



Wastewater Treatment Plant Assessment Township of Verona, New Jersey



BACKGROUND

The Verona Wastewater Treatment Plant (WTP) is located at 10 Commerce Court Verona, New Jersey and was constructed in 1928. Major renovations were completed in 1967 and 1988. The facility treats the wastewater it receives from domestic and commercial sources conveyed throughout the Township of Verona's sewer collection system, including customers from Cedar Grove and North Caldwell. The plant is owned and operated by the Township and is rated for an average daily flow of 3.0 million gallons per day (MGD) and discharges into the Peckman River, which is classified as FW2-NT.

The property is Block 1201, Lot 4 with a property lot size of 11.97 acres. Approximately 1.75 acres of this Lot is located in the AE Zone of FEMA's floodway map due to its close proximity to the Peckman River (Appendix A). The property contains many assets including, but not limited to, a raw sewage pumping station, headworks area, three (3) primary clarifiers, three (3) secondary clarifiers, two (2) final clarifiers, two (2) trickling filters, two (2) oxidation ditches, two (2) anaerobic digestors, three (3) microscreens, and four (4) sets of in-channel UV system.

Treated effluent from the facility is discharged into the Peckman River. The New Jersey Department of Environmental Protection (NJDEP) regulates various aspects, including wastewater discharge (NJDEP Permit No. NJ0024490), residuals/sludge management (NJDEP No. NJG0200531), stormwater discharge, air emissions, and laboratory operations. The collected sludge is transported offsite to Passaic Valley Sewerage Authority (PVSC).

I. CONDITION ASSESSMENT OF WTP

An assessment was performed by Boswell to determine the condition of the existing assets of the WTP. Site visits were conducted and meetings with staff and operator were done to determine the priority of any required upgrades or improvements to the WTP.

The following was discussed with the WTP personnel:

- Staffing
- Recent Improvements to the WTP
- Current needs/Issues of the WTP

The assessment identified improvements that needed to be completed due to deficiencies found at the plant (Appendix B). The capital improvements were categorized into:

1. Immediate need projects
2. Priority 1 projects
3. Future projects.

1. Immediate need projects are as follows:
 - a. Primary Clarifier Effluent Pump Station pump and motor replacement
 - b. Secondary Clarifier Sludge Pump Station pump and motor replacement
 - c. Install new leak detectors on two (2) gas and one (1) diesel lines at the refueling station (DEP Compliant)
 - d. Trickling Filter Effluent Pump Station pump and motor replacement
 - e. Ozone Pumping Station pump rehabilitation
 - f. Microscreen backwash system
 - g. Secondary sludge digester methane gas pipe needs to be repaired

WTP personnel obtained informal quotes for the improvements summarized above from several contractors in order to establish budgets and schedules. It is recommended these projects proceed immediately and be completed during 2024.

2. Priority 1 projects should be designed, permitted and constructed within the next 1-3 years in order to address major deficiencies. The recommended projects are summarized below:

- a. *Primary Clarifier Pumping Station*

The Primary Clarifier Pumping Station upgrades are currently in the final design stage and should be bid by mid-2024. The project entails the replacement of the three (3) effluent pumps, motors, piping, valves and associated electrical work.

- b. *Microscreens*

The microscreens are an outdated design with failing components. The equipment is deteriorated and obtaining replacement parts has become a challenge for the WTP. Replacing the microscreens with a new tertiary filter system is a high priority in order to meet permit requirements.

- c. *Ultraviolet (UV) Disinfection System*

The UV disinfection system has four (4) banks of in-channel bulbs. The system has had issues for the last several years, including moisture issues due to the air conditioning unit installed by the manufacturer and requires significant maintenance to run.

3. Future projects are also identified in the condition assessment, including but not limited to improvements to the following:
 - a. Primary Clarifiers, replacement of drives and structural analysis
 - b. Rehabilitation of Raw Sewage Pumping station
 - c. Replacement of Trickling filter slide gate and flow meter
 - d. Structural improvements at Secondary Clarifiers
 - e. Miscellaneous Site Civil Improvements
 - f. Anaerobic Digesters
 - g. Replacement the of Secondary Clarifiers drives

III. SEWER COLLECTION SYSTEM

The WTP experiences peak flows in excess of 4 times the average flow during extreme wet weather events. A peaking factor of this magnitude is indicative of excessive rainfall derived inflow and infiltration (I/I). Excessive I/I is a common issue with older sanitary collection systems and can significantly impact operating conditions at the WTP.

For this reason, a comprehensive I/I study is recommended to identify sources of extraneous flow. Elimination of excessive I/I will minimize peak flow challenges at the WTP and normalize flows allowing for increased operating efficiencies.

As a first step in the I/I study, smoke testing of the sanitary system should be performed to identify illicit connections, including but not limited to:

- Cross connections between the storm and sanitary systems;
- Connected roof and cellar drains;
- Leaking manholes
- Yard and foundation drains
- Sump pumps

Each test consists of two (2) sections of sewer, usually 600-800 linear feet of 8"-12" pipe. One manhole is blocked off and smoke under pressure is introduced into the main and will follow the path of least resistance. This allows faults in the systems to be identified. The contractor performing the tests will coordinate with the DPW and fire department and door to door notifications will be distributed to residents 24 hours prior to the test. Residents will be asked to notify contractor of any smoke in the interior of the home. Crews can test approximately 8,000-10,000 linear feet of sewer in an eight (8) hour period.

The next step in the I/I Study includes video inspection of lines that experience surcharging or require continuous maintenance. Video inspection facilitates identification of deficiencies in the pipes that would contribute to the I/I to the plant. Once the issues are identified, improvements to the system will be categorized by priority.

IV. NITRATE LEVEL DISCHARGE REQUIREMENTS

According to the Summary Decision (Docket No. 0024490-47050), dated November 27, 2023, *Verona Township WTP vs. New Jersey Department of Environmental Protection*, the nitrate level in the permit is changing to 10 mg/L, will require an additional treatment process at the plant.

In order to respond to the requirements of the new nitrate level, the Township consulted with One Water NJ to determine if it was feasible to revise this requirement by performing dynamic modeling of the Peckman River. Existing nitrate levels were calculated using a single calculation under critical low stream flow, which results in an overly restrictive effluent limit.

The NJDEP allows for dynamic modeling techniques to be used to calculate nitrate limits. This may result in a higher permissible nitrate discharge limit. The dynamic modeling utilizes 10 years of flow data and test results to calculate the rolling average. This method will define the maximum permissible nitrate level concentration for a 30-day average.

Treatment options for nitrate removal include:

1. Packed bed bioreactors
2. Membrane bioreactors (MBRs)
3. Ion Exchange

An increase in the discharge level would have a corresponding decrease in the nitrate removal processes. This could significantly reduce treatment costs by allowing for smaller scale treatment systems and blending within the WTP.

V. OPERATION AND MANAGEMENT OF WTP

Three (3) alternatives were reviewed to address current staffing issues and provide a long-term solution for operation and management of the WTP. The alternatives are summarized as follows:

1. Hire a full-time operator and have the Township continue to run and manage the plant.
2. Retain the services of an Operation and Management (O&M) company, that will provide full-time operator and personnel, as required for the plant.
3. Hire full-time operator and pursue the conversion of the WTP to a pumping station that will convey flow to Passaic Valley Sewerage Commission (PVSC).

Alternative 1

Alternative 1 entails hiring a full-time (licensed) operator and staff for the WTP. Currently, the plant is understaffed and there are shared employees with the Department of Public Works (DPW). In the 1990s, the staff consisted of eleven (11) full-time employees, one (1) plant operator, one (1) laboratory manager, one (1) maintenance supervisor and eight (8) laborers. In 2024, there are a total of seven (7) employees, (1) part-time S3 plant operator, (1) full time S2 operator and five (5) laborers.

One of the challenges with this alternative is the shortage of S3 operators in the State. License class S-3 requires one of the following:

- Completion of DEP approved training course
- High School Diploma or equivalency certificate plus six (6) years of experience (three (3) years operating experience and three (3) years direct responsible charge experience)
- Associates degree plus seven (7) years of experience (four (4) years operating experience and three (3) years direct responsible charge experience)
- Bachelors degree plus five (5) years of experience (three (3) years operating experience and two (2) years of direct responsible charge experience)

The licensed operator is responsible for all operation and maintenance of the plant, including monitoring of effectiveness of treatment, routine inspections, system inspections, reporting all emergencies that may affect public health or violate permit and recording of all remedial measures to rectify issues at the plant. In this alternative, all of the sampling and regulatory compliance will be the responsibility of the in-house licensed operator and the Township. The operator is responsible for active, daily, on-site supervision of the plant.

The licensed operator should be proactive and identify projects for capital improvements to ensure the WTP meets all current and future permit limits.

The improvements outlined in this report will need to be completed, including any treatments required from new regulatory requirements.

Alternative 2

Alternative 2 is to retain the services of an O&M consultant that will provide an on-site licensed operator and laborers, as needed. The consultant will be responsible for all sampling, DEP reporting and day to day operations of the WTP. The consultant will also be responsible for permit & regulatory compliance, water quality testing, effluent level monitoring, reporting and records management.

Under this alternative, the consultant will work directly with the existing Township staff and

will supplement personnel, as needed. Responsibilities can vary from operator responsibilities to full operation of the plant, including staffing, labor costs, utilities, chemicals, maintenance/repair, and vehicles/rolling stock.

A primary advantage to this alternative is the specialized experience regarding advanced technologies and efficient management practices that O&M contractor can provide, including the following:

- Routine inspections and preventative maintenance to optimize plant performance
- Communication with the Township to address specific concerns
- Regulatory compliance and records management
- Operations monitoring and data analysis to identify trends and improve operating efficiencies
- Training and mentoring of Township staff

The licensed O&M provider would ensure compliance with the NJDEP's evolving regulatory standards while providing opportunities for further savings through effective operation of the WTP.

Alternative 3

A third alternative considered the possible conversion of the WTP to a pumping station to convey flow to the Passaic Valley Sewerage Commission (PVSC) WTP in Newark. Meetings were held between the Township, Boswell and PVSC to discuss the feasibility of this project.

Three (3) different routes were investigated included the following:

- Route to the north into the City of Paterson
- Route to the east into either the City Clifton or Township of Nutley
- Route to the South through the Second River Joint Meeting (SRJM)

Although, the PVSC WTP may have (treatment) capacity, one of the primary concerns is conveyance capacity within the receiving interceptors to convey the flow.

There are additional concerns regarding potential impacts to Combined Sewer Overflow (CSO) communities, such as Paterson. These communities are required to develop and implement Long Term Control Plans (LTCPs) to address water quality concerns. The LTCPs are developed based upon existing conveyance capacity within the PVSC interceptor system.

The connection of the Verona's flow would reduce the wet weather capacity of the receiving interceptor, thereby reducing the amount of flow CSO communities may discharge. This

could affect multiple communities within the current PVSC service area.

An additional concern must be considered if an alternative to connect into the SRJM system. An analysis would have to be performed to determine if there is adequate conveyance capacity within the SRJM system.

Any connection into either the PVSC interceptor or SRJM systems would require several NJDEP approvals including:

- Wastewater Management Plan (WMP) Amendment (for all affected communities)
- Treatment Works Approval (TWA)
- Land Use Permit

The WMP amendment process would include a review of environmentally sensitive areas, environmental impact to the Peckman River due to flow reduction and possible interbasin transfer, which may require a Water Allocation Permit.

This alternative would require the plant to stay in service while planning, design, permitting and construction occurred. This would require interim improvements to allow the current WTP to remain in operation for a minimum of 8-10 years. This alternative would also require studies to assess if capacity was available in the trunk lines, legal concerns and anticipated construction costs, connection fees, financing charges and engineering fees. Although this alternative may be technically feasible, preliminary construction costs are estimated at approximately \$60M. This does not include the cost of improvements needed at the WTP over this time period to ensure proper operation.

VI. CONCLUSIONS AND RECOMMENDATIONS

1. Wastewater Treatment Plant

The WTP requires significant improvements to continue to run efficiently and in regulatory compliance.

Immediate Need Projects

The immediate needs projects are in the process of being implemented and detailed cost estimates are estimated in this report.

Priority 1 Projects

Estimates for Priority 1 Projects are presented below and should be completed within 1-3 years. These projects are critical to minimize the potential for failure of the WTP and any violations associated with not meeting established permit limits.

Preliminary Cost Estimate-Priority 1 Projects

a. Primary Clarifier Pumping Station	\$1,667,000
b. Microscreens	\$3,375,000
c. UV Disinfection System	\$1,485,000
Subtotal	\$6,527,000
10% Contingency	<u>\$ 652,700</u>
Total	\$7,179,700*

*Estimates do not include Design, Permitting, Inspection Charges

Future Priority Projects

Future priority projects are outlined in Appendix B. The projects include equipment that needs replacement due to continuous maintenance, age of equipment and mechanical deficiencies. The majority of the processes have backup equipment, as required by NJDEP. When equipment is out for service or non-functional, the utility runs the risks of having to retain a contractor to perform work on an emergency basis, which is more expensive than projects bid under the public contracts law.

Item No.	Process/Building	Description	Construction Cost
1	Primary Clarifiers	Drives 1, 2 and 3	\$ 250,000.00
2	Raw Sewage Pumping Station	Rehab of PS	\$ 300,000.00
3	Trickling Filter	Slide Gate	\$ 120,000.00
4	Trickling Filter	Flow meter	\$ 84,000.00
5	Secondary Clarifiers	Structural Improvements	\$ 650,000.00
6	Secondary Clarifiers	Drives	\$ 200,000.00
7	RAS/WAS	Rehab	\$ 80,000.00
8	Anaerobic Digesters		\$ 5,000,000.00
9	Old Control Building	Rehab	\$ 85,000.00
10	Electrical Analysis of WTP**		\$ 75,000.00
11	Structural Analysis of Clarifiers**		\$ 50,000.00
12	Miscellaneous Site Civil/Improvements		\$ 2,000,000.00
		Total	\$ 8,894,000.00
		15% Contingency	\$ 1,334,100.00
		Subtotal	\$ 10,228,100.00
		Priority 1 work*	\$ 6,600,000.00
		Subtotal	\$ 16,828,100.00
		Design/Inspection	\$ 3,300,000.00
		Subtotal	\$ 20,128,100.00
		I/I Study - Smoke Testing	\$ 182,000.00
		Immediate Needs	\$ 180,000.00
		Total	\$ 20,490,100.00
		\$200K/Year for I/I work	\$ 2,000,000.00
		10 year total	\$ 22,490,100.00

* Priority Work includes Clarifier PS, Microscreens and UV System

**Recommended improvements will be determined during Analysis

These improvements are necessary to ensure the WTP runs efficiently and meets permit limits to avoid possible NJDEP violations. It will also reduce the amount of maintenance required to keep the older equipment running effectively.

2. Infiltration/Inflow Study

The implementation of an I/I study is necessary to identify illicit connections and failed elements of the sanitary collection system. The initiative is expected to occur over several years but larger defects in the systems can be improved to yield significant reductions in wet weather flows.

Reduced wet weather flows will facilitate improved overall operations at the WTP and reduce long-term costs associated with treating the higher wet weather flows.

3. Rate Study

Our team attended several meetings with the Township and NewGen Strategies and Solutions (NewGen) as the rate study was being developed. Coordination included discussions of capital improvement costs over the next 10 years, including future studies and projects, such as I/I reduction work. All of this was taken into account by NewGen when determining revenue requirements, which is a key factor for determination of sewer user rates.

4. Operation and Management of WTP

All three (3) alternatives for operation of the WTP are considered to be feasible. However, Alternative 2 has clear benefits over the other two (2) alternatives. They include:

- Ability to implement a solution within the shortest timeline. It is expected this alternative can be implemented within 6 months
- Assumption of responsibility WTP operations by O&M Provider
- Assumption of responsibility for all testing, reporting and records management
- Opportunity for training and mentoring of Township personnel by qualified personnel
- Specialized experience with advanced technologies by O&M provider
- Ability for O&M Provider to change staffing to meet specific operating conditions, as needed
- Reduced exposure to personnel difficulties in operating the WTP with in-house staff (Alternative 1)
- Ability to implement solution on either a short or long-term basis. A shorter term (5-10 years) would allow for further consideration of Alternate 3 in the

future, if so desired

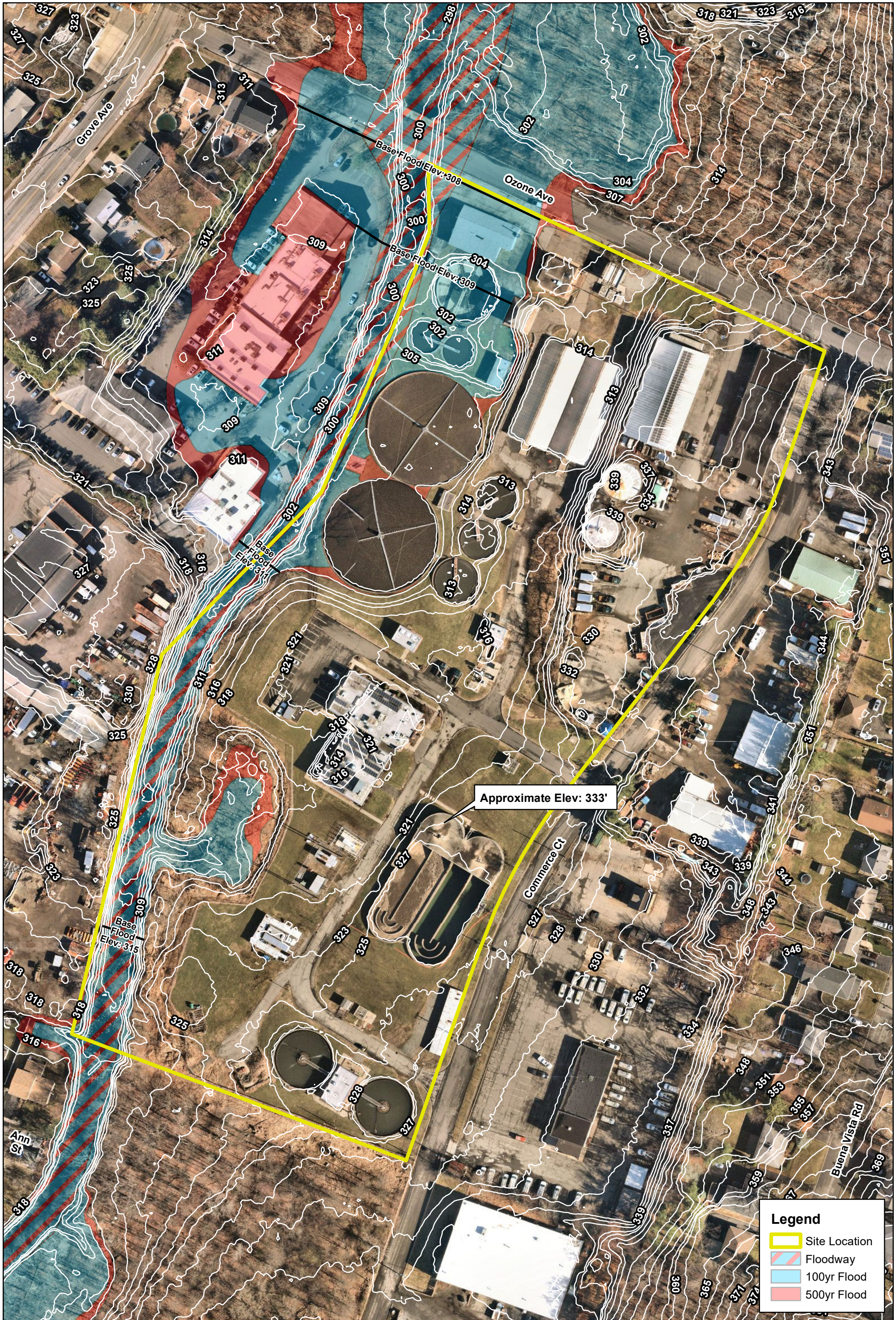
It should be noted that unlike the other 2 alternatives, Alternative 2 does have an annual cost associated with the O&M provider, which will be established once the level of service of the provider is determined. With the specialized experience of their staff, there is potential of long-term overall savings from increased operating efficiencies.

For the reasons noted above, Alternative 2 is respectfully recommended as the most appropriate solution for the Township's consideration.

We further recommend the Township identify the scope of services to be provided and term of an agreement with an O&M provider at this time.

APPENDIX A: WASTEWATER TREATMENT PLANT





Legend

- Site Location
- Floodway
- 100yr Flood
- 500yr Flood

Drawn By: JMW
 Check By: FJR
 January 2024
 Last Edit: 1/11/2024

Scale
 1 in = 100 ft
 Job No. VA-155



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Wastewater Treatment Facility
Environmental Constraints Map
 Township of Verona
 Essex County New Jersey

Notes:
 NearMap Image Date: March 21, 2023
 Base Flood Elevations are in NAVD88

APPENDIX B: Condition Assessment Findings



BOSWELL ENGINEERING
330 PHILLIPS AVENUE, SOUTH HACKENSACK, NJ 07606
P. 201-641-0770 | F. 201-641-1831
ENGINEER'S ESTIMATE

Project: Verona WTP Capital Projects
 Location: Township of Verona
 County: Essex County

Job No: VA-143
 Date: 1/18/2024

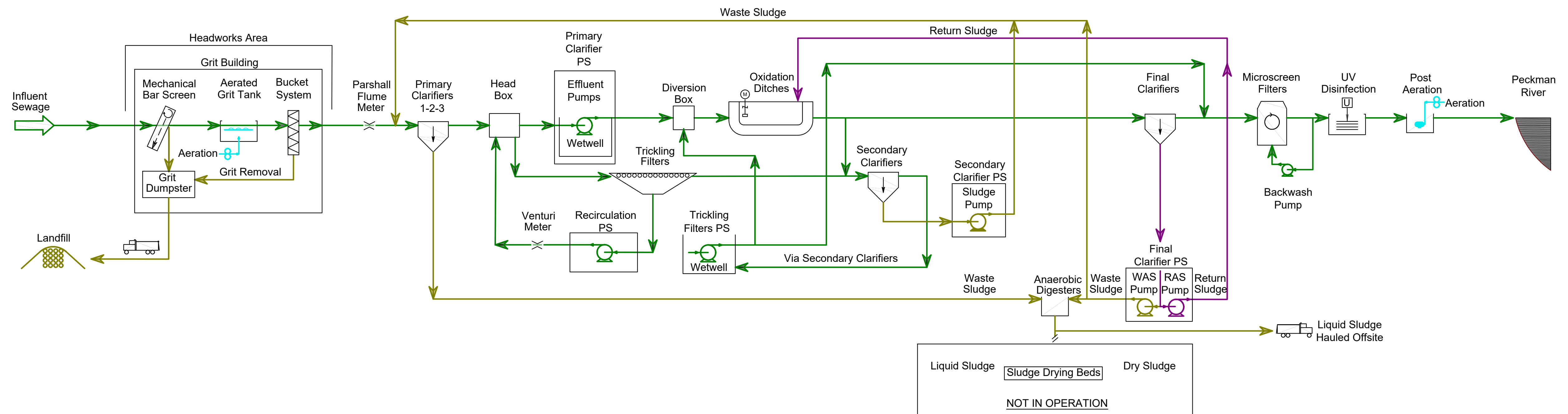
PRIORITIES 2 AND 3

Item No.	Process/Building	Description	Construction Cost
1	Primary Clarifiers	Drives 1, 2 and 3	\$ 250,000.00
2	Raw Sewage Pumping Station	Rehab of PS	\$ 300,000.00
3	Trickling Filter	Slide Gate	\$ 120,000.00
4	Trickling Filter	Flow meter	\$ 84,000.00
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Subtotal			\$ 16,828,100.00
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Immediate Needs			\$ 180,000.00
Total			\$ 20,490,100.00
\$200K/Year for I/I work			\$ 2,000,000.00
10 year total			\$ 22,490,100.00

10 years

* Priority Work includes Clarifier PS, Microscreens and UV System
 **Recommended improvements will be determined during Analysis

VERONA WWTP PROCESS FLOW DIAGRAM



Condition Assessment

Two (2) site visits were conducted by Boswell to review the condition of the assets at the WTP. Below are the findings:

Raw Sewage Pumping Station

The Raw Sewage Pumping Station (RSPS) conveys untreated sewage from the Township's sewer system to the headworks area. Before entry, a mechanical coarse bar screen removes large materials, such as rags and debris. The influent is conveyed from the north section of the plant through 18-inch, 20-inch, and 30-inch pipes, where the flow then goes to one of the two (2) wet wells with three (3) dry pit submersible pumps: one (1) for Wet Well No. 1 and two (2) for Wet Well No. 2. All three (3) pumps have variable frequency drives (VFDs).

Upon inspection, the check valve for Pump No. 1 is inoperable and Pump No. 2 has winding issues. It is recommended that all three (3) pumps and check valves be replaced in the future as the pumps are close to the end of their useful life. There is an immediate need to replace Pump No. 1 and the associated check valve.

It was observed that one (1) panel in the RSPS is General Electric (GE), while the rest of the WTP utilizes Allen Bradley panels. To maintain consistency, it is advisable to replace the panel.

The bubbler system, which monitors wastewater levels in the WTP's wet well, is frequently clogged by grit and debris. The problem is currently mitigated by frequent cleaning and maintenance by WTP staff. When the pumping station is rehabilitated, it is recommended to replace with a transducer with backup floats.

The bar rack and Motor Control Center project was completed in the station.

Flow is metered through the Parshall flume. With new developments anticipated, the Parshall flume should be analyzed to determine if it is sized adequately.

Headworks Area

The headworks area is comprised of an influent chamber, a main inlet channel with coarse bar rack and mechanically cleaned bar screen, a bypass channel with a coarse bar rack screen only, and a single train, aerated grit chamber removal system. In 2019, repairs were completed, including the installation of a new mechanical influent bar rack/screen, grit screws, valves, and the installation of a new service for seal water.

Electrical upgrades and heat tracing were installed in 2023 to prevent freezing during winter months.

Primary Clarifiers

The Verona WTP utilizes three (3) primary clarifiers, which settle solids from wastewater before the flow continues to the trickling filters or oxidation ditches. In 2019, upgrades were performed to ensure a more even distribution of flow between Primary Clarifier No. 3 and No. 1 & 2, with the installation of new valves and rods.

Subsequent inspections have revealed the need for further improvements, including required repairs for Clarifier No. 3 for the broken gear and drive motor. There is also visible rust at the diversion gate and weir plates. Additionally, Primary Clarifier No. 2 requires the installation of a new drive unit to address ongoing leaks.

Primary Clarifier Effluent Pumping Station

Following the primary clarification process, wastewater is pumped by the Primary Clarifier Pumping Station to the Oxidation Ditches. At this pumping station, there are three (3) pumps with VFDs. Recently, all three (3) VFDs were upgraded and replaced. The pumps and motors need replacement due to the condition. Currently, Pump No. 2 is leaking and a replacement vertical pump is a top priority for the WTP.

Trickling Filters

Flow that is not pumped to the Oxidation Ditches is gravity feed to the two (2) Trickling Filters via the weir in the Head Box. In these filters, wastewater is evenly distributed using rotating arms over a bed of crushed rock, which hosts a biofilm that breaks down the organic material.

Following treatment in the Trickling Filters, the flow is then directed either to the Secondary Clarifier or the Recirculation Pumping Station. In the latter case, the flow is sent back through the Trickling Filters, allowing the rotating arms to continue their process. Currently, only one (1) Trickling Filter runs under normal conditions.

The Trickling Filter Effluent Pumping Station nearly failed last year. It is comprised of three (3) submersible pumps: one (1) EMU pump, one (1) new Davis pump, and one (1) rehabilitated Flygt pump. The EMU pump should be replaced to increase pump station reliability.

The Trickling Filter Control Panel was recently replaced with a new panel and transitioned to a transduction system with float backup. Additionally, the rotating arms were lowered four (4") inches.

To address potential issues, a new slide gate should be installed in the distribution box to ensure a proper seal and prevent leakage, which could lead to grit accumulation in the distribution box.

Recirculation Pumping Station

The Recirculation Pump Station (RPS) circulates flow back to the Trickling Filters, ensuring a sufficient flow that enables the distribution arms of the trickling filters to rotate and enhances the removal of biological oxygen demand (BOD).

Currently, Pump No. 2's VFD is being serviced and is offline. Additionally, Pump No. 3 is currently undergoing maintenance due to unusual noise and is suspected to have a defective bearing. The functioning pump is a Worthington 1200-1500 GPM pump.

Recently, a new flow meter was installed in the RPS.

Secondary (Final) Clarifiers

The WTP features three (3) Secondary Clarifiers to remove solids from the trickling filter effluent. The treated effluent from these clarifiers is then directed to the Trickling Filter Effluent Pumping Station. Meanwhile, the sludge that settles in these clarifiers is pumped directly to the anaerobic digesters through the existing sludge pumping station. The drive on Clarifier No. 3 was replaced. The drives on No. 1 and 2 should be replaced.

A quote for the pump replacement was obtained to replace the pump, which is an immediate need.

All three (3) clarifiers require rehabilitation, including replacing weir plates, scraper flights and coating of exposed components. A structural analysis should be completed to determine needed repairs to the concrete.

Old Control Building/Secondary Clarifier Pumping Station

The Old Control Building is a part of the original wastewater treatment plant. Currently, it serves as the housing for sludge pumps responsible for extracting sludge from the Secondary Clarifiers. It also provides space for operator maintenance and storage.

Currently, there are no improvements needed at this time.

Oxidation Ditches

Two (2) Oxidation Ditches, built as part of the 1988 WTP Upgrade, play a crucial role in providing biological treatment for the wastewater, complementing the function of the Trickling Filters.

Recently, the Aerator No. 2 motor/gear has been upgraded to an inverter-duty motor. However, Aerator No. 1 motor and VFD is beyond its useful life and should be replaced.

Furthermore, the weir plate on Oxidation Ditch No. 1 is beyond its useful life and should be replaced.

Final Clarifiers

Two (2) Final Clarifiers are responsible for settling and returning biological solids to the Oxidation Ditches. These concrete tanks are in good condition. At the moment, WTP staff is actively engaged in rebuilding the final clarifier drives and replacing the scum arms.

In a recent upgrade, the clarifiers have been sealed over, and the blades have been replaced. However, Motor and Pump No. 3 must be replaced. Additionally, all mechanical pump seals must be upgraded.

Final Clarifier Sludge Pumping Station

The Final Clarifier Sludge Pumping Station, which serves the final clarifiers, comprises two types of pumps: return activated sludge (RAS) pumps and waste-activated sludge (WAS) pumps. The RAS pumps recirculate settled solids from the final clarifiers to the oxidation ditches. Meanwhile, the WAS pumps transport settled solids to the Anaerobic Digesters for treatment and eventual disposal.

The sump pump panel has been replaced.

Microscreens

Three (3) Microscreens are responsible for tertiary treatment prior to ultraviolet (UV) light disinfection. The equipment in this section of the facility is in an advanced state of deterioration.

Microscreen No. 2, rehabilitated in 2008, is currently the most functional among the three. Microscreen No. 1 is out of service due to significant corrosion damage and Microscreen No. 3 is in a similar but less severe condition.

Additionally, between 2019 and 2020, JEV replaced the sluice gate leading into the microscreen facility.

The mechanical system is obsolete and spare parts no longer readily available. Replacing the microscreens with a new filter system is a high priority. The existing microscreens must be repaired until newer options are selected.

UV Disinfection System

Disinfection is achieved through an ultraviolet (UV) disinfection system. The current system was installed in 2005 and employs four (4) sets of in-channel UV bulbs and is designed to handle a total flow of 14 MGD.

After installation, the existing system experienced electronic ballast overheating. An air conditioning unit was installed by the manufacturer, which caused moisture issues in the panel.

Post Aeration System

A Post Aeration System at a wastewater treatment plant reintroduces oxygen into treated wastewater, aiding in the further breakdown of pollutants by beneficial bacteria. It also helps remove excess chlorine, regulate temperature, and eliminate odors before the treated water is discharged into natural water bodies or reused.

In 2019, JEV rehabilitated this system, which included the replacement of the air header and diffusers, along with various repairs to the tanks.

Anaerobic Digesters

The two (2) Anaerobic Digesters break down organic matter in sludge through anaerobic bacteria without oxygen. This process stabilizes the sludge, reduces its volume, and generates biogas.

Several crucial tasks need to be addressed at the digestors, including cleaning out the contents of both the Primary and Secondary Digesters. Repairs and inspections of both digester covers are necessary, along with the installation of new sludge mixing systems. Additionally, structural analysis and potential painting of both covers are required. Currently, the lid system is inoperable and restricts access to the bubbler, which needs to be evaluated.

Piping and ancillary components within the digester tankage must be inspected and replaced as needed. Verona-identified piping and valves within the digester gallery should be replaced, along with the gas piping system, heat exchanger, and potential pump replacement(s). The gas system must also be evaluated and investigated to reveal why gas is not reaching the secondary tank. The digester gallery and piping systems require painting, and there's a need to upgrade the electrical and mechanical systems. Structural improvements and other improvements requested by WTP staff are also on the agenda for necessary action.

Drying Beds/Greenhouse

The initial configuration of the Sludge Drying Beds comprised eight (8) beds enclosed by a plexiglass greenhouse. These drying beds were last used in 2010, and they currently serve as a decanting area for trucks.

Initially, the WTP had intended to install new sand and other components to rehabilitate of the drying beds. The reactivation of these drying beds would have led to a reduction in the volume of liquid solids transported offsite, resulting in financial savings within the annual operations budget.

However, the WTP's current recommendation is to repurpose this area, which would require NJDEP approval.

Site

The site lighting, especially near the primary clarifiers and trickling filters, is insufficient and needs to be addressed to enhance safety and visibility. Safety concerns also exist with the grating on the tanks, where replacement is necessary. Additionally, tank handrails must be equipped with kick plates to meet OSHA requirements.

To ensure safety and protect equipment, bollards and guardrails need to be installed along the roadways. Roadway repairs, curbing, and widening are essential to facilitate efficient truck traffic within the WTP site.

Repairs to the fencing on the southwest side of the WTP, addressing groundhog holes near the primary clarifiers, and providing backup power for gasoline pumps along Ozone Avenue during power outages are also vital considerations.

Electrical

WTP staff has recommended the installation of a secondary power tie-in feed for backup to ensure uninterrupted operations. An electrical evaluation should be performed.

Building Interior

Most of the building interiors within the facility require repainting, along with the need for new doors and adjustments to enhance overall functionality. A suggested upgrade by personnel involves converting the existing storage area in the basement of the Advanced Treatment Building into an operator lunchroom and break area. To achieve this, items currently in storage must be relocated, and adjustments to the HVAC system must be made to improve conditions for occupancy in this space.

APPENDIX C: INSPECTION PHOTO SHEETS





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 1

Description:

Verona WWTP

Asset:

Overall Plant



Photo No. 2

Description:

Verona WWTP

Asset:

Topography, Paving,
Curbs





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 3

Description:

Verona WWTP

Asset: Secondary Clarifier Sludge Pumps



Photo No. 4

Description:

Verona WWTP

Asset: Primary Clarifiers





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 5

Description:

Verona WWTP

Asset: Parshall Flume



Photo No. 6

Description:

Verona WWTP

Asset: Clarifiers





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 7

Description:

Verona WWTP

Asset: Trickling Filter



Photo No. 8

Description:

Verona WWTP

Asset: Trickling Filter





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 9

Description:

Verona WWTP

Asset: Primary Clarifiers



Photo No. 10

Description:

Verona WWTP

Asset: Sludge Drying Greenhouse





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 11

Description:

Verona WWTP

Asset: Anaerobic
Digesters



Photo No. 12

Description:

Verona WWTP

Asset: Anaerobic
Digesters





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 13

Description:

Verona WWTP

Asset: Anaerobic
Digester Building

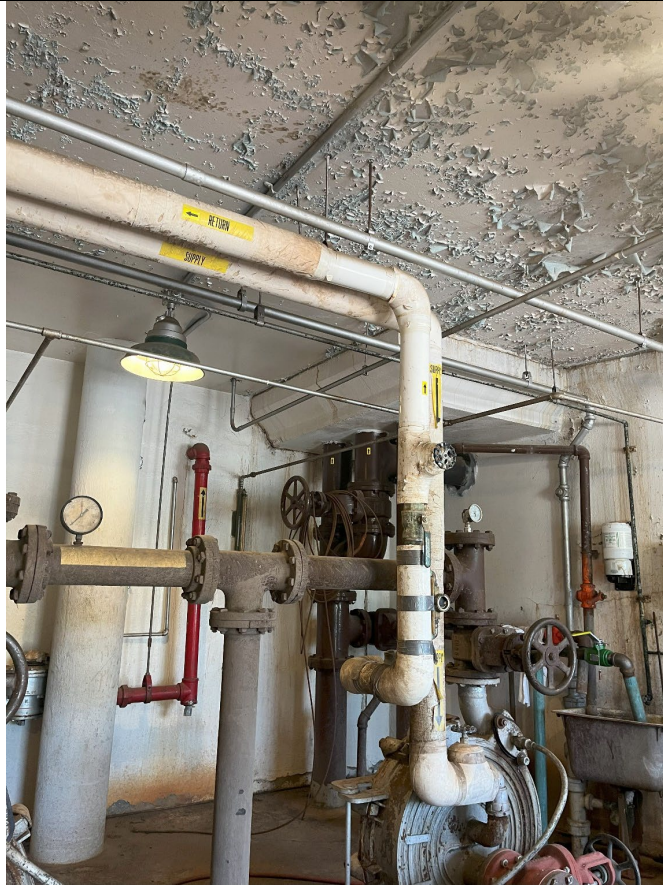


Photo No. 14

Description:

Verona WWTP

Asset: Anaerobic
Digester Building





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 15

Description:

Verona WWTP

Asset: Anaerobic
Digester Building



Photo No. 16

Description:

Verona WWTP

Asset: Secondary
Clarifiers





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 17

Description:

Verona WWTP

Asset: Primary Effluent Pumping Station



Photo No. 18

Description:

Verona WWTP

Asset: Primary Effluent Pumping Station Controls





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 19

Description:

Verona WWTP

Asset: Primary Effluent Pumping Station



Photo No. 20

Description:

Verona WWTP

Asset: Primary Effluent Pumping Station





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 21

Description:

Verona WWTP

Asset: Advanced Treatment Building



Photo No. 22

Description:

Verona WWTP

Asset: Final Clarifier Pumping Station





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 23

Description:

Verona WWTP

Asset: Final Clarifier
Pumping Station



Photo No. 24

Description:

Verona WWTP

Asset: Waste activated
Sludge (WAS) pumps





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 25

Description:

Verona WWTP

Asset: Waste activated
Sludge (WAS) pumps



Photo No. 26

Description:

Verona WWTP

Asset: UV Disinfection





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 27

Description:

Verona WWTP

Asset: UV Disinfection

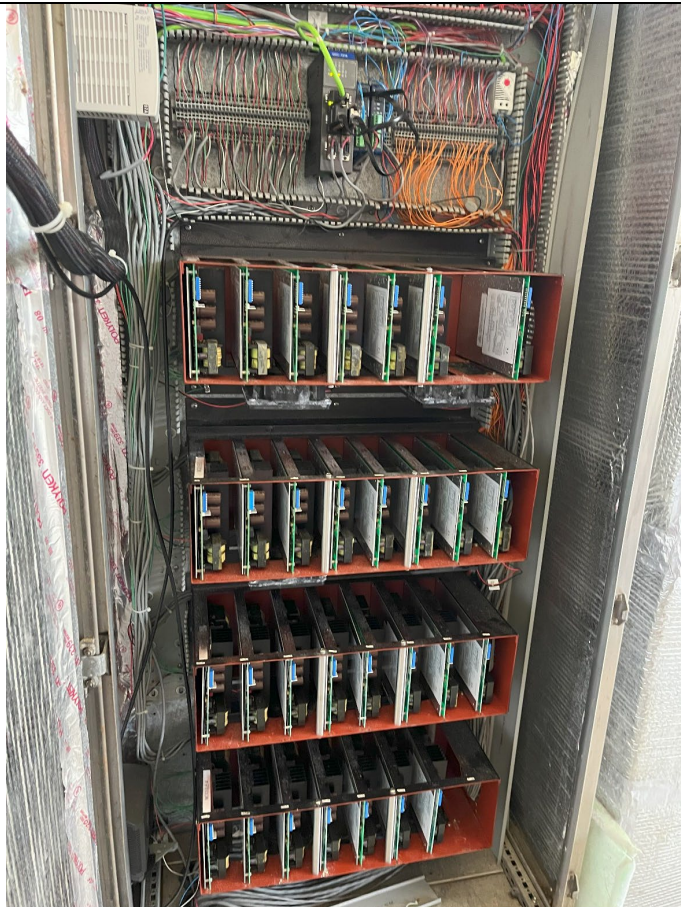


Photo No. 28

Description:

Verona WWTP

Asset: Microscreens





CLIENT NAME:
Township of Verona

SITE LOCATION:
10 Commerce Ct., Verona, NJ

PROJECT NAME:
Condition Assessment - Site

PROJECT NO.:
VA-134

Photo No. 29

Description:

Verona WWTP

Asset: Microscreen



Photo No. 30

Description:

Verona WWTP

Asset: Microscreens

