BOLTON, MA

Wastewater Treatment Facility Evaluation

JUNE 2021

Emerson & Florence-Sawyer Schools

WRIGHT-PIERCE
Engineering a Better Environment

WWTF EVALUATION

FOR

TOWN OF BOLTON, MASSACHUSETTS

EMERSON & FLORENCE-SAWYER SCHOOLS

JUNE 2021

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WASTEWATER TREATMENT FACILITY (WWTF) EVALUATION
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TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF TABLES

LIST OF FIGURES

SECTION 1

INTRODUCTION

1.1 BACKGROUND

The Town of Bolton contracted with Tata and Howard engineering in 2006/2007 to provide wastewater treatment and disposal for two Town schools and nearby Town-owned buildings. The wastewater treatment facility (WWTF) is a package membrane bioreactor (MBR) type system, designed and permitted to treat a maximum flow of 38,000 gallons per day of sanitary wastewater. The Emerson and Florence-Sawyer school campus is located on Mechanic Street. The WWTF is located on a parcel of land abutting the campus, through a wood line and across a small creek. The WWTF can be accessed from the back of the school campus or along a dirt road behind the office buildings off Route 117. The land parcel also includes a subsurface leaching field for treated effluent disposal. The facility operates under a groundwater discharge permit (GWDP) issued by the Massachusetts Department of Environmental Protection (MADEP), permit number 0-833.

Wastewater is collected in two septic tanks at the Emerson school, one septic tank and one grease trap at the Florence-Sawyer school and one septic tank at the WWTF. Solids settle out by gravity in these tanks, which is equivalent to primary settling. Wastewater then flows by gravity to the flow equalization tank at the WWTF site. The wastewater is then pumped to one of two buried bioreactor tanks for biological treatment. In the bioreactor tank, the organic components (biological oxygen demand, BOD) and nutrients (nitrogen) in the wastewater are reduced. The bioreactor is divided into three zones:

- Pre-anoxic
- Aerobic
- Post-anoxic

The bioreactor effluent flows by gravity to the membrane dosing chamber where it is then pumped to the membrane system located in the adjacent building. The membrane system is capable of providing tertiary levels of wastewater treatment by reducing the total suspended solids (TSS) in the wastewater to very low levels.

Treated effluent then flows by gravity through the in-line type ultraviolet disinfection units (located in the building) to the buried effluent distribution box in the leaching field. The UV units are currently offline as disinfection is not required by permit. The wastewater is then directed to the effluent disposal system (subsurface leaching field). Solids handling (waste sludge) is accomplished by periodically pumping out collected solids in the bioreactor.

The membrane bioreactor treatment facility consists of the following sequential list of components comprising the wastewater treatment facility:

- One 13,000, one 5,000, one 24,000, and one 1,500-gallon pretreatment septic tank and one 2,000-gallon grease trap.
- One 20,000-gallon flow equalization tank (with two submersible grinder pumps)
- Two bioreactor trains (13,700-gallons per train, 27,400-gallons total) comprised of:
    - One 2,500-gallon pre-anoxic zone with an eductor (hydraulic mixing nozzle)
    - One 9,600-gallon aeration zone with coarse-bubble diffuser grid and recycle pumps
    - One 1,600-gallon post-anoxic zone with submersible propeller mixer
- One 1,600-gallon membrane dosing chamber with submersible feed pumps
- One dual compartment, painted steel membrane tank, each compartment 900-gallons with a membrane unit in each. Each membrane unit consists of two cassettes each with six modules.
- Membrane and backwash pumps
- Two UV disinfection units
- One sodium hypochlorite day tank and metering pump (membrane cleaning)
- One Micro-C drum and metering pump (supplemental carbon source)
- One sodium bicarbonate day tank and metering pump (supplemental alkalinity and pH adjustment)
- Two aeration blowers
- Two membrane blowers
- One 15,000-gallon effluent wet well with two submersible final effluent transfer pumps
- 14-chamber leaching field with distribution box
- One building to house the membrane and process equipment

- Outdoor propane-powered standby power generator

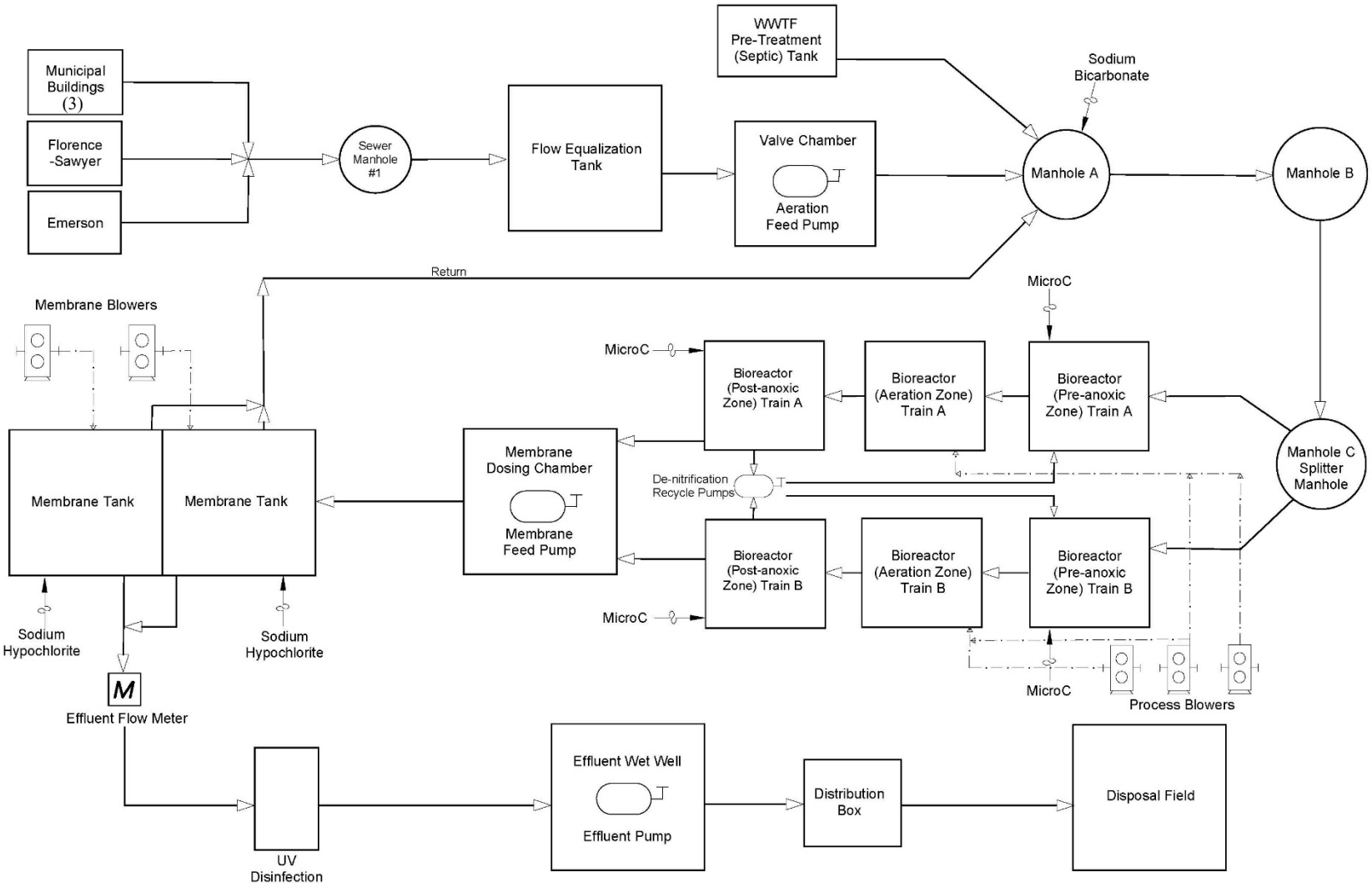
Figure 1-1 shows an aerial view of the WWTF with each site labelled. Figure 1-2 shows the process flow diagram for the treatment facility.

FIGURE 1-1

WWTF AERIAL

FIGURE 1-2

WWTF PROCESS FLOW DIAGRAM



1.2 PROJECT SCOPE

The scope of this project is split into two phases. The following report addresses the first phase, which is the 15-year engineering report required by the facility's GWDP.

The engineering report includes a summary of the detailed evaluation of the treatment systems from an operations and condition standpoint and provides short-term (0-5 years) recommended system improvements.

Wright-Pierce (WP) collected and reviewed relevant data/information. Such data includes relevant operating and maintenance data for the existing WWTF, current groundwater discharge permit, other project related data, and any relevant correspondence from DEP and other entities. WP conducted a site visit of the wastewater facilities with the Contract Operator (WhiteWater).

WP evaluated the WWTF including:

- Historical and current WWTF flows and loads and compared against design flows and loads data, including facility performance.
- Facility performance and evaluated against current and potential future GWDP requirements.
- A WWTF conditions assessment. Evaluated the condition of existing process, structural, electrical, and instrumentation and control equipment for potential immediate repairs and/or improvements.
- Summarizing findings in table format and provided this written report

Phase 2 reviews and evaluates long-range planning and facilities operations improvements.

SECTION 2

DESIGN INFORMATION

2.1 DESIGN FLOWS AND LOADS

The WWTF in Bolton services two public schools, Emerson and Florence-Sawyer (135 and 825 students, respectively, at the time of design, about 800 total currently) and three municipal buildings (Public Safety Building, Public Library, and Houghton Building). During design, criteria outlined in 310 CMR 15.000 (Title 5) was used to estimate flow. 10 gallons per day per person was used for a total design flow of 9,600 gpd. A future flow allowance was allotted to increase flow to 38,000 gpd. The influent BOD and TSS concentrations used for design were 500 mg/L for each parameter.

2.2 GROUNDWATER DISCHARGE PERMIT

In 2007, the WWTF was issued an Order of Conditions by the Bolton Conservation Commission. Shortly thereafter, MassDEP issued a groundwater discharge permit (GWDP) for the WWTF. The permit, numbered 0-833, was originally issued on July 18, 2007. The facility is rated as a Grade 4. The permit was most recently renewed in 2016 and expires in July 2021. One of the requirements of the original permit is to prepare an engineering report at year 15.

The WWTF effluent characteristics are summarized in Table 2-1.

TABLE 2-1

SUMMARY OF GWDP EFFLUENT DISCHARGE STANDARDS

Component	Effluent	Monitoring Frequency
Maximum Day Flow	38,000 gpd	Daily
Total BOD	30 mg/l	Monthly
Total Suspended Solids (TSS)	30 mg/l	Monthly
Total Nitrogen	10 mg/l	Monthly
Total Nitrate-Nitrogen	10 mg/l	Monthly
Oil and Grease	15 mg/l	Monthly
pH	6.5-8.5	Daily
Ammonia Nitrogen		Monthly
Total Phosphorus		Quarterly
Orthophosphate		Quarterly
Volatile Organic Compounds		Annually

The GWDP is included in Appendix A.

2.3 CURRENT/HISTORICAL FLOWS AND LOADS

WP reviewed the monthly discharge monitoring reports (DMRs), which the facility is required to submit electronically to MassDEP, for the analysis period January 2018 to January 2021. The results are summarized in Table 2-2. There were several months in 2020 (May-October) when the facility didn't operate due to COVID shutdowns.

TABLE 2-2

JAN 2018 – JAN 2021 FLOWS AND LOADS SUMMARY

Parameter	Flow (gpd)	BOD (mg/L)		TSS (mg/L)		Ammonia (mg/L)	TN (mg/L)	Nitrate (mg/L)
		Inf	Eff	Inf	Eff	Inf	Eff	Eff
Average Daily	2,676	-	-	-	-	-	-	-
Minimum Daily	30	-	-	-	-	-	-	-
Maximum Daily	20,700[1]	-	-	-	-	-	-	-
Maximum Daily, 98th Percentile	9,186	-	-	-	-	-	-	-
Average Monthly	2,531	105	4.9	553	3.2	94	7.5	3.4
Minimum Month	1,125	16	ND[2]	18	ND	21	0.7	ND
Maximum Month	5,779	620	44	6,200	37	190	38	27

1. Occurred on February 20, 2018
2. Non-detect, below detectable limit

Flows

The daily flows for the analysis period did not exceed the permit limit of 38,000 gpd. The facility did not see average annual flows approach the 80% permit-required review threshold of 30,400 gpd. In fact, the flow was below 10,000 gpd 98 percent of the time during the analysis period.

Loads

The effluent BOD had 2 exceedances during the analysis period; TSS had 1 exceedance; Operations staff attributed these violations to equipment malfunction. The facility averaged 92.3% removal of BOD and 97.0% removal of TSS over the analysis period as shown in Table 2-3.

TABLE 2-3

JAN 2018 – JAN 2021 BOD AND TSS REMOVAL PERCENTAGES

Parameter	Monthly Percent Removal		
	Minimum	Average	Maximum
BOD			
2018	61.8%	94.5%	100%
2019	58.1%	96.2%	100%
2020	-18.9%	86.4%	100%
2018-Jan 2021	-18.9%	92.3%	100%
TSS			
2018	66.4%	95.2%	100%
2019	93.7%	98.5%	100%
2020	72.7%	97.0%	100%
2018-Jan 2021	72.7%	97.0%	100%

Nutrients

The facility is required to remove nitrogen by permit. The facility monitors influent ammonia and effluent total nitrogen and nitrate. The majority of nitrogen in the influent wastewater is ammonia and removal efficiency can be estimated as such. During the analysis period, nitrate had 3 exceedances; and total nitrogen had 7 exceedances. Table 2-4 shows removal of nitrogen using influent ammonia and effluent total nitrogen.

TABLE 2-4

JAN 2018 – JAN 2021 NITROGEN REMOVAL PERCENTAGES

Parameter	Monthly Percent Removal		
	Minimum	Average	Maximum
2018	83.7%	94.9%	99.1%
2019	65.5%	89.4%	99.4%
2020	76.9%	94.0%	98.9%
2018-Jan 2021	65.5%	92.7%	99.4%

The facility is consistently operating as designed and largely meeting performance and permit requirements. The occurrences of non-compliance have been due to equipment failure.

SECTION 3

CONDITION ASSESSMENT

3.1 DESCRIPTION OF EXISTING FACILITIES

The wastewater treatment facility (WWTF) is a packaged membrane bioreactor type system (Suez [formerly GE] is the membrane system manufacturer). The components of the WWTF system evaluated includes the WWTF and effluent disposal system and are outlined in Section 1 of this report (collection system is not included in this evaluation). The unit processes, equipment, and structures were observed and evaluated during a site visit on March 22, 2021 attended by WP engineers and the facility contractor operator (WhiteWater). Each of the subsections below go into greater detail and develop the basis for recommendations in Section 4.

3.2 PROCESS EVALUATION

The process evaluation for the WWTF seeks to establish the condition of the existing equipment and process tankage, understand how they are operated, and if improvements are necessary. This section will follow the treatment path of the wastewater.

3.2.1 Wastewater Treatment Facility

Pre-Treatment Tanks

The Pre-Treatment (aka septic and grease trap) Tanks are located at each school and at the south side of the facility, adjacent to the building. They are buried, pre-cast, concrete tanks with access manhole covers. The municipal buildings pretreatment consists of a septic tank effluent pumping system (STEP) that serves the library and safety buildings and an E-One grinder pump system that serves the Houghton Building.

All of the wastewater flows from the schools' collection systems into the pretreatment tanks and municipal buildings into its collection system then flows across the creek to the WWTF equalization tank. In addition, the WWTF building's sanitary flow discharges into a pretreatment tank that flows into the flow equalization tank. The pretreatment tanks do not have any mechanical

or electrical equipment inside. As such, the covers were not opened during the site visit. The interior concrete condition was not observed. The manhole covers appear to be in good condition at the WWTF. The schools' tanks were not observed.

Flow Equalization Tanks

The flow equalization system consists of one buried pre-cast concrete tank. The tank has four access manholes and one aluminum access hatch. The tank contains two submersible grinder pumps, which are tagged P-76A and B. The pumps have an operating point of 28 gpm at 20-feet of total dynamic head (TDH). These pumps transfer the flow into the bioreactor tank's pre-anoxic zone. Only one pump is required to run at a time, leaving the other as a redundant spare/backup.

The pump chamber and valve vault concrete are in good condition. The main tank internals were not inspected so the condition is unknown. One of the pumps was replaced in 2017, the other is original. These pumps have a standard design life of 20 years and can be impacted by the amount and type of solids and other materials they are pumping.

Bioreactor

Flow from the equalization tank is pumped to one of two bioreactor tanks, which are subdivided into a pre-anoxic compartment, followed by an aerobic compartment, and finally a post-anoxic compartment. The system is designed for full treatment through one train, leaving the other as a spare/redundant train. This allows operators to take a train down for maintenance without interrupting treatment. The tanks are buried pre-cast concrete structures with concrete baffle walls separating the compartments. The pre- and post-anoxic compartments have an aluminum access hatch at grade and the aerobic compartment has three manhole cover access points. The hatches and covers are in good condition. The exterior concrete is in fair condition with minor cracks. The tank internals were viewed from above, without entering and without emptying the tanks. The interior concrete that was able to be viewed and appears to be in good condition.

Pre-Anoxic Zone

The pre-anoxic zone mixes raw wastewater from the FET with recycle from the aerobic zone of the bioreactor. The zone has an eductor valve at the terminus of the recycle force main pipe to

provide mixing energy to prevent settling. There is no mechanical equipment in this zone. The wastewater flows by gravity to the aerobic zone.

Aerobic Zone

Flow to the aerobic zone consists of denitrified influent from the pre-anoxic zone and return activated sludge from the membrane tank. A coarse-bubble diffused aeration system provides oxygen to the wastewater. The air is distributed through coarse bubble diffusers, which consist of one lateral each with 40 diffusers, split between two sides. A dissolved oxygen (DO) probe is located in this zone. The transmitter is located in the WWTF building.

At the end of the zone, there are two (one in each tank, no redundant pump) internal nitrified mixed liquor recycle pumps, which recycle flow back to the pre-anoxic zone for denitrification. Each pump has its own discharge pipe. The pumps are tagged P-36A and B. The wastewater level is measured by a level transmitter.

The internal equipment was not observed as the tanks were not empty. The diffusers have a typical design life of 20 years. The pumps have a design life of 20 years.

Post-Anoxic Zone

The oxidized wastewater flows over a baffle wall into the post-anoxic zone. Micro C is added to this zone automatically or manually controlled from the PLC, as required, to act as a supplemental carbon source to support the biological denitrification process. There is a mixer in each tank (no redundancy within trains), which is tagged as MX-36A and B. The purpose of the mixer is to prevent settling and to prevent the zone from becoming anaerobic. One mixer was replaced in 2021, the other is original. Typical design life for these types of mixers is 15 years. This can be reduced if rags and other materials are able to pass through the settling tanks to these zones.

Wastewater flows by gravity to a common pump chamber where two submersible membrane feed (mixed liquor) pumps discharge the flow from the bioreactor tank to the membrane tanks. One pump is required at a time with a redundant spare. The membrane feed pumps, which are tagged as P-34A and B, have a design capacity of 135 gpm at 21-feet of TDH. The pumps are removable

via the slide rail system for maintenance. Both pumps are original. Typical design life for the pumps is 20 years.

Chemical Addition

Sodium Bicarbonate can be added to the anoxic zone to increase alkalinity levels and for pH control through chemical dosing pump P-55-A/B. Supplemental carbon can also be added to the anoxic or post-anoxic zones using chemical dosing pump P-58-A.

These pumps have a typical service life of 5-10 years depending on the chemical being pumped and how well they are maintained. The carbon pump was replaced in 2020 and the bicarbonate pumps are original.

WWTF Building

The WWTF Building houses the membrane skid system, blowers, lab area, chemical storage, and bathroom. The building, electrical and mechanical (HVAC) systems are included in subsequent sections.

Membrane Skid

The Suez (GE) Membrane Bioreactor (MBR) ZeeWeed® system consists of several pieces of process equipment including:

- Two membrane tanks (painted steel)
- Two trains of PVDF hollow fiber membranes
- Two permeate/backflush pumps
- Sodium Hypochlorite feed pump for cleaning
- One back pulse tank
- 2 membrane process blowers
- 3 bioreactor aeration zone process blowers (one spare/backup)
- Fine bubble aeration stream within the membrane tank for cleaning
- One clean-in-place pump
- Controls

Membranes

The membranes consist of small diameter hollow fibers that are grouped into bundles, which are then placed in module rows. There are two membrane trains consisting of two cassettes of six modules each. A vacuum is applied by the permeate pumps draws the mixed liquor through the fibers from outside to inside the fiber, providing treatment by separating all but the very smallest particles from the water. Air is supplied to assist in cleaning the membranes and also provides oxygen to sustain the bacteria for BOD removal and ammonia nitrification. The membranes require periodic cleaning to maintain treatment capacity and efficiency. This is monitored through pressure differential and by a turbidimeter. Membranes have a typical design life of 10 years. The original membranes were both replaced in 2020.

Permeate Pumps

The permeate/backflush pumps are reversible pumps, tagged P-35-1&2. The pumps typically operate at 55 gpm at 18-feet TDH. The pumps are controlled by GE's main control panel. Both pumps are original. Typical design life for the pumps is 20 years.

The permeate pumps are controlled by a level transmitter in the membrane tanks for on/off control.

Back pulse Pumps

The back pulse pumps, P-88-1&2 are used to introduce clarified effluent to assist in cleaning the membranes. They typically operate at 56 gpm at 18-feet TDH. Typical design life is 10 years for this type of pump. The pumps withdraw water from the back pulse tank, which uses a level transmitter for low-level shutoff.

Blowers

There are five blowers inside the WWTF Building. Two are used for membrane cleaning and three are used for the bioreactor.

An air scour system is used to maintain the permeability of the membranes. The flux rate to the membranes dictates how air is provided to the membranes. The air is provided by blower B-85-1&2, which are rated for 220 cfm at 6.5 psi. Blowers are controlled automatically through the PLC.

The diffused aeration in the bioreactor aeration zone is provided by positive displacement blowers, B-87A/B/C. The blowers are controlled by a VFD. The blowers provide 150 cfm at 6.5 psi through 2-inch diameter air piping. There is one blower assigned to each Bioreactor with a third as backup. A DO transmitter is located in each aeration zone to control blower speed.

These blowers have a typical design life of 20 years. The blowers appeared to be in good condition. One of the process blowers was replaced in 2015.

Ultraviolet (UV) Disinfection

The permeate pumps transfer clarified flow from the membrane tanks through one of two UV units, UV-18A&B. The UV system was designed to disinfect all effluent flow using low-pressure, high-intensity ultraviolet light before it is transferred to the effluent disposal system. The systems contain ballasts and lamps. The entire UV-002 unit was replaced in 2018. These systems typically have a design life of 15 years, with ballasts needing to be replaced every few years and lamps being replaced more frequently. Both units are currently out of service as there is no permit limit for bacteria.

Effluent Disposal

Downstream of the UV system, the effluent exits the building and flows by gravity into the effluent wet well. Two centrifugal submersible transfer pumps (one standby), P-77A&B, convey flow to the disposal field and are controlled with level switches. The pumps have a typical design life of 20 years. They are both original.

Effluent Disposal Field

The treated effluent is disposed of in a subsurface leaching field comprised of 14 leaching chamber trenches, each 100 feet long which provides 8,196 square feet of leaching area. The design hydraulic loading rate is approximately 4.6 gpd/square feet at the maximum design flow of 38,000 gpd.

The design life of a subsurface disposal field is highly variable depending upon the native soils' characteristics and the quality of the effluent. The Bolton WWTF provides an extremely high level of treatment and the system has been historically loaded at levels far below the design basis.

Therefore, the subsurface disposal field should last longer than typical. Wright-Pierce did not perform any excavation or any forms of testing during the site visit. The leaching field was visually inspected from above. The manhole cover to the distribution box was opened and the box was visually observed.

Sludge Management

There are no sludge holding tanks at the facility. Waste sludge is managed as mixed liquor in the bioreactors and after time will be pumped out of the tanks and disposed off-site at another facility.

3.3 INSTRUMENTATION EVALUATION

The instrumentation and controls at the WWTF are comprised of process control instruments, control panels for specific equipment, process monitoring instruments, various alarms, and alarm dialers.

Process Control and Monitoring Instruments

Several level elements and transmitters are used throughout the WWTF tankage to control on/off operations of pumps and to indicate when certain tanks should be pumped out. Level elements are located in the Flow Equalization Tank, Membrane Tank, and Back pulse Tank. These instruments typically have a design life of 5-10 years. Depending on the location, this life can be reduced, especially if they are not maintained.

The Bioreactor contains a DO probe and transmitter for process monitoring and control. These instruments must be maintained in order to have accurate readings and to have them last. The instruments have a typical design life of 2-5 years.

The membrane skid contains several instruments for process control and monitoring. Several pressure transmitters are used to monitor the pumps on the skid and the membranes themselves. The pressure transmitters have a design life of 5-10 years.

The final instruments used in process monitoring and control are flow meters. Flow meters are used to measure effluent flow. Flow meters have a typical design life of 15 years but require regular

re-calibration and maintenance. A flow switch is provided on the blower air piping to sense operation.

Control Panels

The WWTF contains a main control panel for controlling the membrane skid.

Remote Connection

The WWTF does not have a system in place for remote alarm communications. This type of system would be used for offsite operator personnel to view and diagnose alarms and processes.

3.4 ELECTRICAL EVALUATION

The WWTF power is supplied from the main switch gear at the school with a 250-amp service with main circuit breaker and utility metering compartment. Backup power is provided by a 150 kW emergency generator located outside, adjacent to the WWTF building in a weather-tight enclosure.

The emergency generator is powered by diesel. When the main power is lost, the 260-amp automatic transfer switch activates the generator and it will run the entire treatment facility. A sequential starter is included to prevent an overload of the circuitry upon transfer to and from the standby power generator. The generator is exercised regularly. Typical design life is 35 years. The generator is in good condition.

The equipment disconnects throughout the facility are in good condition. The site and building lighting systems are in good condition.

3.5 HVAC EVALUATION

Heating for the WWTF building is supplied through two 500 cfm electric unit heaters located in the membrane room. An electric baseboard heater is located in the bathroom. There is no cooling provided to the building.

Ventilation is provided for the building as follows:

- 67 cfm exhaust fan in the bathroom
- 3,200 cfm exhaust fan in the membrane room

There is no supply ventilation provided for the membrane room aside from a passive 40" x 72" air louver. A 7.2 kW tankless hot water heater is located in the building. The heaters and fans have a typical design life of 20 years.

3.6 BUILDING EVALUATION

The WWTF building is 27.3' x 28.6' x 20.0' constructed of CMU block walls, a concrete foundation, vinyl siding, and an asphalt shingled roof.

Exterior

The exterior of the building is in good condition. The vinyl siding is intact with one broken section on the corner near the hose bibb. There are very little signs of algae/mold, sun degradation, or dust/dirt buildup. There are no windows in the building. There is an overhead garage door on the north-facing wall, an entry door on the west wall, and an entry door on the south wall. The door seals are in good condition. The exterior doors are in good condition. The asphalt shingle roof is in good condition. The overhead door is in good condition.

Interior

The interior walls and paint appear to be in good condition. The steel equipment skid is in fair condition, with peeling paint and corrosion throughout. The floors are in fair condition with peeling paint throughout.

Doors

The interior bathroom door and hardware is in good condition.

Foundation

The foundation that is visible appears to be in good condition, with no visual cracks observed.

3.7 MASSDEP INSPECTIONS

MassDEP conducted two compliance inspections, one in 2016 and another in early 2021 that Wright-Pierce obtained reports for from the Town. A summary of their recommendations is included in this section.

2016 Inspection

Conducted on May 19, 2016.

- Pump out WWTF septic tank and assure only facility flow is received at such
- Ensure school septic tanks are routinely pumped to increase FET pump longevity
- Clean collection system piping between FET and Bioreactor regularly to avoid solids buildup
- Replace equipment in Bioreactors
- Pump out and clean Pre-Anoxic compartment for solids
- Pump out Bioreactor B to evaluate if infiltration is occurring
- Replace UV control panel if inoperable

2021 Inspection

Conducted on March 31, 2021.

- Repair FET manhole concrete collar
- Replace chain and rails within FET
- Verify recycle flow meter is operable
- Include school septic tanks in WhiteWater's contract.
- Install mixer in Post-Anoxic compartment B
- Pump facility septic tank more frequently

SECTION 4

FACILITY RECOMMENDATIONS AND ESTIMATED COSTS

4.1 INTRODUCTION

The purpose of this section is to provide recommendations with estimated costs for near and long-term improvements to the WWTF based on operating data, site visit observations, MassDEP inspection recommendations, typical design life of equipment and structures, and notes from the WWTF operators. This was accomplished by creating an equipment list, attached in Appendix B, that organizes all the assets at the WWTF and establishes an asset management table based on when the equipment was installed/replaced and its typical service life.

Planning-level capital costs have been estimated for the recommended improvements and are presented in each subsection. The costs were estimated using standard cost estimating procedures consistent with industry standards utilizing unit cost information, as necessary.

Many factors arise during the design phase of implementing facility improvements (e.g., foundation conditions, owner selected features and amenities, code issues, etc.) that cannot be definitively identified and estimated at this time. These factors are intended to be covered by the 10% contingency allowance; however, this allowance may not be adequate for all circumstances. Costs are presented with an inflation allowance of 2% per year, which may be low during the current bidding and pandemic climate.

4.2 NEAR-TERM IMPROVEMENTS (0-5 YEARS)

Near-term improvements to the WWTF are primarily based on equipment/systems nearing or beyond the end of their useful life. Much of the recommendations in this section involve equipment replacement. The following list comprises the near-term improvements recommended:

- Replace membrane permeate pumps
- Replace membrane back pulse pumps
- Replace sodium bicarbonate and hypochlorite pumps

- Replace denitrification recycle pumps
- Replace bioreactor air diffusers
- Replace aeration system feed pump A
- Replace UV system A
- Replace electric unit heaters
- Replace process and membrane blowers
- Replace post-anoxic mixer A
- Replace effluent pumps
- Replace membrane feed pumps
- Membrane system control panel replacement

4.2.1 Cost Estimate

Table 4-1 provides a planning level cost estimate for the recommended near-term improvements. The assumed project year is 2023.

TABLE 4-1

RECOMMENDED NEAR-TERM IMPROVEMENTS COST ESTIMATE

Recommended Improvement	Estimated Cost
Membrane Permeate Pumps	$9,000
Membrane Back Pulse Pumps	$9,000
Sodium Bicarbonate and Hypochlorite Pumps	$7,900
Denitrification Recycle Pumps	$17,000
Bioreactor Air Diffusers	$5,600
Aeration System Feed Pump A	$13,700
UV System A	$20,000
Electric Unit Heaters	$16,900
Process and Membrane Blowers	$80,000
Post-Anoxic Mixer A	$7,100
Effluent Pumps	$16,900
Membrane Feed Pumps	$17,000
Membrane System Control Panel	$35,000
TOTAL	**$255,100**

4.3 LONG-TERM IMPROVEMENTS (5+ YEARS)

Long-term improvements to the WWTF involve the remaining equipment, systems, and structures not outlined in the near-term recommendations. In addition, SCADA upgrades are recommended as an addition to improve operations at the WWTF. The systems were prioritized based on expected replacement year, criticality of failure, and whether an item made sense to do in a larger project or as annual operation and maintenance project. The project years range from 2030 to 2070.

4.3.1 Cost Estimate

Table 4-2 provides a planning level cost estimate for the recommended long-term improvements, organized by priority. The assumed project year with associated inflation cost is based on life expectancy as established in the equipment list in Appendix B.

TABLE 4-2

RECOMMENDED LONG-TERM IMPROVEMENTS COST ESTIMATE

Recommended Improvement	Estimated Cost	Estimated Replacement Year	Estimated Project Year
Membranes	$ 49,000	2030	2030
SCADA	$ 20,000	2030	
MicroC Pump	$ 3,000	2030	
Aeration System Feed Pump B	$ 17,500	2032	2032
Membrane Backpulse Tank	$ 8,500	2032	
Sodium Bicarb Tank	$ 1,000	2032	
Sodium Hypo Tank	$ 1,000	2032	
UV System B	$ 24,200	2033	2033
Process Blowers	$ 25,000	2035	2035
WWTF Building Roof	$ 122,500	2032	
Overhead Doors	$ 18,000	2037	
Standby Generator Switchgear	$ 40,000	2032	2040
Standby Generator	$ 142,500	2042	
Post-Anoxic Mixer B	$ 10,000	2041	2041
WWTF Building	$ 350,000	2047	2050
Pre-Treatment (Septic) Tank	$ 50,000	2067	2070
Flow Equalization Tank	$ 200,000	2067	
Bioreactor Tanks	$ 300,000	2067	
Membrane Dosing Chamber	$ 100,000	2067	
Membrane Steel Tank	$ 50,000	2067	
Effluent Pump Chamber	$ 80,000	2067	
TOTAL	**$ 1,612,200**		

Appendix A

Groundwater Discharge Permit

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Central Regional Office • 8 New Bond Street, Worcester MA 01606 • 508-792-7650

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

July 11, 2016

Donald Lowe, Town Administrator
Town of Bolton
663 Main Street
Bolton, MA 01740

City/Town: Bolton
Re: **Final Permit**
Program Identifier: GW #833-1; WP12
Transmittal No.: X269583
Facility Name: Emerson and Florence Schools WWTF
Authorization Type: Groundwater Discharge

Dear Mr. Lowe,

In response to your application for a permit to discharge into the ground a treated effluent from the wastewater treatment facility located at 100 Mechanic Street in Bolton, MA and after due public notice, I hereby issue the attached final permit.

No comments objecting to the issuance or terms of the permit were received by the Department during the public comment period. Therefore, in accordance with 314 CMR 2.08, the permit becomes effective on the date of issuance.

Parties aggrieved by the issuance of this permit are hereby advised of their right to request an Adjudicatory Hearing under the provision of Chapter 30A of the Massachusetts General Laws and 314 CMR 1.00, Rules for the Conduct of Adjudicatory Proceedings. Unless the person requesting the adjudicatory hearing requests and is granted a stay of the terms and conditions of the permit, the permit shall remain fully effective.

If you have any questions or comments regarding this matter, please feel free to contact Andrew Osei at 508-767-2823 or andrew.osei@state.ma.us.

Sincerely,

David Boyer, P.E.
Section Chief
Wastewater Program

Ao/hs: x269583fp (Bolton)-034

cc: Nashoba Assoc. Boards of Health – James Garreffi
30 Central Ave.
Ayer, MA 01432

David Boucher – White Water Inc
253B Worcester Road
Charlton, MA 01507

Purna Rao, DEP-CERO, Permit Coordinator

Commonwealth of Massachusetts
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INDIVIDUAL GROUNDWATER DISCHARGE PERMIT

Name and Address of Applicant: Town of Bolton
663 Main Street
Bolton, Massachusetts 01740

Date of Application: February 22, 2016

Application/Permit No. 833-1

Date of Issuance: July 11, 2016

Date of Expiration: July 11, 2021

Effective Date: July 11, 2016

AUTHORITY FOR ISSUANCE

Pursuant to authority granted by Chapter 21, Sections 26-53 of the Massachusetts General Laws, as amended, 314 CMR 2.00, and 314 CMR 5.00, the Massachusetts Department of Environmental Protection (the Department or MassDEP) hereby issues the following permit to: The Town of Bolton (hereinafter called "the permittee") authorizing discharges to the ground from the onsite wastewater treatment facility located at the Emerson and Florence-Sawyer School at 100 Mechanic Street in Bolton, MA such authorization being expressly conditional on compliance by the permittee with all terms and conditions of the permit hereinafter set forth. The facility collects sanitary waste from two schools: Emerson School and Florence-Sawyer School.

David Boyer, P.E.
Bureau of Water Resources

7/11/16
Date

I. SPECIAL CONDITIONS

A. Effluent Limits

1) The permittee is authorized to discharge into the ground from the wastewater treatment facilities for which this permit is issued a treated effluent whose characteristics shall not exceed the following values:

Effluent Characteristics	Discharge Limitations
Flow	38,000 gpd
Biochemical Oxygen Demand (BOD_5)	30 mg/l
Total Suspended Solids (TSS)	30 mg/l
Nitrate Nitrogen	10 mg/l
Total Nitrogen (NO_2 + NO_3 + TKN)	10 mg/l
Oil and Grease	15 mg/L

a) The pH of the effluent shall not be less than 6.5 nor greater than 8.5 at any time or not more than 0.2 standard units outside the naturally occurring range.

b) The discharge of the effluent shall not result in any demonstrable adverse effect on the groundwater or violate any water quality standards that have been promulgated.

c) The monthly average concentration of BOD and TSS in the discharge shall not exceed 15 percent of the monthly average concentrations of BOD and TSS in the influent into the permittee's wastewater treatment facility.

d) When the average annual flow exceeds 80 percent of the permitted flow limitations, the permittee shall submit a report to the Department describing what steps the permittee will take in order to remain in compliance with the permit limitations and conditions, inclusive of the flow limitations established in this permit.

B. Monitoring and Reporting

1) The permittee shall monitor and record the quality of the **influent** and the quality and quantity of the **effluent** prior

to discharge to the leaching facilities according to the following schedule and other provisions:

INFLUENT:

Parameter	Minimum Frequency of Analysis	Sample Type
BOD_5	Monthly	24 Hr. Composite
TSS	Monthly	24 Hr. Composite
Total Solids	Monthly	24 Hr. Composite
Ammonia Nitrogen	Monthly	24 Hr. Composite

EFFLUENT:

Parameter	Minimum Frequency of Analysis	Sample Type
Flow	Daily	Max-Min-Avg
pH	Daily	Grab
BOD_5	Monthly	24 Hr. Composite
TSS	Monthly	24 Hr. Composite
Nitrate Nitrogen	Monthly	24 Hr. Composite
Total Nitrogen	Monthly	24 Hr. Composite
Oil & Grease	Monthly	Grab
Total Phosphorus	Quarterly	Grab
Orthophosphate	Quarterly	Grab
Volatile Organic Compounds (US EPA Method #624)	Annually	Grab

a) After one full year of monitoring the Total Phosphorus and Orthophosphate results, the Department may determine, upon the request of the permittee, that the frequency of monitoring may be reduced if, in the judgment of the Department, the results of the sampling indicate that existing phosphorus levels will not adversely impact downgradient receptors. If the Department reduces the frequency of monitoring for Total Phosphorus and Orthophosphate, the Department reserves the right to resume more frequent monitoring if the Department determines that phosphorus levels are impacting downgradient receptors.

2) The permittee shall monitor, record and report the quality of water in the four (4) monitoring wells, one upgradient (MW# 3) and three downgradient (MW# 4, MW# 5 and MW# 6), of the discharge as stated in the "Mounding Analysis Report

for Town of Bolton" prepared by Tata & Howard and D'Amore Associates revised February 2007 according to the following schedule and other provisions:

Parameter	Minimum Frequency of Analysis
pH	Monthly
Static Water Level	Monthly
Specific Conductance	Monthly
Nitrate Nitrogen	Quarterly
Total Nitrogen	Quarterly
Total Phosphorus	Quarterly
Orthophosphate	Quarterly
Volatile Organic Compounds (US EPA method #624)	Annually

a) Static Water Level shall be expressed as an elevation and shall be referenced to the surveyed datum established for the site. It shall be calculated by subtracting the depth to the water table from the surveyed elevation of the top of the monitoring well's PVC well casing/riser.

b) After one full year of monitoring the Total Phosphorus and Orthophosphate results, the Department may determine, upon the request of the permittee, that the frequency of monitoring may be reduced if, in the judgment of the Department, the results of the sampling indicate that existing phosphorus levels will not adversely impact downgradient receptors. If the Department reduces the frequency of monitoring for Total Phosphorus and Orthophosphate, the Department reserves the right to resume more frequent monitoring if the Department determines that phosphorus levels are impacting downgradient receptors.

3) Any grab sample or composite sample required to be taken less frequently than daily shall be taken during the period of Monday through Friday inclusive. All composite samples shall be taken over the operating day.

4) The permittee shall submit all monitoring reports within 30 days cf the last day of the reporting month. Reports shall be on an acceptable form, properly filled and signed and shall be sent to: the Deputy Regional Director, Bureau of Water Resources, Department of Environmental Protection, Regional Office, 8 New Bond Street, Worcester, MA 01606 and

to the Department of Environmental Protection, Bureau of Water Resources, Wastewater Management Program, One Winter Street/5th Floor, Boston, MA 02108, and to the Nashoba Associated Boards of Health, 30 Central Avenue, Ayer, MA 01432.

a) Submission of monitoring reports in electronic format is available through eDEP and serves as data submission to both the Regional and Boston offices. To register for electronic submission go to: *http://www.mass.gov/eea/agencies/massdep/service/online/edep-online-filing.html*

C. Supplemental Conditions

1) The permittee shall notify the Department at least thirty (30) days in advance of the proposed transfer of ownership of the facility for which this permit is written. Said notification shall include a written agreement between the existing and new permittees containing a specific date for transfer of permit, responsibility, coverage and liability between them.

2) A staffing plan for the facility shall be submitted to the Department once every two years and whenever there are staffing changes. The staffing plan shall include the following components:

a) The operator(s)'s name(s), operator grade(s) and operator license number(s);
b) The number of operational days per week;
c) The number of operational shifts per week;
d) The number of shifts per day;
e) The required personnel per shift;
f) Saturday, Sunday and holiday staff coverage;
g) Emergency operating personnel

3) The permittee is responsible for the operation and maintenance of all sewers, pump stations, and treatment units for the permitted facility, which shall be operated and maintained under the direction of a properly certified wastewater operator.

4) Operation and maintenance of the proposed facility must be in accordance with 314 CMR 12.00, "Operation and Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Discharges", and, 257 CMR 2.00, "Rules and

Regulations for Certification of Operators of Wastewater Treatment Facilities".

a) The facility has been rated (in accordance with 257 CMR 2.00), to be a Grade 4 facility. Therefore, the permittee shall provide for oversight by a Massachusetts Certified Wastewater Treatment plant operator (Chief Operator) Grade 4 or higher. The permittee will also provide for a backup operator who shall possess at least a valid Grade 3 license.

b) The date and time of the operator's inspection along with the operator's name and certification shall be recorded in the log book on location at the treatment facility. All daily inspection logs consistent with the O&M Manual requirements shall be kept at the facility for a period of three (3) years.

c) Records of operation of wastewater treatment facilities or disposal systems required by the Department shall be submitted on forms supplied by the Department or on other forms approved by the Department for such use. Monthly reports shall be certified by the wastewater treatment plant operator in charge and shall be included in the discharge monitoring reports submitted each month.

5) If the operation and maintenance of the facility is contracted to a private concern, the permittee shall submit a copy of the contract, consistent with what is required by the approved Operation & Maintenance manual and signed only by the contractor, to the appropriate MassDEP Regional Office within thirty (30) days of permit issuance. Along with the contract, a detailed listing of all contract operation obligations of the proposed contractor at other facilities shall also be submitted.

6) Any additional connections to the sewer system, beyond the current two (2) schools (Florence-Sawyer school and Emerson school) must be approved by MassDEP and the local Board of Health prior to the connection.

7) All tests or analytical determinations to determine compliance with permit standards and requirements shall be done using tests and procedures found in the most recent version of *Standard Methods for the Examination of Water and Wastewater* and shall be performed by a Massachusetts Certified laboratory.

8) The permittee shall notify the appropriate MassDEP Regional Office, in writing, within thirty (30) days of the following events:

   a) Any interruption of the treatment system operation, other than routine maintenance.
   b) Final shutdown of the treatment system.

9) The permittee shall contract to have any and all solids and sludges generated by the treatment system for which this permit is issued removed off site by a properly licensed waste hauler for disposal at an EPA/MassDEP approved facility. The name and license number of the hauler along with the quantity of wastes removed and the date(s) of removal shall be reported by the permittee in writing to the appropriate MassDEP Regional Office.

10) Simultaneously with year fifteen ***[2022]*** following the initiation of plant operations, the permittee shall submit an engineering report, prepared by a registered professional engineer, that outlines in sufficient detail what modifications (if any) to the facility or other changes are required to insure that the facility can remain in compliance with its GWDP and other applicable requirements through the next 5 year permit term (year 2026) and beyond.

11) In the event that effluent limits are not met, or the discharge is determined to impair groundwater quality in accordance with 314 CMR 5.16(1), the permittee may be obligated to modify, supplement or replace the permitted treatment process so as to ensure that the discharge does not impair the ability of the groundwater to act as an actual or potential source of potable water.

12) Pursuant to M.G.L. Chapter 21A, section 18(a), and 310 CMR 4.03, holders of this Permit may be subject to annual compliance assurance fees as assessed each year on July 1st and invoiced by MassDEP. Failure of the Permit holder to pay applicable annual compliance assurance fees shall result in the automatic suspension of the permit by operation of law under the statute. If fee non-payment continues for sixty days or more, MassDEP has the statutory option of revoking the Permit, denying any other pending permit applications filed by the Permit holder or taking other enforcement action. Permit holders are required to

notify MassDEP in writing if they wish to relinquish or transfer a permit. Failure to do so will result in the continued assessment of fees.

E. Appeal Rights

During the thirty (30) day period following issuance of this permit, a Notice of Claim for an Adjudicatory Appeal may be sent by any person aggrieved (the "Petitioner") by the issuance to:

Case Administrator
Office of Appeals and Dispute Resolution
Department of Environmental Protection
One Winter Street/2nd Floor
Boston, MA 02108

310 CMR 1.01(6)(b) requires the Notice of Claim to: include sufficient facts to demonstrate aggrieved person status; state the facts which are grounds for the appeal specifically, clearly and concisely; and, state relief sought. The permit shall become or remain effective at the end of the 30 day appeal period unless the person filing the Notice of Claim requests, and is granted, a stay of its terms and conditions. If a permit is modified under 314 CMR 2.10, only the modified terms and conditions may be subject to an Adjudicatory Appeal. All other aspects of the existing permit shall remain in effect during any such Adjudicatory Appeal.

Per 310 CMR 4.06, the hearing request to the Commonwealth will be dismissed if the filing fee is not paid. Unless the Petitioner is exempt or granted a waiver, a valid check payable to the Commonwealth to Massachusetts in the amount of $100.00 must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

The filing fee is not required if the Petitioner is a city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority effective January 14, 1994, or any municipal housing authority; or, per MGL 161A s. 24, the Massachusetts Bay Transportation Authority. The Department may waive the adjudicatory hearing filing fee for a Petitioner who shows that paying the fee will create an undue financial hardship. A Petitioner seeking a waiver must file,

along with the hearing request, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

II. GENERAL PERMIT CONDITIONS

The fcllowing conditions from 314 CMR 5.16 apply to all individual and general permits:

(1) No discharge authorized in the permit shall cause or contribute to a violation of the Massachusetts Surface Water Quality Standards (314 CMR 4.00) or any amendments thereto. Upon promulgation of any amended standard, this permit may be revised or amended in accordance with such standard and 314 CMR 2.10 and 3.13 or 5.12. Except as otherwise provided in 314 CMR 5.10 (3)(c), 310 CMR 5.10(4)(a)2 and 314 CMR 5.10(9), no discharge authorized in the permit shall impair the ability of the ground water to act as an actual or potential source of potable water. Evidence that a discharge impairs the ability of the ground water to act as an actual or potential source of potable water includes, without limitation, analysis of samples taken in a downgradient well that shows one or more exceedances of the applicable water quality based effluent limitations set forth in 314 CMR 5.10. In those cases where it is shown that a measured parameter exceeds the applicable water quality based effluent limitations set forth in 314 CMR 5.10 at the upgradient monitoring well, evidence that a discharge impairs the ability of the ground water to act as an actual or potential source of potable water is deemed to exist if a measured parameter in any downgradient well exceeds the level of that same measured parameter in the upgradient well for the same sampling period. . A statistical procedure approved by the Department shall be used in determining when a measured parameter exceeds the allowable level.

(2) Duty to comply. The permittee shall comply at all times with the terms and conditions of the permit, 314 CMR 5.00, M.G.L. c. 21, §§ 26 through 53 and all applicable state and federal statutes and regulations.

(3) Standards and prohibitions for toxic pollutants. The permittee shall comply with effluent standards or prohibitions established under § 307(a) of the Federal Act, 33 U.S.C § 1317(a), for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

(4) Proper operation and maintenance. The permittee shall at all times properly operate and maintain all facilities and equipment

installed or used to achieve compliance with the terms and conditions of the permit, and the regulations promulgated at 314 CMR 12.00 entitled "Operation and Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Discharges, and 257 CMR 2.00, Rules and Regulations for Certification of Operators of Wastewater Treatment Facilities".

(5) Duty to halt or reduce activity. Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or discharges or both until the facility is restored or an alternative method of treatment is provided. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

(6) Power Failure. In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

(a) provide an alternative power source sufficient to operate the wastewater control facilities; or

(b) halt, reduce or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

(7) Duty to mitigate. The permittee shall take all reasonable steps to minimize or prevent any adverse impact on human health or the environment resulting from non-compliance with the permit.

(8) Duty to provide information. The permittee shall furnish to the Department within a reasonable time as specified by the Department any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine whether the permittee is complying with the terms and conditions of the permit.

(9) Inspection and entry. The permittee shall allow the Department or its authorized representatives to:

(a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records required by the permit are kept;

(b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;
(c) Inspect at reasonable times any facilities, equipment, practices, or operations regulated or required under the permit; and
(d) Sample or monitor at reasonable times for the purpose of determining compliance with the terms and conditions of the permit.

(9A) The permittee shall physically secure the treatment works and monitoring wells and limit access to the treatment works and monitoring wells to those personnel required to operate, inspect and maintain the treatment works and to collect samples.

(9B) The permittee shall identify each monitoring well by permanently affixing to the steel protective casing of the well a tag with the identification number listed in the permit.

(10) Monitoring. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136 unless other test procedures are specified in the permit.

(11) Recordkeeping. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and all records of all data used to complete the application for the permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time. Records of monitoring information shall include:
(a) The date, exact place, and time of sampling or measurements;
(b) The individual(s) who performed the sampling or measurement;
(c) The date(s) analyses were performed;
(d) The individual(s) who performed the analyses;
(e) The analytical techniques or methods used; and
(f) The results of such analyses.

(12) Prohibition of bypassing. Except as provided in 314 CMR 5.16(13), bypassing is prohibited, and the Department may take enforcement action against a permittee for bypassing unless:

(a) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
(c) The permittee submitted notice of the bypass to the Department:

1. In the event of an anticipated bypass, at least ten days in advance, if possible; or
2. In the event of an unanticipated bypass, as soon as the permittee has knowledge of the bypass and no later than 24 hours after its first occurrence.

(13) Bypass not exceeding limitations. The permittee may allow a bypass to occur which does not cause effluent limitations to be exceeded, but only if necessary for the performance of essential maintenance or to assure efficient operation of treatment facilities.

(14) Permit actions. The permit may be modified, suspended, or revoked for cause. The filing of a request by the permittee for a permit modification, reissuance, or termination, or a notification of planned changes or anticipated non-compliance does not stay any permit condition.

(15) Duty to reapply. If the permittee wishes to continue an activity regulated by the permit after the expiration date of the permit, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Department in writing.

(16) Property rights. The permit does not convey any property rights of any sort or any exclusive privilege.

(17) Other laws. The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, and local laws and regulations.

(18) Oil and hazardous substance liability. Nothing in the permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under § 311 of the Federal Act, 33 U.S.C. § 1321, and M.G.L. c. 21E.

(19) Removed substances. Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed in a manner consistent with applicable Federal and State laws and regulations including, but not limited to, the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26 through 53 and the Federal Act, , 33 U.S.C. § 1251 et seq, the Massachusetts Hazardous Waste Management Act, M.G.L. c. 21C, and the Federal Resource Conservation and Recovery Act, 42 U.S.C. § 6901, et seq., 310 CMR 19.000 and 30.000, and other applicable regulations.

(20) Reporting requirements.

(a) Monitoring reports. Monitoring results shall be reported on a Discharge Monitoring Report (DMR) at the intervals specified elsewhere in the permit. If the permittee monitors any pollutant more frequently than required by the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

(b) Compliance schedules. Reports of compliance or non-compliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date.

(c) Planned changes. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility or activity which could significantly change the nature or increase the quantity of pollutants discharged. Unless and until the permit is modified, any new or increased discharge in excess of permit limits or not specifically authorized by the permit constitutes a violation.

(d) Anticipated non-compliance. The permittee shall give advance notice to the Department of any planned changes

in the permitted facility or activity which may result in non-compliance with permit requirements.

(e) 24 hour reporting. The permittee shall report any non-compliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the non-compliance, including exact dates and times, and if the non-compliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the non-compliance. The following shall be included as information which must be reported within 24 hours:

1. Any unanticipated bypass which exceeds any effluent limitation in the permit.

2. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the permit to be reported within 24 hours.

(f) Other non-compliance. The permittee shall report all instances of non-compliance not reported under 314 CMR 5.16(20)(a), (b), or (e) at the time monitoring reports are submitted. The reports shall contain the information listed in 314 CMR 5.16(20)(e).

(g) Toxics. All manufacturing, commercial, mining, or silvicultural dischargers must notify the Department as soon as they know or have reason to believe:

1. That any activity has occurred or will occur which would result in the discharge of any toxic pollutant listed in 314 CMR 3.17 which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:

   i. 100 micrograms per liter (100 ug/l);
   ii. 200 micrograms per liter (200 ug/l) for acrolein and acrylonitrile; 500 micrograms per liter (500 ug/l) for 2,4-dinitrophenol

and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

iii. Five times the maximum concentration value reported for that pollutant in the permit application; or

2. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

(h) Indirect dischargers. All Publicly Owned Treatment Works shall provide adequate notice to the Department of the following:

1. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to § 301 or 306 of the Federal Act, 33 U.S.C. § 1311 or 1316, if it were directly discharging those pollutants; and

2. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

(i) Information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

(21) Signatory requirement. All applications, reports, or information submitted to the Department shall be signed and certified in accordance with 314 CMR 3.15 and 5.14.

(22) Severability. The provisions of the permit are severable, and if any provision of the permit, or the application of any provision of the permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of the permit, shall not be affected thereby.

(23) Reopener clause. The Department reserves the right to make appropriate revisions to the permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26 through 53 or the Federal

Act, 33 U.S.C. §1251 *et seq* in order to bring all discharges into compliance with said statutes.

(24) Approval of treatment works. All discharges and associated treatment works authorized herein shall be consistent with the terms and conditions of this permit. Any modification to the approved treatment works shall require written approval of the Department prior to the construction of the modification.

(25) Transfer of Permits.

(a) RCRA facilities. Any permit which authorizes the operation of a RCRA facility which is subject to the requirements of 314 CMR 8.07 shall be valid only for the person to whom it is issued and may not be transferred.

(b) Transfers by modification. Except as provided in 314 CMR 5.16(25)(a) and (c), a permit may be transferred by the permittee to a new owner or operator provided that the permit has been modified or revoked and reissued or a minor modification is made to identify the new permittee in accordance with 314 CMR 5.12(3) and (4).

(c) Automatic transfers. For facilities other than Privately Owned Wastewater Treatment Facilities (PWTFs) that treat at least some sewage from residential uses, hospitals, nursing or personal care facilities, residential care facilities, and/or assisted living facilities, PWTFs that have been required to establish financial assurance mechanism(s) pursuant to 314 CMR 5.15(6), and RCRA facilities subject to the requirements of 314 CMR 8.07, a permit may be automatically transferred in accordance with 314 CMR 5.12(5).

(26) Permit Compliance Fees and Inspection Information. Except as otherwise provided, any permittee required to obtain a surface water or ground water discharge permit pursuant to M.G.L. c. 21, § 43 and 314 CMR 3.00 and 5.00, shall be required to submit the annual compliance assurance fee established in accordance with M.G.L. c. 21A, § 18 and 310 CMR 4.00 as provided in 314 CMR 2.12. The requirement to submit the annual compliance fee does not apply to any local government unit other than an authority. Any permittee required to obtain a surface water or ground water discharge permit pursuant to M.G.L. c. 21, §43 and 314 CMR 3.00 and 5.00 may be required to submit inspection information annually as a condition of the permit as provided in 314 CMR 2.12.

Massachusetts Department of Environmental Protection
One Winter Street, Boston MA 02108 • Phone: 617-292-5751

Communication For Non-English Speaking Parties - 310 CMR 1.03(5)(a)

1 English:
This document is important and should be translated immediately. If you need this document translated, please contact MassDEP's Diversity Director at the telephone numbers listed below.

2 Español (Spanish):
Este documento es importante y debe ser traducido inmediatamente. Si necesita este documento traducido, por favor póngase en contacto con el Director de Diversidad MassDEP a los números de teléfono que aparecen más abajo.

3 Português (Portuguese):
Este documento é importante e deve ser traduzida imediatamente. Se você precisa deste documento traduzido, por favor, entre em contato com Diretor de Diversidade da MassDEP para os números de telefone listados abaixo.

4(a) 中國（傳統）(Chinese (Traditional):
本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與MassDEP的多樣性總監聯繫。

4(b) 中国（简体中文）(Chinese (Simplified):
本文件非常重要，应立即翻译。如果您需要翻译这份文件，请用下面列出的电话号码与MassDEP的多样性总监联系。

5 Ayisyen (franse kreyòl) (Haitian) (French Creole):
Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradui imedyatman. Si ou bezwen dokiman sa a tradui, tanpri kontakte Divèsite Direktè MassDEP a nan nimewo telefòn ki nan lis pi ba a.

6 Việt (Vietnamese):
Tài liệu này là rất quan trọng và cần được dịch ngay lập tức. Nếu bạn cần dịch tài liệu này, xin vui lòng liên hệ với Giám đốc MassDEP đa dạng tại các số điện thoại được liệt kê dưới đây.

7 ប្រទេសកម្ពុជា (Kmer (Cambodian):
ឯកសារនេះគឺមានសារៈសំខាន់និងគួរត្រូវបានបកប្រែភ្លាម។ ប្រសិនបើអ្នកត្រូវបានបកប្រែ ឯកសារនេះសូមទំនាក់ទំនងឆ្មោតជានាយក MassDEP នៅលេខទូរស័ព្ទដែលបានរាយខាងក្រោម។

8 Kriolu Kabuverdianu (Cape Verdean):
Es documento é importante e deve ser traduzido imidiatamente. Se bo precisa des documento traduzido, por favor contacta Director de Diversidade na MassDEP's pa es numero indicode li d'boche.

9 Русский язык (Russian):
Этот документ является важным и должно быть переведено сразу. Если вам нужен этот документ переведенный, пожалуйста, свяжитесь с директорсм разнообразия MassDEP по адресу телефонных номеров, указанных ниже.

Appendix B

Equipment List

Project: Bolton Emerson & Florence-Sawyer Schools WWTF Evaluation
Project No: 20588A
Date 4/28/2021 rev 2: 6/30/2021 A.Higgins

Bolton Emerson & Florence-Sawyer Schools WWTF Evaluation
Existing Equipment and Unit Process Evaluation

Equipment Name	Equipment Tag	Number of Units	Location	Room	Capacity (ea)	Motor HP	Date Installed / Replaced	Typical Service Life (Years)	Expected Replacement Year	Demo	Unit Replacement Cost	Installation (% of Equipment) 15%	Total Replacement Cost	Project Multiplier - Contingency 10%	Project Multiplier - Inflation to Midpoint Construction	Engineer's Estimate of Construction Cost
Pre-Treatment (Septic) Tank	-	3	Site	-	1,500 gallons	-	2007	60	2067	$ 25,000	$ 10,000	$ 1,500	$ 109,500	$10,950	$110,814	$ 231,264
Flow Equalization Tanks	TK-76	1	Site	-	15,000 gallons	-	2007	60	2067	$ 25,000	$ 60,000	$ 9,000	$ 94,000	$9,400	$95,128	$ 198,528
Aeration System Feed Pumps	P-76A	1	Site	TK-76	28 gpm @ 20' TDH	1.34	2007	15	2022	$ 500	$ 10,000	$ 1,500	$ 12,000	$1,200	$264	$ 13,464
Aeration System Feed Pumps	P-76B	1	Site	TK-76	28 gpm @ 20' TDH	1.34	2017	15	2032	$ 500	$ 10,000	$ 1,500	$ 12,000	$1,200	$2,904	$ 16,104
Bioreactor	TK-36A, B & C	2	Site	Pre-Anoxic, Aerobic, Post-Anoxic Zones	9,400 gallons	-	2007	60	2067	$ 25,000	$ 60,000	$ 9,000	$ 188,000	$18,800	$190,256	$ 397,056
Denitrification Recycle Pumps	P-36A&B	2	Bioreactor	Aerobic Zone	77 gpm @ ' TDH	2.15	2007	15	2022	$ 500	$ 6,000	$ 900	$ 14,800	$1,480	$326	$ 16,606
Aeration Diffusers	-	1	Bioreactor	Aerobic Zone	-	-	2007	10	2017	$ 2,000	$ 2,500	$ 375	$ 4,875	$488	-$429	$ 4,934
Process Blowers	B-87A&B	2	WWTF Building	Process Room	150 cfm @ 6.5 psi	7.5	2007	20	2027	$ 500	$ 15,000	$ 2,250	$ 35,500	$3,550	$4,686	$ 43,736
Process Blowers	B-87C	1	WWTF Building	Process Room	150 cfm @ 6.5 psi	7.5	2015	20	2035	$ 500	$ 15,000	$ 2,250	$ 17,750	$1,775	$5,467	$ 24,992
Post-Anoxic Mixers	MX-36A	1	Bioreactor	Post-Anoxic Zone	-	2.1	2007	20	2027	$ 500	$ 5,000	$ 750	$ 6,250	$625	$825	$ 7,700
Post-Anoxic Mixers	MX-36B	1	Bioreactor	Post-Anoxic Zone	-	2.1	2021	20	2041	$ 500	$ 5,000	$ 750	$ 6,250	$625	$2,750	$ 9,625
Membrane Dosing Chamber	TK-35	1	Site	-	-	-	2007	60	2067	$ 25,000	$ 60,000	$ 9,000	$ 94,000	$9,400	$95,128	$ 198,528
Membrane Feed Pumps	P-34A&B	2	Membrane Dosing Chamber	-	135 gpm @ 21' TDH	2.15	2007	15	2022	$ 500	$ 6,000	$ 900	$ 14,800	$1,480	$326	$ 16,606
Membrane Tanks	TK-34-1&2	2	WWTF Building	Process Room	2,180 gallons	-	2007	60	2067	$ 2,000	$ 5,000	$ 750	$ 15,500	$1,550	$15,686	$ 32,736
Membranes		2	WWTF Building	TK-34-1&2	-	-	2020	10	2030	$ 500	$ 16,000	$ 2,400	$ 37,800	$3,780	$7,484	$ 49,064
Membrane Blowers	B-85-1&2	2	WWTF Building	Process Room	220 cfm @ 6.5 psi	12	2007	20	2027	$ 500	$ 15,000	$ 2,250	$ 35,500	$3,550	$4,686	$ 43,736
Membrane Permeate Pumps	P-35-1&2	2	WWTF Building	Process Room	55 gpm @ 18 ft TDH	0.5	2007	10	2017	$ 500	$ 3,000	$ 450	$ 7,900	$790	-$695	$ 7,995
Membrane Backpulse Pump	P-88-1&2	2	WWTF Building	Process Room	56 gpm @ 18' TDH	0.5	2007	10	2017	$ 500	$ 3,000	$ 450	$ 7,900	$790	-$695	$ 7,995
Membrane Backpulse Tank	TK-88	1	WWTF Building	Process Room	-	-	2007	25	2032	$ 500	$ 5,000	$ 750	$ 6,250	$625	$1,513	$ 8,388
UV System	UV-18A	1	WWTF Building	Process Room	-	-	2007	15	2022	$ 500	$ 15,000	$ 2,250	$ 17,750	$1,775	$391	$ 19,916
UV System	UV-18B	1	WWTF Building	Process Room	-	-	2018	15	2033	$ 500	$ 15,000	$ 2,250	$ 17,750	$1,775	$4,686	$ 24,211
Sampler		1	WWTF Building	Process Room	-	-	2007	10	2017	$ -	$ 7,500	$ 1,125	$ 8,625	$863	-$759	$ 8,729
Sodium Bicarb Pump	P-55A&B	2	WWTF Building	Process Room	2 gph @ 41' TDH	-	2007	10	2017	$ -	$ 2,000	$ 300	$ 4,600	$460	-$405	$ 4,655
Sodium Bicarb Tank	TK-55	1	WWTF Building	Process Room	-	-	2007	25	2032	$ -	$ 500	$ 75	$ 575	$58	$139	$ 772
MicroC Pump	P-58A	1	WWTF Building	Process Room	2.2 gph @ 117' TDH	-	2020	10	2030	$ -	$ 2,000	$ 300	$ 2,300	$230	$455	$ 2,985
MicroC Tank	TK-58	1	WWTF Building	Process Room	-	-	2007	25	2032	$ -	$ -	$ -	$ -	$0	$0	$ -
Sodium Hypo Pump	P-66	1	WWTF Building	Process Room	1.8 gph @ 102' TDH	-	2007	10	2017	$ -	$ 2,000	$ 300	$ 2,300	$230	-$202	$ 2,328
Sodium Hypo Tank		1	WWTF Building	Process Room	-	-	2007	25	2032	$ -	$ 500	$ 75	$ 575	$58	$139	$ 772
Effluent Pump Chamber		1	Site	-	-	-	2007	60	2067	$ 15,000	$ 20,000	$ 3,000	$ 38,000	$3,800	$38,456	$ 80,256
Effluent Pumps	P-77A&B	2	Effluent Pump Chamber	-		2.15	2007	20	2027	$ 500	$ 6,000	$ 900	$ 14,800	$1,480	$1,954	$ 18,234
WWTF Building		1	Site		-		2007	40	2047	$ 50,000	$ 150,000	$ 22,500	$ 222,500	$22,250	$127,270	$ 372,020
Building Roof		1	WWTF Building	Exterior	-		2007	25	2032	$ 5,000	$ 75,000	$ 11,250	$ 91,250	$9,125	$22,083	$ 122,458
Unit Heaters	EUH-1&2	2	WWTF Building	Process Room	-		2007	15	2022	$ 500	$ 6,000	$ 900	$ 14,800	$1,480	$326	$ 16,606
Baseboard Heaters	EBB-1	1	WWTF Building	Process Room	-		2007	15	2022	$ 500	$ 3,000	$ 450	$ 3,950	$395	$87	$ 4,432
Fans	EF-1&2	2	WWTF Building	Process Room	-		2007	15	2022	$ 500	$ 2,500	$ 375	$ 6,750	$675	$149	$ 7,574
Overhead Doors		1	WWTF Building	Process Room	-		2007	30	2037	$ 1,000	$ 10,000	$ 1,500	$ 12,500	$1,250	$4,400	$ 18,150
Standby Generator		1	Site		150 kW		2007	35	2042	$ 5,000	$ 75,000	$ 11,250	$ 91,250	$9,125	$42,158	$ 142,533
Standby Generator Switchgear		1	WWTF Building	Process Room	260 amp		2007	25	2032	$ 1,000	$ 25,000	$ 3,750	$ 29,750	$2,975	$7,200	$ 39,925

Red Highlights are for near-term improvements

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