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# Engineering Report for the Rehabilitation of the Wastewater Treatment Plant at the Clifton Springs Service Area

November 4, 2025

The New York State Thruway Authority (NYSTA)

NYS DEC SPDES Permit No. NY-0027481

Town of Clifton Springs, Ontario County, NY

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## Executive Summary

This report evaluates the current conditions at the Clifton Springs Service Area Wastewater Treatment Plant (WWTP) through historic reports, field visits, and operator feedback. The assessment highlights deficiencies given the age of the plant's infrastructure and evaluates alternatives including rehabilitation and replacement. Alternatives are analyzed based on current plant needs, cost-effectiveness, and feasibility that meet regulatory requirements. Some equipment at the facility needs to be replaced while other proposed upgrades are optional for improved efficiency. The total cost for recommended replacements is less than the cost of a new package treatment, making it the preferred option.

## Project Background and History

### 1. Site Information

According to previous reports related to the facility, The New York State Thruway Authority (NYSTA) owns and operates the existing wastewater treatment facility at the Clifton Springs Service Area at milepost 337 on the eastbound lane of I-90 between Exit 43 (Manchester) and Exit 42 (Geneva) in the Town of Clifton Springs, Ontario County.

The facility operates under a New York State Department of Environmental Conservation (NYS DEC) State Pollution Discharge Elimination System (SPDES) permit (NY0027481). The Clifton Springs WWTP discharges treated effluent to the Flint Creek, which is a tributary waterbody to Lake Ontario. At the location of the discharge outfall, the Flint Creek has a NYSDEC stream classification C, which is defined as waters suitable for fish, shellfish, and wildlife propagation and survival. The waters are also suitable for primary and secondary contact recreation.

Based on prior reports, additional environmental considerations for the WWTP and the outfall are outlined below:

- The WWTP is not located on any NYS mapped wetlands but there may be some wetlands along the route of the outfall.
- The WWTP is not located in a FEMA floodplain per FIRM Community Number 361301B.
- The Cultural Resource Information System (CRIS) indicates the WWTP is in an archeological buffer area which means it could be an archaeologically sensitive area, but both the WWTP site and the outfall have been previously disturbed for the construction of the existing facilities.
- The US Fish and Wildlife Service Information for Planning and Consultation (IPaC) has identified two endangered or threatened species potentially affected by activities on the site including the Northern Long-eared Bat and the Monarch Butterfly. While these species may be in the area, the existing site is maintained grass area with low likelihood for presence on the site.
- The NYS DEC Info locator has identified the area as a potential environmental justice area (PEJA) or Disadvantaged Community (DAC).

Watts Architecture & Engineering has been subcontracted by Colliers Engineering & Design to conduct a thorough investigation into the environmental impacts of the site on the surrounding environment. This investigation will encompass a comprehensive assessment of various environmental factors, including but not limited to soil quality, water resources, air quality, and the potential effects on local flora and fauna. The aim of this analysis is to identify any adverse effects that the site may have on its surroundings, ensuring that all potential environmental concerns are addressed. Furthermore, the findings from this investigation will play a crucial role in informing future development decisions, promoting sustainable practices, and ensuring permit compliance.

## 2. Ownership and Service Area

The New York State Thruway Authority owns and operates the WWTP located at the Clifton Springs Service Area. The WWTP provides treatment of the wastewater effluent from the Service Area exclusively. The Service Area includes restaurants, a newsstand, a market store, a travel information center, restroom facilities and a gas station. Based on site constraints, no additional development at the Service Area is anticipated.

## 3. Existing Facilities and Present Conditions

### General

According to prior reports the original 54,000 gpd secondary treatment facility was constructed in 1954. Most of the reinforced concrete tankage remains in use today.

In 1991 the plant was partially reconstructed by the Marriott Corporation. The facility underwent its last major upgrade in 2003 with the addition of a flow diversion structure, equalization tank, blower enclosure, pump station, flume structure, replacement of existing headworks, and conversion of the existing chlorine contact chamber to a flow measurement flume. Some additional improvements included replacement of pumps, repair of the sludge holding tank's rake arm, and repair of the primary and secondary clarifier concrete walls.

In 2023 the primary rest area building was upgraded by Apple Green. This involved a complete reconstruction of the building to accommodate new restaurants and restrooms.

Treatment at this wastewater treatment plant presently includes headworks structure with comminutor and bypass channel with bar screen, two equalization tanks, primary clarification, low lift pump station, pumphouse with lower and upper wet well, trickling filter, secondary clarification, flow measurement flume/outfall, and sludge holding tank.

The hydraulic profile includes gravity flow and one pumping stage on the main treatment train. Plant influent flows by gravity from the Service Area to the headworks and continues by gravity to the diversion structure, which directs normal flow to the primary clarifier, diverting excess flow to the equalization tanks. Flow leaving the primary clarifier enters the primary effluent wet well where it is pumped to the trickling filter. From the trickling filter, effluent flows to the secondary influent wet well, then flows by gravity to secondary clarification. Effluent flows by gravity through the remainder of the facility to the outfall into the receiving stream.

Sludge and scum from primary and secondary clarification are periodically pumped to the sludge storage tank by operators using plunger pumps within the control building basement. The sludge and scum are periodically removed from the holding tank by tank truck.

Sewage diverted to the equalization tanks is returned to the headworks by the equalization tank return pumps.

The WWTP's treatment components and processes are provided in Figure 1.

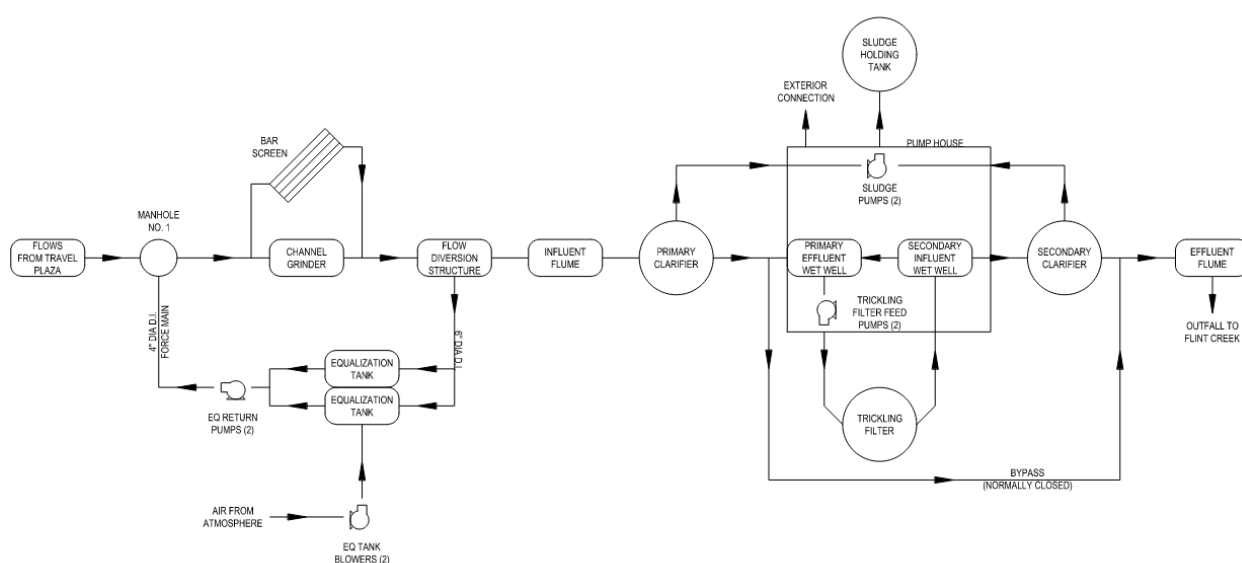


Figure 1 – Clifton Springs Treatment Process Flow Chart

The facility operates under a NYS DEC SPDES permit (NY0027481). Based on available information, the permit was last issued April 26, 2011, and can be found in Appendix A. The treatment plant is permitted to discharge 54,000 gpd. The treatment plant discharges to Flint Creek, which is a tributary to Lake Ontario. The effluent quality requirements of the permit are summarized in

Table 1. The effluent monitoring requirements are summarized in Table 2 from the last issued SPDES permit. The facility sustained two documented compliance issues in February and March of 2011 where effluent BOD<sub>5</sub> was observed at levels of 31 and 36.68 mg/l, respectively. There is no history of storm damage or flood impacts at this site.

**Table 1 – SPDES Permit Effluent Limitations**

Effluent Parameter	30 Day Arithmetic Mean	7 Day Arithmetic Mean	Daily Maximum Value
Flow (gpd)	54,000	-	-
Biochemical Oxygen Demand, 5 day (BOD <sub>5</sub> ) (mg/L)	30	45	-
Biochemical Oxygen Demand, 5 day (BOD <sub>5</sub> ) (lbs/day)	13.5	20.3	-
Total Suspended Solids (TSS) (mg/L)	30	45	-
Total Suspended Solids (TSS) (lbs/day)	13.5	20.3	-
Settleable Solids (ML/L)	-	-	0.3
pH (Daily Max – Daily Min)	6.0 – 9.0		

**Table 2 - SPDES Permit Effluent Monitoring Requirements**

Effluent Parameter	Frequency	Sample Type	Sample Location	
			Influent	Effluent
Flow (gpd)	Continuous	-	X	-
Biochemical Oxygen Demand, 5 day (BOD <sub>5</sub> ) (mg/L)	Once/Month	6-hour comp	X	X
Total Suspended Solids (TSS) (mg/L)	Once/Month	6-hour comp	X	X
pH (Daily Max – Daily Min)	Daily	Grab	X	X
Settleable Solids (mL/L)	Daily	Grab	X	X
Temperature (Degree C)	Daily	Grab	X	X

## Flows and Loading

In the 2017 Beardsley report, flow data from January 2011 to October 2013 were analyzed with a 30-day average daily flow of 20,983 gpd and a 30-day maximum flow of 40,940 gpd. A maximum daily flow of 69,000 gpd was recorded on July 6, 2011.

Table 3 shows flows reported by NYSTA personnel from September 2024 through May 2025. This recent data shows average flows of approximately 8,100 gpd and a peak day flow of 22,000 gpd. Given the facility is sized for flow of 54,000 gpd, the WWTP is oversized. This could be attributed to low flow fixtures installed during the 2023 service area upgrade.

**Table 3 – Clifton Springs Service Area Flows and Loadings (2024)**

Month	Peak Day Flow	Monthly Average					Measured Once per Month			
		Flow	Inf pH	Eff pH	Inf Settle Solids	Eff Settle Solids	Inf BOD <sub>5</sub>	Eff BOD <sub>5</sub>	Inf Suspended Sol	Eff Suspended Solid
	MGD	MGD	Max	Max	mL/L	mL/L	mg/L	mg/L	mg/L	mg/L
Sept-24	0.022	0.01107	8.6	7.7	250	0.1	694	10	284	5
Oct-24	0.021	0.01219	8.8	7.9	150	0.1	538	60.5	492	5
Nov-24	0.013	0.00947	8.8	7.8	250	0.1	1760	12	993	5
Dec-24	0.014	0.00884	8.1	7.8	250	0.1	867	11	950	5
Jan-25	0.011	0.00545	8.4	7.8	250	0.1	351	8.6	280	5
Feb-25	0.007	0.00504	7.7	7.5	300	0.1	1260	12	2040	5
Mar-25	0.007	0.00503	8.9	7.4	200	0.1	1390	11	1370	5
Apr-25	0.008	0.00873	8.5	7.7	250	0.1	1520	8.8	860	5
May-25	0.016	0.01016	8.7	7.7	200	0.1	946	13	417	5
Average	-	0.0081089	8.5	7.7	233	0.1	1036	10.32	854	5
Max	0.022	0.01219	8.9	7.9	300	0.1	1760	13	2040	5

## Hazardous Materials

A limited hazardous materials survey was conducted by Beardsley on December 29, 2016. The survey was conducted to identify hazardous building materials that might be disrupted as part of the project's planned improvements. The survey findings are summarized below:

- No asbestos-containing materials were identified during the limited survey.
- Lead-containing paints (<0.5% lead by weight) were identified at the trickling filter, control building, and sludge holding tank.
- Painted surfaces observed in good condition were not sampled as part of this survey and must be assumed to have detectable lead levels at concentrations above OSHA and EPA standards due to the age of the WWTP. OSHA worker protection regulations (29 CFR 1926.62) will apply to disturbances of these paints.
- No suspect polychlorinated biphenyls-containing (PCBs) caulks were observed within the work area.



The Limited Hazardous Materials Survey Report, dated March 8, 2017, is provided as Appendix B | Limited Hazardous Materials Survey

### **Existing Energy Consumption**

Existing energy usage at the facility was not available at the time of this report. It is assumed that any replacement in kind will have minimal impacts on energy usage at the site. It is likely that upgrades will result in decreased energy usage due to increased efficiency of newer equipment.

### **Individual Component Assessment**

#### **Headworks**

According to prior reports, raw wastewater flows from the Clifton Springs Service Area building to the WWTP concrete headworks structure via an 8-inch diameter gravity sewer. The headworks precast concrete structure is a feature of the 2003 reconstruction and is 5'-3" wide by 10'-0" long by 4'-9" deep. The structure includes a comminutor (grinder) channel and a manual bar screen bypass channel. The rotating knives of the grinder shred larger solids such as plastic items, wood, and cloth into smaller pieces which in theory are less likely to clog pipes and pumps.

The grinder is a JWC Muffin Monster Model 20000 with a 5 HP hydraulic drive. The bypass channel contains a manual bar screen which can be used when the mechanical grinder is not operational due to breakdown or repairs. NYSTA personnel had previously reported that the comminutor is the only hydraulic unit in the region, and since the headworks structure never floods, replacement with an electric unit is preferred.

Based on CED's June 2025 facility inspection, the conditions described by previous reports are accurate. The concrete remains in good condition with no cracking or spalling of the walls or floor slabs observed. The hydraulic drive on the grinder creates unnecessary maintenance issues associated with the hydraulic fluid. There is no need for a hydraulic drive as a direct submersible motor drive can do the same job with less maintenance and greater efficiency. Replacement with a direct motor drive is recommended.

During CED's June 2025 inspection, NYSTA operators report excess grease discharge from Apple Green entering the headworks. Fats, oils and grease (FOG) that enter a wastewater treatment plant increase the risk of flow blockages in the pipelines and result in excessive floatables on the primary clarifier which are difficult to remove with the scum collection arrangement in place now. The Applegreen facility does have a grease trap, but the NYSTA feels it is not functioning as required. Plants are not designed for heavy grease loading and problems such as this should be addressed with the discharger through the required pretreatment program.

#### **Flow Diversion Structure**

The diversion structure consists of an approximately 9-foot-long gravity flow 8-inch PVC pipe with the top cut off and elevated on a concrete pier. If flow exceeds the half pipe, the wastewater will overflow into the lower portion of the chamber and flow by gravity to the equalization tank. A

downstream valve can also be closed to send all flow to the equalization tank. Staff report that there has been little to no use of the equalization tank required based on present flow conditions.

Based on CED's June 2025 facility inspection, the concrete structure, pipe and overflow were in good condition with no improvements proposed.

#### **Influent Flume Structure**

Downstream from the flow diversion structure is a rectangular concrete influent flume structure that is 7'-6" long by 6'-0" wide by 3'-0" deep. In the past the structure was fitted with a trapezoidal flume, sensor and junction box which are connected to an influent flow meter in the existing control building. While the flume is still in place, the sensor and junction box have been removed because the influent flow meter is no longer utilized due to inaccurate data collected from the sensors.

Based on CED's June 2025 facility inspection, the concrete structure and flume were in good condition and no improvements are presently proposed.

#### **Equalization Tank**

The equalization tank, constructed in 2003, is a two-chamber reinforced concrete structure that is 28'-0" long by 27'-0" wide by 11'-0" deep with a storage volume of approximately 30,300 gallons. Each chamber is separated by a 1'-0" wide concrete wall and is aerated while in holding, using one of two 15 HP Dresser Roots blowers.

A stand-alone duplex pump station (the Low Lift Pump Station below) conveys the wastewater from the equalization tank utilizing a 4-inch ductile iron force main, to a manhole located upstream of the headworks to reintroduce the wastewater into the treatment plant.

According to the facility inspection conducted by CED in June 2025, the concrete structures and return pump station were found to be in excellent condition. The air header showed signs of corrosion, and the diffusers could use replacement.

The NYSTA personnel indicated that the equalization tanks are not in use due to low flow conditions. One of these tanks could be repurposed into a sludge holding tank.

#### **Low Lift Pump Station**

According to CDM Smith, the low lift pump station is a precast reinforced concrete wet well, 6'-0" W by 13'-0"H housing two submersible sewage pumps. The pump station conveys flow from the equalization tank to the head of the WWTP.

Based on CED's June 2025 facility inspection, the pump station is in good condition, however, fall protection is recommended.

#### **Primary Clarifier**

According to prior reports, the primary clarifier structure is a feature of the original 1954 plant construction and is a circular concrete basin with a 15'-4" inside diameter, an overall depth from the top of the concrete to the tank bottom of 9 ½ feet, a side water depth of 7 feet, a liquid volume of 9,253 gallons, and lies mostly below grade.

The primary clarifier equipment includes a steel bridge mounted clarifier mechanism with a steel center well, motor, gear reducer, torque tube and scrapper mechanism. The system also includes a sludge/scum pump in the basement of the control building. During the 2003 WWTP rehabilitation, improvements were made to the primary clarifier including the replacement of the motor and gear drive, steel support beams and deck plate, and influent and effluent lines. The top 4 1/2 to 5 feet of the perimeter concrete wall including the effluent channels were replaced. The existing weir and scum baffle were removed and reinstalled post construction.

The primary clarifier removes non-soluble biological solids, grit, and floatable solids prior to biological treatment. Solids and grit are settled to the bottom of the tank and pushed with a steel plow to a center well for removal by pumping to the waste sludge holding tank. Floatable solids and scum are pushed by a steel skimmer arm to a submerged collection point which empties to a concrete scum well attached to the periphery of the tank. Scum is then pumped to the waste sludge holding tank.

The side water depth of 7'-0" is less than the minimum side water depth of 10'-0" recommended by the Ten State Standards for Wastewater Facilities. With the reduced side water depth, the separation zone between the sludge blanket and overflow weir is also reduced, which increases the potential for solids carry over, particularly during high flow events. However, this has not been a problem at this facility.

Based on CED's June 2025 facility inspection, the Primary Clarifier scum collection is not an ideal arrangement. The collection point is submerged which complicates the collection of floatable particulates. An alternative approach should be considered. The facility could be retrofitted with a scum collection beach as this would reduce the volume of water collected and sent to waste and better concentrate the floatable particulate.

The overflow weir was observed to be a sharp-crested rectangular weir, which is not typical for clarifiers. The weir was also observed to have uneven flow around the perimeter. CED recommends a new fiberglass v-notch weir to facilitate even flow.

Above grade concrete was observed to be in good conditions with no cracking or spalling. When the structure is empty, the interior concrete should be inspected to determine if any concrete repairs are needed. Site grading around the clarifier perimeter provides insufficient freeboard between the top of the tank and the surrounding ground, with the potential of allowing stormwater to enter the tank during heavy precipitation. The Ten State Standards for Wastewater Facilities requires a minimum of 6-inch above surrounding grade. A concrete curb should be added to the clarifier tank perimeter to increase the top of tank elevation.

### **Sewage Wet Wells and Control Building**

According to prior reports, the control building consists of a substructure and a one-story masonry superstructure. The substructure includes a dry well and two wet wells. The dry well contains two vertical centrifugal sewage pumps, two sludge piston pumps, piping, valves, and fittings. The superstructure includes an area for power and control equipment, as well as a small workspace for the laboratory and storage. This building contains the lab equipment that the plant operations staff use to conduct daily operational tests and record keeping. The main electrical distribution panel is also housed in this building. The building, roof and fixtures therein were reported to be in good condition.

According to CDM Smith, at the time of their site visit in 2014, the substructure and superstructure did not appear to have any substantial defects. However, between the headspace of the wet well and dry well there is an access opening that currently violates NFPA 820 requirements and poses hazard of combustible gases passing between the wet and dry well. CDM Smith recommended the sealing of the opening with a gas-tight masonry plug. Additionally, they recommended the replacement of two wet well access hatches on the outside of the control building.

Primary clarifier effluent flows by gravity to the lower wet well on the west side of the building. The wet well is divided into two chambers. Flow that enters the lower wet well is pumped by the trickling filter feed pumps to the trickling filter. The trickling filter effluent flows by gravity to the upper wet well. There is a recirculation butterfly valve connecting the two wells. During times of day when there is zero flow to the plant, pumping must be maintained to feed the trickling filter biomass. Under this circumstance all the trickling filter effluent flows back into the first chamber where it is combined with primary clarifier effluent and recycled through the trickling filter. During times of day when there is incoming flow from the service area, the excess overflows a weir and flows by gravity to the secondary clarifier.

There is an opening in the wall between the basement and the lower wet well. The wooden door that covers the opening is not sealed to prevent sewer gas intrusion into the basement. The electrical panels, lights, and fittings in the basement and the first floor are not rated for service in the presence of methane sewer gas, which is a violation of National Electrical Code.

Based on CED's June 2025 facility inspection, the 20-year-old trickling filter feed pumps and waste sludge pumps have reached the end of their useful life and should be replaced. All the process piping in the basement should be replaced. The floor should be repainted following installation of new piping and pumps.

The opening to the wet well will need to be sealed to meet code due to the presence of sewer gases in closed quarters with nonexplosion-proof equipment. Level floats will need to be relocated to be able to access from the outside hatch once this is sealed.

Ventilation improvements to comply with worker safety and electrical standards per NFPA 820 should be considered.

### **Trickling Filter**

According to previous reports, constructed originally as part of the WWTP in 1954, the trickling filter has a diameter of 30'-0" and a depth of 6'-0". It is constructed of reinforced concrete with a galvanized steel roof. Internally, the filter includes a rotary flow distributor, rock media, and underdrain. The trickling filter and secondary clarifier are designed for BOD<sub>5</sub> and TSS removal. On the surface of the rock media, biomass growth allows biological treatment of the wastewater when influent is sprayed over the rocks by the rotary flow distributor. The wastewater trickles down through the filter media and is collected at the bottom through the underdrain system and is conveyed by gravity to the existing upper wet well within the control building. (Beardsley 21).

The recommended depth of rock media per the Ten State Standards for Wastewater Facilities is 6'-0" to 10'-0". Based on drawings from the 2003 WWTP rehabilitation, the Clifton Springs trickling filter media depth is approximately 5'-5", which does not meet the recommended depth; however, the plant has not had any issues meeting permit.

Based on CED's June 2025 facility inspection, it was noted that the filter media was outdated and may be substituted with polypropylene media. It is noted that the Trickling Filter mechanism and rotating arms have reached the end of their useful lives and should be replaced. It was also noted that the roof was in poor condition with corrosion evident at the perimeter. This should be further assessed to determine if replacement is necessary. The blower on the roof is not original to the trickling filter and is still in good condition.

### **Secondary Clarifier**

According to prior reports, wastewater flows from the trickling filter by gravity to secondary influent wet well at the control building then to the secondary clarifier. The secondary clarifier structure is a feature of the original plant construction and is 15'-4" in diameter by 7'-0" side water depth with a volume of 9,253 gallons. The discharge weir is about 41 feet long.

The secondary clarifier removes biological solids and any remaining floatable solids after the biological treatment in the trickling filter. Biological solids are settled to the bottom of the tank and pushed with a steel plow to a center well for removal to the waste sludge holding tank. Floatable solids and scum are pushed by a steel skimmer arm to a submerged collection point which empties to a concrete scum well (attached to the periphery of the tank) and are then pumped to the waste sludge holding tank.

The side water depth of the secondary clarifier (7'-0") is less than the minimum side water depth of 10'-0" recommended in the Recommended Standards for Wastewater Facilities. With the reduced side water depth, the separation zone between the sludge blanket and overflow weir is reduced, which increases the potential for solids carry over, particularly during high flow events. This has not been a problem at this facility.

Based on CED's June 2025 facility inspection, the Secondary Clarifier scum collection is not an ideal arrangement. The submerged collection point complicates the collection of floatables and results in excess water being sent to waste. The facility could be retrofitted with a scum collection beach to better concentrate floatables and reduce the volume of water collected.

The overflow weir was observed to be a sharp-crested rectangular weir, which is not typical for clarifiers. The weir was also observed to have uneven flow around the perimeter. CED recommends a new fiberglass v-notch weir to facilitate even flow.

Above grade concrete was observed to be in good condition with no cracking or spalling. When the structure is empty, the interior concrete should be inspected to determine if any concrete repairs are needed.

Also, site grading around the clarifier perimeter provides insufficient freeboard between the top of the tank and the surrounding ground, with the potential of allowing stormwater to enter the tank during heavy precipitation. The Ten State Standards for Wastewater Facilities requires a minimum of 6-inch above surrounding grade. A concrete curb should be added to the clarifier tank perimeter to increase the top of tank elevation.

### **Filtration**

The existing facility does not have filtration and has not had a problem meeting permit without it. CED considered the feasibility of adding filtration to the treatment train for improved efficiency and an extra layer of protection in the event of a clarifier upset. A cloth filter system would fit the footprint of the plant; however, the existing layout is limited by the hydraulic profile and a nearby transformer and generator. The addition of a cloth filter system would require a new pumping step in the treatment train. Due to the extensive design involved and the plant not having permit issues, this alternative was not evaluated further. It is something that could be considered in the future if the plant started encroaching on effluent solids limits.

### **Disinfection**

As per previous reports, The WWTP was originally equipped with a chlorine contact chamber for disinfection of the wastewater effluent. At some point in time (unknown) the chlorine contact system was removed, leaving the rectangular (11'-11" long x 5'-7" wide x 3'-8" high) concrete structure to remain. As part of the 2003 improvements the structure's existing v-notch weir was removed and a trapezoidal flume was installed with an 8-inch-wide flow channel.

During CED's June 2025 facility inspection, CED observed that the former chlorine contact chamber is used solely for flow rate measurement of effluent discharging from the WWTP. During the visit, the NYSTA operators expressed interest in implementing UV disinfection as an additional treatment process. If there is a modification to the SPDES permit, disinfection would likely be required. CED recommends the installation of a UV system to provide disinfection.

### **Effluent Flume**

Based on record information, the second flow measurement flume was constructed in 2003 within the former chlorine contact chamber. Flow is measured using a trapezoidal flume and a level sensor. The original 11'-9" long by 5'-6" wide by 3'-8" deep reinforced concrete structure.

Based on CED's June 2025 facility inspection, the flume appears to be in good condition with no improvements necessary.

### **Effluent Pipe**

As per prior reports, during the 2003 WWTP rehabilitation project, the entire length of the effluent discharge piping was replaced with PVC piping.

It is the recommendation of CED that further investigation of the effluent pipe through CCTV be considered to ensure constitution of the piping.

### **Sludge Holding Tank**

Per the prior reports waste sludge and scum is pumped from the primary and secondary clarifiers to the sludge holding tank. The sludge holding tank is 30'-0" in diameter with an approximate depth 15'-6". The actual depth will need to be confirmed. The tank is a feature of the original plant and is of reinforced concrete construction. As part of the 2003 WWTP rehabilitation project, the rake arms and driver of the sludge holding tank were repaired.

During the Beardsley site visit, NYSTA personnel noted that the influent line yard valve, located adjacent to the structure, is inoperable and in need of replacement. Additionally, the structure's center hatch has corroded to the point that it also shall be replaced.

Based on CED's June 2025 facility inspection the exterior concrete remains in good condition, but CED recommends abandonment of the sludge holding tank in favor of retrofitting one of the equalization tanks to a more appropriately sized sludge holding tank. The smaller retrofitted equalization tank would also allow for decant of excess water and return to the head of the plant. The NYSTA operators reportedly do this at other facilities. Removing excess water from the sludge will reduce waste hauling costs.

### **Fire Protection**

CED will subcontract RAN Fire Protection Engineering, P.C. to establish a fire alarm system for this facility, ensuring code compliance.

Per previous reports and confirmed upon the CED/RAN site assessment, the existing facility does not currently have a fire alarm system. The site currently has two structures that need fire alarm devices: (1) main office/operator space (including basement/pump pit) and (2) detached office/maintenance storage. The main office is provided with power infrastructure that can be utilized for power to a new fire alarm system.

Based on discussions with site/NYSTA personnel, the wastewater treatment facility is fully independent from the rest stop facility. Any system installed will operate as a stand-alone with an independent means of central station communication. It is also desired to provide direct communication with operator upon a potential fire alarm signal via cell phone alerts/texts.

### **Electrical and Communication Systems**

The electrical service to the WWTP is noted as 200A at 208/120VAC, 3PH, 4W. The entire service is backed up by a permanent diesel generator. The transformer on site looks to be in good condition. The generator on site looks to be in good condition. It is not expected to alter the service in anyway. However, utility data showing the peak loading information over the past year is required in order to perform an accurate load analysis and load calculation. The expectation is the old and outdated



equipment will be replaced with new equipment of comparable size and power and so there will not be a large increase in overall site electrical demand. Existing stainless steel disconnect switches will be re-used where possible. Existing underground conduit will be re-used where possible. Locations where PVC conduit penetrate the ground will be removed and replaced with galvanized rigid steel for vertical sections and elbows. PVC will be used in horizontal underground runs of conduit and in interior areas subject to corrosion such as the basement. Existing LFMC (liquid-tight flexible metal conduit) shall be reused where possible. Existing conductors, circuit breakers, and fuses will be reused where possible. Motor control enclosures for the comminutor, trickle filter feed pumps, sludge pumps, and others shall be specified to be provided from the pump manufacturer. Per previous reports, a wireless automatic alarm dialer does not exist at the facility and should be provided to communicate critical alarm conditions from the wastewater treatment plant to a remote receiving station. Critical alarms may include the loss of power, high wet well alarm level, headworks comminutor failure, and others as specified by the client.

It is the recommendation of CED that the Service Area's WWTP be connected to the NYSTA's intranet system by a landline that includes an auto-dialer device or an internet connection to the Service Area's offsite communications system.

No improvements are intended to be made to the site's interior and/or exterior lighting.

#### **WWTP Site and Grounds**

The WWTP tanks and equipment sit at varying elevations, requiring walking up and downside slopes and stairs to access some of the treatment processes.

The site is well drained and adequately lighted. The WWTP is surrounded by a 6-foot-high chain link fence which is in good condition. The asphalt drives and parking areas on the site were reported in fair to poor condition with cracking, spalling and potholes evident.

The staff reported that all buried valves are in poor condition. They are either broken (will not open or will not close) or are exceedingly difficult (require excessive force) to operate.

Based on CED's 2025 facility inspection, it's recommended that all the valves should be replaced. New spring-loaded access hatches with fall prevention should be added where applicable.

#### **Summary**

Based on prior inspections and reports as well as CED's facility inspection, the existing facility is very well operated. It meets permit requirements, but numerous mechanical components are oversized and/ or in need of replacement. Some additional upgrades are suggested to improve performance of the plant and reduce sludge hauling costs.

Actual flows are well below the 54,000 gpd capacity. The existing facility is oversized for existing flows.

### **4. Definition of the Problem**

As noted above the WWTP has aged equipment and is oversized.



Several concrete structures such as the headworks, clarifiers and the sludge holding tank are seventy years old. Their condition below the water level is uncertain. They are sized for 54,000 gpd which is far above what the plant is seeing in the present day. Also, the Clarifiers do not conform to Ten States Standards for Wastewater Facilities requirements for freeboard to surrounding grade and side water depth.

Most of the mechanical equipment is at least twenty years old with significant pieces being over seventy. Much of this has reached the end of its useful life and needs to be replaced.

The WWTP is sized for 54,000 gpd but recent data indicates actual flows are a fraction of this. Additional flows are not anticipated considering the Service Area was recently upgraded and no increase in service area is planned.

The facility sites an elevation such that it is at minimal risk due to climate change (sea level rise, storm surge, potential for flooding impacts, or other extreme weather event).

The WWTP meets permit, but to continue meeting permit, significant improvements are necessary to replace aging infrastructure. An alternative would be to replace the plant with a downsized facility.

Table 4 details the recommended improvements to rehabilitate the WWTP.

**Table 4 - Recommended Improvements**

Recommended Improvement	Justification and Benefit to the Facility
Replace existing hydraulic grinder drive with a direct drive motor	<ul style="list-style-type: none"> <li>- Consistency with other NYSTA facilities</li> <li>- Continuity of service with ease of maintenance and readily available spare parts</li> </ul>
Modify existing EQ tank to use half as sludge holding tank and replace the diffusers and header piping	<ul style="list-style-type: none"> <li>- Existing EQ tank is oversized and not utilized</li> <li>- New process flow would allow for sludge to be decanted which reduces total volume for hauling</li> <li>- Existing diffusers and header piping are in poor condition</li> </ul>
Decommission the existing sludge holding tank	<ul style="list-style-type: none"> <li>- Existing sludge holding tank is original to the plant with unknown interior condition of the concrete</li> <li>- Rake arms and driver mechanism are from the 2003 rehabilitation and have exceeded their useful life</li> <li>- Existing tank is oversized.</li> <li>- Existing tank does not allow decanting</li> <li>- Repurposing the EQ tank will eliminate the need to repair the existing sludge holding tank</li> </ul>

Recommended Improvement	Justification and Benefit to the Facility
Replace trickling filter feed pumps Local controls can be reused	- Existing pumps have exceeded their useful life
Replace sludge pumps Local controls can be reused	- Existing pumps have exceeded their useful life
Seal wet well hatch in the basement of the control building	- The opening to the wet well makes the control building a classified space which would require all electrical equipment to be explosion proof rated
Install a ventilation fan in the control building basement	- Worker safety
Install non-skid flooring in the control building basement	- Worker safety
Install a concrete curb around existing clarifiers	- The clarifiers do not meet Ten States Standards for freeboard above surrounding grade or side water depth
Replace trickling filter mechanism and rotating arms	- Existing equipment has exceeded its useful life
Install UV Disinfection	- There is currently no disinfection at the facility and DEC will likely require disinfection with any permit modification
Install a manual fire alarm and occupant notification system throughout the main office/operator space	- The existing facility does not currently have a fire alarm system and there are two structures that need fire alarms.
Install an alarm communication system	- Communicate critical alarm conditions from the wastewater treatment plant to a remote receiving station.
Replace yard valves	- Existing valves have reached the end of their useful life

The following features are suggested upgrades to improve efficiency:

- Switch the clarifier weirs to v-notch fiberglass for improved capture of floatables including grease
- Retrofit clarifiers to use a scum beach to reduce liquid sent to the sludge holding tank
- Replace the trickling filter media for improved biological treatment
- Filtration system for improved treatment and backup suspended solids treatment

## 5. Financial Status

The WWTP is owned and operated by the NYS Thruway Authority. Its only customer is the Service Area. It is funded according to existing Thruway agreements.

## Alternatives Analysis

Alternatives evaluated in this report include no-action, rebuild the 54,000 gpd facility, and construction of a smaller facility.

### 1. No Action

Many major components of the existing facility are 70 years old and oversized for the daily average flows. No action may lead to permit violations and decreased efficiency of the treatment process. No action is not a solution.

### 2. Equipment Replace in Kind (54,000 GPD)

#### Low Lift Pump Station

CED recommends installation of fall protection measures be carefully considered for the pump station. This recommendation arises from a thorough assessment of the site and the potential hazards associated with working at heights, which can pose significant risks to the safety and well-being of personnel. Fall protection included in this alternative consists of aluminum safety grating under the spring-loaded aluminum hatch.

#### Headworks

CED recommends substituting the existing hydraulic grinder driver with an electric driver. See Appendix C | Vendor Cut Sheets

As a result, facilities can expect lower maintenance costs and less frequent repairs, ultimately leading to increased uptime and productivity. The transition to this solution not only enhances operational reliability but also supports a more sustainable approach to resource management within the plant. New unit will come with a new control panel. Controls can be added to ensure the comminutor does not run dry.

Over-Current Protection Device (OCPD) for grinder will require replacement. Conductor size will need to be verified by contractor and replaced if not rated for 30A. Existing PVC conduit is damaged as it penetrates ground by the existing grinder. That conduit will need to be replaced at the elbow with galvanized rigid steel.

#### Equalization Tank

It is the recommendation of CED that one of the unused equalization tanks be retrofitted to a sludge holding tank. One equalization tank would have a sludge storage volume of 15,000 gallons, which at current flows, would provide abundant storage. This retrofit should include ability to decant the sludge to reduce water being hauled off site.

Replacement of the diffusers and piping to the equalization tanks is recommended.

#### **Primary Clarifier**

When the structure is empty, the interior concrete should be inspected to determine if any concrete repairs are needed.

The areas of the wall with insufficient freeboard (less than 6 inches) should be addressed by regrading or a concrete curb.

The flat metal weir is recommended to be replaced with a fiberglass v-notch weir.

#### **Sewage Wet Wells and Control Building**

CED recommends replacement of the sludge pumps, Trickling Filter feed pumps, and all the process piping in the basement. The floor should be repainted following installation of new piping and pumps.

The opening to the wet well will need to be sealed to meet code due to the presence of sewer gases in closed quarters with nonexplosion-proof equipment. Level floats will need to be relocated to provide access from the outside once this is sealed. The level floats communicate to the duplex control panel. Those conduits will require explosion proof seals to prevent the hazardous gases from migrating to the control panel.

Ventilation improvements to comply with worker safety and electrical standards per NFPA 820 should be considered.

Existing circuit breakers, conduit, conductors, and HOA disconnect switches can be reused. Some disassembly might be required to accommodate piping replacement. The existing starters will need to be verified as the correct size and the overload protection will need to be replaced to match the nameplate amperage draw of the new sludge pump motors.

Existing duplex control panel can be reused. Contractors will need to perform function tests and checks on all I/O and safety controls. Added controls can be added to ensure the pumps switch lead/lag designations for improved longevity and reliability of pumps. Tying status of WWTP to the Service Areas Intranet will be investigated. Communication of alarms, both trouble and supervisory to operators via an auto-dialer will be added to the duplex control panel.

#### **Secondary Clarifier**

When the structure is empty, the interior concrete should be inspected to determine if any concrete repairs are needed.

The areas of the wall with insufficient freeboard (less than 6 inches) should be addressed by regrading or a concrete curb.

The flat metal weir is recommended to be replaced with a fiberglass v-notch weir.

#### **Trickling Filter**

CED suggests the replacement of the trickling filter mechanism and the rotating arms, which have reached the end of their useful lives.

CED recommends the replacement of the stone media with new media such as polypropylene.

Existing blower on top of existing trickling filter shall be removed to accommodate installation of new trickling filter media. The roof should also be replaced at this time. The blower can then be reused and reinstalled. Much of the existing conduit and conductors can be reused for the replacement of the Trickling Filter Feed Pumps.

### **Disinfection**

The addition of a UV disinfection system installed within a concrete channel is recommended to be implemented between the secondary clarifier and the effluent flume. Vendor cut sheets can be found in Appendix C | Vendor Cut Sheets

A new branch circuit for the UV disinfection system will be required. The branch circuit will be buried underground if it is needed to run to a building/station separate from the main control house.

### **Site and Grounds**

All the valves are recommended to be replaced.

All the old hatches are recommended to be replaced with fall prevention where applicable.

### **Sludge Holding Tank**

The existing sludge holding tank should be decommissioned and demolished as it is old and oversized. The retrofitted equalization tank will serve as the new sludge storage tank.

### **Fire Alarm and Detection Systems**

The requirements for fire alarm and detection systems were determined in accordance with NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities, 2016 Edition. The majority of the processes that are covered within NFPA 820 are exterior and not within structures, with the exception of the pumping station dry well. NFPA 820 Table 4.2.2 does not require fire alarm, smoke detection or combustible gas detection systems.

Although it is not required it has been communicated to RAN to account for providing a fire alarm system. The components of this non-required system are as follows: (1) fire alarm control panel, (2) cellular dialer, (3) manual pull stations and (4) horn/strobe notification appliances. The fire alarm control panel and dialer will be located at the front entrance of the main office/operator room. The fire alarm system will be provided with an approved central station monitoring service which will utilize the dialer for communication. In accordance with NFPA 72, manual fire alarm pull stations will be located within five feet of each exit door. Fire alarm horn/strobes will be located throughout the occupied spaces to provide full audible and visual coverage.

All the recommendations above are based on a 54,000 gpd plant. Except for the UV disinfection, they involve utilizing existing structures and providing process equipment to fit. The opinion of probable cost to implement these improvements is \$2,390,000. See Appendix D for details. In addition, there are several unknowns such as the condition of the clarifiers 1954 concrete structures.

### 3. Construction of a Smaller Facility

As noted earlier, actual plant flows are well below the present plant capacity. Based on the past years' data (2024), the average flow to the plant is about 8,100 gpd with a max day of 22,000 gpd based on the effluent flow meter. In addition, there is no expectation that the rest area or service area will be expanded in any way in which the flows to the plant would significantly increase.

Therefore, CED explored the alternative of a small package type treatment plant. We based this on an average daily flow of 8,100 gal with the understanding that flow to a plant serving a rest area is highly variable.

CED cost out 4 package plant options. The costs are shown in Table 6 with further detail in Appendix D | Opinion of Probable Cost

The package plants evaluated were The Amphidrome, The ECOPOD, a Membrane Bioreactor (MBR) from Kubota, and The Ecodisc from Veolia.

#### **Amphidrome**

The Amphidrome is a submerged attached growth bioreactor which uses filtration to remove suspended solids and biofilms to treat BOD, ammonia, and nitrates. The system uses intermittent aeration to reduce energy consumption and often does not require any chemicals. Filters are backwashed to the EQ tank where sludge settles until it needs to be occasionally pumped and removed for offsite disposal. This alternative utilizes below grade concrete tanks and an above grade building to house the blowers and control panels.

#### **ECOPOD**

The ECOPOD is a submerged fixed film system that uses vertical plastic flutes to facilitate biofilm growth. Like the Amphidrome, The ECOPOD is installed in concrete tanks and does not require any chemicals or secondary clarification, and it uses blowers to provide aeration. This system requires a primary settling tank with an effluent filter to remove solids and has an EQ tank to account for periods of increased flow. Instead of backwashing the media, the air from the blowers scours the vertical flute media to slough off excess biofilm. Sludge remains in this tank where it would be removed for offsite disposal approximately every 14 days.

#### **Kubota MBR**

The third package plant evaluated was an MBR from Kubota. This plant features several prefabricated tanks that house space for equalization, screening, sludge storage, and the membrane unit. These tanks get affixed to slabs and buried underground with an above grade equipment room. Occasional use of chemicals for cleaning the membrane is required to remove fouling. The sludge storage tank will need to be pumped out every 14 days like the ECOPOD.

#### **Ecodisc RBC**

The last package plant alternative evaluated was The Ecodisc from Veolia. The system requires an EQ tank at the start of the treatment train, a slab for the Rotating Biological Contactor (RBC), and a sludge storage tank. The discs allow growth of biofilm then rotate in and out of the wastewater to

provide oxygen when exposed to air and break down nutrients when submerged. Excess biofilm sloughs off the discs and is removed by the drum filter before being sent to a sludge storage tank during backwashing of the filter.

Based on minimal cost and maintenance requirements, the Amphidrome package plant should be considered as a comparable alternative to the rehab alternative. The other 3 package plants would require a separate larger sludge holding tank to minimize the frequency of hauling. This means the existing sludge storage tank would need to be rehabilitated for these alternatives, adding additional cost. The ECOPOD also requires primary settling before the treatment process which adds the cost of repairing the existing primary clarifier.

#### 4. Opinion of Probable Cost

A summary of the opinion of probable construction costs for re-building the existing plant is presented in Table 5. This shows the breakdown between recommended replacements and suggested upgrades. Table 6 shows the package plant alternatives. These costs do not include the cost of demolition for the existing structures.

**Table 5 – Re-build the Existing Plant**

Alternative	August 2025 Estimated Construction Cost
Recommended Replacements	
Suggested Upgrades	
Clarifier Scum Collection	
Trickling Filter Media	
Filtration	
<b>Total</b>	<b>OMMITTED</b>

**Table 6 – Package Plants**

Description	Opinion of Cost
Amphidrome	
ECOPOD	
Kubota MBR	
Veolia RBC	<b>OMMITTED</b>

#### 5. Non-Monetary Factors

Non-monetary factors such as increased recreational opportunities, increased local employment, climate resiliency, standardization, personnel impacts, permit issues, community objections, or wetland relocation have minimal to no impact on the options.

Building a smaller plant could improve aesthetics, habitat, and reduce carbon footprint, but would require significantly more construction work.

## Summary and Comparison of Alternatives

After evaluating the alternatives, the two best options are isolated upgrades to the plant or replacing it with the Amphidrome package plant. Rebuilding the plant will maintain the current capacity at 54,000 gpd but will require downtime of the plant during periods of construction. There would be no change in operation and maintenance effort or energy cost. The Amphidrome would be sized properly for the typical flows seen at the plant and would reduce the footprint significantly. The operation and maintenance for the Amphidrome is minimal and the daily tasks would be like the existing plant. An additional benefit to the smaller plant is it can be constructed while the existing plant remains in service if existing tankage is not utilized.

## Recommended Alternative

Based on the reduced upfront cost, CED recommends the following upgrades:

- Headworks grinder
- Modify EQ tank to use half as the sludge holding tank
- Demolish the existing sludge holding tank
- New trickling filter feed pumps
- New sludge pumps
- Seal the wet well hatch in the basement of the control building
- Ventilation in Control Building basement
- Clarifier curbs
- Trickling filter mechanism
- UV Disinfection
- Replace all yard valves
- Upgrade hatches to include fall protection
- Fire Alarm System to include fire alarm control panel, (2) cellular dialer, (3) manual pull stations and (4) horn/strobe notification appliances
- The Clifton Service area WWTP should be added to the service areas intranet and communication status and alarms. Additionally, an auto-dialer feature can be added to communicate trouble and supervisory alarms to operators.
- Branch circuits, conduit, disconnects, and controls will be replaced as needed to accommodate pump demolition and installation.

Additional items to consider include:

- Upgrade Clarifier floatable collection mechanism
- Replace Trickling Filter Media
- Add filtration