

**IN RE: ADMINISTRATIVE ORDER ON CONSENT**

**CWA-03-2023-0058DN**

**ATTACHMENT "A"**

**TAMAQUA BOROUGH AUTHORITY**

**WWTP IMPROVEMENTS PROJECT**

**SUMMARY OF PROPOSED IMPROVEMENTS**

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WWTP Improvements Project  
Summary of Proposed Improvements**

**1. Headworks Building**

- a. Construction of a new headworks building to the North of the existing headworks that will include the following:
  - i. Two (2) new mechanical bar screens with washer/compactors for screenings. Motor-operated slide gates will allow both screens to operate during wet weather flows. A third channel with a manual bar rack will allow for bypass of the screens in the case that a screen is out for maintenance during wet weather flows.
  - ii. A new vortex-style grit removal system with two (2) grit pumps pumping grit to a washer/classifier unit. A bypass around the grit unit will be provided.
  - iii. New magnetic flow meter downstream of the grit unit measuring flow into the plant.
  - iv. New CSO regulator with overflow weir leading to CSO Diversion Chamber. The height of the weir will be set to only overflow when the hydraulic capacity of the plant is exceeded. A new fiberglass scum baffle will prevent scum and floatables from being discharged to CSO No. 014.
  - v. New refrigerated, flow-proportioned, automatic sampler for taking influent samples.
  - vi. New CSO Diversion Chamber with two (2) motor-operated plug valves to control wet weather-induced high flow discharges. The diversion chamber will first direct wet weather-induced bypass flows to Equalization Tanks / Aeration Tank Nos. 5 and 6 for equalization to reduce CSO discharges. Only after Aeration Tank Nos. 5 and 6 have reached their capacity will flow be discharged to CSO No. 014.
  - vii. New CSO metering chamber with a new Palmer Bowlus flume and level transducer to measure CSO discharge flows.
  - viii. New Electrical Room for equipment control panels.

**2. Primary Clarifiers**

- a. Demolition of obsolete equipment in the flash mix tank, including mixer agitator and tipping weir. Replace the existing wooden influent baffle with a fiberglass baffle.
- b. Replacement of the influent slide gates with new motor-operated slide gates to automate bringing clarifiers online during wet-weather flows.
- c. Addition of isolation valves to all recycle flows discharging to the flash mix tank (WAS, digester supernatant, and sump pump discharge).
- d. Replacement of all three (3) primary clarifier mechanisms, including new drive motors and new plow-type scraper mechanisms. New scum baffles and overflow weirs as well.

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- e. Upsizing of clarifier effluent piping from 16" to 20" to reduce potential hydraulic bottleneck.
- f. Replacement of primary sludge pumps with double disc diaphragm pumps with VFDs and new motor control center (MCC), along with all associated suction and discharge piping and the addition of a new flow meter on the pump discharge line.
- g. Replacement of scum and primary sludge plug valves and addition of a new concrete manhole for accessing valves.
- h. Structural Improvements:
  - i. Application of a skim coat of cementitious coating on concrete weir bench and effluent trough.
- i. Electrical improvements:
  - i. Installation of new local electrical equipment, including disconnect switches, local control stations, and drive motors, mounted outside of the classified envelope to eliminate the need for Class I, Division II rated equipment.
  - ii. Installation of new bridge-mounted LED lighting on the drive access platforms of all three (3) primary clarifiers.

**3. Aeration Tanks (i.e. Bioreactors)**

- a. Replacement of the regulator chamber influent gate and motor operator with a new stainless-steel slide gate and automated motor operator.
- b. Replacement of the secondary treatment process flow meter with an ultrasonic flow meter.
- c. Installation of four (4) new slide gates in the Caustic Mix Tank/Aeration Tank Distribution Chamber for improved flow distribution, along with replacement of the disconnect switch and local control station for the tank mixer.
- d. Replacement of the ceramic diffusers with high-efficiency tubular fine bubble membrane diffusers.
- e. Installation of a DO control system for air flow control, with DO probes and meters in each aeration tank and modulating butterfly valves at each main air header.
- f. Modification of Aeration Tank Nos. 5 and 6 to allow them to operate as either aeration tanks or equalization basins, including a new line from the CSO No. 014 Diversion Chamber, a tank level sensor control in the tanks, and new duplex submersible pump stations to drain the Tanks back to the WWTP Headworks.
- g. Enlargement of the 10-inch effluent lines of Aeration Tank Nos. 5 and 6 to eliminate a hydraulic restriction.
- h. New mud valves in all tanks.
- i. New pump and valving in Aeration Tanks and Chlorine Contact Tanks drain sump.
- j. Structural improvements:

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- i. Rehabilitation of Aeration Tank No. 5 to repair a leak at the effluent line penetration of the concrete wall.
- ii. Repair of a horizontal crack along the top of the concrete wall of Aeration Tank No. 5 with a gravity feed epoxy adhesive.
- k. Electrical improvements:
  - i. Installation of new LED lighting on the walkways of all Aeration Tanks.
  - ii. Replacement of all electrical equipment, including disconnect switches and control stations, and repower from the new Electrical Room in the Blower Building.

#### **4. Blower Building**

- a. Replacement of process aeration blowers and blower controls, along with automation of the system with a new PLC.
- b. Replacement of the RAS Pumps with PLC-based VFD controllers along with new piping and valves, to allow flow pacing of the system.
- c. Replacement of WAS Pumps with PLC-based VFD controllers along with piping and valves to allow for an automated wasting schedule.
- d. Installation of new plant water system, consisting of three (3) skid mounted vertical multi-stage centrifugal pumps with VFD controls, along with a new self-cleaning strainer and new piping and valves.
- e. Installation of new sodium hypochlorite feed system for disinfection, including bulk tank and two (2) new feed pumps. New chemical containment and a new fill station will be provided.
- f. New slide gate, telescoping valves, and mud valves in RAS wet well.
- g. Replacement of RAS and WAS flow meters.
- h. Demolition of the obsolete caustic feed system, including storage tanks, feed pumps, and associated piping. A new alkalinity control system will be installed in the Dewatering Building.
- i. Creation of a new, separate Electrical room for new service entrance disconnect, transfer switch, and distribution switchgear along with MCCs.
- j. Structural Improvements:
  - i. Fill in unused City Water Pit to provide more space in the blower room.
- k. Architectural improvements:
  - i. Installation of a new 30-year single ply roof membrane system with rigid insulation, a vapor barrier and new metal coping and flashing. All repairs to concrete planks will also be performed.
  - ii. Installation of a concrete masonry wall to create a separate Electrical room with an access door from the building interior and access door from the

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exterior. The room will be conditioned to provide cooling of the VFDs and electrical gear.

- I. Mechanical improvements:
  - i. Installation of a ventilation system with properly-sized intakes and roof-mounted exhaust fans.
  - ii. Installation of a dehumidifier in the basement space to address humidity issues.
  - iii. Replacement of the existing electric unit heaters.
- m. Electrical improvements:
  - i. Installation of a new Electrical Room that will contain the necessary MCCs and electrical distribution switchgear to power the southern half of the WWTP processes and buildings.
  - ii. Demolition of the existing Motor Control Center No. 3.
  - iii. Installation of new LED lighting throughout the building to replace existing fixtures.

#### **5. Final Clarifiers**

- a. Replacement of all three (3) existing final clarifier multiple riser pipe clarifier mechanisms with suction header mechanisms.
- b. Structural improvements:
  - i. Repairs to the top of the concrete wall of Clarifier No. 3, including replacement of the top 2' of the wall.
- c. Electrical improvements:
  - i. Installation of new local electrical equipment, including disconnect switches, local control stations, and drive motors, mounted outside of the classified envelope to eliminate the need for Class I, Division II rated equipment.
  - ii. Installation of new bridge-mounted LED lighting on the drive access platforms of all three (3) final clarifiers.

#### **6. Chlorine Contact Tanks**

- a. Replacement of the two (2) Distribution Chamber mixers with new submersible mixtures.
- b. Addition of a second parallel 12-inch pipe from the Distribution Chamber to Tank Nos. 1 and 2 to address a hydraulic constriction and flow imbalance between the Chlorine Contact Tanks (CCT's).
- c. Addition of new sodium hypochlorite diffuser piping in Distribution Chamber.
- d. Replacement of the slide gates and mud valves in all CCT's.

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- e. Demolition of the obsolete post aeration blower.

**7. Primary Digester**

- a. Inspection of the Digester cover during construction, make any necessary repairs to corroded steel components, as well as repaint the cover.
- b. Replacement of the gas mixing system with a pumped recirculation mixing system, with a set of mixing nozzles, for higher mixing energy, effective mixing patterns, and easier maintenance.
- c. Replacement of the boiler/heat exchanger combination unit with two (2) separate units. The new boiler will be located in a new Boiler Building near the Digester while the new spiral heat exchanger will be installed in the Digester Control House where the current unit is located.
- d. Replacement of the gas handling and safety equipment with a new system housed in the new Boiler Building. Separating the gas handling equipment in a separate room to bring the Digester Control House into compliance with NFPA standards and make both rooms "unclassified spaces" without the need for explosion-proof equipment.
- e. Replacement of the digester recirculation pumps and associated valving.
- f. Replacement of all digester internal piping, as well as the Digester Control House sump pumps.
- g. Two (2) new rotary lobe pumps with VFDs located in a new MCC for dewatering feed.
- h. Architectural improvements:
  - i. Installation of a new 30-year single ply roof membrane system with rigid insulation, a vapor barrier and new metal coping and flashing. All repairs to concrete planks will also be performed.
  - ii. Replacement of the double door and frame with new aluminum door and frame.
- i. Mechanical improvements:
  - i. Installation of a combustible gas detector in the existing Control Building and new Boiler Building.
  - ii. Upgrade the ventilation system in the existing Control Building with a new supply fan with duct heater and exhaust fan.
  - iii. Replacement of the hot water unit heaters with electric units.
  - iv. Installation of a new ventilation system in the new Boiler Building with a supply fan with electric duct heater and exhaust fan. An electric unit heater will be added for supplemental heating. (all explosion proof).
- j. Electrical improvements:

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- i. Removal of the existing MCC and associated panels from the Primary Digester Control House.
- ii. All proposed electrical equipment will be fed out of the proposed Electrical Room in the Dewatering Building.
- iii. Replacement of all existing lights with LED fixtures.

**8. Control Building and Secondary Digesters**

- a. Demolition of both Secondary Digesters, removing all non-structural digesters walls and filling in digesters to grade.
- b. Removal of the progressive cavity dewatering feed pump in the Control Building basement.
- c. New Double Disc Diaphragm pumps for primary sludge with bypass to feed directly to the new Screw Press.
- d. Architectural improvements:
  - i. Replacement of single door and frame with new aluminum door and frame.
  - ii. Replacement of the exterior louver grille with a new aluminum louver.
- e. Mechanical improvements:
  - i. New air conditioning unit in existing electrical room.
- f. Electrical improvements:
  - i. Replacement of all the existing MCCs and panels.
  - ii. The equipment located in the Control Building will be fed by the proposed new MCC and distribution switchgear to be located in the Dewatering Building. All the existing equipment to remain will be refed.
  - iii. Consideration should also be given to replacing the fluorescent light fixtures with LEDs.

**9. Dewatering Building**

- a. Replacement of the existing Belt Filter Press with a new Screw Press. A new tote-based polymer system will be provided for the Screw Press, including a polymer flocculation tank.
- b. New dewatering conveyors, including a level conveyor for in the sludge loading area.
- c. Conversion from a dry polymer system to a liquid polymer system.
- d. Addition of a new magnesium hydroxide feed system for alkalinity control. The new system will consist of two bulk tanks and two peristaltic metering pumps.
- e. Demolition of the obsolete ferric chloride and lime chemical systems.
- f. Structural improvements:
  - i. Installation of a concrete pad in front of the sludge storage bay to handle heavy truck loadings.

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- ii. Repair of the concrete floor in the sludge loading bay and addition of steel guides for the roll-off dumpster.
- g. Architectural improvements:
  - i. Installation of a new 30-year single ply roof membrane system with rigid insulation, a vapor barrier and new metal coping and flashing. All repairs to concrete planks will also be performed.
  - ii. Replacement of doors and frames with new aluminum doors and frames.
  - iii. Clean the existing brick and garage bay precast concrete lintel with a chemical solution to remove staining, salts, and debris.
  - iv. Installation of concrete masonry walls between the existing BFP and Polymer Feed areas to create two (2) district rooms- a dewatering Control Area and an Electrical Room.
- h. Mechanical improvements:
  - i. Installation of a new make-up air unit with electric heat on the roof, along with exhaust fans in each space.
  - ii. Replacement of unit heaters with corrosion resistant types in these spaces.
  - iii. Replacement of the air handling unit, electric duct heaters, and exhaust fans of the garage bay.
  - iv. Installation of new ventilation system with roof-mounted exhaust fan for the new Electrical Room.
- i. Electrical improvements:
  - i. Installation of a new Electrical Room that will contain the necessary MCCs and electrical distribution switchgear to power the northern half of the WWTP processes and buildings, in addition to housing the new incoming electrical services.
  - ii. Conversion of electrical service from 240V three-phase power to 480V three-phase power. Local step-down transformers will be provided where needed to re-power existing 240V equipment that is to remain and cannot be easily re-powered for 480V.
  - iii. Replacement of the existing lighting fixtures with LEDs.

## **10. Overall Site Improvements**

- a. Installation of motor-operated gate with electronic key fob/badge access.
- b. Installation of electric key fob/badge access to all building doors.
- c. Installation of closed-circuit video surveillance throughout the plant site.
- d. Installation of additional LED site lighting.
- e. Installation of a new exterior diesel generator with a 24-hour sub-base fuel tank adjacent to the Dewatering Building, close to the location of the new incoming



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electrical service. The generator will be provided with a weatherproof, sound attenuating enclosure.

**11. Instrumentation and Control Improvements**

- a. Provide critical infrastructure of a Process Control and Monitoring Control System (PMCS) with flexibility and expandability.
- b. Installation of fiber cable between all site buildings.
- c. Main Process Control Panel (PCP) located in the Digester Control Building.
- d. Client workstation in the Digester Control Building for local monitoring and data reporting needs.
- e. A total of five (5) PCPs are proposed- Headworks Building, Blower Building, Dewatering Building, Primary Digester Control House, and Digester Control Building (Main Location).
- f. Select PCPs will be provided with Operator Interface Terminals (OITs) to permit viewing of the PMCS system locally at the panel.