CITY OF ADELANTO REQUEST FOR PROPOSALS FOR

Professional Services Related to the Design Services for Adelanto Wastewater Treatment Plant Tertiary Improvements Project

RFP Release Date:

December 27,2024

Proposals Due:

January 23, 2025

1. PURPOSE

The City of Adelanto (City) is seeking qualified professional firms (Consultants) to submit a proposal to provide professional Design services to provide engineering design services resulting in the provision of tertiary treatment capabilities at the existing Adelanto Wastewater Treatment Plant (WWTP). Consultants who submit proposals for this project must have experience in providing similar services for other cities, agencies, and water districts.

This Request for Proposals (RFP) is expected to result in a contract (Professional Services Agreement) with a cost not to exceed the listed amount. The selected consultant shall perform the tasks specified in the "Scope of Work" section of the RFP. The consultant is encouraged to suggest additions or modifications to the scope that will enhance or clarify the requested services and the suggestions should be incorporated into the proposal.

The Department contact (Contact) for this Request for Proposal (RFP) is the sole point of contact for this procurement. All communication shall be in writing and submitted to the Contact as designated below. Consultants are not permitted to communicate with other Department/City staff or officials about this RFP, except during pre-proposal meetings and/or interviews, unless otherwise directed by the Contact. Direct written questions and/or correspondence related to this RFP to:

Brenda Lopez, City Clerk
E-mail: blopez@adlantoca.gov

Consultants interested in participating in this RFP should immediately provide the Contact with a telephone number, fax number, and an e-mail address for dissemination of addenda and/or supplemental information, as applicable. Failure to provide said contact information may result in late notifications and/or incomplete proposals.

A. Deadline for Submitting Questions

Any questions regarding the RFP must be submitted to the Contact referenced above no later than August 25, 2023. Reference the RFP Title when making inquiries.

B. RFP Schedule

Request for Proposals Released December 27, 2024
Deadline for Submitting Questions ..... January 20,2025
Deadline for Submitting Proposals* ..... January 23, 2025

*See Section 5 ‘Proposal Submission’ for additional details.

2. GENERAL

The City of Adelanto (City), California is located in the High Desert in the Victor Valley region of the Mojave Desert and is situated along the Highway 395 corridor, which was recently widened to help the with City’s expected growth over the next few years. Adelanto is a Charter City, and operates as a Council-Manager form of government with a five (5) member City Council.

The Adelanto Public Utilities Authority (City) is the sole agency for collecting, treating, and discharging wastewater within its service area through the Adelanto Wastewater Treatment Facility. The facility was upgraded from a treatment capacity of 1.5 million gallons per day (MGD) to its current capacity with a permit of 4MDG. However, the upgraded facility cannot successfully treat the city's wastewater to a quality suitable for industrial and tertiary.

The City of Adelanto currently serves nearly 36,000 people within its 53-square mile service area. The wastewater from Adelanto's water service area is collected and treated at the City-owned activated sludge wastewater treatment facility. The City's sewer system includes over 55-56 miles of gravity sewer lines, one lift station, associated force mains, and an existing wastewater treatment plant.

In 2022, the City treated a total metered wastewater volume of 3.015 MGD (million gallons per day). The quantities of wastewater generated are generally proportional to the population and water usage in the service area. It is estimated that the city's customers generate wastewater roughly proportional to 60 to 70 percent of the City's water demand.

The Mojave Basin, where the city is located, is a closed basin, and the remaining wastewater effluent is percolated to the groundwater basin, eventually reusing it as groundwater, benefiting the water supply for all regional water agencies.

The City of Adelanto supports the efforts of regional water management agencies to utilize recycled water in the High Desert region of San Bernardino County. The immediate goal for the upgraded wastewater treatment plant is to produce treated water meeting California's Title 22 requirements, which can be used for irrigation, construction, dust control, and other beneficial uses. The city’s ultimate plan is to produce recycled water that can be classified as fully recycled per California standards:
Water Boards Recycled Water Policy and Regulations | California State Water Resources Control Board.

The city is in the process of awarding a contract to increase the capacity at the WWTP, detail of which can be found here: https://vendors.planetbids.com/portal/62287/bo/bo-detail/124789

3. PURPOSE AND SCOPE

The purpose of this RFP is to find and select a qualified engineering consulting firm to provide professional Design services to design tertiary treatment capacity at the current WWTP, while considering the city's ultimate goal of creating fully recycled water in the future. The existing WWTP is located in the northeast corner of Jonathan Street and Auburn Ave. The location of the current WWTP is shown in Exhibit A.

The project scope includes the design service to implement the tertiary capability at the existing Adelanto WWTP upon completion of the optimization project.

The selected firm must be able to complete the entire scope of work. It is expected to have a bid ready package.

i. SCOPE OF SERVICES

The firm selected for this project will be required to provide equipment, materials, and labor to provide the following services:

- Prepare technical design report.
- Prepare Construction drawings and Specifications
- Provide Bidding Assistance.

The City's current WWTP operator prepared the attached technical memorandum (Exhibit C), describing the required scope of work, analysis and proposed next steps.
A brief description of the required elements of each scope of work task is described below:

a. Project Management and Meetings

Consultant will conduct project management, schedule and budget tracking, and invoicing to confirm that the project is progressing ahead on budget and schedule. Monthly project status reports highlighting the progress of each task, work planned for the coming month, data needs, key issues and important decision needs, updated project schedule and the status of the action items from the previous report are to be developed and submitted with the monthly invoice.

Kickoff and Progress Meetings

Consultant shall organize and attend one (1) project kickoff meeting with the Department. Consultant shall schedule to attend a monthly coordination meeting with weekly project updates via email and/or telephone to discuss budget, schedule, and project issues. Attend coordination meeting with other project stakeholders and agencies. Expect minimum, two (2) progress meetings with the Department after the kickoff meeting (60 percent and 90 percent complete) to resolve any questions or issues. Record all meeting minutes and submit a copy of minutes to the Department within three (3) working days after each meeting. Describe the total assumed number of meetings and associated hours in the proposal. Project status conference calls will be held as needed to address any questions or clarifications needed.

b. Prepare Preliminary Design Report

The selected firm prepare a draft and final preliminary design report that includes but not limited to design criteria, assumptions, site layouts, planning level cost estimates for the design, and timeline of design period. A review meeting with Department staff shall also be provided to review the draft report and preliminary layout sketches, design assumptions, design criteria and design options prior to issuance of the final preliminary design report. Assume five (5) hard copies of each report and one (1) electronic copy in PDF format of each report will be submitted.

c. Prepare Technical Plans, Specifications, and Engineer's Estimate

The selected firm will develop a set of detailed design drawings, specifications, and estimates for this project. Plans, specifications and estimates shall be submitted to the Department for review at 60%, 90% and 100% design stages. The 60%, 90% and 100% submittals shall include five (5) sets of drawings, specifications, supporting documents, and engineer's cost estimate for review.

Prepare detailed technical plans and specifications for the equipment that need to be purchase or replaced.

Prepare a planning level cost estimate (at each design stage) for the installation and improvements. The estimate is to be based on recent and competitive winning bids for similar projects and will include an itemized list of tasks and quantities required for the work.

d. Bidding Assistance

Attend a pre-bid meeting with interested contractors and Department staff at the beginning of the bidding process to discuss key issues in the technical specifications, and to answer all questions regarding, preliminary WWTP optimization design, schedule and other matters. During the bidding process,

respond to bidder's questions and prepare bid addenda as necessary. Once the bidding process is complete, review and evaluate all bids received and provide recommendations regarding contract award.

4. PROPOSAL REQUIREMENTS

Proposals should provide a straight-forward and concise presentation, adequate to satisfy the requirements of the RFP. Emphasis should be on completeness and clarity of contents. Responsiveness to the RFP will be a principal basis for evaluation.

The proposal shall be submitted via email in pdf format and shall be organized in an easy-to-follow layout. Proposals should be limited to thirty (30) 8½" x 11" pages (including the cover letter and resumes). Proposals must include, at a minimum, the following sections:

A. Cover Letter

A brief summary containing highlights of consultant's proposed approach to the services described in the RFP, including a statement of its understanding of the project and services required, signed by an individual authorized to bind the proposing firm stating the firm has read and will comply with all terms and conditions of the RFP.

B. Background on Firm

A brief description of the firm including the size of the organization, location of offices, years in business, organizational chart, name of owner and principal parties, and titles of staff. Qualifications of individuals who will perform the work listed in the Scope of Work along with identification of the individual who will be the Department's main contact.

If sub-consultant(s) are proposed, provide the name, address and telephone number of the sub-consultant, the type of work to be performed, and the percentage of the total work of the proposal.

Submit the name(s) of specific staff to be assigned to this project. Provide a work history resume for each of the key personnel, including applicable training, licensing, and/or certifications, descriptions of similar work, dates, and duties performed by the individual on the projects.

C. Statement of Understanding and Approach

Provide a description of the methodology the firm will use to complete the Scope of Work as detailed in this RFP. Discuss and describe the firm's experience working

on similar projects and provide a statement of the services your firm feels differentiates your firm from others. Additionally, as a part of the summary, identify the responsibilities of the Department and the responsibilities of the firm.

D. Scope of Work

Provide details with specific task descriptions to demonstrate that the proposer has considered all aspects of the proposal and that the proposer will cover them thoroughly.

E. Project Schedule

Provide a project schedule with significant milestone events or deadlines. Scheduling milestones should be concrete and achievable; however, they may be revised on approval of both parties. The City desires to complete the design drawing within 4 months upon being awarded.

F. References

Provide the following information for five (5) projects which are similar in scope to the project requested by this proposal:

- Name, address, and telephone number of the client
- Person to contact for references
- Time period of project and brief description of the services provided

G. Additional Information

The Department has outlined the requirements of this project in as much detail as is currently known. Respondents may add information not requested in this RFP, but the information should be in addition to, not instead of, the requested information and format. Please provide any exceptions, additional information, or suggestions that will aid in the selection process (attachments are acceptable). Please keep these as brief as possible. This information should be included in the thirty (30) pages allocated.

H. Cost Estimates of Consulting Fee

Each proposal shall include a cost estimate for providing services. Estimated costs must include all labor, materials, equipment, professional services, insurance, travel, profit, and all other costs and expenses for the proposed project with a total "not to exceed" amount.

A detailed man-hour estimate by personnel classification for the major portions of the work broken down through each of the tasks. Provide sub-consultant fee

proposals if any. All current hourly fee schedules should be based on the consultant's current fee schedule.

5. PROPOSAL SUBMISSION

The deadline for submitting a proposal via email is **5:00 pm on January 20, 2025**. Any proposals received after this time will not be considered as eligible.

Proposal submittals shall comply with all conditions, requirements and specifications contained herein, with any departure constituting sufficient cause for rejection of the proposal at the City's sole discretion. All submittals received shall become the property of City and will not be returned.

Proposals must be submitted electronically to: Brenda Lopez, via email at: blopez@adelantoca.gov no later than 5 pm. on January 23, 2025. Please note, files larger than 15 MB may not be delivered.

6. EVALUATION CRITERIA

The City intends to engage the most qualified consultant available for this assignment. Therefore, it is imperative that the consultant's proposal fully address all aspects of the RFP. Proposals submitted will be evaluated by a committee comprised of Department staff. The committee's evaluation will be based upon, but not limited to the following criteria:

- Past performance and qualifications of the proposed team members on similar projects (20 points).
- Familiarity with and capacity to handle all aspects of the work (15 points).
- Ability to complete the project within an expedited time frame (10 points).
- The proposed project approach, scope, manner, and thoroughness in which it is presented in the proposal (25 points).
- Firm's experience, staff availability and stability (15 points).
- Consultant Fees (15 points).

The City will select the proposal that best meets its needs and no one criterion will be determinative. While cost is a key consideration, the City reserves the right to choose the best proposal, which may not be based on price. After evaluating the proposals, the City reserves the right to further negotiate the proposed work and/or method and amount of compensation. The consultant must clearly state the period of time for which the proposal will be valid. This period must not be less than ninety (90) days from the date of submittal.

The City shall not be liable for any pre-contractual expense incurred by the consultant. The City exercises its discretion in selecting a firm or individual that presents the proposal that, in sole judgment of the City, best serves the interest of the City. The City reserves the right to waive minor irregularities in any proposal, reject any proposal that fails to meet the proposal requirements in any respect, to reject all proposals for any reason or to cancel in part or in its entirety the RFP.

The consultant selected will execute an Agreement for Professional Services (Agreement) with the City that will cover term, insurance, indemnity, task orders, and other global issues. The City Agreement for Professional Services is attached (Exhibit B) for review and comments. Please indicate if the proposed agreement is acceptable to your firm and, if not, what specifically is not acceptable with your firm's proposed changes.

7. QUESTIONS & NON-MANDATORY SITE VISIT

All questions regarding this RFP shall be submitted by email to: Saba Engineer, via email at: Blopez@adelantoca.gov no later than 5 pm on November 25, 2024.

8. GENERAL ADMINISTRATIVE INFORMATION

- Each respondent understands and agrees that the City, its departments, their officers, employees or agents shall not be liable for:
  - Any costs incurred by a respondent in the preparation, delivery or presentation of a proposal.
  - Any costs incurred by a respondent in meeting the criteria as a result of making or submitting a proposal or subsequently in entering into a formal agreement with the City; and
  - Any errors, inaccuracies or misstatements related to the information or data supplied to any consultant by the City. The use of such information or data provided by the City, its officers, employees or agents is intended to be used at the sole discretion and risk of the firm in the preparation of a proposal pursuant to this RFP only.
- The selected firm shall comply with any and all applicable Federal and State laws pertaining to employment.
- The City reserves the right to accept, reject, modify or cancel in whole or in part, this RFP.
- The City reserves the right to accept or reject any or all proposals, negotiate modifications to proposals that it deems acceptable, to request and consider additional information from any proposer, and to waive minor irregularities and technical defects in this proposal process. The City reserves the right to seek new proposals when it determines that it is in the best interest to do so.

9. TO WITHDRAW

The City reserves the right to withdraw this RFP without prior notice. The City makes no representation that any agreement will be awarded to any firm as a result of having responded to this request. The City expressly reserves the right to reject any and all proposals in response to this RFP without indicating a reason for such rejection. All costs incurred in the preparation of the proposal, submission of information and/or selection of a proposal prior to the award and/or execution of a signed contract shall be borne by respondent. All proposals submitted to the City in response to this RFP shall become the property of the City, shall be considered public information, and will not be returned.

10. ATTACHMENTS

Exhibit A –Current WWTP Site Location
Exhibit B – Sample Professional Services Agreement
Exhibit C – Technical Memorandum

Thank you for your interest in working with the City of Adelanto for this service. We look forward to receiving your proposal.

EXHIBIT A

Current WWTP SITE LOCATION



<u>Location Map</u>
19101 Jonathan Street
Adelanto, California 92301

EXHIBIT B

CITY OF ADELANTO
PROFESSIONAL SERVICES AGREEMENT

CITY OF ADELANTO
AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT made and entered into this ____ day of _____, 2025, by and between the **City of Adelanto**, hereinafter called "**City**", and _____, hereinafter called the **"Consultant"**.

RECITAL

1. Purpose

The purpose of this Agreement is to allow City to procure the service of a professional firm to provide _____for _____(the "Project").

TERMS AND CONDITIONS

2. Mission

City hereby retains Consultant in the capacity as Consultant for provision of services described in Exhibit A. Consultant hereby accepts such responsibility as described herein.

3. Terms

This Agreement shall commence as of the day and year first above shown and shall remain in full force and effect and ongoing until the completion of the Project, unless sooner terminated as provided herein.

4. Consultant Responsibilities

The Consultant represents and maintains that he and his employees are skilled in the professional calling necessary to perform all services, duties and obligations required by this Agreement to fully and adequately complete the Project. The Consultant shall perform the services and duties in conformance to and consistent with the highest level of skill and care generally recognized as being employed by professionals in the same discipline in the State of California, and the Consultant expressly warrants that the work to be performed pursuant to this Agreement shall be performed in accordance with that standard. The Consultant further represents and warrants to the City that it has all licenses, permits, qualifications and approvals of whatever nature which are legally required to practice his profession and to perform the services required by this Agreement, and that he shall keep all such licenses and approvals in effect during the term of this Agreement. Consultant shall obtain and maintain a City of Adelanto Business License during the performance of this Agreement.

In the performance of this Agreement, Consultant shall abide by and conform to any and all applicable laws of the United States, the State of California, the Adelanto Municipal Code and ordinances of the City. Consultant warrants that all work done under this Agreement will be in strict compliance with all applicable safety rules, laws, statutes, ordinances, regulations and practices. Where approval by the City or other representatives of the City is indicated, it is understood to be conceptual approval only and does not relieve Consultant of responsibility for complying with all laws, codes and industry standards, or from liability for damages caused by negligent acts, errors, omissions, noncompliance with industry standards, or misconduct of the

Consultant or its sub-consultants or specialty contractors, if any.

Upon the request of the City Manager, or his/her designee, Consultant shall complete the work program described in each estimate submitted. Consultant commits the principal personnel listed below to the Project for its duration:

PROFESSIONAL

_____
_____

5. Replacement of Named Personnel

It has been determined that the individuals(s) named in this Agreement are necessary for the successful performance of this Agreement. No replacement of these individuals(s) shall be made by Consultant without written consent of City, which shall not be unreasonably withheld. The consent of the City shall be given in writing within ten (10) days of the receipt of written notice from the Consultant of the intent to replace personnel. If City fails to respond to Consultant within ten (10) days of notification by Consultant, said personnel replacement shall be deemed approved.

6. Release of News Information

No news release, including photographs, public announcements or confirmation of same, of any part of the subject matter of this Agreement or any phase of any program hereunder shall be made without prior written approval of the City Manager or his/her designee.

7. Confidentiality of Reports

Consultant shall keep confidential all reports, information and data received, prepared or assembled pursuant to performance hereunder and that City designates as confidential. Such information shall not be made available to any person, firm, corporation or entity without the prior written consent of City.

8. Ownership of Documents

All draft and final reports, plans drawings, studies, maps, photographs, specifications, data, notes, manuals, warranties and all other documents of any kind or nature prepared, developed or obtained by Consultant in connection with the performance of services assigned to it by City shall become the sole property of City, and Consultant shall promptly deliver all such materials to City. At the City's sole discretion, Consultant may be permitted to retain original documents, and furnish reproductions. If City uses such documents for any purpose other than for which they were prepared without Consultant's prior written approval, City hereby waives any claims against Consultant and will hold Consultant harmless from any claim or liability for injury or loss arising from City's unauthorized use.

Subject to applicable federal and state laws, rules and regulations, City shall hold all intellectual property rights to any materials developed pursuant to this Agreement. Consultant shall not use for purposes other than the performance of this Agreement, nor shall Consultant release, reproduce, distribute, publish, adapt for future use or any other purposes, or otherwise use, any data or other materials first produced in the performance of this Agreement, nor authorize

others to do so, without the prior written consent of City.

9. Prohibited Interests

Consultant maintains and warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for the Consultant, to solicit or secure this Agreement. Further, the Consultant warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for the Consultant, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement.

For breach or violation of this warranty, the City shall have the right to rescind this Agreement without liability, or, at its discretion, to deduct from the Agreement price or consideration, or otherwise recover, the full amount of such fee, commission, percentage, brokerage fee, gift or contingent fee.

10. Conflict of Interest

For the term of this Agreement, no member, officer or employee of the City, during the term of his or her service with the City, shall have any direct interest in this Agreement, or obtain any present or anticipated material benefit arising therefrom.

For purposes of this Agreement, Consultant shall be considered a “consultant,” subject to the reporting and disclosure obligations under the Political Reform Act (Government Code Sections 81000 et seq.), and City ordinances and resolutions adopted pursuant thereto.

11. Conflict of Employment

Employment by Consultant of personnel on the payroll of the City shall not be permitted in the performance of services under this Agreement, even though such employment may occur outside of the employee’s regular working hours or on weekends, holidays or vacation time. Further, the employment by the Consultant of personnel who have been on the City’s payroll within one year prior to the date of execution of this Agreement, where this employment is caused by and or dependent upon the Consultant securing this or related agreements with the City, is prohibited.

12. Equal Employment Opportunity

The Consultant represents that it is an equal opportunity employer and it shall not discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, sex, sexual orientation, physical or mental disability, special disabled veteran status, marital status, age, or any other protected classification. These principles are to be applied by Consultant in all employment practices including recruiting, hiring, transfers, promotions, training, compensation, benefits, layoffs and terminations. Consultant agrees to comply with Title VII of the Civil Rights Act of 1964, as amended, the California Fair Employment Practices Act, the Americans with Disabilities Act of 1990, and any other federal and state laws and regulations in effect or hereinafter enacted.

13. Drug Free Workplace

Consultant agrees to comply with the City’s Drug Free Workplace policy.

14. Compensation

During the term of this Agreement, City shall pay Consultant the fee described in Exhibit "A", the program budget. Said compensation shall be considered full and complete reimbursement for all of the Consultant's costs associated with the services provided hereunder. The maximum compensation for services, including all Consultant's costs, under the terms of this Agreement, shall not exceed the maximum of $ _____.

Consultant shall be paid in accordance with City's standard accounts payable system. Invoices shall be approved by the City Manager or his/her designee prior to payment.

Consultant shall perform the Project services in a prompt and timely manner which will allow the satisfactory completion of the Project within the time schedule required by the City. In the event that the Consultant determines that a schedule modification is necessary, the Consultant shall promptly submit a revised schedule for approval by the City. Performance of any services under this Agreement may be delayed by mutual written agreement of the parties. Upon such agreement, the Consultant's schedule for completion of the tasks affected by such delay shall be extended as necessary by the City. The Consultant shall take all reasonable steps to minimize delay in completion, and additional costs, resulting from such extension.

15. Right to Audit

City or any of its duly authorized representatives shall have access to any books, documents, papers and records of Consultant and/or its subcontractors which are pertinent to the specific program hereunder for the purpose of making an audit, an examination, excerpts and transcriptions. All books, records and supporting detail shall be retained for a period of five (5) years after the expiration of the term of this Agreement, or any extension thereof, or for any longer period of time as required by law.

16. Audit Exceptions

Consultant agrees that in the event the program established hereunder is subjected to audit exceptions by appropriate audit agencies, it shall be responsible for complying with such exceptions and paying City the full amount of liability resulting from such audit exceptions.

17. City Support

City shall provide Consultant with any plans, publications, reports, statistics, records or other data or information pertinent to the services to be provided hereunder which are reasonably available to City.

18. Independent Contractor

Consultant shall perform the services as contained herein as an independent contractor and shall not be considered an employee of City or under City supervision or control. This Agreement is by and between Consultant and City, and is not intended, and shall not be construed, to create the relationship of agent, servant, employee, partnership, joint venture, or association, between City and Consultant. Consultant shall pay all wages, salaries and other amounts due such personnel in connection with their performance of services and as required by law. Consultant shall be responsible for all reports and obligations respecting such personnel,

including but not limited to, social security taxes, income tax withholdings, unemployment insurance, and workers' compensation insurance.

19. Prevailing Wages

Consultant is alerted to the requirements of California Labor Code Sections 1770 et seq. which would require the payment of prevailing wages, where the services or any portion thereof are determined to be a public work, as defined therein. Consultant shall defend, indemnify and hold harmless the City, its officers, employees, consultants and agents from any claim or liability, including without limitation, penalties, interest and/or attorneys' fees, arising from any failure or alleged failure of Consultant to comply with California Labor Code Sections 1770 et seq.

20. Conflict of Interest

Consultant represents, warrants and agrees that it does not presently have, nor will it acquire during the term of this Agreement, any interest direct or indirect, by contract, employment or otherwise, or as a partner, joint venture or shareholder (other than as a shareholder holding a one percent [1%] or less interest in publicly traded companies) or affiliate with any business or business entity that has entered into any contract, subcontract or arrangement with City. Upon execution of this Agreement and during its term, as appropriate, Consultant shall upon written request, disclose in writing to City, any other contractual or employment arrangement from which it receives compensation. Given that the services Consultant performs for City relate to economic development, Consultant agrees not to accept employment during the term of this agreement by any other person, business or corporation which employment is likely to directly develop a conflict of interest over a specific business attraction or retention effort.

21. Successor and Assignment

The services as contained herein are to be rendered by Consultant whose name is as appears first above written and said Consultant shall not assign nor transfer any interest in this Agreement without the prior written consent of City, which consent may be withheld for any reason or for no reason at all, in the City's sole discretion.

22. Indemnification

Consultant agrees to indemnify, defend (upon request by City) and save harmless City, its elected and appointed officials, officers, agents and employees from and against claims of bodily injury, death, personal injury or property damage and related expenses (including attorney's fees), arising from or connected with the services performed by or on behalf of Consultant by any person pursuant to this Agreement. The indemnification provision does not apply to professional (Errors & Omissions) liability.

23. Insurance

Without limiting Consultant's indemnification of City, Consultant shall procure and maintain at all times during the life of this Agreement, a program of insurance against claims for injuries to persons or damages to property which may arise from or in connection with performance of the work hereunder by Consultant, its officers, representatives, agents or employees. Consultant acknowledges that Section 3700 of the California Labor Code requires all employers to be insured against liability for

workers' compensation or undertake self insurance in accordance with the provisions of that Code Section. Consultant shall, prior to commencement of work pursuant to this Agreement, obtain all insurance required hereunder from a company or companies acceptable to City Manager.

a. Minimum Scope of Insurance

Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage (Occurrence Form CG 0001).

2. Insurance Services Office Form Number CA 0001 (Ed. 1/87) covering Automobile Liability, Code 1 (any auto).

3. Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance.

4. Errors and Omissions liability insurance appropriate to Consultant's profession.

b. Minimum Limits on Insurance

Consultant shall maintain limits of no less than:

1. General Liability: $1 million per occurrence for bodily injury, personal injury and property damage for products/completed, operations and any other activities undertaken by Consultant pursuant to this Agreement.

2. Automobile Liability: $1 million per accident for bodily injury, death and property damage insuring against liability arising out of the use of any vehicle.

3. Workers' Compensation insurance as required by the State of California.

4. Employer's Liability: $1 million per accident for bodily injury or disease.

5. Errors and Omissions Liability: $1,000,000 per occurrence insuring against any liability arising out of professional errors and/or omissions ("malpractice").

Modifications to the above noted minimum insurance limits may only occur upon concurrence of both parties to this Agreement, confirmed in writing by Consultant and City Manager.

c. Deductibles and Self-Insured Retentions

Any deductibles or self-insured retention's must be declared to and approved by City Manager. At the option of the City Manager, either:

1. The insurer shall reduce or eliminate such deductibles or self-insured retention's as respects the City, its elected and appointed officials, officers, agents and employees; or

2. The Consultant shall provide a financial guarantee satisfactory to the City Manager guaranteeing payment of losses and related investigations, claim administration and defense expenses.

d. Other Insurance Provisions - Commercial General and Automobile Liability

The commercial general liability and automobile liability policies are to contain, or be endorsed to contain, the following provisions:

1. The City, its elected and appointed officials, officers, agents and employees are to be covered as insured with respect to:

(i) liability arising out of work or operations performed by or on behalf of the Consultant; or

(ii) automobiles owned, leased, hired or borrowed by the Consultant.

2. For any claims related to Consultant's services rendered pursuant to this Agreement, the Consultant's insurance coverage shall be primary insurance as respects the City, its elected and appointed officials, officers, agents and employees. Any insurance or self-insurance maintained by the City, its elected and appointed officials, officers, agents and employees shall be excess of the Consultant's insurance and shall not contribute with it.

3. Each insurance policy required by the clause shall be endorsed to state that coverage shall not be reduced or canceled by either party, except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the City Manager.

4. Consultant's insurance shall specify that:

(i) it applies separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability;

(ii) any failure to comply with reporting or other provisions of the required policy, including breaches of warranty, shall not affect the coverage required to be provided;

(iii) the insurer waives all rights of subrogation against any of the named additional insured; and

(iv) all costs of adjusting and/or defending any claim against any insured, including court costs and attorney's fees, shall be paid in addition to and shall not deplete any policy limits.

e. Other Insurance Provisions - Workers' Compensation and Employer's Liability

The following provisions apply to Consultant's workers' compensation and employer's liability insurance:

1. Such policies may be subject to deductible or retention in an amount acceptable to the City Manager.

2. If a "claims made" policy is provided, such policy shall be maintained in effect from the date of performance of work or services hereunder until three (3) years after the date the work or services are accepted as completed. Coverage for the post-completion period may be provided by renewal or replacement of the policy for each of the three (3) years or by a three (3) year extended reporting period endorsement which reinstates all limits for the extended reporting period. If any such policy and/or policies have a retroactive date, that date shall be no later than the date of first performance of work or services hereunder. Renewal or replacement policies shall not allow for any advancement of such retroactive date. Each such policy or policies shall include a standard "notice of circumstances" provision.

f. Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII, unless the City Manager approves, in writing, insurers with a lower A.M. Best rating.

g. Verification of Coverage

Consultant shall furnish the City Manager with original certificates and amendatory endorsements effecting coverage required by this clause. The Endorsements should be on forms provided by the City Manager or on other than City's forms provided those endorsements conform to the requirements of the City Manager. All certificates and endorsements are to be received and approved by the City Manager before work commences. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements effecting the coverage required by these specifications at any time. Notwithstanding the above, if the life of this Agreement shall extend beyond one (1) year, Consultant shall provide City with certificate, amended endorsements or complete certified copies of required insurance policies evidencing renewal of the required policies of insurance prior to beginning of any subsequent year of services pursuant to this Agreement.

h. Failure to Provide or Maintain Insurance

Failure on the part of Consultant to procure or maintain required insurance shall constitute a material breach of this Agreement upon which City may immediately terminate this Agreement.

24. Compliance with Laws

The parties agree to be bound by applicable federal, state and local laws, regulations and directives as they pertain to the performance of this Agreement.

25. Non-Discrimination

In the fulfillment of the program established under this Agreement, either as to employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other terms of compensation, selection for training, including apprenticeship or participation in the program or the receiving of any benefits under the program, Consultant agrees not to discriminate nor to allow any subcontractor to discriminate on the basis of race, color, creed, religion, natural origin, ancestry, sex, age, marital status or physical disability.

26. Severability

In the event that any provision herein contained is held to be invalid, void or illegal by any court of competent jurisdiction, the same shall be deemed severable from the remainder of this Agreement and shall in no way affect, impair or invalidate any other provision contained herein. If any such provision shall be deemed invalid due to its scope or breadth, such provision shall be deemed valid to the extent of the scope or breadth permitted by law.

27. Interpretation

No provision of this Agreement is to be interpreted for or against either party because that party or that party's legal representative drafted such provision, but this Agreement is to be construed as if it were drafted by both parties hereto.

28. Entire Agreement

This Agreement supersedes any and all other agreements, either oral or in writing, between the parties hereto with respect to the retention of Consultant by City and contains all the covenants and agreements between the parties with respect to such retention.

29. Waiver

No breach of any provision hereof can be waived unless in writing. Waiver of any one breach of any provision shall not be deemed to be a waiver of any other breach of the same or any other provision hereof.

30. Contract Evaluation and Review

The ongoing assessment and monitoring of this Agreement is the responsibility of the City Manager or his/her designee.

31. Termination

This Agreement may be terminated by either party by giving written notice at least ten (10) days prior to the effective termination date in the written notice.

32. Notice

Notices, herein shall be presented in person or by certified or registered U.S. mail, as follows:

To Consultant: _____
_____
_____
_____

To City: City of Adelanto
11600 Air Base Road
Adelanto, CA 92301
Attn.: City Manager

Nothing in this paragraph shall be construed to prevent the giving of notice by personal

service.

33. Entire Agreement

This Agreement with attachments constitutes the entire understanding and agreement of the parties.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the day and year first above shown.

CONSULTANT

By: _____

Title: _____

APPROVED AS TO FORM:

By: _____
City Attorney

CITY OF ADELANTO

By: _____
Mayor

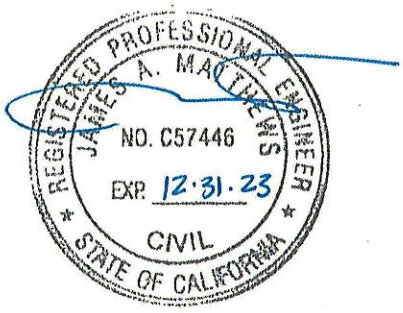
Attest:
By: _____
City Clerk

EXHIBIT C

Technical Memorandum

PACE
Advanced Water Engineering

Technical Memorandum



Date: Rev. May 5, 2023

To: Mr. Bob Nespeca - PERC Water

From: James Matthews, PE & Felicia Carlander, EIT - PACE

Re: Adelanto WWTP – Performance Optimization Testing Summary of Findings #B810

1.1 INTRODUCTION

In 2012, the Adelanto Public Utility Authority (APUA) contracted with PERC Water and PACE to provide Design/Build services to rehabilitate and increase the capacity of the existing Adelanto Wastewater Treatment Plant (Adelanto WWTP). The original facility had an Average Annual Day Flow (AADF) capacity of 1.5 MGD with a Peak Day Flow (PDF) capacity of 2.5 MGD. By upgrading the existing headworks, secondary aeration Biolac basins, adding flow equalization within the Biolac basins, installing new aeration blowers and constructing two new 70' diameter secondary clarifiers, the facility capacity was increased to its current AADF of 3.0 MGD and MDF of 4.0 MGD. The current effluent discharge permit, issued by the Regional Water Quality Control Board (RWQCB), provides for a discharge of up to 4.0 MGD Maximum Monthly Day Flow (MMDF) and 6.0 MGD Maximum Day Flow (MDF). Below is an excerpt from the current Discharge Permit:

I. FLOW LIMIT
After completion of Facility upgrades, the treatment plant capacity will be rated at 4 MGD, and influent flows to the Facility must not exceed a monthly average of 4 MGD. The maximum daily flow must not exceed 6 MGD.

II. DISCHARGE EFFLUENT LIMITS
A. Effluent Limits
1. All wastewater treated by the Facility and discharged to the percolation pond Nos. 1, 4, 5, and 9 must meet the following effluent limits.

Constituents	Units	30 day Mean	Daily Maximum
Biochemical Oxygen Demand	mg/L	15	30
Methylene Blue Active Substances	mg/L	1	2
Total Nitrogen	mg/L	10	---

2. All wastewater discharged to the authorized percolation ponds must have a pH between 6.0 and 9.0.
3. All wastewater discharged to the authorized percolation ponds must have a dissolved oxygen concentration of not less than 1 mg/L.

B. The emergency pond may receive influent, partially treated wastewater, or effluent. Influent and partially treated wastewater (effluent) must be returned to the headworks for full treatment. Any fully treated wastewater that may be placed into the emergency pond must be sampled, tested and shown to meet effluent requirements prior to being discharged into any percolation pond.

The emergency pond sampling must consist of 4 grab samples, one from each side of the emergency pond, composited into one sample. The following are the applicable effluent limits for the emergency pond to discharge to the percolation ponds: total nitrogen of 10 mg/L, biochemical oxygen demand of 30 mg/L and methylene blue active substances of 2 mg/L.

Based on flow and loading studies conducted in 2022 by Stantec for APUA, the facility received an influent AADF of approximately 2.9 MGD, with an anticipated increase of approximately 0.1 MGD per year, based on projected future service connections. With the plant currently operating near its average design rate (3.0 – 3.1 MGD) with two BOD violations (March 2022), APUA commissioned a Treatment Plant Capacity Assessment, which was recently completed by Stantec (2022). The Capacity Assessment, based on current operation of the facility, confirmed the design capacities indicated above and provided recommendations for several interim improvements that could be made to increase the average operating capacity, while the Authority plans for the next expansion.

As the Design/Builders and current operators of the facility, APUA requested PERC Water review the Treatment Capacity Assessment to identify additional operational changes that could be made to optimize the existing facility; and to performance-test the operational changes, as well as some of the recommendations from the Stantec assessment. This Technical Memorandum serves to summarize the operational improvements identified, the results of the performance testing of the proposed optimization and recommendations for implementing both physical and operational improvements.

1.2 BACKGROUND

Based on a review of the information provided in the Stantec Assessment and additional data provided by PERC Water's operational staff, PACE conducted initial field observations and interviews to confirm current operating conditions in December and January of this year. From these field observations, PACE concluded that the existing WWTP may be able to achieve a MMDF capacity of as much as 4.0 MGD with some equipment additions / modifications and optimization of the current processes. The identified limiting factors include:

(1) Potential reduced nitrification / denitrification efficiency based on current Biolac air-chain control settings
(2) Limitation of aeration blower capacity, due to local performance limits set on the existing blowers
(3) Suboptimal performance and consistency in settleability in the secondary clarifiers limiting flow / solids capacity
(4) Reduced RAS flow capacity due to worn RAS/WAS pump impellers
(5) Inefficient RAS return flow rate due to clarifier sludge blanket depth imbalance
(6) Inefficient RAS mass return rate due to operation of the RAS system using fixed Flow Control vs Influent Ratio Control (related to Item 5).

PACE concluded that optimization of the Biolac basins, by increasing aeration capacity, improving RAS mass return and optimizing anoxic / oxic cycling, will provide the biological treatment capacity to accommodate increased flows. Additionally, by improving the biological process efficiency, settleability performance and consistency in the clarifiers should improve. Finally, clarifier performance can be consistently improved under all flow conditions using cationic polymer addition at the clarifier feed well when treating over 3.0 MGD.

PERC Water and PACE initiated a pilot testing program to physically evaluate proposed operational improvements and their impact to capacity of the facility. These included:

(1) Re-configure and re-program the Biolac aeration chain controls on the South Biolac basin to better distribute the oxic and anoxic zones and improve mixing and consistency of solids feed to the secondary clarifiers. After implementation; study the effects on settleability and secondary water quality.
(2) Testing the existing blower and Biolac aeration systems to determine if the additional air, made available through changes to the local blower programming, can be affectively delivered using the existing aeration diffuser system. If successful, assess the increase in aeration capacity provided by allowing the existing blowers to operate at full capacity as well as potentially adding an additional fourth blower.
(3) The design and installation of a temporary cationic polymer injection system on the South secondary clarifier to test polymer addition and its ability to improve overall settleability and consistency in clarifier performance.
(4) Provide a field flow test using newly rebuilt RAS/WAS Pump 2 to determine field RAS/WAS pump capacity.
(5) Assess installation of field instrumentation (solids meters, sludge blanket detectors and automated underflow valve controls) to balance and optimize sludge concentration and mass return.

Testing and observations were initiated at the end of January and completed at the beginning of March, 2023. The following summarizes the testing and our findings.

1.3 BIOLAC BASIN MODIFICATIONS

1.3.1 Current Operation of the Biolac Basins

The existing Biolac Wave-Ox system is a preparatory activated sludge secondary treatment process supplied by the Parkson Corporation, which consists of large lined aeration basins with multiple aeration chains spanning across the width of the basin. Each chain can be individually turned ON or OFF and sequenced with other chains, so as to create oxic and anoxic mixing zones. Wastewater flows in one end of the basin and treated effluent, as Mixed Liquor Suspended Solids (MLSS), discharges out the opposite end. Below is a typical schematic of the Parkson Wave-Ox system for reference.

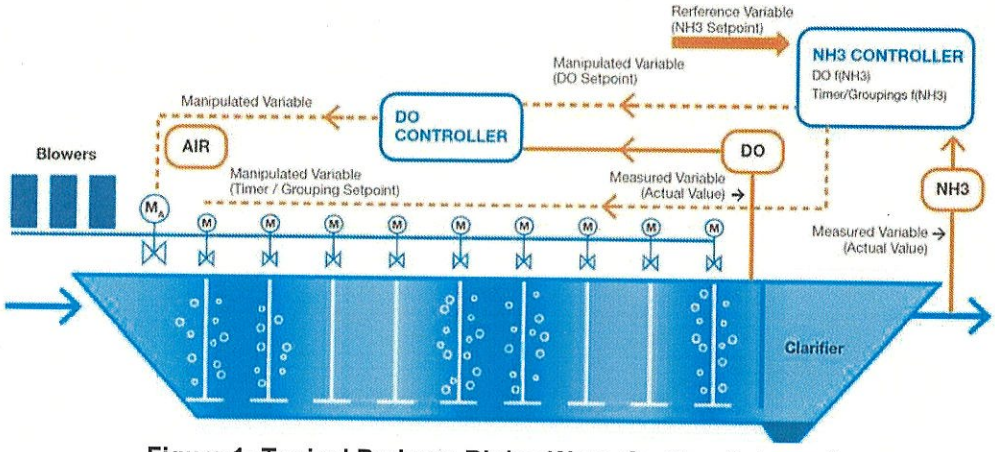


Figure 1: Typical Parkson Biolac Wave-Ox Plus Schematic

The Adelanto WWTF has two (2) Biolac basins, which are designed with eleven (11) air chains each, operating on a standard Wave-Ox control system (no online ammonia controller). The first air chain in each basin is always ON. This provides immediate re-oxygenation to the mixture of raw wastewater and Return Activated Sludge (RAS) from the secondary clarifiers. The remaining aeration chains are alternating between ON and OFF (assigned to 'Group A' or 'Group B' respectively) with each group assigned a block of five (5) air chains (I.E. Group A = Chains 2-6 / Group B = Chains 7-11). Each ON / OFF cycle is operated at between 20-30 minutes. The Dissolved Oxygen (DO) of the basin is continuously measured with a HACH LDO probe, located in the outlet structure on the downstream end of each basin. (See Figure 2)

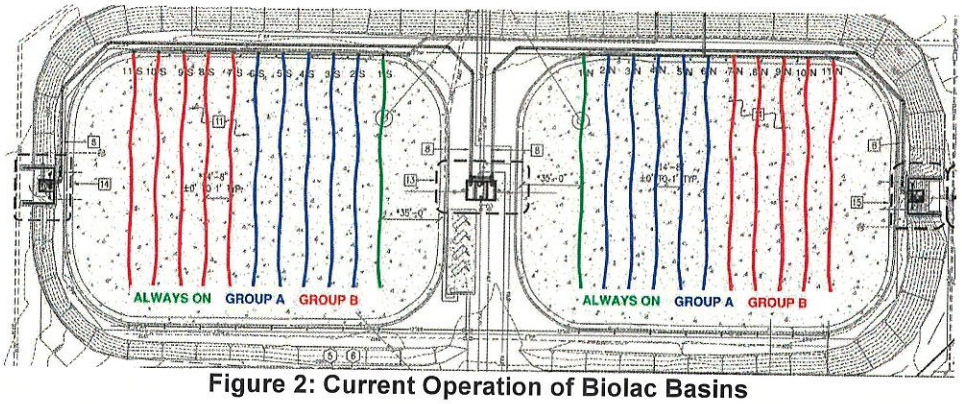


Figure 2: Current Operation of Biolac Basins

While the treatment plant effluent is currently in compliance for Ammonia, Nitrate and Total Nitrogen, cycling the large blocks of air chains within an extended period of time appears to create treatment inefficiencies and slug loading of solids to the secondary clarifiers. Observed conditions indicate that significant settling

occurs within the basin after approximately 5-10 minutes upon turning off the air. This leads to essentially clear liquid exiting from the top of the basin, over the outlet weir, for a period of 20-25 minutes each cycle. When the air is turned back on, the settled contents is re-suspended and solids flow out to the clarifiers again. While this likely has little effect on the biological treatment process as a whole, it does create pulses of solids to the secondary clarifiers. These pulses present themselves as rings of alternating clear and settling solids, traveling from the clarifier inlet well to the effluent launders.

Additionally, the large-block air chain sequence may also provide a path for wastewater to short-circuit across the basin top surface, as water entering the first group of chains may not be aerated and travel to the second group of air chains at approximately the same time as they turn off, resulting in no aeration being applied to this water. This condition presents itself in review of the trending on the outlet DO of each basin, particularly during periods of daily high inflow.

Lastly, the current air chain sequence creates considerable potential for Low DO Bulking conditions, particularly during periods of low water temperature, which can lead to pour settleability in the secondary clarifiers. Photo documentation, taken prior to and during performance testing, showed that the native Mixed Liquor Suspended Solids (MLSS) was somewhat dispersed with pour flocculating characteristics.

1.3.2 Modified Operation of the Biolac Basins

To determine the effects on treatment performance due to modifying the air chain sequencing, PACE provided two (2) alternate air chain sequences, to be applied on the South Biolac Basin, while maintaining the North Biolac Basin with its current sequence. PACE provided temporary PLC programming modifications as well as installation of an online continuous multi-parameter water quality probe. The In-Situ Aquatrol 500 was equipped with DO, Nitrirate, Temperture and Turbidity (TSS) and installed in the South Biolac Basin outlet structure, directly adjacent to the existing HACH LDO probe.

Sequence 1 used the existing Wave-Ox program and settings, but modified the Group assignments as follows (See Figure 3):

a. Chain 1 was kept unchanged - Continuously ON.
b. Chains 2-4 and 8-9 were designated as Group A.
c. Chains 5-7 and 10-11 were designated as Group B.
d. The cycle time was maintained as before (25 minutes).
e. Blower and DO control settings were unchanged.

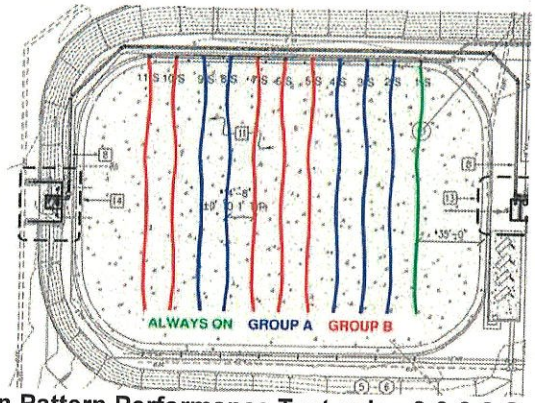


Figure 3: Aeration Pattern Performance Test using 3-3-2-2 Grouping vs. 5-5 Grouping

This sequence provides better dispersion of the delivered air, reduces short-circuiting potential and reduces Low DO Bulking potential.

Sequence 2 used a modified Wave-Ox program and settings in which a block of five (5) air chains was cycled through the basin in a "continuous loop", starting from the outlet to the inlet, simulating a sweeping pattern (See Figure 4).

a. Chain 1 was kept unchanged - Continuously ON.
b. 5 Chains were designated to be ON with 5 Chains Off.
c. The cycle time was maintained as before (25 minutes) with chains advancing at each cycle interval.
d. Blower and DO control settings were unchanged.

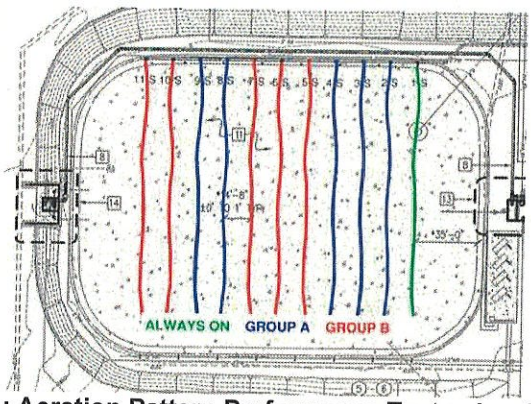


Figure 4: Aeration Pattern Performance Test using Sweeping Loop

This sequence uses the same 5 ON / 5 OFF operation as the current sequence, but eliminates short-circuiting potential.

Based on the testing results presented below, Sequence 1 achieved better biological performance and improved visual settleabilty, while Sequence 2 lead to reduced biological nutrient removal performance with no apparent improvement in settleability. In our opinion, this was primarily due to the fact that the cycle time was not reduced to compensate for the sweeping pattern, which lead to OFF periods that lasted an average of 2 hours (5 x 25 minutes) vs 25 minutes. If the cycle time had been adjusted to 5 minutes, we believe the performance of Sequence 2 would have been equal to or better than Sequence 1.

Therefore, it was concluded that operating in Sequence 1 provides performance benefits over both the current and Sequence 2 operation, as observed, and that Sequence 2 should be re-evaluated at a later date to see if it provides additional benefits. The increased performance, while using Sequence 1 in the South Basin, was apparent enough that the control for the North basin was updated to operate on Sequence 1 as well. Both Biolac basins were thus operated with a modified aeration pattern during the extent of the performance testing of the secondary clarifiers.

1.3.3 Summary of Testing Timeline

Table 1 below shows a summary of the testing timeline. A detailed list of the operational information during the testing period was provided by the plant operations staff and is included in Appendix E.

Table 1: Summary of Testing Timeline.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1/22	1/23	1/24	1/25	1/26 *South Biolac Basin Aeration Pattern updated to test protocol.*	1/27 *Insitu WQ probe not recording.*	1/28 *Insitu WQ probe not recording.*
1/29 *Insitu WQ probe not recording.*	1/30 *Insitu WQ probe not recording.*	1/31 *Insitu WQ probe not recording.*	2/1 *Insitu WQ probe not recording.*	2/2	2/3	2/4
2/5	2/6	2/7 *North Biolac Basin Aeration Pattern updated to test protocol.*	2/8	2/9	2/10	2/11
2/12	2/13 ** Polymer System (injecting to the south clarifier) was started with a polymer dose of 3 ppm.* ** No PM MLSS sample. AM MLSS data used to calculate SVI.*	2/14 ** No PM MLSS sample. AM MLSS data used to calculate SVI.*	2/15 ** No PM MLSS sample. AM MLSS data used to calculate SVI..*	2/16 ** No PM MLSS sample. AM MLSS data used to calculate SVI.*	2/17 ** No PM MLSS sample. AM MLSS data used to calculate SVI.*	2/18 ** Aeration blower failure.* ** No PM MLSS sample. AM MLSS data used to calculate SVI.*
2/19 ** SVI/MLSS testing canceled due to aeration blower failure previous day.*	2/20 ** No PM MLSS sample. AM MLSS data used to calculate SVI.*	2/21 ** No PM MLSS sample. AM MLSS data used to calculate SVI.*	2/22 ** Increased polymer does to 5 ppm (previously 3 ppm).* ** No PM MLSS sample. AM MLSS data used to calculate SVI.*	2/23	2/24	2/25
2/26	2/27	2/28	3/1	3/2 *No PM MLSS sample. AM MLSS data used to calculate SVI.*	3/3 *The polymer injection system to the South clarifier was turned off.*	3/4

1.3.4 Biolac Aeration Basin Testing Results

Figure 5 and Figure 6 show the results of the testing period from February 2nd to March 3rd. Figure 5 is a plot of the recorded values while Figure 6 plots the 12-hour rolling averages. Figure 7 (full view) & Figure 8 (zoomed view) show the operation staff reported daily process laboratory test result for Nitrate (NO3-N) and ammonia (NH3-N) from the secondary clarifier's combined effluent and Sludge Volume Index (SVI) from both Biolac basins combined MLSS effluent. Both Figure 7 and Figure 8 also include the 12-hour rolling average nitrate values from the In-Situ probe for comparison.

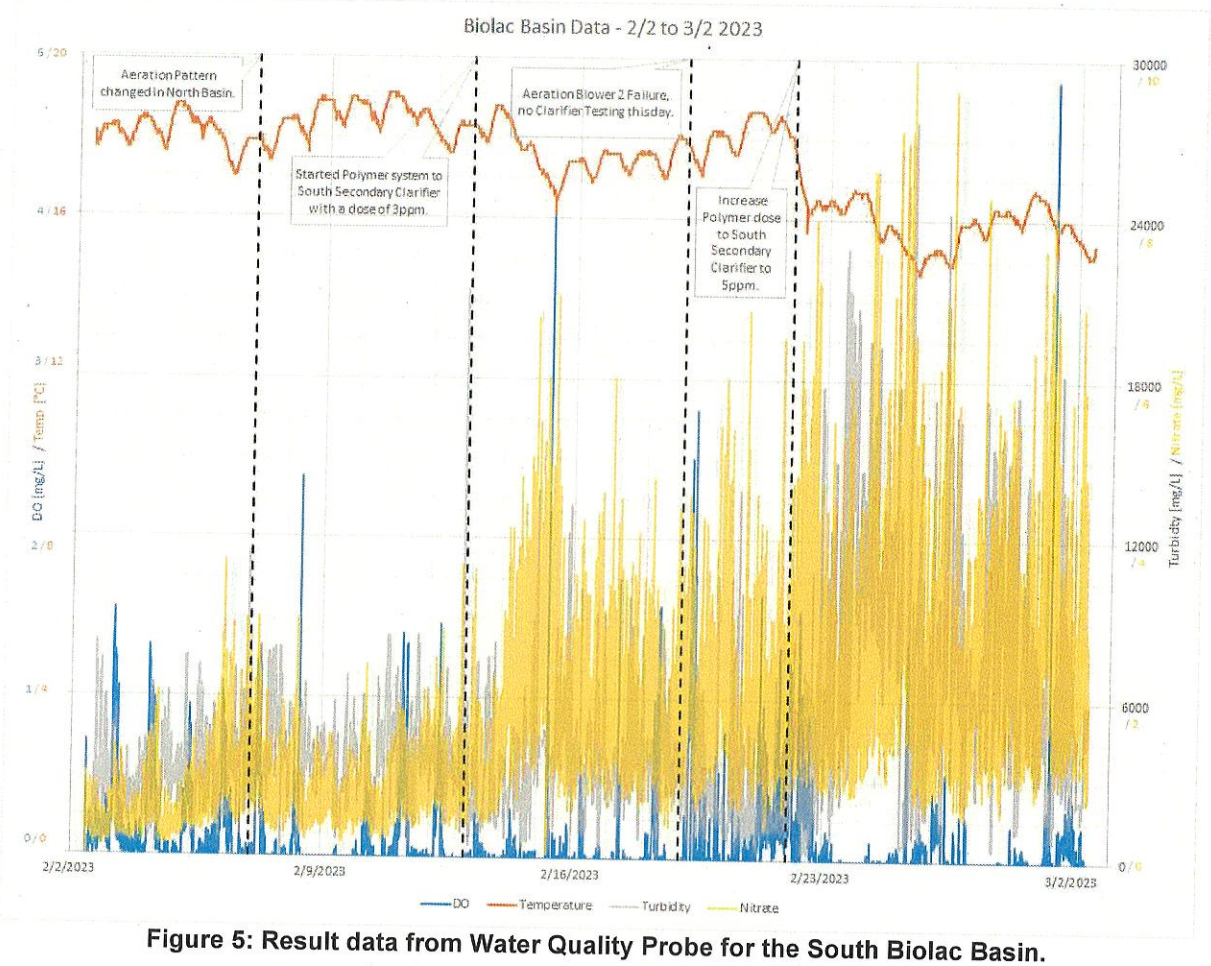


Figure 5: Result data from Water Quality Probe for the South Biolac Basin.

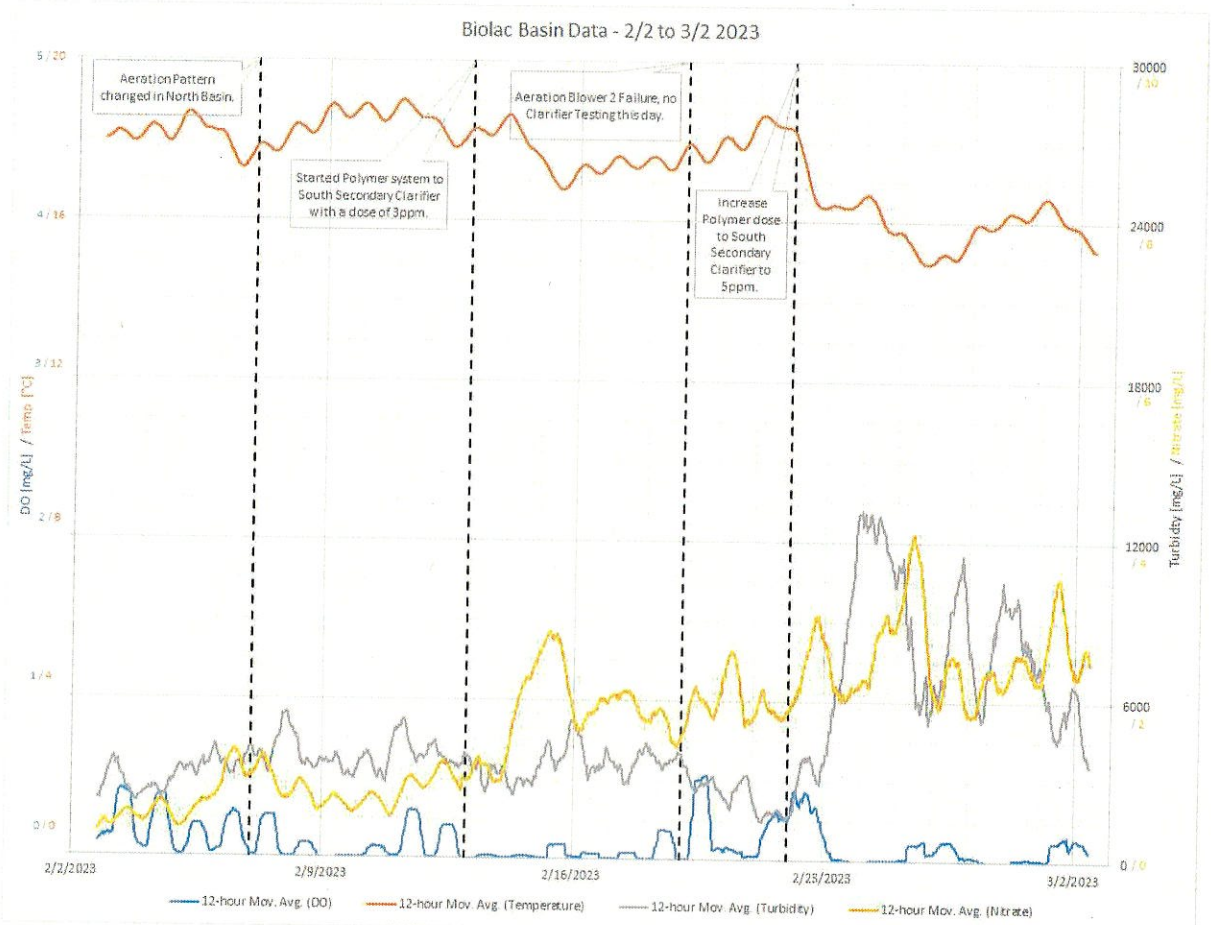


Figure 6: Water Quality Probe Measurements for the South Biolac Basin, 12-hr moving average.

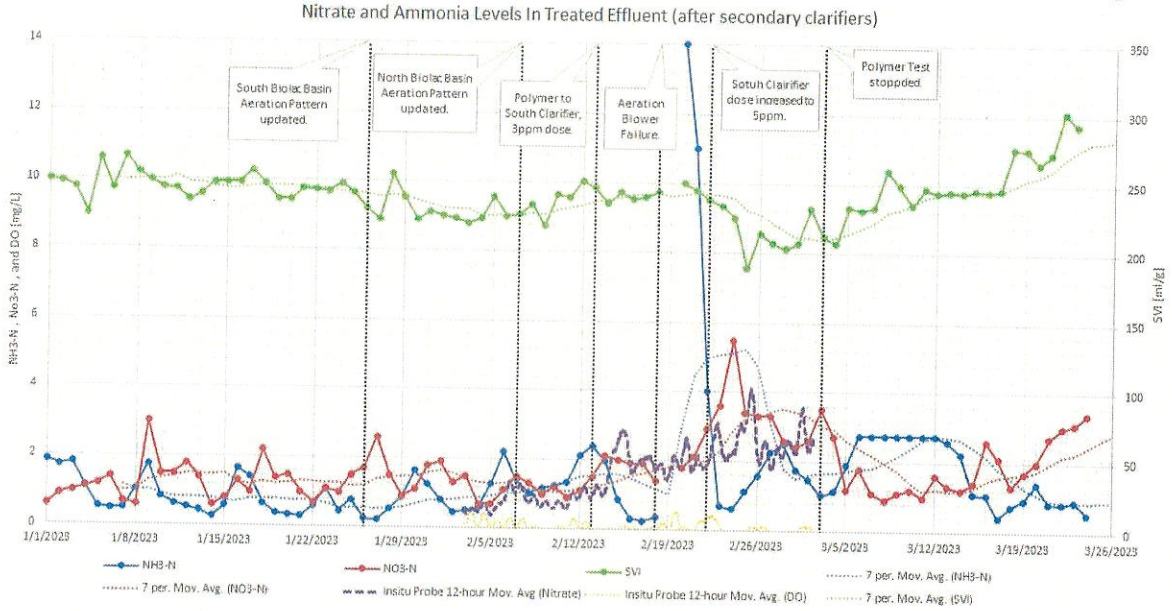


Figure 7: Operator Daily Test Result for NH3-N, NO3-N and SVI.

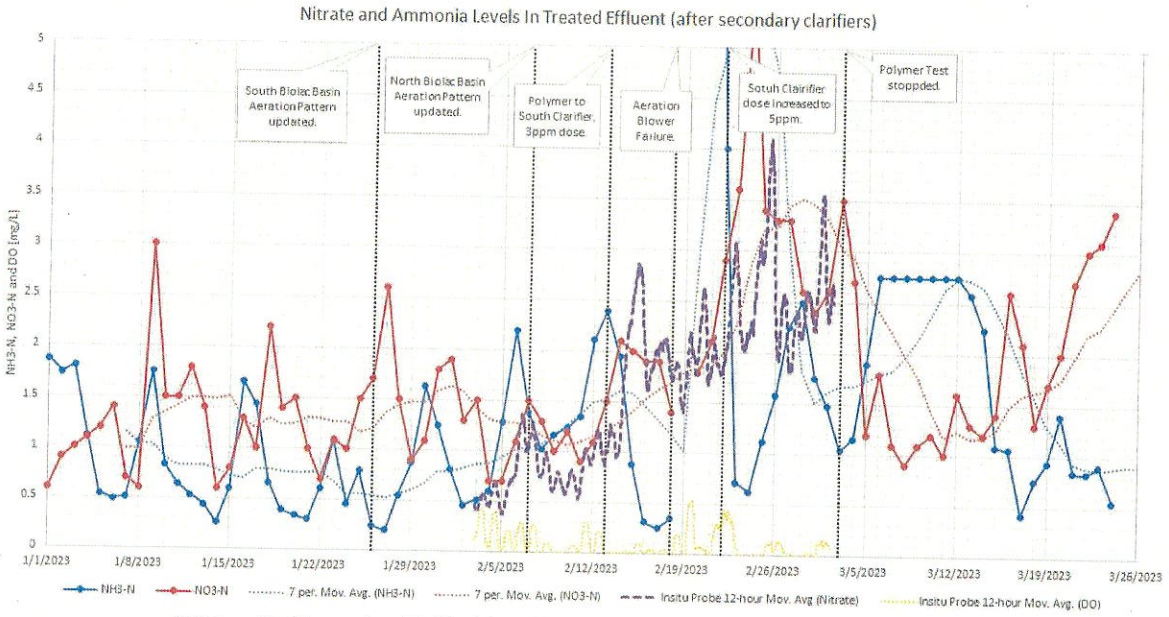


Figure 8: Operator Daily Test Result for NH3-N, NO3-N (zoomed in)

1.3.5 *Evaluation of Biolac Aeration Basin Test Results*

As indicated previously, visually, the aeration pattern sequence change to 3-3-2-2 was seen to improve the performance in the South Biolac basin, which led to operations adopting the same sequence in the North Basin early on during the testing period. The numerical results from the In-Situ probe, however, show that the air never reached the dissolved oxygen set point (~0.6mg/L). This is typical of the operation of the plant and is likely due to the probe being located at the downstream end of the basin with the last aeration chain included in the ON/OFF cycles. The DO control system which controls the output of the blowers, uses a 5-minute rolling average to compare to the set point.

The NO3-N levels in the basin actually increased slightly during the testing period. Notably in Figure 6, when polymer addition was initially started at 3 ppm and again when it was increased to 5 ppm. This was due to an increase in RAS mass return from higher solids concentrations in the South Clarifier, without a corresponding adjustment to the RAS flow rate. The RAS rate was maintained at approximately 700 GPM total during the entire testing period, effectively increasing the RAS ratio. Once stabilized, the additional mass continued to require additional air. However, the blowers are currently limited to approximately 75% of their total capacity by local flow rate limit settings. While Nitrate and Total Nitrogen were still consistently below 10 mg/L, the ability to supply more air to the system would increase nitrification capacity and allow additional adjustment to the time sequence to ensure full nitrification and denitrification. Due to a failure of the South Basin aeration blower on February 19th, the data includes some uncertainty. However, relatively quick recovery of the system after February 19th indicates the resiliency of the biomass to process upset when sufficient air is supplied.

Additionally, it should be noted that the In-Situ probe accurately tracked the Nitrate values vs the process lab results for approximately 30 days. Therefore, for future operation and optimizing the aeration system, it is recommended to install permanent Nitrate probes in the outlet boxes of the basins and install new DO probes within each basin at aeration chains 3 & 6. The DO control program could then be modified to use the DO and Nitrate probes to more efficiently and more effectively control the blower air supply.

The turbidity data shown in Figure 5 and Figure 6 are not directly translatable to the MLSS concentrations as the calibrated maximum operation range of the In-Situ probe is limited to 0-1500 mg/l. However, the readings are indicative of the MLSS concentration trend. As can be seen in the figures above, the turbidity/MLSS is relatively stable until increasing the polymer dose from 3 ppm to 5 ppm. Although this

again increased the RAS mass return ratio, there was also a corresponding issue with the dewatering systems in which operations was unable to dewater solids at a rate consistent with yield. Therefore solids inventory in the Biolac basins was increased for the last part of February. This resulted in higher levels of mixed liquor being returned to the Biolac basins (artificially higher RAS rate), requiring additional oxygen for respiration of the additional MLSS, further suppressing measured DO levels. Although this was an unplanned condition, it did provide the opportunity to operate the aeration basins and clarifiers at higher than normal MLSS concentrations (3,000 – 3,300 vs 2,500) while simultaneously dealing with higher seasonal Sludge Volume Index (SVI) numbers.

To treat additional biological loading, the aeration basins and clarifiers will need to operate at higher MLSS concentrations and therefore, the performance testing concluded that they are indeed capable of doing so when operating with a polymer flow-based dose of approximately 5 ppm prior to clarification. However, the higher MLSS concentrations drove operating DOs lower, causing additional settlability issues. Therefore, in combination with increasing the MLSS concentration, biological loading, additional air will be required.

1.3.6 Evaluation of the Aeration Blower Test Results

Operating at an MLSS concentration around 3,000 to 3,500 mg/L to treat the additional loading would require additional blower capacity. The facility aeration blowers currently consist of three (3) 180 kW high-speed single-stage turbo units, which are configured with one unit dedicated to each aeration basin and the third unit as redundant. Each blower, based on local programming, is currently limited to a maximum output of 3,850 CFM at 6.7 PSI, which appears to be purely based on original process design documentation provided by Parkson. In review of the original Parkson Biolac process calculations, 3,850 cfm should be sufficient to treat 2.0 MGD through each basin, if operating at an MLSS concentration of 3,000 to 3,500 mg/l and RAS rate of 3Q. However, as observed at the facility and during performance testing, 3,850 CFM appears to be required to treat the current flow and loading conditions of 3.0 MGD (1.5 MGD per basin) at 2,800 to 3,000 mg/l MLSS. Therefore, it can be concluded that approximately 30 to 40% more air per basin will be required to operate consistently at 4.0 MGD (2.0 MGD per basin), assuming higher operating MLSS concentrations and reduced oxygen transfer efficiency due to higher gassing rates. This equates to an air delivery requirement of approximately 5,000 to 5,400 CFM per basin.

Based on the blower performance curve presented below (See Figure 9), the units are designed to operate at a maximum output of up to 4,700 CFM at 8.0 PSI. Performance testing of the units using the existing aeration system diffusers, operating with a total of 6 air chains per basin, produced a maximum operating pressure of 7.3 PSI at 4,500 CFM. This is within the normal maximum operating limits of the air diffuser system (765 CFM / Chain). Therefore, it is possible to increase the output capacity of the aeration system by simply changing the maximum output limitation to 4,500 CFM, equating to an increase in operating capacity from 3.0 MGD to approximately 3.5 MGD.

While increasing the available operating range of the blowers is an immediate improvement to the current capacity limitation; to achieve an increase of up to 4.0 MGD, additional blower capacity will be required. Therefore, it is recommended to install a fourth 180 kW turbo blower and change the current configuration of dedicated blowers to a common manifold configuration (I.E. 3+1). Currently, the blower building is constructed with a spare blower pad, piping connections and electrical service for the addition of the fourth blower. Minor modifications to the discharge piping and PLC program would need to be completed to allow air balancing of the blower common manifold output. With three (3) 180kW turbo blowers operating, the total combined capacity would be 13,500 CFM, providing up to 6,750 CFM per basin.

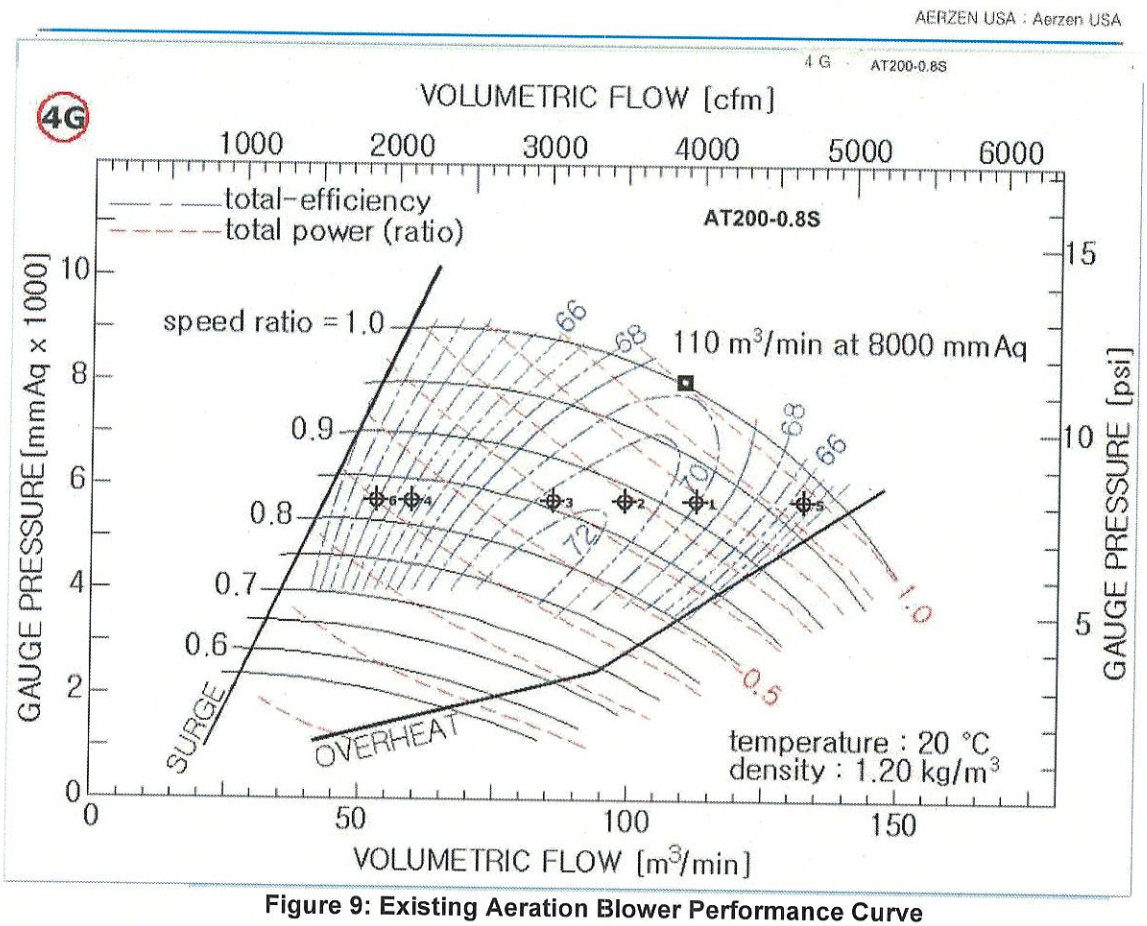


Figure 9: Existing Aeration Blower Performance Curve

1.4 CLARIFIER MODIFICATIONS

1.4.1 Current Performance of the Secondary Clarifiers

The effluent from the two (2) Biolac basins is combine at the clarifier, prior to being split evenly between the two (2) Secondary Clarifiers (See Figure 10). Representative SVI and MLSS values have historically been collected daily by plant operations, downstream of the Biolac basin outlets, prior to the clarifier splitter box. The samples are typically collected during the morning hours, combined and reported as the average SVI and MLSS of the basins for the day. Figure 11 below shows the feed 30-minute SVI to the Secondary Clarifiers, prior to testing with polymer addition, averaging approximately 250 mL/g. Historically, these measurements have varied from approximately 150 mL/g to over 300 mL/g, depending on the time of year. Although typically in the 150 to 180 range most of the year, operating with SVIs over 150 indicate suboptimal settleability a majority of the time. Ideally the operation should be consistently less than 150 mL/g while operating at MLSS concentrations of up to 3,500 mg/l.

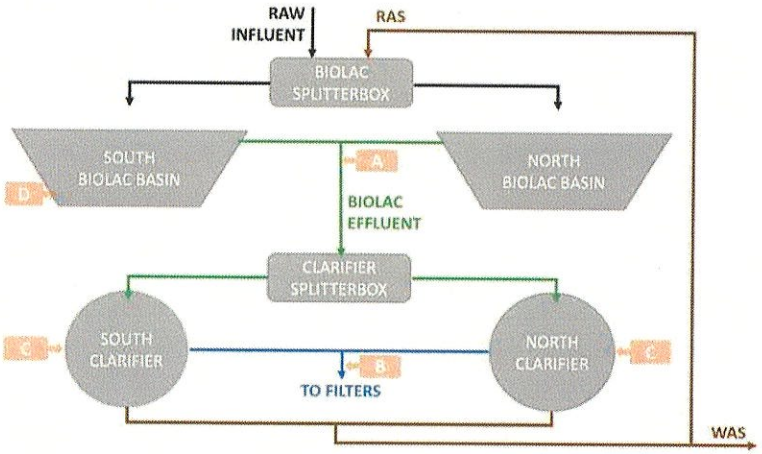


Figure 10: Simplified Schematic Flow Diagram
A = Non Performance Test SVI & MLSS Sample Location
B = Non Performance Test NH3 &NO3 Sample Location
C = Performance Test SVI Sample Location
D = Performance Test In-Situ Probe Location

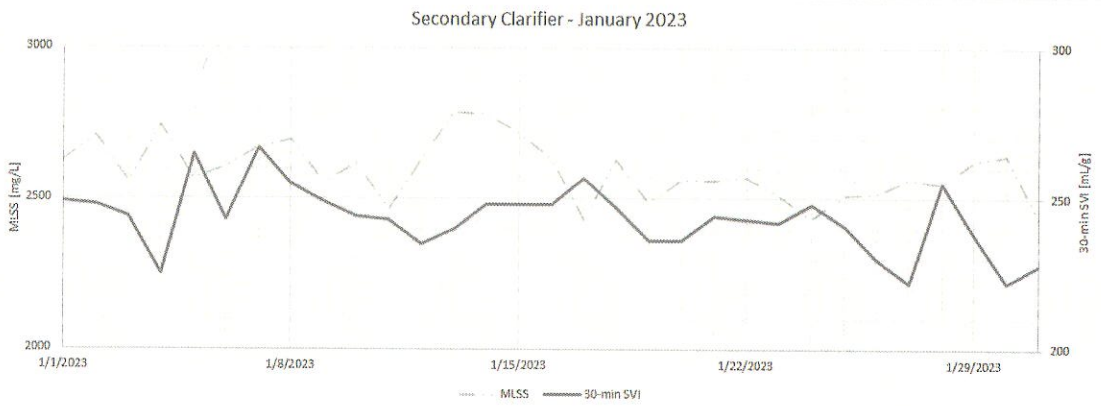


Figure 11: Secondary Clarifiers' Performance Data Prior to Testing

1.4.2 Polymer Addition Testing

To determine the effect of polymer addition and the amount of polymer need to provide consistently lower SVIs, PERC Water and PACE purchased and installed a new temporary polymer injection system. The injection system consists of a water booster pump, a Dyna-Blend MiniBlend neat polymer dilution system and PVC piping from the plant water system to the booster, through the polymer dilution unit. The entire system is installed within a temporary shelter to protect it from the elements.

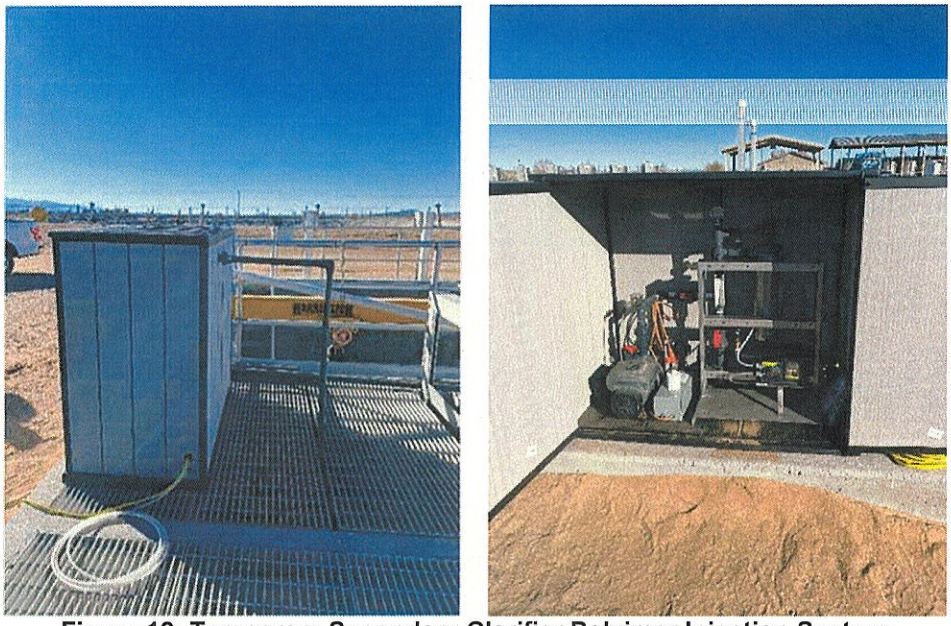


Figure 12: Temporary Secondary Clarifier Polyimer Injection System

The polymer injection system is installed just downstream of the clarifier splitter box, injecting active polymer into the South Clarifier feed box. Reaction travel time from the point of polymer addition to entrance into the clarifier center feed well averaged approximately 3 to 5 minutes, depending on the influent flow rate. For all performance tests, polymer was dosed based on flow-pacing of the polymer feed pump from the combined inflow to the clarifier splitter box and maintaining approximately the same MLSS concentration and RAS return flow rates. Potentially better performance and optimal polymer dosing could be achieved if continuous MLSS meters were installed on the clarifier splitter box and polymer dosing was based directly on solids mass (flow x concentration) vs simply flow-pacing.

Prior to performance testing, jar testing of the MLSS samples was conducted by a Polydyne representative, who estimated that the optimal volumetric dose was between 10 to 20 ppm of neat polymer (10 to 20 gallons of neat polymer per million gallons treated). Therefore, initial sizing of the polymer pump and reaction chamber were based on this estimate. However, once the system was installed and commissioned, it was immediately evident, that considerably lower polymer doses (in the 5 to 7 ppm range) would be required to achieve SVI consistency. Therefore, the polymer dosing pump was modified to a smaller tube diameter and the dilution water flow was adjusted from 8 GPM to approximately 5 GPM, to provide the turn-down needed.

For testing, PACE requested that PERC operations sample the MLSS from both the North and South clarifier center feed wells and conduct 5-minute and 30-miniuted settlometer tests. The 30-minute settleometer tests, along with the daily MLSS tests were then used to calculate the AM and PM SVIs for both clarifiers. Sampling was conducted regularly at approximately 9AM and 3PM each day with some minor variability. Additionally, AM and PM sludge blanket depth information and combined RAS MLSS concentrations were used to determine the impact to sludge thickness under varying inflow and polymer dose conditions. To reduce the potential impact to plant operation from overdosing of polymer, testing was initial conducted at 3 ppm dose and then increased to 5 ppm dose 9 days later.

1.4.3 Secondary Clarifier Test Results

As anticipated, upon activation of the polymer system, there was a clear visual improvement in the flocculation of solids and the clarification rate in the feed well of the South Clarifier (polymer) compared to the North Clarifier (no polymer) as depicted in the Figure 13 photos below.

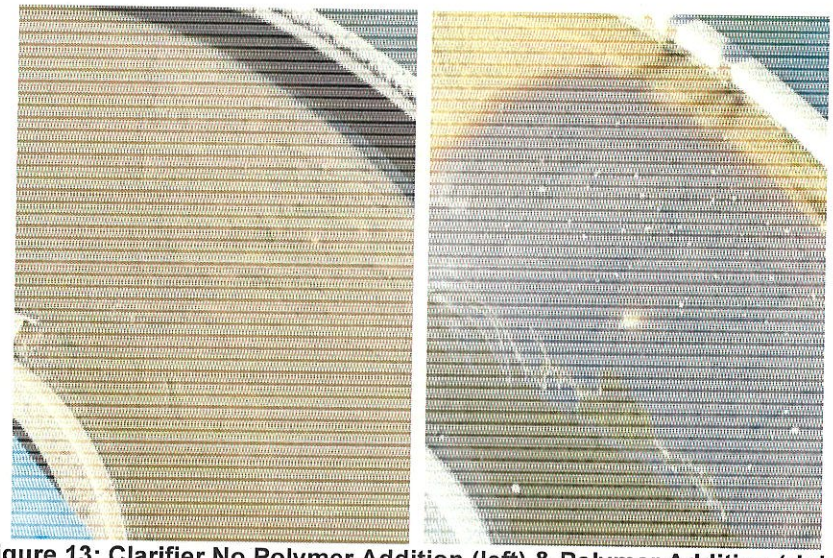


Figure 13: Clarifier No Polymer Addition (left) & Polymer Addition (right)

Figure 14 plots the sludge blanket depth samples and the moving 7-day average of both the North and South Clarifiers before, during and after polymer addition testing from January 1st to March 22nd. Note from the graph below, that polymer addition reduced the variability of sludge blanket depths on both clarifiers and increased compaction / solids concentration by approximately 1.5 to 2-times verse the non-polymer treated clarifier. Additionally, there appears to be a "Halo Effect" after the termination of the polymer addition, as sludge depths continue to be consistent and eventually converge approximately two weeks after polymer termination.

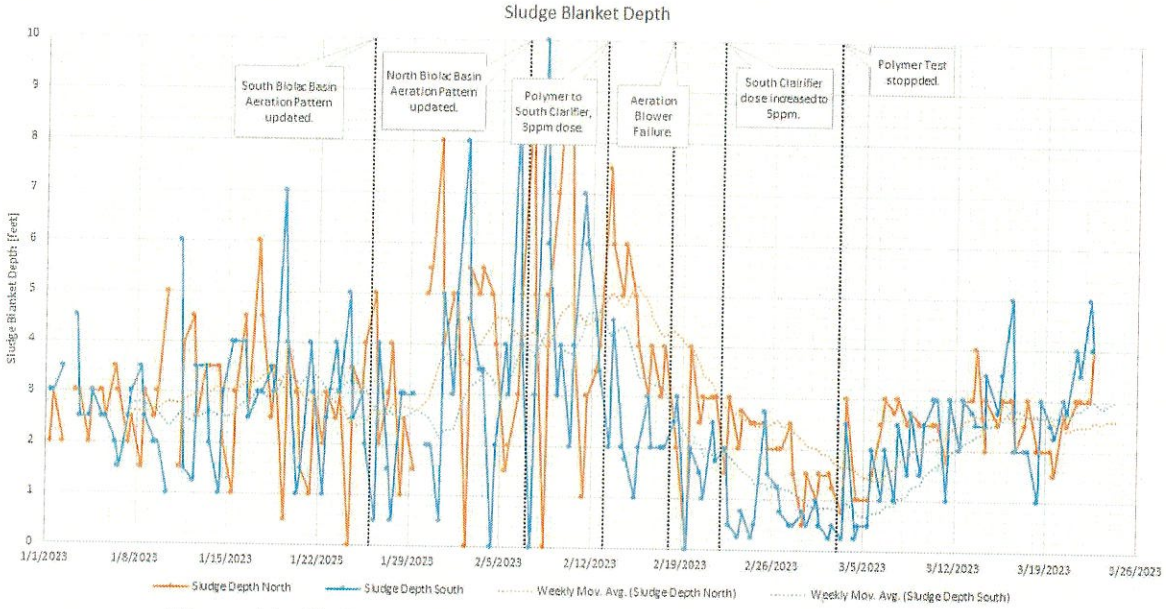


Figure 14: Sludge Blanket Depth Sampling & 7-day Moving Average

PACE

Figure 15 plots the 30-minute SVI results for the secondary clarifiers (North – no polymer & South – w/ polymer addition). Samples were taken and analized in the morning (AM) and afternoon (PM) each day for each clarifier. Note that for testing, additional SVI sample locations, in addition to the Biolac basin, were used at the feed wells of the clarifiers. Due to some pre-settling in the clarifier feed wells at the sample locations, the clarifier SVI results were generally lower than the Biolac sampling locations. 30-minute SVIs for the Biolac sampling location were also continued during the testing process, so that a normalized comparison of the results could be made.

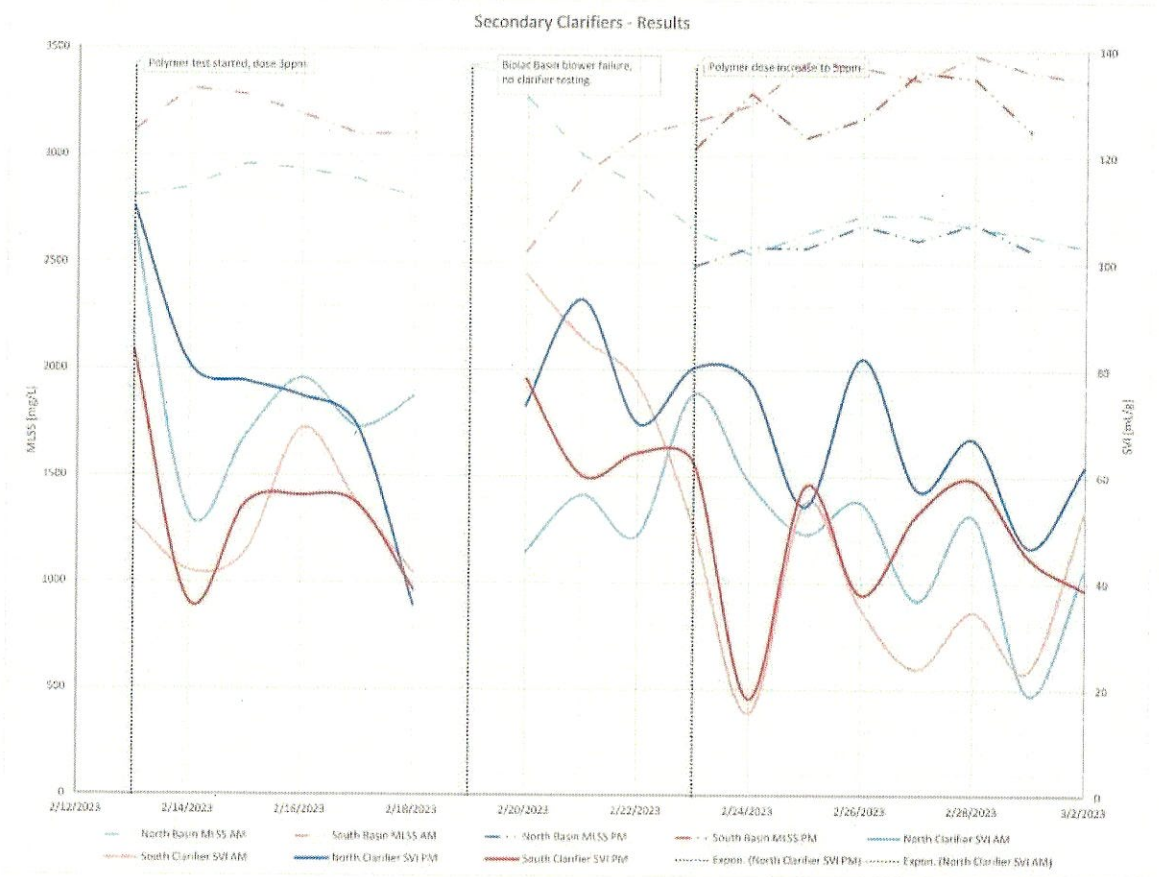


Figure 15: Secondary Clarifiers Test Results, AM/PM plotted separately.

1.4.4 Evaluation of Secondary Clarifier Rest Results

The results above show that the SVI is somewhat effected by higher flow conditions in the PM samples and that the addition of polymer, reduced both AM and PM SVIs by approximately 50% over pre-application conditions. The increase in polymer dose from 3 ppm to 5 ppm provided a bit more consistency in SVI between AM and PM performance. However, it is clear from the North Clarifier SVI results, that polymer recirculation through the RAS flow was influencing the North Clarifier performance as the testing progressed.

As can be seen in both Figure 15 and Figure 14, the South Clarifier, which had the polymer injection, always outperformed the North Clarifier in terms of reaching a lower SVI, and thus, a better settleability. The discrepancy between the pre-test Biolac basins' SVI (Figure 11) and the North Clarifier's SVI at the start of testing (Figure 15), indicates that the results are not fully comparable. This is further suggested by the fact that SVI values for the Biolac basins' combined effluent during the testing period (see Figure 7) remained

at around 250 ml/g. As indicated previously, this is attributed to pre-settling occurring at the clarifier inlet wells where the individual clarifier SVI samples were taken.

Even so, a distinct difference between the starting SVI for the North (107 ml/g) and the South (51 ml/g) Clarifiers indicate that the polymer addition did increase the settleability. This is also supported by the visual difference that resulted in the clarifier with polymer addition compared to the control (see Figure 13).

However, the most prominent trend is the consistent decline in sludge blanket depth, and the AM/PM blanket depth values stabilizing following the polymer addition (See Figure 14). The data consistently shows lower sludge depth for the South Clarifier compared to the North during the testing period as well as a stabilization in depth between morning and afternoon testing. Polymer addition seemed to impact the fluctuations in the North Clarifier positively as well, despite no direct polymer injection. This is seen, for example, with an apparent decline in depth about 3-4 days following the initial polymer addition (3ppm) and 3-4 days after the dose increase to 5 ppm. The gradual sludge depth decrease is even more clearly visualized in the weekly moving average trend lines. While the Biolac basin MLSS concentrations remain fairly steady or had a slight increase, this lower sludge blanket depth indicates an increase in sludge density for both the RAS and WAS streams. Lastly, the sludge blanket depth can be seen to increase slowly after the test completion, with larger fluctuations in depth starting to emerge again after about 1-2 weeks, indicative of the approximate time for the polymer to leave the system.

The benefit of a denser, more stable sludge concentration is the consistency this gives to the RAS solids that are pumped back into the Biolac basins. The thicker sludge also effectively increases the RAS mass rate, while maintaining the same volumetric flow rate, essentially doubling the RAS system capacity with a doubling of the sludge density. The higher density sludge also aids in the downstream sludge thickening and dewatering process, with WAS concentrations near 2% vs. 1%, gravity thickening may be improved or by-passed all together, as the optimum concentration to feed to the centrifuges is between 2.5 and 3%. This not only improves the centrifuge performance, but also reduces centrifuge run time and decreases the required polymer addition for dewatering.

Based on the results, it was concluded that the 30-minute clarifier SVI could be consistently maintained at or below 50 mL/g with a polymer dose of 5ppm. Considering the Biolac to clarifier SVI difference, this is equivalent to a Biolac basin outlet SVI of approximately 120 mL/g. Therefore, for clarifier capacity evaluation using State Point Analysis, PACE compared the reported historical high 300 mL/g SVI values, to operating consistently below 120 mL/g.

1.4.5 Secondary Clarifier – State Point Analysis

The current operation of the secondary clarifiers is sufficient for the current daily influent flow of 3.0 to 3.1 MGD. The secondary clarifiers' current performance can be evaluated and approximated using State Point Analysis. The settling flux curves shown in all State Point Analysis figures in this section are calculated using equations published by Dr. Glen Daigger (1995):

$$G\left[\frac{kg}{m^2 \times hr}\right] = X\left[\frac{g}{l}\right] \times V_0 \times e^{-n \times X\left[\frac{g}{L}\right]}$$

Where:

- $V_0 = 6.5\left[\frac{m}{hr}\right]$
- $n = 0.1645 + 0.001586 \times SVI\left[\frac{mL}{g}\right]$

Figure 16 below shows the approximate performance of the secondary clarifiers, based on MLSS concentrations (average around: 2,500 mg/L) and measured SVI (around: 300 mL/g) during the month of January 2023. The figure shows the performance for the average flow (3.1 MGD) and the average peak hour daily flow (3.8 MGD). As the plant is currently operating with a constant RAS flow, the RAS flow is shown as 1.0 MGD for both flow conditions.

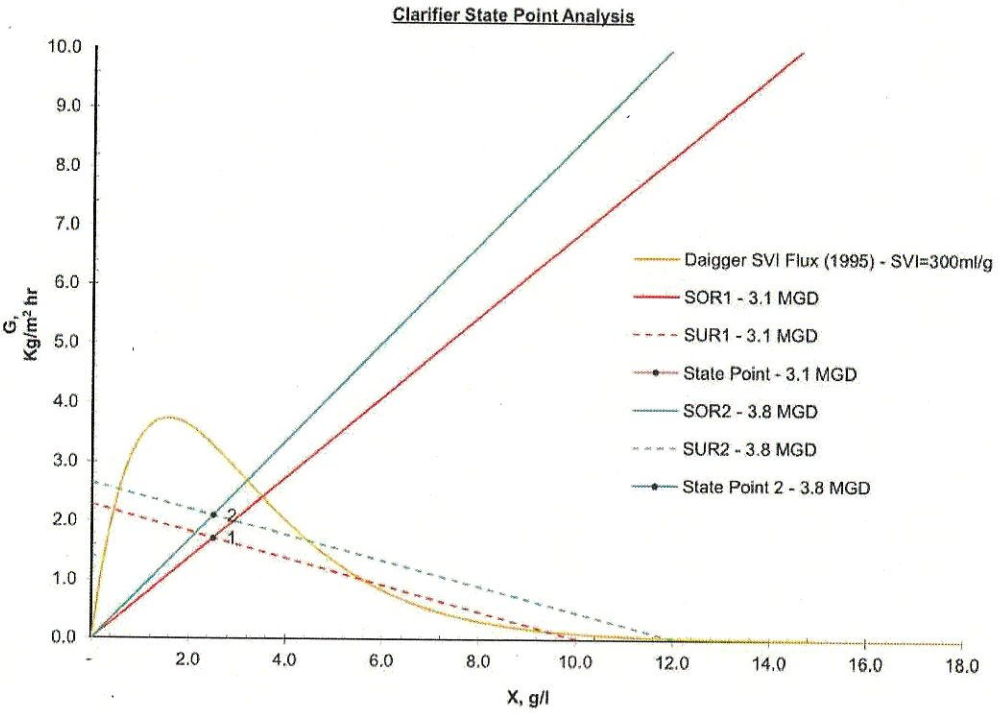


Figure 16: State Point Analysis of Current Operational Conditions MLSS=2,500 mg/L, SVI=300 ml/g, RAS=1.0 MGD

When plotting the State Point (SP) of a clarifier, the permissible operating conditions are represented by the area under the orange SVI Flux curve at various solids loading rates (y-axis) and MLSS concentrations (x-axis). Therefore, the current operating conditions are plotted at the average 24-hour flow of 3.1 MGD (SP 1), peak daily diurnal flow of 3.8 MGD (SP 2). As indicated by facility operations and confirmed in the graph above (Figure 16), the clarifiers are operating within a permissible condition.

However, increasing flows to a 24-hour average of 4.0 MGD and 4.9 MGD average peak daily flow would require higher MLSS concentrations (3,500 mg/l) for treatment of the additional load; which combined with higher volumetric flows, would push the State Points above the SVI flux curve for an SVI of 300 mL/g (See Figure 17).

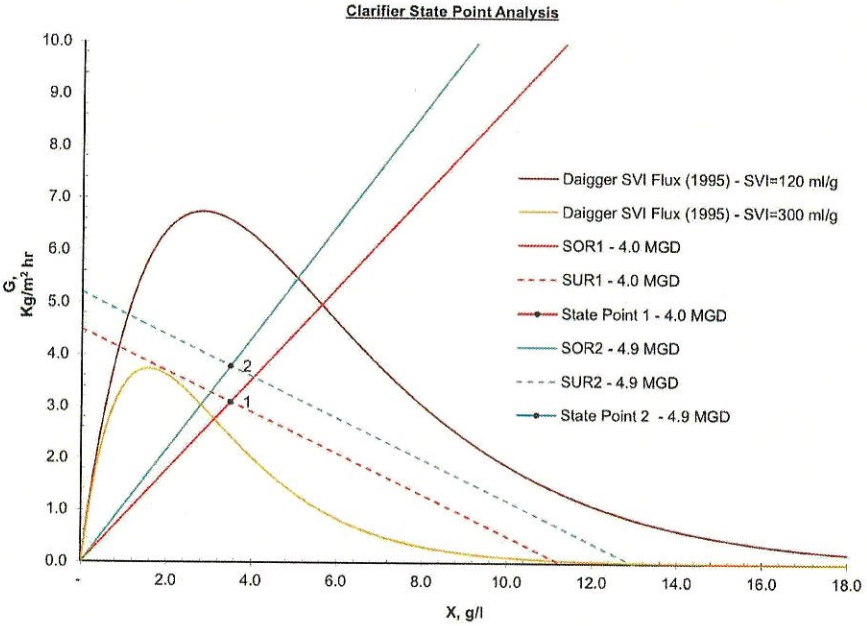


Figure 17: State Point Analysis w/ Increase Flows & MLSS Concentrations MLSS=3,500 mg/L, SVI=120 mL/g & SVI=300, RAS=2.0 MGD

Figure 17 above shows both the current historical high SVI of 300 mL/g (orange), replotted from Figure 16, and the polymer treated anticipated high SVI of 120 mL/g (red) achieved in the testing. State Point conditions are increased to a 24-hour average flow of 4.0 MGD (SP 1) and 4.9 MGD (SP 2) with a corresponding increase in RAS rate from 1.0 to 2.0 MGD. Note in operation, the testing showed that the RAS flow rate could remain the same, as the polymer increased the settled sludge concentration from 1 to 2%. Again, Figure 17 shows that by using polymer to consistently achieve an SVI of 120 mL/g, the plant would be able to operate at 4.0 MGD with peak day flows up to 6.0 MGD. Without polymer addition, the facility will not be able to operate much beyond its current flow of 3.1 MGD. This is consistent with the findings in the Stantec Capacity Assessment.

1.5 CONCLUSION AND SUGGESTED IMPROVEMENTS

Based on the results of the performance testing, PACE concludes that the facility is capable of treating a capacity of between 3.7 to 4.0 MGD, with a Peak Capacity of 6.0 MGD, if relatively minor physical and operational modifications to the facility are implemented. These include:

1. Install new field instrumentation on each Biolac basin and modify the existing DO control system to optimize oxic and anoxic conditions within the basins. This would consist of the following:
    a. Two (2) new DO probes per basin, installed at air chains 3 & 6
    b. One (1) new Nitrate probe per basin, installed in the outlet box of each Biolac
    c. Modify the DO control program to use either the 3-3-2-2 or modified sweeping aeration pattern and measure DO using the new probes with air capacity set point trimmed based on the Nitrate probe reading.

2. Install a fourth single-stage aeration turbo blower, reconfigure the air discharge manifold in order to balance airflow between the two basins. This would require relocation of the existing actuated butterfly valves, within the blower building, to each of the basin air supply pipes and the addition of modulating control to the existing actuators. It would also require additional control programming to operate the modulating valves so that they supply the air flow rate requested by the Biolac control panel. Finally, the blower control program would need to be modified to operate the blowers on a 3+1 common manifold configuration. This will increase available air supply from 4,500 CFM per basin to 6,750 CFM.

3. Install a permanent polymer injection system at the secondary clarifiers. This system would consist of a permanent block or wood building with the following equipment installed:
    a. Two (2) Dilution Water Booster Pumps (one redundant)
    b. Two (2) MiniBlend Polymer Dilution Units (one redundant - reuse temporary unit)
    c. Polymer PLC Control Panel (connected and coordinated with the existing CLR RIO)
    d. Permanent plant water supply pipe and dilute polymer discharge pipe to the clarifier splitter box
    e. Sufficient space to store one to two polymer totes while in use

4. Install new field instrumentation and programming on the secondary clarifiers to include:
    a. Clarifier Ultrasonic Sludge Blanket Depth Meters
    b. An MLSS Meter on the Clarifier Splitter Box
    c. An MLSS Meter on the WAS/RAS discharge manifold
    d. Modulating Valve Actuators on the Existing Manual Underflow Plug Valves
    e. Add control programming to use the new field instrumentation to optimize polymer dose, maintain consistent sludge blanket levels and provide consistent RAS and WAS rates, stabilizing SRT.
    f. Operate the RAS system using either the existing influent flow ratio control or new constant sludge blanket level control vs. current constant flow rate set point.

5. Additional improvements that were noted, but not performance tested are as follows:
    a. Provided needed repairs / replacement of the headworks screening dewatering compactor
    b. Increase the size of the existing jockey influent pump or install a forth, large pump of equal capacity.
    c. Provide a consistent, reliable plant water source. A proper plant water supply system is absolutely critical to the success of the existing headworks equipment, clarifiers and proposed new polymer system. This could be obtained by either rehabilitating the existing chlorine contact tank, vertical turbine pumps and hydro-pneumatic tank or replacing / rehabilitating the existing secondary effluent pond pump system.

APPENDIX

A. Polymer System Install Specifications
B. Polymer System Install Photos
C. In-Situ Water Quality Probe Specifications
D. Adelanto WWTP Diurnal Flow Data.
E. PACE Chronological Operations Detailed Information Feb-Mar 2023 (provided by PERC, the operator)
F. Full-sized Result Graphs as shown in the Technical Memorandum Figures