

**PROFESSIONAL SERVICES
AGREEMENT BETWEEN
JACOBS CONSULTANTS, INC.
AND THE CITY OF ANN ARBOR FOR
HYDRID OPTIMIZER AT THE WATER RESOURCE RECOVERY FACILITY**

This agreement ("Agreement") is between the CITY OF ANN ARBOR, a Michigan municipal corporation, 301 E. Huron St. Ann Arbor, Michigan 48104 ("City"), and JACOBS CONSULTANTS, INC., a Michigan [REDACTED], 30800 Telegraph Road, Suite 4900, Bingham Farms, Michigan 48025 ("Contractor"). City and Contractor agree as follows:

1. DEFINITIONS

Administering Service Area/Unit means **Water Resource Recovery Facility**.

Contract Administrator means Anne Warrow, acting personally or through any assistants authorized by the Administrator/Manager of the Administering Service Area/Unit.

Deliverables means all documents, plans, specifications, reports, recommendations, and other materials developed for and delivered to City by Contractor under this Agreement.

Effective Date means the date this Agreement is signed by the last party to sign it.

Services means To develop and implement a Hybrid Optimizer at the Water Resource Recovery Facility as further described in Exhibit A.

2. DURATION

- A. The obligations of this Agreement shall apply beginning on the Effective Date and this Agreement shall remain in effect until satisfactory completion of the Services unless terminated as provided for in this Agreement.

3. SERVICES

- A. Contractor shall perform all Services in compliance with this Agreement. The City retains the right to make changes to the quantities of Services within the general scope of the Agreement at any time by a written order. If the changes add to or deduct from the extent of the Services, the compensation shall be adjusted accordingly. All such changes shall be executed under the conditions of the original Agreement.
- B. Quality of Services under this Agreement shall be of the level of quality performed by persons regularly rendering this type of service. Determination of acceptable quality shall be made solely by the Contract Administrator.
- C. Contractor shall perform Services in compliance with all applicable statutory, regulatory, and contractual requirements now or hereafter in effect. Contractor shall also comply with and be subject to City policies applicable to independent contractors.
- D. Contractor may rely upon the accuracy of reports and surveys provided by the City,

except when a defect should have been apparent to a reasonably competent professional or when Contractor has actual notice of a defect.

4. INDEPENDENT CONTRACTOR

- A. The parties agree that at all times and for all purposes under the terms of this Agreement each party's relationship to any other party shall be that of an independent contractor. Each party is solely responsible for the acts of its own employees, agents, and servants. No liability, right, or benefit arising out of any employer-employee relationship, either express or implied, shall arise or accrue to any party as a result of this Agreement.
- B. Contractor does not have any authority to execute any contract or agreement on behalf of the City and is not granted any authority to assume or create any obligation or liability on the City's behalf, or to bind the City in any way.

5. COMPENSATION OF CONTRACTOR

- A. The total amount of compensation paid to Contractor under this Agreement shall not exceed \$130,000.00, which shall be paid upon invoice by Contractor to the City for services rendered according to the schedule in Exhibit A. Compensation of Contractor includes all reimbursable expenses unless a schedule of reimbursable expenses is included in an attached Exhibit A. Expenses outside those identified in the attached schedule must be approved in advance by the Contract Administrator.
- B. Payment shall be made monthly following receipt of invoices submitted by Contractor and approved by the Contract Administrator, unless a different payment schedule is specified in Exhibit A.
- C. Contractor shall be compensated for additional work or Services beyond those specified in this Agreement only when the scope of and compensation for the additional work or Services have received prior written approval of the Contract Administrator.
- D. Contractor shall keep complete records of work performed (e.g. tasks performed, hours allocated, etc.) so that the City may verify invoices submitted by Contractor. Such records shall be made available to the City upon request and submitted in summary form with each invoice.

6. INSURANCE/INDEMNIFICATION

- A. Contractor shall procure and maintain from the Effective Date or Commencement Date of this Agreement (whichever is earlier) through the conclusion of this Agreement, such insurance policies, including those required by this Agreement, as will protect itself and the City from all claims for bodily injury, death, or property damage that may arise under this Agreement; whether the act(s) or omission(s) giving rise to the claim were made by Contractor, Contractor's subcontractor, or anyone employed by Contractor or Contractor's subcontractor directly or indirectly. Prior to commencement of work under this Agreement, Contractor shall provide documentation to the City demonstrating Contractor has obtained the policies and endorsements required by this

Agreement. Contractor shall provide such documentation in a form and manner satisfactory to the City. Currently, the City requires insurance to be submitted through its contractor, myCOI. Contractor shall add registration@mycoitracking.com to its safe sender's list so that it will receive necessary communication from myCOI. When requested, Contractor shall provide the same documentation for its subcontractors.

- B. All insurance providers of Contractor shall be authorized to do business in the State of Michigan and shall carry and maintain a minimum rating assigned by A.M. Best & Company's Key Rating Guide of "A-" Overall and a minimum Financial Size Category of "V". Insurance policies and certificates issued by non-authorized insurance companies are not acceptable unless approved in writing by the City.
- C. To the fullest extent permitted by law, Contractor shall indemnify, defend, and hold the City and its officers, employees, and agents harmless from all suits, claims, judgments, and expenses, including attorney's fees, resulting or alleged to result, from an act or omission by Contractor or Contractor's employees or agents occurring in the performance or breach of this Agreement, except to the extent that any suit, claim, judgment, or expense are finally judicially determined to have resulted from the City's negligence, willful misconduct, or failure to comply with a material obligation of this Agreement. The obligations of this paragraph shall survive the expiration or termination of this Agreement.
- D. Contractor is required to have the following minimum insurance coverage:

- 1. Professional Liability Insurance or Errors and Omissions Insurance protecting Contractor and its employees - \$1,000,000.
- 2. Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 04 13 or current equivalent. The City of Ann Arbor shall be an additional insured. There shall be no added exclusions or limiting endorsements that diminish the City's protections as an additional insured under the policy.

\$1,000,000	Each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined
\$2,000,000	Per project General Aggregate
\$1,000,000	Personal and Advertising Injury

- 3. Worker's Compensation Insurance in accordance with all applicable state and federal statutes; also, Employers Liability Coverage for:

Bodily Injury by Accident - \$500,000 each accident
Bodily Injury by Disease - \$500,000 each employee
Bodily Injury by Disease - \$500,000 each policy limit

- 4. Umbrella/Excess Liability Insurance shall be provided to apply in excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of \$1,000,000.

- E. Commercial General Liability Insurance and Motor Vehicle Liability Insurance (if

required by this Agreement) shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute with this insurance. Contractor agrees to waive any right of recovery by its insurer against the City for any insurance listed herein.

- F. Insurance companies and policy forms are subject to approval of the City Attorney, which approval shall not be unreasonably withheld. Documentation must provide and demonstrate an unconditional and unqualified 30-day written notice of cancellation in favor of the City of Ann Arbor. Further, the documentation must explicitly state the following: (a) the policy number(s); name of insurance company; name(s), email address(es), and address(es) of the agent or authorized representative; name and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions, which may be approved by the City in its sole discretion; (c) that the policy conforms to the requirements specified. Contractor shall furnish the City with satisfactory certificates of insurance and endorsements prior to commencement of any work. If any of the above coverages expire by their terms during the term of this Agreement, Contractor shall deliver proof of renewal and/or new policies and endorsements to the Administering Service Area/Unit at least ten days prior to the expiration date.

7. WAGE AND NONDISCRIMINATION REQUIREMENTS

- A. Nondiscrimination. Contractor shall comply, and require its subcontractors to comply, with the nondiscrimination provisions of MCL 37.2209. Contractor shall comply with the provisions of Section 9:158 of Chapter 112 of Ann Arbor City Code and assure that Contractor's applicants for employment and employees are treated in a manner which provides equal employment opportunity.
- B. Living Wage. If Contractor is a "covered employer" as defined in Chapter 23 of Ann Arbor City Code, Contractor must comply with the living wage provisions of Chapter 23 of Ann Arbor City Code, which requires Contractor to pay those employees providing Services to the City under this Agreement a "living wage," as defined in Section 1:815 of the Ann Arbor City Code, as adjusted in accordance with Section 1:815(3); to post a notice approved by the City of the applicability of Chapter 23 in every location in which regular or contract employees providing services under this Agreement are working; to maintain records of compliance; if requested by the City, to provide documentation to verify compliance; to take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee or person contracted for employment in order to pay the living wage required by Section 1:815; and otherwise to comply with the requirements of Chapter 23.

8. REPRESENTATIONS AND WARRANTIES BY CONTRACTOR

- A. Contractor warrants that the quality of Services shall conform to the level of quality performed by persons regularly rendering this type of service.
- B. Contractor warrants that it has all the skills, experience, and professional and other

licenses necessary to perform the Services.

- C. Contractor warrants that it has available, or will engage at its own expense, sufficient trained employees to provide the Services.
- D. Contractor warrants that it has no personal or financial interest in this Agreement other than the fee it is to receive under this Agreement. Contractor certifies that it will not acquire any such interest, direct or indirect, which would conflict in any manner with the performance of the Services. Contractor certifies that it does not and will not employ or engage any person with a personal or financial interest in this Agreement.
- E. Contractor warrants that it is not, and shall not become overdue or in default to the City for any contract, debt, or any other obligation to the City, including real and personal property taxes. Further Contractor agrees that the City shall have the right to set off any such debt against compensation awarded for Services under this Agreement.
- F. Contractor warrants that its bid or proposal for services under this Agreement was made in good faith, that it arrived at the costs of its proposal independently, without consultation, communication, or agreement for the purpose of restricting competition as to any matter relating to such costs with any competitor for these services; and no attempt has been made or will be made by Contractor to induce any other person or entity to submit or not to submit a bid or proposal for the purpose of restricting competition.
- G. The person signing this Agreement on behalf of Contractor represents and warrants that they have express authority to sign this Agreement for Contractor and agrees to hold the City harmless for any costs or consequences of the absence of actual authority to sign.
- H. The obligations, representations, and warranties of this section 8 shall survive the expiration or termination of this Agreement.

9. OBLIGATIONS OF THE CITY

- A. The City shall give Contractor access to City properties and project areas as required to perform the Services.
- B. The City shall notify Contractor of any defect in the Services of which the Contract Administrator has actual notice.

10. ASSIGNMENT

- A. Contractor shall not subcontract or assign any portion of any right or obligation under this Agreement without prior written consent from the City. Notwithstanding any consent by the City to any assignment, Contractor shall at all times remain bound to all warranties, certifications, indemnifications, promises, and performances required of Contractor under the Agreement unless specifically released from the requirement in writing by the City.
- B. Contractor shall retain the right to pledge payments due and payable under this

Agreement to third parties.

11. TERMINATION OF AGREEMENT

- A. If either party is in breach of this Agreement for a period of 15 days following receipt of notice from the non-breaching party with respect to the breach, the non-breaching party may pursue any remedies available against the breaching party under applicable law, including the right to terminate this Agreement without further notice. The waiver of any breach by any party to this Agreement shall not waive any subsequent breach by any party.
- B. The City may terminate this Agreement, on at least 30 days' advance notice, for any reason, including convenience, without incurring any penalty, expense, or liability to Contractor, except the obligation to pay for Services actually performed under the Agreement before the termination date.
- C. Contractor acknowledges that if this Agreement extends for several fiscal years, continuation of this Agreement is subject to appropriation of funds through the City budget process. If funds are not appropriated or otherwise made available, the City shall have the right to terminate this Agreement without penalty at the end of the last period for which funds have been appropriated or otherwise made available by giving written notice of termination to Contractor. The Contract Administrator shall give Contractor written notice of such non-appropriation within 30 days after the Contract Administrator has received notice of such non-appropriation.
- D. The expiration or termination of this Agreement shall not release either party from any obligation or liability to the other party that has accrued at the time of expiration or termination, including a payment obligation that has already accrued and Contractor's obligation to deliver all Deliverables due as of the date of termination of the Agreement.

12. REMEDIES

- A. This Agreement does not, and is not intended to, impair, divest, delegate, or contravene any constitutional, statutory, or other legal right, privilege, power, obligation, duty, or immunity of the parties.
- B. All rights and remedies provided in this Agreement are cumulative and not exclusive, and the exercise by either party of any right or remedy does not preclude the exercise of any other rights or remedies that may now or subsequently be available at law, in equity, by statute, in any other agreement between the parties, or otherwise.
- C. Absent a written waiver, no act, failure, or delay by a party to pursue or enforce any right or remedy under this Agreement shall constitute a waiver of that right with regard to any existing or subsequent breach of this Agreement. No waiver of any term, condition, or provision of this Agreement, whether by conduct or otherwise, shall be deemed or construed as a continuing waiver of any term, condition, or provision of this Agreement. No waiver by either party shall subsequently affect the waiving party's right to require strict performance of this Agreement.

13. NOTICE

All notices and submissions required under this Agreement shall be delivered to the respective party in the manner described herein to the address stated below or such other address as either party may designate by prior written notice to the other. Notices given under this Agreement shall be in writing and shall be personally delivered, sent by next day express delivery service, certified mail, or first class U.S. mail postage prepaid, and addressed to the person listed below. Notice will be deemed given on the date when one of the following first occur: (1) the date of actual receipt; (2) the next business day when notice is sent next day express delivery service or personal delivery; or (3) three days after mailing first class or certified U.S. mail.

If notice is sent to Contractor:

Jacobs Consultants, Inc.
ATTN: Shawn Thompson
30800 Telegraph Road, Suite 4900
Bingham Farms, Michigan 48025

If notice is sent to the City:

City of Ann Arbor
ATTN: Anne Warrow
49 Old Dixboro Road
Ann Arbor, Michigan 48105

With a copy to: The City of Ann Arbor
ATTN: Office of the City Attorney
301 East Huron Street, 3rd Floor
Ann Arbor, Michigan 48104

14. CHOICE OF LAW AND FORUM

This Agreement will be governed and controlled in all respects by the laws of the State of Michigan, including interpretation, enforceability, validity and construction, excepting the principles of conflicts of law. The parties submit to the jurisdiction and venue of the Circuit Court for Washtenaw County, State of Michigan, or, if original jurisdiction can be established, the United States District Court for the Eastern District of Michigan, Southern Division, with respect to any action arising, directly or indirectly, out of this Agreement or the performance or breach of this Agreement. The parties stipulate that the venues referenced in this Agreement are convenient and waive any claim of non-convenience.

15. OWNERSHIP OF DOCUMENTS

Upon completion or termination of this Agreement, all Deliverables prepared by or obtained by Contractor as provided under the terms of this Agreement shall be delivered to and become the property of the City. Original basic survey notes, sketches, charts, drawings, partially completed drawings, computations, quantities, and other data shall remain in the possession of Contractor as instruments of service unless specifically incorporated in a Deliverable, but shall be made available, upon request, to the City without restriction or limitation on their use. The City acknowledges that the documents are prepared only for the Services. Prior to completion of the Services the City shall have a recognized proprietary interest in the work product of Contractor.

16. CONFLICTS OF INTEREST OR REPRESENTATION

Contractor certifies it has no financial interest in the Services to be provided under this Agreement other than the compensation specified herein. Contractor further certifies that it presently has no personal or financial interest, and shall not acquire any such interest, direct or indirect, which would conflict in any manner with its performance of the Services under this Agreement.

Contractor agrees to advise the City if Contractor has been or is retained to handle any matter in which its representation is adverse to the City and to obtain the City's consent therefor. The City's prospective consent to Contractor's representation of a client in matters adverse to the City, as identified above, will not apply in any instance where, as the result of Contractor's representation, Contractor has obtained sensitive, proprietary, or otherwise confidential information of a non-public nature that, if known to another client of Contractor, could be used in any such other matter by the other client to the material disadvantage of the City. Each matter will be reviewed on a case-by-case basis.

17. SEVERABILITY OF PROVISIONS

Whenever possible, each provision of this Agreement will be interpreted in a manner as to be effective and valid under applicable law. However, if any provision of this Agreement or the application of any provision to any party or circumstance is prohibited by or invalid under applicable law, that provision will be ineffective to the extent of the prohibition or invalidity without invalidating the remainder of the provisions of this Agreement or the application of the provision to other parties and circumstances.

18. EXTENT OF AGREEMENT

This Agreement, together with all Exhibits constitutes the entire understanding between the City and Contractor with respect to the subject matter of the Agreement and it supersedes, unless otherwise incorporated by reference herein, all prior representations, negotiations, agreements, or understandings, whether written or oral. Neither party has relied on any prior representations in entering into this Agreement. No terms or conditions of either party's invoice, purchase order, or other administrative document shall modify the terms and conditions of this Agreement, regardless of the other party's failure to object to such terms or conditions. This Agreement shall be binding on and shall inure to the benefit of the parties to this Agreement and their permitted successors and permitted assigns and nothing in this Agreement, express or implied, is intended to or shall confer on any other person or entity any legal or equitable right, benefit, or remedy of any nature whatsoever under or by reason of this Agreement. This Agreement may only be

altered, amended, or modified by written amendment signed by Contractor and the City. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall be deemed to be one and the same agreement.

19. ELECTRONIC TRANSACTION

The parties agree that signatures on this Agreement may be delivered electronically or by facsimile in lieu of a physical signature and agree to treat electronic or facsimile signatures as binding.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK; SIGNATURE PAGES FOLLOW]

JACOBS CONSULTANTS, INC.

By: _____

Name: Shawn Thompson

Title: Vice President

Date: _____

CITY OF ANN ARBOR

By: _____

Name: Milton Dohoney Jr.

Title: City Administrator

Date: _____

Approved as to substance:

By: _____

Name: Jordan Roberts

Title: Public Services Area Administrator

Date: _____

Approved as to form:

By: _____

Name: Atleen Kaur

Title: City Attorney

Date: _____

By: _____

Name: Christopher Taylor

Title: Mayor

Date: _____

By: _____

Name: Jacqueline Beaudry

Title: Clerk

Date: _____

EXHIBIT A



1055 Wilshire Ave
Troy, MI 48084

**Challenging today.
Reinventing tomorrow.**

T +1.248.839.0900
www.jacobs.com

January 22, 2025

Attn: Nicholas K. Jaworski
Water Resource Recovery Services Assistant Manager
City of Ann Arbor Water Resource Recovery Facility
49 S. Dixboro Road
Ann Arbor, Michigan 48105

Project name: Ann Arbor WRRF Hybrid Optimizer

Subject: Proposal for Hybrid Optimizer Services

Dear Mr. Jaworski,

We understand the City of Ann Arbor ("City") would like to utilize the Jacobs Hybrid Optimizer to deliver operational support for the Ann Arbor Water Resource Recovery Facility (AAWRRF). The Hybrid Optimizer Digital Twin has been designed to provide additional insights into plant operation by offering soft sensors and process intelligence throughout the plant. Its primary focus is to augment existing staff by providing forecasting, process insight, and operational recommendations to improve process reliability and optimize laboratory/maintenance efforts.

Background

Given that plant operations are largely reactive, with alerts issued when reviews reveal underperformance, dependencies are reliant on lagging performance indicators and a broader focus is on troubleshooting rather than real-time proactive analysis and operation. As decision-makers in the process industry move to embrace digital transformation to help address labor force limitations, extract more value from their data, improve visibility over their business, and increase their asset reliability and optimize their operations, it is important to consider a digital twin as a vital step in this transformation to move away from reactive operations and unplanned maintenance. Jacobs follows the lead of the International Water Association in defining a digital twin as a simulation/model of an existing system that automatically receives and inputs live data into that simulation. This provides a true mirror of the actual facility and should not be confused with a simple off-line simulation.

Jacobs's Hybrid Optimizer, a digital twin solution, provides a powerful combination of Jacobs' water subject matter expertise in operations and maintenance (O&M), treatment processes, design and data science, combined with mechanistic modelling and machine learning on a cloud computing platform and a simple user interface. Our unique software brings together two of the most modern approaches to efficient and reliable plant operation. By using machine learning, the mechanistic model can reliably perform longer range forecasting while also identifying and addressing errors in your data. The resulting clean and complete data sets enable useful predictions of your plant's performance on a day-to-day basis.

Once configured and deployed to a treatment plant, the Hybrid Optimizer provides an immediate comprehensive insight into the system and can send predictive operational recommendations directly to field staff's smart phones and/or tablets. These actionable insights and recommendations help frontline staff optimize performance, before it is too late, to realize efficiency or performance improvement

opportunities. It also simplifies what operations needs to evaluate, thus freeing up more time for staff to perform other duties. When fully calibrated and deployed on your treatment plant, the Hybrid Optimizer software can address both the targeted short-term control needs and provide previously unavailable forecasting capabilities to augment the suite of tools currently used by staff.

Jacobs has been working with the City on various design and modelling aspects of the AAWRRF over the past three years, and thus has solid basis for understanding of what is there, what is coming up, and how best to support front-line staff during the on-going upgrades and changes at the facility. At the AAWRRF, the Hybrid Optimizer will provide significant benefits not only in Operations and Maintenance but will also benefit for any future design projects in providing much more reliable data and performance information as the new systems and processes designed, constructed and brought online, thus reducing capital costs and overall process risks during construction. Our process staff can then use the Hybrid Optimizer insight to provide relevant feedback and input to Operations as desired by the City.

Proposal Overview

Following discussions with the City, this proposal is to provide the scope and costs for supplying process operations support at the AAWRRF. It will cover initial setup and operating costs associated with both maintaining it and providing AAWRRF process operations support based upon it.

The Hybrid Optimizer will be implemented on the Microsoft Azure Cloud platform and provide information and advisory services for AAWRRF staff. As described below, additional functionality and features can be added as requested by the City for an additional cost.

The scope of this work will fall into three categories:

1. **Development and Implementation** needed to provide the Hybrid Optimizer for AAWRRF (data pipeline, Microsoft Azure Cloud, system, calculations, and User Interface (UI)). Jacobs will work with City staff to develop and provide a cybersecure data pipeline from their internal systems to the MS Azure Cloud platform.
2. **Functional Support** needed to keep the Hybrid Optimizer running (data pipeline, MS Azure Cloud, system, calculations, and User Interface (UI), along with any updates and upgrades that apply to this cloud environment implementation.
3. **Process and Data Analytics Support:** This category includes a) Process Operations support, b) Process Engineering Support, and c) Data Analytics Support during the pilot (i.e., the initial 4-month operating period provided in this contract). Consulting services have been allowed for, which includes one-hour weekly meetings to review model validity and process performance with our wastewater process experts.

Scope of Work

Duration: Initial four-month operational period (pilot), with options for annual renewal thereafter.

Hybrid Optimizer: Microsoft Azure Cloud Implementation

Tasks

1. Development and Implementation:
 - 1.1. Data Pipeline: Jacobs will work with the City IT/OT staff to develop and implement a cybersecure export pipeline of the live SCADA data and laboratory data needed for Hybrid Optimizer operation. This will include data quality analysis, cleaning and imputation (infilling) of the data streams from AAWRRF.
 - 1.2. Mechanistic Process Model and Auto-Calibration: The existing AAWRRF Sumo process model will be used and any potential additional functionality needed to support AAWRRF operations and maintenance needs. An autocalibration system will be put in place based on available instrumentation and received laboratory data.
 - 1.3. Soft Sensor: A soft sensor will be implemented that estimates the dynamic 15-minute wastewater characteristics (such as ammonia, nitrates, TSS, etc.) of the plant influent and the other wastewater streams within the autocalibrated mechanistic model based on the available data. This will be updated every 24 hours.
 - 1.4. Forecaster: A machine learning based 24-hour, 15-minute frequency, forecast of influent and primary effluent flows and concentrations, secondary phosphorus, ammonia and nitrate concentrations, secondary clarifier solids loading, and secondary effluent BOD, COD, Phosphorus, Ammonia and Nitrate concentrations will be provided. It will use as inputs the historical soft sensor results, weather service precipitation forecasts, and other available local flow information. All forecasts, other than the influent, will be based upon the operation/control of the past day.
 - 1.5. User Interface (UI): A UI customized for AAWRRF Operations. The goal of this UI is to provide a simple, easy to understand front end that operators can quickly reference at the top level, while providing needed engineering information at the lowest level. Additional UI levels provide information from the Hybrid Optimizer for trust building, engineering details, and quality control. The top two levels will be developed with the front-line operations staff to minimize daily impacts to their work routine, and support trust building.
 - 1.6. SRT/WAS Control Recommendations: The Hybrid Optimizer will calculate and send recommendations for maintaining a Sludge Retention Time (SRT) by providing recommendations for a daily wastage rate. This will consider seasonal and school calendar variations with the overall goal to stabilize SRTs in the system during times of rapid change.
 - 1.7. Primary Sludge Pumping Recommendations: Monitor and recommend the primary sludge pumping rate. The goal of this recommendation would be to stabilize hydrolysis and VFA production in the primary treatment step to help improve overall enhanced biological phosphorus removal (EBPR) stability.
2. Functional Support: These are the tasks and costs associated with keeping the Hybrid Optimizer running after implementation, which includes:

- 2.1. Computing System and UI maintenance
- 2.2. Implementation of any common bug fixes and improvements.
- 2.3. Minor customizations of data pipelines, calculations, models, or user interface (e.g., data reports, changes to UI reports, etc.); limited to three (3) customizations during the pilot.
3. Process Operations and Data Analytics support (9 hours per month on average):
 - 3.1. Weekly 30-minute check-in meetings between the City and Jacobs senior process and data analytics experts (as appropriate) after the startup of the Hybrid Optimizer
 - 3.2. Process Operations Support:
 - Operations support answer questions based on the Hybrid Optimizer process insights for identified treatment related operational issues or efficiency gains.
 - Overall performance reviews prior to weekly meetings
 - 3.3. General Project Management: The purpose of this task is to perform typical project management duties. Specific duties will include:
 - Oversight of the work – The project manager will develop project instructions and oversee all work, and coordinate and maintain staffing.
 - Invoicing – Invoices and progress reports will be developed and submitted in accordance with the agreement. Invoices will be submitted electronically, per guidance provided by the City.

Schedule

This work will start immediately upon execution of a contract agreement. Setup of the Hybrid Optimizer will be completed within eight weeks of the establishment of the full data pipeline. A one-month operational readiness checkout period will then commence. Following this period, regular operation of the Hybrid Optimizer, covered by the maintenance fee, will commence. Regular operations will be for four (4) calendar months. At the end of this period, unless superseded by a new contract, the Hybrid Optimizer will be shut down, archived for a period of six months, and the final databases provided to the City.

Commercial Terms

The software as a service (SaaS) fee (inclusive of taxes) to the City for the provision of this project is offered at a lump sum of \$110,000 for the setup and operation of the Hybrid Optimizer at AAWRRF during the pilot. This would be for the continued operation of the digital twin for a period of four (4) months from the end of the Hybrid Optimizer Checkout period described above.

These costs are based upon:

- 1) a SaaS product fee of \$110,000 for the development, operationalization and functional support (keeping the Hybrid Optimizer running) as described in Tasks 1 and 2; and
- 2) \$20,000 for consultant services (process/data engineering and additional functionality support) related to AAWRRF specific needs as described in Task 3. See Payment Schedule for breakdown of price proposal.

Any additional major modules contracted during this project would be an additional cost and can be requested at any time.

Payment Schedule

	After Month 1	After Month 4*	Months 4-7*	Total
Product Fee (Lump Sum)	\$60,000	\$20,000	\$5,000 per month for 4 months (\$20,000 total)	\$110,000
Consultant Services – Process Support	Billed Monthly			\$20,000
Total				\$130,000

*Based on an estimate of 8 weeks to establish full data connection + One month checkout and 4 month pilot period

Basis of the Proposal

This proposal is based on the following:

1. The City will have a non-exclusive, non-assignable right to access and use the Cloud Software Services including anything developed by Jacobs and delivered to the City as part of those services solely for City business operations and subject to Jacobs's standard Web Application Terms & Conditions ("Terms");
2. The City may allow employees to use the Hybrid Optimizer for the purpose specified above and the City would be responsible for its employees' compliance with the Terms;
3. The City will retain all ownership and intellectual property rights to the City data;
4. The City and Jacobs will agree to the data retention requirements for the duration of operation, with a rolling retention period proposed as part of this proposal;
5. On expiry of this agreement, without renewal, Jacobs will archive the data for a period of six (6) months after which it will be permanently deleted with no option to restore;
6. Jacobs and/or its licensors/partners retain all ownership and intellectual property rights in Hybrid Optimizer, the Software Specification and any ancillary programs and software, to any derivative works thereof, and to anything developed or delivered by or on behalf of Jacobs that is not the City data;
7. Other than as stated in this proposal, no development or configuration shall be required or undertaken to Jacobs proprietary software during this contract;
8. Hybrid Optimizer will identify appropriate data quality issues in the source systems however, Jacobs shall not be responsible for the quality of the City supplied data, the responsibility for which shall remain with the City.

Date: January 22, 2025

Subject: Ann Arbor WRRF Hybrid Optimizer

Jacobs

9. This proposal is valid for three (3) months from the date of issue.

The City shall assist the Pilot by:

1. Providing Jacobs with the timely access required for operation, such as access to data lake and/or source data systems;
2. Respective access and right to and use of any the City supplied data for the purposes of this operation;
3. Providing asset information from the City data sources within the timeframes agreed to deploy Hybrid Optimizer; and
4. Providing a method of automatic transfer of SCADA and Laboratory data from the City data sources to the Hybrid Optimizer.

We trust the above reflects the discussions to date and appreciate the opportunity to work with the City on this project and provide this proposal for your consideration and feedback. Jacobs is committed to structuring this effort in a way that meets your operational goals and supports your vision for an efficient, sustainable, and fully compliant facility.

If you should have any questions or would like details, please do not hesitate to contact us to discuss in more detail.

Yours sincerely,



Bruce R Johnson, PE
Senior Technology Fellow

+1(303) 324.4473
Bruce.Johnson2@jacobs.com



Allen Gelderloos, PE
Project Manager

+1(616) 430.9298
Allen.gelderloos@jacobs.com

Copies to: Gregg Kennedy

Appendix A

Software Specification

Hybrid Optimizer (HO) is a blend of digital twin software and Jacobs expertise which provides a virtual simulation of wastewater treatment systems and is used to monitor the performance and offer advice of the selected parts of the treatment plant in near real time. For the AAWRRF, the software will be deployed to provide operational recommendations (advisory only) to help augment existing available operations staff. Additional options can be added as requested.

The proposed digital twin system will include the following:

Influent Soft Sensor

A soft sensor will be implemented that estimates the dynamic 15-minute wastewater characteristics (such as ammonia, nitrates, TSS, etc.) of the plant influent and the other wastewater streams within the autocalibrated mechanistic model based on the available data for the previous 24 hours. The soft sensor estimates will be updated every 24 hours.

AAWRRF Forecaster

Every 24 hours, a machine learning based 24 hour, 15-minute frequency, forecast of influent flows and concentrations, secondary ammonia and nitrate concentrations, mixed liquor suspended solids, secondary clarifier loading, and secondary effluent BOD, COD, Ammonia and Nitrate concentrations will be provided. All forecasts, other than the influent, will be based upon the operation/control of the past day.

SRT Control

The Hybrid Optimizer will calculate and send recommendations for maintaining a more stable Sludge Retention Time (SRT) by providing recommendations for a daily wastage rate. This will consider seasonal and school calendar variations with the overall goal to stabilize SRTs in the system during times of rapid change. Daily WAS rate recommendations would be produced. This tool can be used to help identify longer term potentials for insufficient nitrification and phosphorus removal.

Primary Sludge Management Recommendations

Monitor and recommend the primary sludge pumping rate on a once per day basis. The goal of this recommendation would be to stabilize hydrolysis and VFA production in the primary treatment step to help improve overall enhanced biological phosphorus removal (EBPR) stability.

User Interface

A user interface (UI) will be provided that provides the recommendations and the plots to support the above items. It will be built in a minimum of three levels (Operator, Analyst, and Engineer) with increasing levels of complexity as appropriate. It will include dynamic data, daily composite-based load data (actual and synthetic), and error graphs (actual versus HO and actual versus forecasted, where appropriate) for the above-described components.

The UI will also include the functionality to download the current auto calibrated Sumo model for use by staff or engineering support. The data behind the UI graphics will be downloadable as a data report (the data behind the graphics on any UI level in CSV format) that will be produced by pressing a button on the UI.

Appendix B – Jacobs Hybrid Optimizer License Terms

These License Terms only apply to the use of Hybrid Optimizer for this contract. All other Agreement terms remain in full force and effect.

“Jacobs Proprietary Information” means Jacobs’ proprietary information, technical data, trade secrets or know-how, including, but not limited to, ideas, works of authorship, research, product plans, products, services, software, developments, inventions, processes, formulas, technology, designs, drawings, engineering, hardware configuration information, marketing, finances or other business information.

1. **Grant of License** – Jacobs grants to the City, for the subscription term, a non-exclusive license to access Jacobs’ Hybrid Optimizer proprietary software platform and related proprietary models (“Hybrid Optimizer”).

2. **Identification of Users** – The City shall identify its employee users (“Users”) to Jacobs. Only Users identified to Jacobs shall access the Hybrid Optimizer. The City shall be responsible for ensuring that the Users access the Hybrid Optimizer only in accordance with the provisions of these License Terms.

3. **Ownership** – As between Jacobs and the City, the materials generated as output of Hybrid Optimizer as specified in the Task Order (“Advisory Output”) shall be deemed owned by the City (excluding any part of Jacobs’ Proprietary Information that may be incorporated into such Advisory Output). As between Jacobs and the City, all rights, title, and interest in and to all intellectual property rights in Jacobs’ Proprietary Information and the Hybrid Optimizer are owned exclusively by Jacobs, including any improvements, modifications, updates and derivative works. The City expressly acknowledges that the Advisory Output may not be unique and may be substantially similar in whole or part to results produced for another customer of Jacobs requesting similar analysis and product using similar data sources. Jacobs shall have an as-is, royalty-free, worldwide, non-exclusive, transferable, sub-licensable, irrevocable, perpetual right to make, use, sell, offer for sale, import, or otherwise incorporate into the Hybrid Optimizer, any suggestions, enhancements, recommendations or other feedback provided by the City.

4. **Limitations on Access** – The City shall not: (a) sell, lease or sublease access to the Hybrid Optimizer; (b) copy, decompile, or reverse engineer any portion of the Hybrid Optimizer; (c) use the Hybrid Optimizer to provide third party processing services to other parties, commercial timesharing, rental or sharing arrangements, or on a “service bureau” basis; (d) remove any vendor titles, trademark symbols, copyright symbols and restrictive legends; (e) bypass or disable any protections that may be put in place to provide security for the Hybrid Optimizer or to protect against unlicensed use of the Hybrid Optimizer; (f) use the Hybrid Optimizer to store, transmit or produce infringing, libelous, or otherwise unlawful or tortious material, or to store or transmit material in violation of third-party privacy rights; (g) introduce into the Hybrid Optimizer, or use the Hybrid Optimizer to transmit, viruses, Trojan horses and other harmful or malicious code; or (h) interfere with or disrupt the integrity or performance of the Hybrid Optimizer or Third Party Software contained therein.

5. **Third Party Software** – The City acknowledges that the Hybrid Optimizer may contain or be provided with components which are licensed from third parties (“Third Party Software”), including components

subject to terms and conditions of open source software licenses ("Open Source Software"). Open Source Software is identified in the Documentation tab within the Hybrid Optimizer. To the extent required by the licenses under which the Open Source Software is licensed, the terms of such licenses will apply in lieu of these Terms and Conditions with respect to such Open Source Software, including without limitation any provision governing access to source code, modification or reverse engineering.

6. Limitations on Liability – Jacobs' liability under or arising out of or in connection with the use and performance of the Hybrid Optimizer shall be limited to and shall not exceed in the aggregate the total remuneration paid to Jacobs for the access to the Hybrid Optimizer.

7. NO WARRANTIES – THE HYBRID OPTIMIZER IS PROVIDED "AS IS" WITHOUT WARRANTY, EXPRESS OR IMPLIED, INCLUDING WARRANTIES ARISING UNDER STATUTE, WARRANTIES OF MERCHANTABILITY, ACCURACY, TITLE, NON-INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE OR ANY WARRANTIES ARISING FROM USAGE OF TRADE, COURSE OF DEALING OR COURSE OF PERFORMANCE. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, JACOBS SPECIFICALLY DOES NOT WARRANT THAT THE HYBRID OPTIMIZER WILL MEET THE REQUIREMENTS OF THE CITY OR OTHERS OR THAT THEY WILL BE ACCURATE OR OPERATE WITHOUT INTERRUPTION OR ERROR. THE CITY ACKNOWLEDGES THAT IN ENTERING THIS LICENSE IT HAS NOT RELIED ON ANY PROMISE, WARRANTY OR REPRESENTATION NOT EXPRESSLY SET FORTH HEREIN OR INCORPORATED INTO THIS LICENSE BY REFERENCE.