project Scope: The City is issuing this Request for Information (RFI) to determine the feasibility of utilizing artificial intelligence (AI) to integrate with existing plant processes and control systems to reduce O & M costs and better manage treatment process effectiveness.

Estimate: $300,000

Paid Sick Leave: The City of Tacoma requires all employers to provide paid sick leave as set forth in Title 18 of the Tacoma Municipal Code. For more information, visit our Minimum Employment Standards Paid Sick Leave webpage.

Americans with Disabilities Act (ADA Information): The City of Tacoma, in accordance with Section 504 of the Rehabilitation Act (Section 504) and the Americans with Disabilities Act (ADA), commits to nondiscrimination on the basis of disability, in all of its programs and activities. Specification materials can be made available in an alternate format by emailing Gail Himes at ghimes@cityoftacoma.org, or by calling her collect at 253-591-5785.

Title VI Information:
“The City of Tacoma” in accordance with provisions of Title VI of the Civil Rights Act of 1964, (78 Stat. 252, 42 U.S.C. sections 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin in consideration of award.

Additional Information: Requests for information regarding the specifications may be obtained by contacting Dawn DeJarlais, Sr.Buyer by email to ddejarlais@cityoftacoma.org

Protest Policy: City of Tacoma protest policy, located at www.tacomapurchasing.org, specifies procedures for protests submitted prior to and after submittal deadline.
Meeting sites are accessible to persons with disabilities. Reasonable accommodations for persons with disabilities can be arranged with 48 hours advance notice by calling 253-502-8468.
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**SUBMITTAL CHECK LIST**

This checklist identifies items to be included with your submittal. Any submittal received without these required items may be deemed non-responsive and not be considered for award. Submittals must be received by the City of Tacoma Purchasing Division by the date and time specified in the Request for Information page.

<table>
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<th>The following items make up your submittal package:</th>
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<tr>
<td>Letter of Interest</td>
</tr>
<tr>
<td>Literature to include technical specifications, safety data information, warranty, brochures</td>
</tr>
<tr>
<td>Technical specification sheets</td>
</tr>
<tr>
<td>Responses to questions in Section 8 (8.1 - 8.9)</td>
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1. INTRODUCTION

The City of Tacoma (City) / Environmental Services Department is soliciting responses to a Request for Information (RFI) from firms experienced in, and capable of, providing software applications that use artificial intelligence (AI) to optimize performance of the wastewater treatment process at two City of Tacoma treatment plants. The RFI is intended to be the first step in the process of a Request for Proposal (RFP) that will be issued at a later date. At the conclusion of the RFP process, the City will negotiate a contract with the successful proposer.

2. BACKGROUND

The City of Tacoma operates two wastewater treatment plants and the SCADA system for 50 pump stations. The plant control system was recently updated to a Rockwell Automation PlantPAx Distributed Control System. The system communicates with Allen-Bradley PLCs dedicated to specific areas throughout the treatment plants which are connected to hundreds of devices and instrumentation. Rockwell FactoryTalk is utilized to support operator controls, alarm and event notifications. Historical data is archived with FactoryTalk Historian. Reports and trends of the historical information is displayed utilizing FactoryTalk VantagePoint, while change management is addressed through FactoryTalk AssetCentre.

The plant control system operates on a private network that consists of 45 Windows servers and network time server, 60 network switches, one domains, 13 workstations and 32 thin clients. The control system has its own Microsoft domain separate from the corporate IT network. Dual firewalls isolate the two systems from each other.

Additional information about the City of Tacoma’s wastewater treatment plants can be found in Appendix A under Attachments and the following link.

3. PURPOSE

The City is issuing this Request for Information (RFI) to determine the feasibility of utilizing artificial intelligence (AI) to integrate with existing plant processes and control systems to reduce O & M costs and better manage treatment process effectiveness. The software application shall be capable of the following:

- Detect real time changes in effluent and propose adjustments to improve effluent water quality.
- Propose operational adjustments to reduce operating costs (i.e., reductions in energy or chemical usage).
- Ensure wastewater treatment remains within permit compliance.
- Able to integrate with existing control systems.
4. CALENDAR OF EVENTS

This is a tentative schedule only and may be altered at the sole discretion of the City.

The anticipated schedule of events concerning this RFI is as follows:

<table>
<thead>
<tr>
<th>Event</th>
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<tbody>
<tr>
<td>Question Deadline</td>
<td>12/29/2021</td>
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<tr>
<td>Questions and Answers Posted</td>
<td>1/7/2022</td>
</tr>
<tr>
<td>Submittal Due Date</td>
<td>1/18/2022</td>
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</table>

5. INQUIRIES

Please submit questions in writing to Dawn DeJarlais via email to ddejarlais@cityoftacoma.org. Make subject line read:

ES21-0639F – Artificial Intelligence to optimize performance of Wastewater treatment plant Operations – VENDOR NAME

Please note:

- Questions marked confidential will not be answered or included.
- The City reserves the discretion to group similar questions to provide a single answer
- The City reserves the right to not answer all questions submitted.
- The answers are not typically considered an addendum.
- The City will not be responsible for unsuccessful submittal of questions.
- Written answers to questions will be posted approximately one week after the question deadline.

6. DISCLAIMER

Please note that this Request for Information is not a Request for Bids (RFB) or a Request for Proposals (RFP), and there is no guarantee that either a RFB or RFP will be issued. A Respondent’s decision to respond, or not to respond, to this RFI will NOT be a factor in the evaluation process in a future RFB or RFP.

Request for Information

Specification No. ES21-0639F

Template Revised: 11/24/2020
While the intent of this RFI is to help identify vendors who meet various requirements for a competitive solicitation, there is no guarantee that any specific information presented by any Respondent will ultimately be included in any future solicitation issued by the City.

Each Respondent shall bear all expenses incurred by the preparation and presentation of its RFI response. The City will therefore reject any claim made against them in this matter, regardless of the results of the subsequent processes, if any.

7. QUALIFYING REQUIREMENTS

- **Step 1 (current step):** The City will review and evaluate the information from the RFI based on the contents to be submitted outlined. If the City determines to move forward with the process of potentially implementing the software application, then it will move to Step 2.
- **Step 2:** The City will release a Request for Proposal (RFP).
- **Step 3:** The City will review the results, evaluate the proposals using specified evaluation criteria, and develop a ranking, then select the highest ranked proposer(s).

Firm must be a legal entity with a Washington State Business License and must have experience providing software applications that use artificial intelligence (AI) to optimize performance of the wastewater treatment process.

8. CONTENT TO BE SUBMITTED

Submittals should present information in a straightforward and concise manner, while ensuring complete and detailed descriptions of the respondent’s/team’s abilities to meet the requirement of this RFI. Emphasis will be on completeness of content. Organization of the submittal shall follow the sequence of contents below so that essential information can be located easily during review.

If reference is made to supporting literature or documentation included with your submittal, direct the reader using specific reference to the document that address the topic, including document name, section and page number.

1. Cover letter of interest
   a. Company’s Name
   b. Years of experience developing and implementing AI based software applications
   c. Your company’s ability to proceed beyond the RFI process
   d. Company’s point of contact and contact information

2. General Overview Information
a. Information about your company
   i. Years in business
   ii. Areas of focus and how long
   iii. Staffing Levels and Roles
   iv. Leadership
b. Description of the products and services your company provides.
c. References from other facilities that implemented the application for wastewater treatment plants.
   i. Contact Information
   ii. Date of implementation

3. Information Specific to City of Tacoma Wastewater Treatment Plants
   a. Detailed description of the products your company would recommend for COT wastewater treatment plants.
   b. Description of the AI system used in the application
   c. Type and amount of data required to develop/train the AI system specifically for the COT wastewater treatment plants.
   d. Describe how the operator interfaces with the system
e. Describe what elements of the application would have to be customized to facilitate the COT wastewater treatment plants.

4. Interface with City Data and Plant Network
   a. Would the system be cloud based or on premise. If the proposed solution is cloud-based, include a specific example of implementation at another city/public utility. Cloud based services require cyber insurance.
   b. Describe how the system would interface with City’s corporate and/or private network
c. Describe how the system would interface with City data
d. What cybersecurity measures would be taken and measures needed to meet security requirements

5. Implementation and Development Process
   a. Indicate whether your firm is able to provide the City with a demonstration via a webinar. The purpose of the demonstration is to discuss capabilities with the intent of assisting the City in finalizing elements for a potential RFP.
   b. Describe the process your company would use to develop and implement the application for the COT wastewater treatment plants, including the following:
      i. Anticipated timeline for each phase
      ii. Level of City staff involvement for each phase
      iii. Key activities to be performed by the City
c. Describe the process used at other wastewater treatment plants of similar size. Including the following:
i. Timeline planned vs actual  
ii. Keys to the success of the implementation  
iii. Lessons learned from the implementation  
d. Provide information about development services if customizations to the product are necessary.  
e. Provide a detailed description of manufacturer’s experience accommodating various types of reporting activities.

6. License and Fee Structure  
a. Describe the license or fee structure that would be proposed for the development and implementation of the application  
   i. Would each plant have its own license or fee structure  
b. Describe the long-term maintenance costs/fees for the application

7. Maintenance and Future Change  
a. Describe how the system would be maintained and updated to reflect changes at the treatment plants.  
   i. What level of involvement would be required by City staff  
b. Provide a detailed description of manufacturer’s long-term involvement on maintenance and software updates

8. Return on Investment  
a. Describe the anticipated return on investment for the City. Provide information specific to the COT wastewater treatment plants as possible.

9. Project Team  
a. Project manager and direct contact information

9. **PRICING INFORMATION**

   Please provide as much general information as possible about your firm’s fee structure. During the course and performance of the testing and demo phase, Supplier will provide proof and maintain the insurance coverage in the amounts and in the manner specified in the City of Tacoma Insurance Requirements document applicable to the services, products, and deliverables provided under the possible future RFP. The City of Tacoma Insurance Requirements document will be fully incorporated into the RFP.
10. ENVIRONMENTALLY PREFERABLE PROCUREMENT

In accordance with the City of Tacoma’s Sustainable Procurement Policy, it is the policy of the City of Tacoma to encourage the use of products or services that help to minimize the environmental and human health impacts of City Operations. Respondents are encouraged to incorporate environmentally preferable products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, products, manufacturing, packaging, distribution reuse, operation, maintenance or disposal of the product or service.

The City of Tacoma encourages the use of sustainability practices and desires any awarded contractor(s) to assist in efforts to address such factors when feasible for:

- Reduction of pollutant releases
- Toxicity of materials used
- Waste generation
- Greenhouse gas emissions, including transportation of materials and services
- Recycle content
- Comprehensive energy conservation measures
- Waste manage reduction plans
- Potential impact on human health and the environment

11. EQUITY IN CONTRACTING

The City of Tacoma is committed to encouraging firms certified through the Washington State Office of Minority and Women’s Business Enterprise to participate in City contracting opportunities. See the TMC 1.07 Equity in Contracting Policy at the City’s Equity in Contracting Program website.

12. PROPRIETARY OR CONFIDENTIAL INFORMATION

The Washington State Public Disclosure Act (RCW 42.56 et seq.) requires public agencies in Washington make public records available for inspection and copying unless they fall within the specified exemptions contained in the Act, or are otherwise privileged. Documents submitted under this RFI shall be considered public records and, with limited exceptions, will be made available for inspection and copying by the public.

Information that is confidential or proprietary must be clearly marked. Further, an index must be provided indicating the affected page number(s) and location(s) of all such identified material. Information not included in said index will not be reviewed for confidentiality or as proprietary before release.
13. ADDENDUMS

In the event it becomes necessary to revise any part of this RFI, an addendum will be issued through the event in Ariba.
APPENDIX A

Central Treatment Plant Information

North End Treatment Plant Information
Heat generated by bacteria in the first stage aerobic digesters begins the digestion process. The elevated temperature achieved in the aerobic digesters, maintained over a number of hours, conditions the sludge, making it easier to anaerobically digest.

In addition to an ongoing, active inflow and infiltration elimination program that works to eliminate these connections to the wastewater system, the City constructed the Peak Wet Weather Flow Treatment Facility to increase the plant's capacity and avoid overflows of untreated and partially treated wastewater in all but the most extreme circumstances.

Peak Wet Weather Flow Treatment Facility

What makes the Central Treatment Plant unique?

Central Treatment Plant:

• Began treating wastewater in 1952 as a primary treatment facility.
• Handles most of the wastewater flow in the Tacoma area, including the industrialized north end of the system. It also treats wastewater from the north end of the Puget Sound waterfront; south, central and northeast Tacoma; and Fircrest, Fife, Milton and some bordering areas in Pierce County and Federal Way. Wastewater from the north end of the Puget Sound waterfront and the City of Ruston is treated at the North End Treatment Plant.
• Completed a major expansion and upgrade in 2009, including construction of the Peak Wet Weather Flow Treatment Facility. Other improvements included the addition of a new screening facility, a new grit removal system, and a 25-foot raised sludge lagoon wall.
• Has a permitted peak hydraulic capacity of 150 gallons per day.
• Discharges treated wastewater, known as effluent, to Commencement Bay through a 30-foot deep outlet pipe located in the middle of Commencement Bay.
• Managed over twenty million gallons of wastewater daily, or approximately 25 percent of the wastewater flow in the Tacoma area.
• Produces biosolids in the form of a solid cake that is dewatered and sold for various uses.
• Produces a concentrated stream of biogas that is collected in the anaerobic digesters and converted into electricity.
• Has an average daily flow of about 13 million gallons of wastewater. From this amount, on average 2,700 gallons of biosolids are produced daily. The remaining 97.3 percent is discharged to the Puget Sound after treatment.
• Produces high-quality, Class A-Exceptional Quality biosolids.
More than 220,000 people rely on the City of Tacoma to properly and safely treat their wastewater. A close-up look at the Central Treatment Plant reveals the complex process of wastewater treatment.

Wastewater flows slowly from one end of the tanks to the other, allowing the solid materials to settle to the bottom of the tanks. The settled solids are scraped off the bottom of the primary clarifiers and pumped to the thickening tanks. This process removes up to 80 percent of the settled solids, which are then returned to the oxygenation tanks (return activated sludge) to keep up the biological activity in the tanks.

Rectangular primary clarifiers are used to remove settleable and floatable solids from the wastewater. Grit is removed because it will interfere with the process. Grit is washed and hauled to a landfill.

As the wastewater moves through the plant, mechanical equipment removes debris larger than ¼-inch. Screened material containing volatile solids is dewatered (excess water is squeezed out), then compacted and conveyed to bins for disposal at a landfill. The remaining solids are called screenings and treated as a solid waste.

Scrubbers associated with the dissolved air flotation process and solids dewatering process are used to remove water from some or all of the solids before they are sent to the biosolids unit. Here, the blended solids tank receives solid waste from across the region. This process consists of three, 90-foot-diameter tanks. The solids leaving the aerobic digesters are then squeezed out in the presses, leaving a moist, cake-like product.

At the TAGRO Blending Facility, biosolids are blended with bark, sand and compost to make a product called biosolids blend. This material is trucked to the City of Tacoma for food production or spread as a soil amendment.

When it rains hard in Tacoma, a lot of rainwater flows into the plant, augmenting the wastewater flow. Peak wet weather effluent pump stations are designed to handle these surges. Flow from the secondary effluent pump station is directed to a separate, dedicated effluent pump station.

Sodium hypochlorite is added at the secondary effluent pump station and peak wet weather effluent pump stations. This process helps disinfect the wastewater, ensuring it is safe for discharge into Commencement Bay. The treated water from the Secondary clarifiers and the Peak Wet Weather Flow Treatment Facility is then pumped down the outfall pipe to exit deep in Commencement Bay.
Rutgers University for creative, unconventional approaches to solving problems.

The cutting-edge, cost-saving approach to engineering the North End Treatment Plant using a biofilter allows the plant to consistently meet secondary treatment permit requirements. Less than a conventional secondary treatment plant would have cost. The operational costs for this retrofitting one of the original primary solids digestion tanks with plastic media and converting it to an enclosed biofilter. A second digestion tank was converted to a solids holding tank. All original structures.

In 1986-1994, the City of Tacoma, Washington, was unable to consistently meet the 85 percent BOD removal requirement due to soluble BOD in the plant effluent. To address this issue, the City began testing an alternative physical-chemical treatment process, using aluminum sulfate and dry anionic polymer to achieve secondary treatment results while using processes would address soluble BOD and provide the additional treatment needed in a much more cost-effective manner than tearing down the existing facilities to build a conventional secondary plant. So the City returned $19 million in federal grant money earmarked for construction of a conventional secondary plant.

In response to the Federal Clean Water Act's call for stricter standards on wastewater discharge, the Washington State Department of Ecology required the plant to meet secondary treatment requirements. Environmental Protection Agency to prove that the nontraditional method was effective in meeting secondary treatment requirements.

The North End Treatment Plant was originally constructed to be a primary treatment facility and was designed to handle a maximum of 10 million gallons per day. Since then, treatment standards have risen and influent flow to the plant has increased. The City has been innovative in meeting those demands.

Together, the City, its citizens and businesses have been working to protect and preserve the environment and continue Tacoma's history as a leader in wastewater treatment practices. Welcome to the North End Treatment Plant.
## Plant Description

### Influent Pumps
- Number of units: 2
- Capacity (each): 5,560 GPM

### Biofilter
- Number of units: 1
- Capacity: 8 MGD

### Primary Clarifiers
- Number of tanks: 2
- Capacity (each): 4 MGD

### Grit Removal
- Number of tanks: 1
- Capacity (each): 31 MGD (at 4 min. HRT)

### Biofilter Effluent Pumps
- Number of units: 2
- Capacity: 5,560 GPM

### Biofilter Influent Pumps
- Number of units: 2
- Capacity: 5,560 GPM

### Solids Handling
- Solids/Scum Pumps
  - Number of units: 3
  - Capacity (each): 100 GPM

### Equipment & Tankage

<table>
<thead>
<tr>
<th>Material</th>
<th>Number</th>
<th>Capacity</th>
</tr>
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<tbody>
<tr>
<td>Lbs/day</td>
<td>345</td>
<td>665</td>
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</tbody>
</table>

### Wastewater Flow & Characteristics

- Average Influent Flow: 5 million gallons per day
- Peak Influent Flow: 8 million gallons per day

### Water Treatment Process

1. **Influent Bar Screen**
   - Wastewater first passes through the influent bar screen.
   - The influent bar screen consists of bars spaced 1½ inches apart that remove objects like large sticks, rocks, and plastic debris.

2. **Parshall Flume**
   - The wastewater passes through a flow-measuring device called a Parshall flume.

3. **Chemical Storage Area**
   - Chemicals are added upstream of the grit removal tank, at the Parshall flume, and in the primary clarifier tanks.

4. **Multi-Tube Grit Removal Tank**
   - Grit is removed in this tank.
   - EGG shells, gravel, and other materials settle due to natural gravity.
   - The settled material is pumped to grit washers and disposed of at a landfill.

5. **Influent Pumps**
   - Pumps move wastewater from the tank storing poly aluminum chloride.
   - Equipment for polymer addition is also located in this area.

6. **Solids Holding Tank**
   - The material is loaded into tanker trucks and transported to the Central Treatment Plant for treatment there.

7. **Biofilter**
   - Wastewater trickles through 13 layers of plastic media with a total depth of 26 feet.
   - The wastewater passes through 13 layers of media with a total depth of 26 feet.
   - The average influent flow to the North End Treatment Plant is 5 million gallons per day.
   - When flows exceed 8 million gallons per day, the higher flows are routed directly from the primary clarifiers to the disinfectant contact chamber.

8. **Solids Scum Pumps**
   -backflushing flows to the grit removal tank for additional treatment.
   - Backflushing is an important step in ensuring peak biofilter efficiency.

9. **Solids Scum Pumps**
   - Microorganisms growing on the media consume most of the remaining impurities in the wastewater.
   - This biological treatment resulting in an effluent is a blend of treated effluent from both the biofilter and primary clarifier.

10. **Chemical Storage Area**
    - Chemicals are added to the center well of each clarifier.
    - This, along with the alum, intensifies the attraction between particles in the wastewater.

11. **Disinfectant Contact Chamber**
    - The treated water is dosed with a disinfecting agent to ensure safety before discharge to Commencement Bay.

### Additional Information

- More than 220,000 people rely on the City of Tacoma to properly and safely treat their wastewater.
- A close-up look at the North End Treatment Plant.