

Q1 2023 Quarterly Progress Report Niagara Falls Water Board Order on Consent R9-20170906-129

Prepared for submission to:

New York State Department of Environmental Conservation Region 9
270 Michigan Avenue
Buffalo, New York 14203

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Amherst, New York 14228

April 30, 2023



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Table of Contents

Table of Contents.....	i
Executive Summary.....	ES-1
1. WWTP Performance.....	1-1
1.1. Treatment Plant Operations	1-1
1.2. Solids Removal Performance	1-1
1.3. Treatment Plant Equipment Readiness	1-3
2. Deliverables and Routine Communications	2-1
2.1. Deliverables Status.....	2-1
2.1.1.Existing WWTP Optimization Efforts	2-1
2.2. Deliverables in Next Quarter	2-1
2.3. Routine Communications in Past Quarter	2-1
2.4. Unresolved Issues/Delays	2-1
3. Capital Improvement Program	3-1
3.1. In-House Capital Upgrades Completed/Underway	3-1
3.2. Capital Improvement Projects	3-1
 Figures	
Figure 1 – Capital Projects Schedule	3-2
 Tables	
Table 1 – NFWB WWTP Solids Balance.....	1-3
Table 2 - NFWB Submissions to NYSDEC per Schedule A of the Consent Order	2-1

Niagara Falls Water Board Order on Consent R9-20170906-129
Q1 2023 Quarterly Progress Report

April 30, 2023

Executive Summary

This document is the twenty first (21st) quarterly progress report for the Niagara Falls Water Board (NFWB) Order on Consent R9-20170906-129 (Consent Order) as originally required by Schedule A Item 15 of the Consent Order. This progress report covers the period from January 1, 2023 through March 31, 2023.

During the past quarter, the NFWB has properly operated the wastewater treatment plant (WWTP) and has met all State Pollution Discharge Elimination System (SPDES) permit requirements with three exceptions for alpha-BHC (alpha-Hexachlorocyclohexane) in January, February, and March 2023. Solids processing (settling, thickening, dewatering) during this period has functioned as intended. Primary effluent is clean which has allowed the WWTP's activated carbon filters to efficiently process the plant's influent flow. Dewatering throughput during this period has kept up with incoming solids, compared to influent solids loadings. The WWTP was operated free of significant odors during the past quarter.

Maintenance activities during the reporting period have been ongoing, and as of the end of the quarter major treatment systems and components are functional. The WWTP is undertaking a number of capital upgrades and improvements that are within the capability of the WWTP's maintenance staff and/or contractors awarded service contracts. In addition to the projects being undertaken by the WWTP's staff and outside contractors, project planning, design, and construction of \$27 million in major capital upgrades are taking place. Engineering contracts are in place for eleven (11) of the twelve (12) capital projects (Projects 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, and 12) and one (1) of the capital projects has been completed by plant maintenance staff with assistance from an outside contractor under the mechanical services contract (Project 8). Construction of capital Projects No. 4 (GAC Changeout), No. 6 (Effluent Disinfection), No. 8 (Replacement of Blower Equipment) and No. 9 (Process Piping) are complete. Construction is underway on Projects 1, 2, 3, 5 (portions), 7, 10, and 11.

The NFWB has met all scheduled requirements of the Consent Order as identified in Schedule A of the Consent Order. Specific submissions during the past quarter include:

- The twentieth (20th) quarterly report for the fourth quarter of 2022 (Q4 2022) was submitted December 31, 2022 to the New York State Department of Environmental Conservation (NYSDEC) and posted on the NFWB's website (Consent Order Item 15).

The NFWB is committed to working cooperatively and openly with the NYSDEC to improve the Niagara Falls WWTP and operate it to the best of its capability.

Niagara Falls Water Board Order on Consent R9-20170906-129
Q1 2023 Quarterly Progress Report

April 30, 2023

1. WWTP Performance

This section discusses the operation of the NFWB WWTP during the reporting period of January 1, 2023 through March 31, 2023. In the following sections, Treatment Plant Operations, Solids Removal Performance, and Treatment Plant Equipment Readiness are discussed.

1.1 Treatment Plant Operations

Mr. Dennis Kirkland serves as Chief Operator of the wastewater treatment plant as of January 4, 2022. Until such time as Mr. Kirkland achieves the necessary operator's license, Mr. Fred Kasper (New York State Grade 4 licensed Operator 12489) is serving as the licensed plant operator. Mr. Kasper spends 4 hours per day on average at the facility on a Monday through Friday basis and assists Mr. Kirkland with his duties. During the reporting period there were three (3) reported SPDES permit excursions related to a low-level detection of alpha-BHC in the each month. This is an ongoing issue since the facility's SPDES permit limits for alpha-BHC were lowered on October 29, 2021 and is being addressed through the hiring of a consultant in October 2022. It is expected that industrial BHC discharges to the WWTP will be reduced via lowered discharge limits imposed upon permitted industrial users. Solids processing has kept up with the incoming solids, and equipment maintenance and repair activities have been conducted as promptly as possible.

Sodium hypochlorite consumption has dropped further as a result of the continued cold weather and resultant wastewater temperatures and averaged 6,900 gallons per day during Q1 2023 compared to 9,600 gallons per day in Q4 2022. The practice of chlorinating the primary effluent was stopped on January 26, 2023 due to issues with the filters and reduced sulfide generation (see additional discussion below). Chlorination of the filter backwash water continues to be practiced.

The following operational issues were noted during Q1 2023:

- Continuing from Q4 2022, high solids discharge from the Cascades facility during Q1 has continued. The main issue this caused during the past quarter was that the WWTP gravity thickeners do not settle and thicken efficiently with the addition of Cascades solids. As a result, the in-service gravity thickener was frequently overflowing solids back to the head of plant during Q1 2023, and a much thinner sludge must be processed through the belt filter presses. The poor gravity thickener performance results in poor performance of the belt filter presses (reduced solids capture and clogged belts) and requires sludge flow rates to the belt filter presses to be reduced which in-turn requires an increased number of operating hours for the belt filter presses.
- The carbon filters started out Q1 with very high number of filter backwashes per day due to shorter run times. This was a continuation from Q4 2022. Not knowing the exact cause, the following corrective measures were implemented in January 2023:
 - Reduce primary polymer dosage by more than half, back to where it was traditionally operated. The primary polymer dosage had crept up in recent months due to issues

Niagara Falls Water Board Order on Consent R9-20170906-129
Q1 2023 Quarterly Progress Report

April 30, 2023

with Cascades solids discharge and the poor efficiency of the polymer make-up system when using treated effluent as make up water. The polymer system is again using potable water for make-up.

- Reduce ferric chloride dose back to the target set point of 13 mg/l as FeCl_3 . Similarly, ferric chloride usage had gradually increased in the last several months.
- Reduce and then eliminate (as of 1/26/23) the practice of chlorinating primary effluent.
- Encourage operations staff to be more diligent about air scouring and long washing filters during backwash (2 minutes air scour at 2,200 cfm, 15 minutes backwash at 13,000 gpm. Institute the practice of all washes being long washes unless filters are so bad that long washes are not practical.

All backwash water continues to be directed to the head of the plant where it is retreated through the sedimentation basins and carbon. The filters' poor performance ultimately resulted in the occurrence of 100-foot weir overflow on January 1, 2023 which was a continuation of the event from December 31, 2022 (high influent flow rates associated with precipitation and snow melt over a multi-day period).

- The above changes in chemical usage (ferric, primary polymer, and primary effluent chlorination) along with increased diligence on performing long washes has resulted in a gradual decline in the number of filter backwashes. By the end of Q1 2023 filter backwashes were declining and were at approximately 60 to 70 backwashes per day. There has not been any further occurrence of 100-foot weir flow since January 1, 2023.
- Supply chain disruptions of ferric chloride occurred in early January 2023 due to weather and/or changing suppliers with the new calendar year. As a result, there were several one-to-two-day events where ferric chloride feed to the primary influent was stopped.

As of the end of Q1 the plant continues to work through these issues. Sedimentation Basin 3 construction began in March 2023 and is not available to the WWTP for use. Sedimentation Basin No. 4 was turned over to the WWTP with the new chain and flight sludge collector and new effluent weirs. Sedimentation Basin Nos. 4 and 5 are being operated without the benefit of automation or monitoring (sprocket motion monitors, and tipping pole monitoring). Sedimentation Basin 4 and 5 are being used to treat influent flow, while filter backwash continues to be directed to the head of plant.

1.2 Solids Removal Performance

A solids balance for January, February and March 2023 is presented in Table 1. The data is based upon effluent flow meter measurements and influent/effluent total suspended solids sample results generated by the facility. The data shows that the quantity of solids sent to the landfill has generally equaled the amount of solids removed from the wastewater plus chemical solids added (ferric chloride and lime). March experienced reduced performance that was likely related to the amount of solids being discharged by Cascades combined with poor performance of the thickeners and belt filter presses.

Niagara Falls Water Board Order on Consent R9-20170906-129
Q1 2023 Quarterly Progress Report

April 30, 2023

Influent suspended solids have continued to be lower than historical averages. The trend of lower influent solids began in November 2021 and appears to correlate with major reductions in suspended solids discharged from a significant industrial user. For example, during the period January through October of 2021 influent TSS averaged 415 dry tons per month (DTPM) versus the period November 2021 through December 2022 when influent suspended solids averaged 203 DTPM. For the past quarter the influent suspended solids were 194, 240, and 265 DTPM, respectively (average= 200 DTPM).

1.3 Treatment Plant Equipment Readiness

During the reporting period there were several treatment plant equipment breakdowns that required maintenance staff to repair or replace equipment. Minor repairs have been made this past quarter for pumps, belt filter presses, and sedimentation basin equipment to address issues that have arisen. Although these repairs may have kept equipment out of service for periods of time during the past quarter, it has not significantly affected the plant performance. In general, a sufficient number of sedimentation basins with fully functional sludge removal equipment have been available to treat all incoming flows. As of the close of Q1 2023, the following can be said regarding treatment equipment operability:

- Four (4) Main Pumps are operational, although one of the main pumps (No. 4) is equipped with a temporary (rental) variable frequency drive (VFD) due to a VFD failure in this pump during Q3 2022. The repaired VFD has been returned to the facility during Q1 2023 and will likely be installed in Q2 2023 allowing the rental unit to be returned.
- Four (4) Intermediate Pumps are operational and control/VFD issues are being monitored. A project to evaluate the intermediate pumps, motors, drives, and controls is underway and the study outcome should be available in the next quarter.
- Four of the five sedimentation basins are functional, with Sedimentation Basin No. 3 out of service for construction. During the past quarter, two (2) sedimentation basins have been used for flows up to 40 mgd, three (3) basins used for flows between 40 mgd and 60 mgd, and four (4) basins for flows over 60 mgd.
- Twenty-seven (27) activated carbon filters are functional, with filter 27 requiring a repair to the 2" filter underdrain air bleed that appears to be damaged.
- The filter backwash system is functional including two backwash pumps and two blowers.
- Three (3) belt filter presses and related equipment (sludge and polymer feed pumps) are operational although there have been interruptions in belt press operation as a result of Capital Project No. 11 (replacement of the underground sludge pipelines to/from the Thickened Sludge Pump Building). That project was completed January 19, 2023 when the new pipes were placed back into service.
- Two (2) pugmills, two (2) lime feed systems, and two (2) lime storage silos are fully functional.

Niagara Falls Water Board Order on Consent R9-20170906-129
Q1 2023 Quarterly Progress Report
April 30, 2023

Table 1
Q1 2023 NFWB WWTP Solids Balance

Month & Year	Average Daily Flow mgd	Average Influent TSS mg/l	Average Effluent TSS mg/l	TSS Removed (Dry) Tons/day	Ferric Chloride Added to Wastewater (Dry) Tons/day	Lime Added to Sludge (Dry) Tons/day	Total Solids (Dry) (TSS + Lime + Ferric) Tons/day	Solids Content of Landfilled Sludge %	Total Solids (Wet) Tons/day	Solids Landfilled (DRY) Tons/day	% Landfilled ¹ %
Jan-23	29.8	50.4	3.4	5.9	1.19	1.28	8.3	27.3%	30.5	11.8	141%
Feb-23	24.8	48.6	6.1	4.4	1.13	0.83	6.4	29.3%	21.7	11.4	179%
Mar-23	33.0	62.2	4.1	8.0	1.38	1.45	10.8	27.3%	39.7	8.25	76%

NOTES: mgd million gallons per day
TSS Total Suspended Solids
¹ % Greater than or equal to 100 indicates all incoming solids plus all chemicals added are removed and sent to landfill.

Niagara Falls Water Board Order on Consent R9-20170906-129
Q1 2023 Quarterly Progress Report

April 30, 2023

2. Deliverables and Routine Communications

This section presents a listing and discussion of deliverables prepared by the NFWB for submission to the NYSDEC. In addition, other related written communications between the NYSDEC and the NFWB are also discussed.

2.1 Deliverables Status

All deliverables required under the consent order have been submitted to the NYSDEC in accordance with the schedule in the Consent Order. Deliverables submitted during the past quarter are listed in Table 2.

Table 2
NFWB Submissions to NYSDEC per Schedule A of the Consent Order

Date	Prepared By	Consent Order Schedule A Items	Comment
December 31, 2022	AECOM	Item 15	The twentieth quarterly progress report for the fourth quarter of 2022 (Q4 2022) was submitted.

2.1.1 Existing WWTP Optimization Efforts

The plant is using Sedimentation Basin No. 5 as a treatment basin and will continue to direct filter backwash water to the head of the plant for retreatment through the sedimentation basins and carbon filters. This will likely continue until such time as all five (5) sedimentation basins are completed under Capital Project 1.

2.2 Deliverables in Next Quarter

All deliverables required under the Consent Order have been submitted. No other deliverables are pending or due under the consent order other than this quarterly report.

2.3 Routine Communications in Past Quarter

There were no significant communications with the NYSDEC in the past quarter.

2.4 Unresolved Issues/Delays

There are no unresolved issues or delays.

Niagara Falls Water Board Order on Consent R9-20170906-129
Q1 2023 Quarterly Progress Report

April 30, 2023

3. Capital Improvement Program

In this section, progress on WWTP capital upgrades is discussed. Capital upgrades are proceeding on several fronts. Projects that are within the capability of in-house maintenance staff are being undertaken as quickly as possible. Additionally, outside contractors selected for WWTP work (Mechanical Contractor – Mollenberg Betz, Electrical Contractor – Ferguson Electric) are being utilized for larger projects. Lastly, design and construction are underway to perform a number of capital upgrades that are necessary to stabilize the operation of the existing treatment plant. Each of these items is discussed in this section.

3.1 In-House Capital Upgrades Completed/Underway

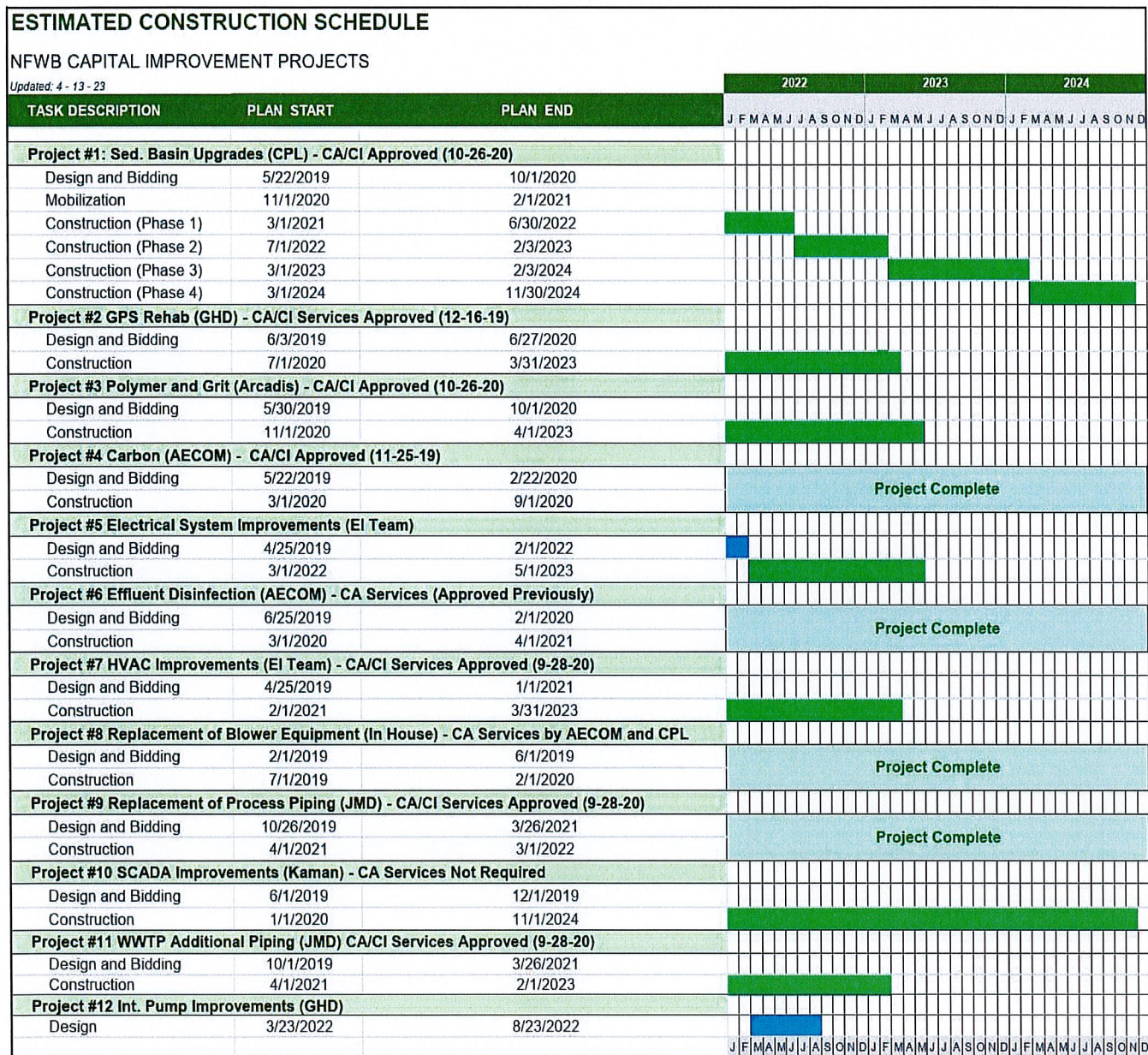
This category of projects includes work being undertaken by plant maintenance staff or outside contractors without the need for extensive design and engineering documents. This work is generally considered repair and/or replace in kind and therefore NYSDEC approval is not generally required prior to performing the work. At this time all work slated to be performed in-house has been performed.

3.2 Capital Improvement Projects

A schedule for the ongoing capital projects is shown in Figure 1.

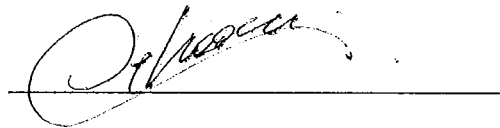
April 30, 2023

Figure 1
Capital Projects Estimated Construction Schedule



I certify under penalty of law that the letter from John T. Kolaga, Esq., Rupp Baase Pfalzgraf Cunningham LLC, and the enclosed Q1 2023 Quarterly Progress Report, Niagara Falls Water Board Order on Consent R9-20170906-129 prepared by AECOM dated April 20, 2023, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Niagara Falls Water Board



Name: Dr. Abderrahman Zehraoui

Title: Executive Director

Date: 4/27/23