CLEAN WATER ACT COMPLIANCE EVALUATION INSPECTION REPORT
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 5

Purpose: Compliance Evaluation Inspection

Facility: City of White Hall Sewage Treatment Plant (STP)
901 NE 200 Avenue
White Hall, Illinois 62092

Date of Inspection: November 28, 2023

EPA Representatives:

Ray Cullen, Environmental Engineer
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State Representative:

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Facility Representatives:

Steve McCarthy, Plant Operator; (217) 473-9486, whilwp@yahoo.com

Ryan Cox, Plant Operator

Report Prepared by: Ray Cullen

Inspector Signature: RAYMOND CULLEN Digitally signed by RAYMOND CULLEN Date: 2024.01.22 15:58:10 -06'00'
Ray Cullen

Approver Name and Title: Ryan J. Bahr, Section 2 Supervisor
WECAB

Approver Signature and Date: RYAN BAHR Digitally signed by RYAN BAHR Date: 2024.01.23 13:28:00 -06'00'

Purpose of Inspection

Cheryl Burdett and I, from EPA Region 5's WECAB, conducted an announced compliance evaluation inspection of the STP owned and operated by the City of White Hall, Illinois (the City) to assess its compliance with the Clean Water Act (CWA) and applicable permits. The STP operates under National Pollutant Discharge Elimination System (NPDES) Permit No. IL0022390 ("Permit"), which expires on September 30, 2025. The Permit authorizes the City to discharge from the STP to Seminary Creek in compliance with requirements set forth therein.

We also observed the efforts the City has taken to come into compliance with an Administrative Order on Consent (AOC) that was issued on September 22, 2022. As cited in the AOC, based on Discharge Monitoring Reports (DMRs) filed by the City with Illinois EPA, on nearly 100 occasions from January 2020 through February 2022, the City reported discharging ammonia-nitrogen (NH_3-N), fecal coliform, total suspended solids (TSS), carbonaceous biochemical oxygen demand ($CBOD_5$), and biochemical oxygen demand (BOD_5) through Outfall 001 that exceeded applicable effluent limits in the Permit. Since issuance of the AOC, the City continues to have constant NH_3-N exceedances, which Steve McCarthy, Plant Operator, has previously blamed on the lack of aeration and the age of the sludge in the treatment system; old sludge decreases dissolved oxygen, which increases NH_3-N. He has also relayed that debris has obstructed the flow of return sludge to the STP's reaeration basin and digester and had requested that I see these issues for myself to better understand the plant's operation and his struggle to comply with the AOC and to cease exceeding the effluent limits.

Arrival Time: 11/28/23, 1:15 p.m.
Departure Time: 11/28/23, 4:35 p.m.

☒ Credentials presented
☒ CBI protection assurances discussed

We first met Mr. McCarthy at a gas station located about a mile north of the STP. He escorted us to the STP, where we met fellow plant operator Ryan Cox and Illinois EPA inspector Lukas Dale. Messrs. McCarthy and Cox ("the operators") are the only people who work at the STP. Mr. Cox has been employed by the City for 20 years and has been at the STP since 2011. The following information was obtained verbally from Mr. McCarthy unless otherwise noted.

Facility Description

The STP receives wastewater from the entire city, serving approximately 2,200 people, with there being between 1,000 and 1,100 sewer connections. The majority of the sewer system is clay pipe, with a small amount being PVC-lined, and all the manholes are of brick construction. All of the connections to the STP are gravity-fed, except there is one lift station for three to four houses, the City's drinking water plant, and a laboratory. The lift station is equipped with two pumps, one of which acts as a backup. Mr. McCarthy said the collection system has inflow and infiltration issues but was uncertain of the number of sanitary sewer overflows over the last few years. Due to the lack of rain the last few months prior to the inspection, he could not recall any recent overflows. He stated that they did not routinely clean the bar screen that used to be at the

headworks, which had caused wastewater to back up into the sanitary sewers. He stated that they have used the sewers as storage so the STP does not surpass its capacity.

The average flowrate to the STP is 0.34 million gallons per day (MGD). The maximum design flowrate is 0.94 MGD, but when the bar screen was blocked, the STP could not handle more than 0.8 to 0.9 MGD. In September 2023, they replaced the bar screen with a grinder to chop up debris present in the influent wastewater that had been preventing constant return sludge flow.

The STP has been in operation since 1983, with certain structures constructed in 1973. It is comprised of a primary clarifier; two digesters (north and south); an activated sludge unit (ASU) consisting of another clarifier, another digester, a reaeration basin, and a contact tank; and a final clarifier (*See* Attachment 1). Wastewater is pumped from the primary clarifier to the ASU. Currently, only two of the three blowers in the reaeration basin in the ASU can run at a time due to issues with a failed fitting in the air line. In previous communication, Mr. McCarthy stated that to increase air flow to the ASU, they lowered it to the digesters. Effluent from the ASU is intended to go through filters before going to the final clarifier, but, ever since a major storm event flooded the STP in 2015, the operators have been bypassing them because they have been causing constant backwashing. Mr. Cox stated that a higher wastewater flowrate from the final clarifier and a higher pace flowrate is necessary to avoid this. Sludge from the primary clarifier goes to the older north digester, and sludge from the ASU typically goes to the newer south one (although ASU sludge can go to either digester depending on where there is room). The City installed the south digester in 2013 or 2014 during a plant rehabilitation event. At the time of the inspection, the operators have been unable to turn the valve on the north digester, and the valve on the south one has been leaking. There is a drying bed for the sludge from the final clarifier, but due to the bed being at capacity lately, the sludge has had to remain in the system.

On December 7, 2021, the City installed the current return sludge pump. The operators do not believe this pump is operating effectively based on the insufficient discharge volume, which they have been struggling to correct. In October 2023, the manufacturer (Penn Valley Pump) attempted to fix it by replacing the disks, but the operators noted that it still currently continues to make an odd thumping noise, and the discharge volume has actually decreased since this repair. They think that the probable cause for this low volume is the suction line's location at the bottom of the secondary clarifier. They have discussed with Caleb Ruyle at Illinois EPA draining the primary clarifier and the ASU to remove debris from the bottom of these tanks that may be clogging the line, which would also reveal possible other issues. At the time of the inspection, the City had not yet received a variance from Illinois EPA to bypass the STP to drain the tanks. I told Mr. McCarthy that I would follow-up with Mr. Ruyle to learn about the status of this permit.

Since about the time Mr. Cox began working at the STP, he and Mr. McCarthy have been trying to improve operations, including by replacing equipment when possible and seeking people capable of solving plant problems. For example, in March 2023, they replaced the failed air lift pump used to waste sludge from the reaeration basin to the ASU digester with a temporary submersible one. They also sought the help of Chris Grove at Aquafix Inc., who supplied them with products Qwik-Zyme L and Sludge Rx to try to lower NH_3-N levels (along with other pollutants). According to the company's website, Qwik-Zyme L mitigates foaming, reduces fats,

oils, and grease, and removes oil scum in clarifiers and aeration basins. The Sludge Rx serves to reduce nutrient-rich sludge to bacterial biomass by breaking down the sludge and absorbing the nutrients to stimulate bacterial growth. They intend to add the Qwik-Zyme L to the ASU and the Sludge Rx to the influent after they are able to get the return sludge pump running properly.

For the most part though, Mr. McCarthy believes that the fixes they have employed over the years are temporary band-aid solutions and acknowledges the need for more permanent remedies such as entire plant replacement. For instance, in October 2023, they disconnected and disassembled the recently installed grinder pump to fix some issue with it at a cost of a couple thousand dollars. Since there is little money available for the STP to continue making these repairs, some of which have been ineffective, Mr. McCarthy discussed with their bank opening a line of credit. Mr. McCarthy has requested but has had no luck receiving funding for STP improvements from the City Council, who he said are more interested in providing funding for the City's drinking water plant to solve nitrate issues there (Mr. McCarthy is responsible for this facility as well). Mr. Cox proposed that the City should pay off its sewer account bonds early and use the money saved in future interest for the STP instead, or accrue money for the STP by increasing citizens' water bills by a relatively minor amount. In addition to affordability concerns, the City has experienced excessive delays in receiving ordered parts. For example, it took 18 months before the City received a pump part for the lift station.

Monitoring

The Permit requires the City to conduct composite monitoring of the influent wastewater for BOD_5 and TSS two days a week. For Outfall 001, the Permit requires the City to conduct composite monitoring of the wastewater for $CBOD_5$ and TSS two days a month and NH_3-N one day a week; and grab sampling for pH two days a month and fecal coliform and dissolved oxygen (DO) 1 day a month. Both operators do the sampling and store the samples in a fridge in an office building, which was 36°F (2.2°C) during the inspection (*See* Attachment 1, Photos 2 and 3). For the influent and effluent composite sampling, they manually collect one liter grab samples at 7 a.m., 11 a.m., and 3 p.m. in separate bottles on the day of sampling (typically Tuesday) then combine them, as allowed by the Permit. They preserve the NH_3-N samples with sulfuric acid, but they do not confirm that the pH of these samples is less than 2, as required by 40 C.F.R. § 136.3, and they were unaware if the lab that does the analysis, Pace Analytical (Pace), verifies this. Once, sometimes twice a month, in coordination with samples taken for the drinking water plant, they transport the samples in an ice-filled Styrofoam cooler to a storage unit in Springfield, Illinois, where Pace picks them up to perform the analyses. For the pH monitoring, they take the collected samples to the drinking water plant for analysis twice a month, and even though there are three buffer standards available (4.0, 7.0, and 10.0), they only use the 7.0 one for calibration. Lastly, there is an effluent flow meter at the ASU and a DO meter at the final clarifier. Mr. McCarthy stated that this meter is inaccurate.

The City keeps the chain of custody forms and the monitoring records in an office on-site. The chain of custodies, which Pace emails to Mr. McCarthy, appeared to be complete and properly filled in. However, the monitoring records Mr. McCarthy showed me did not include who did the sampling and analyses, the date and time that the samples were collected and analyzed, or other required information (Photo 1). The records just showed what are assumed to be the

monitoring results for BOD_5, TSS, NH_3-N, phosphorus, and dissolved oxygen samples taken during the month, along with the average and maximum flowrates observed from the flow meter.

Facility Tour

We toured the facility starting a little before 3 p.m. at the influent sampling location, where we saw the newly-installed grinder (Photo 5) and influent flow sensor and weir (Photo 6). We then saw the primary clarifier located immediately south of the influent well (Photos 7 and 8). The surface water in the clarifier was frothy and full of scum, and the weirs were extremely dirty and coated with grime. We did not see a skimmer in operation. On the southwest side of the clarifier is a well where the sludge pump usually sits (Photo 9). At the time of the inspection, the pump had been removed for the past 3 weeks, during which time sludge could not be wasted. When the pump is in operation, the City wastes daily or weekly depending on the sludge coming in.

We then walked to the digesters, starting with the north one, which Mr. McCarthy believed to be 16 feet deep (Photo 10). The level in this tank can only drop three to four feet when decanting. There are holes in the sides of the tank that the City previously used for decanting but are now plugged and unusable. Then, the water level in the south digester, which was also believed to be 16 feet deep, appeared abnormally low due to a broken valve that would cause the water to leak back into the wet well when it reaches a certain height (Photo 11). We saw a strong flow of wastewater from the primary clarifier wet well to the ASU (Photo 12).

Also in the ASU, we saw the secondary clarifier and reaeration basin (Photos 13, 14, and 17), along with the return sludge pump (Photo 15). The effluent flow from this pump to the reaeration basin was very low. As explained above, the operators believe this is due to debris at the bottom of the clarifier plugging the pump (Photo 16).

Next, we saw the final clarifier (Photos 18), and the location at the clarifier where the operators conduct effluent sampling (Photo 19), along with the DO meter (Photo 22). The water in the final clarifier was covered with a green material. We then walked to Outfall 001 at Seminary Creek, where the receiving water at the effluent pipe appeared to contain sludge and other solids from the STP (Photo 20). There is another pipe to the south of the Outfall 001 effluent pipe that the City installed after the 2015 flood, but it never hooked it up to a pump that would have removed stormwater from the site. There is a building on-site that has pumps in case of a major storm event. A pipe located to the north of the effluent pipe was used during the 1970s but is now defunct. North of this pipe is Outfall 002 (Photo 21), which is for excess flow from the stormwater tank on-site (Photo 23). Mr. McCarthy thinks this tank, which appeared to be at or very near capacity during the inspection, will soon start discharging through Outfall 002. The water in the tank, which we were told is mostly stormwater, appeared to contain algae or other substances.

Areas of Concern

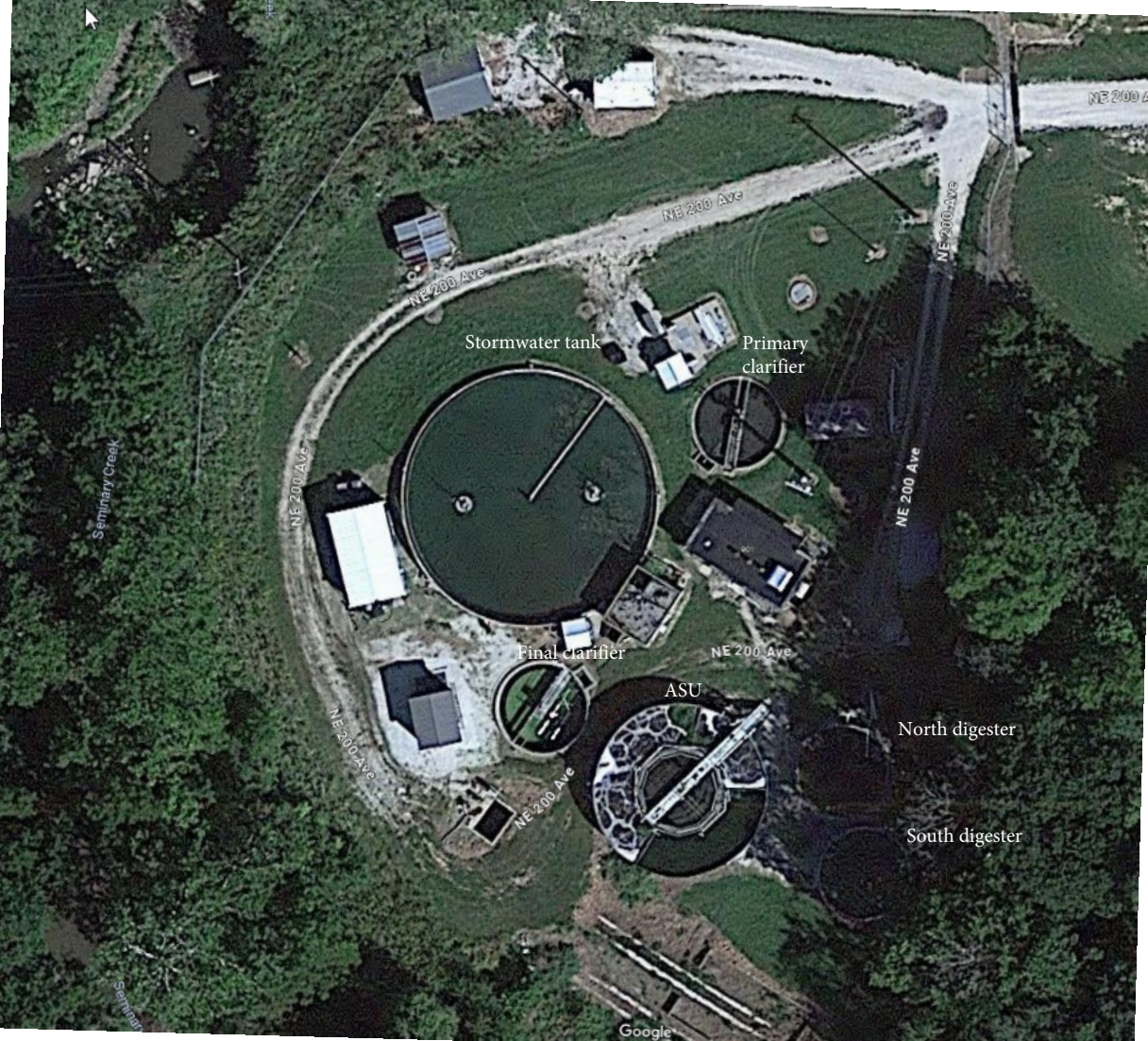
We identified the following areas of concern after reviewing the information obtained during the inspection:

1. The efforts the City has taken to reduce the concentration of pollutants being discharged from the STP to comply with the Permit and the AOC, especially NH_3-N, have been ineffective. As the operators are already aware, insufficient wasting of sludge and insufficient flow of return sludge are most likely the main reason behind the STP's subpar treatment capability.
2. Excessive debris and sludge needing to be wasted at the STP have prevented full flow of wastewater through the system. Instead, influent wastewater has flowed back into the sanitary sewer pipes, which the City has used as wastewater storage instead of allowing the wastewater into the STP.
3. The primary clarifier was full of scum, its weirs were coated with grime, and it did not have a skimmer to remove floating solids.
4. The receiving water around Outfall 001 appeared to contain sludge and other solids or pollutants from the STP.
5. The water in the final clarifier was covered with a green material.
6. The stormwater tank, which appeared to contain algae or other substances is nearly full. If it were to discharge (through Outfall 002) it may exceed the BOD_5 and TSS limits in the Permit.
7. While NH_3-N samples are preserved with sulfuric acid, there is no assurance that they are kept at the proper pH, as required by 40 C.F.R. § 136.3.
8. The operators calibrate the pH probe using only the 7.0 buffer standard when it should be using the 4.0 and 10.0 standards as well.
9. Given that the operators do not analyze pH samples at the STP but rather at the City's drinking water plant, the 15-minute maximum holding time allowed by 40 C.F.R. § 136.3 is very likely being exceeded.
10. The monitoring records lack all required data, including the name of the person(s) doing the sampling and the analyses and the date/time the samples were collected and the date/time analyzed.

Attachments

1. Satellite view of the STP.
2. Photo log.

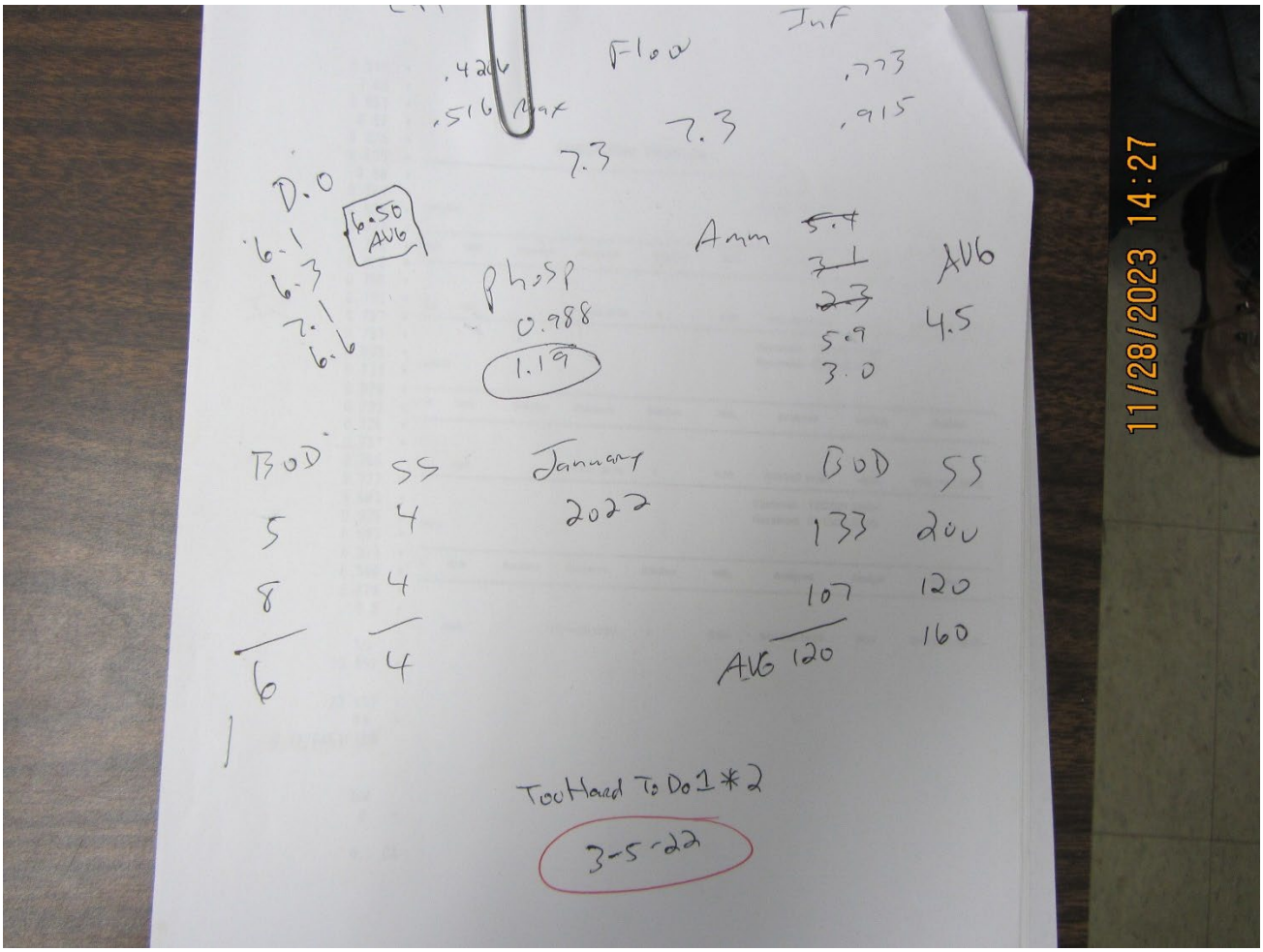
Attachment 1
Satellite view of the STP


Stormwater tank
Primary clarifier
Final clarifier
ASU
North digester
South digester
NE 200 Ave
Seminary Creek
Google

Attachment 2

Photo log

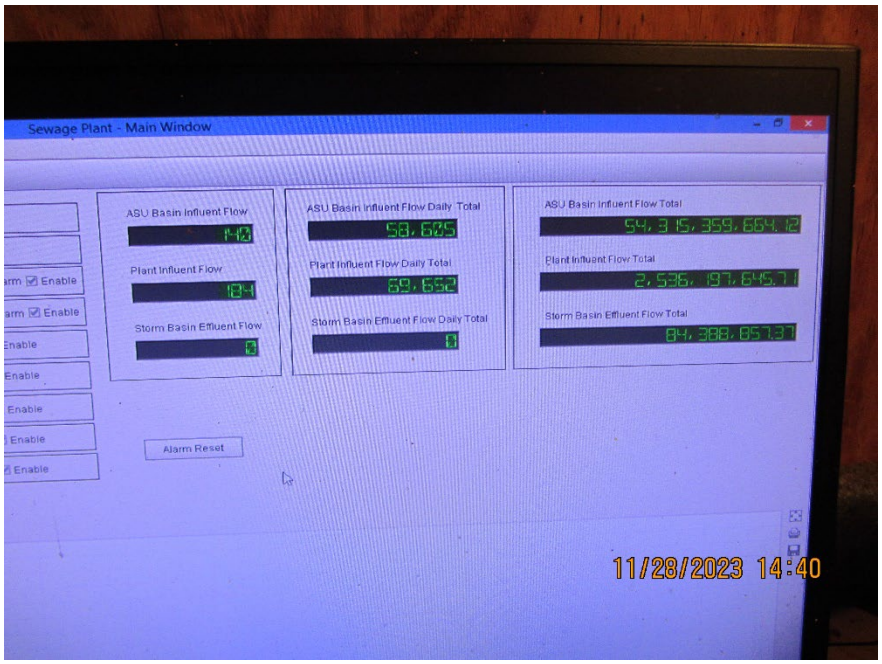
White Hall STP
Photo Log
EPA Inspection November 28, 2023
All photos taken by Ray Cullen, Environmental Engineer, EPA



1: IMG_0399
Description: Monitoring record for January 2022
Location: Office building
Camera Direction: N/A
Date/Time: 11/28/23, 2:27 p.m.

2: IMG_0400
Description: Fridge with wastewater samples
Location: Office building
Camera Direction: N/A
Date/Time: 11/28/23, 2:37 p.m.

3: IMG_0401
Description: Thermometer displaying 36°F (2.2°C) temperature inside fridge shown in Photo 2
Location: Fridge in office building
Camera Direction: N/A
Date/Time: 11/28/23, 2:38 p.m.



4: IMG_0402
Description: Monitor showing ASU influent, STP influent, and storm basin effluent flowrates
Location: Office building
Camera Direction: N/A
Date/Time: 11/28/23, 2:40 p.m.

5: IMG_0403
Description: Influent sampling location with grinder on the left
Location: Influent well
Camera Direction: South, down
Date/Time: 11/28/23, 2:58 p.m.

6: IMG_0404
Description: Ultrasonic influent flow sensor and weir
Location: Influent well
Camera Direction: Down
Date/Time: 11/28/23, 3:01 p.m.

7: IMG_0405
Description: Primary clarifier
Location: South of influent well
Camera Direction: West
Date/Time: 11/28/23, 3:02 p.m.

8: IMG_0406
Description: Primary clarifier
Location: South of influent well
Camera Direction: West
Date/Time: 11/28/23, 3:03 p.m.

9: IMG_0407
Description: Location where primary sludge pump usually is, currently removed
Location: Southwest side of primary clarifier
Camera Direction: Northwest
Date/Time: 11/28/23, 3:05 p.m.

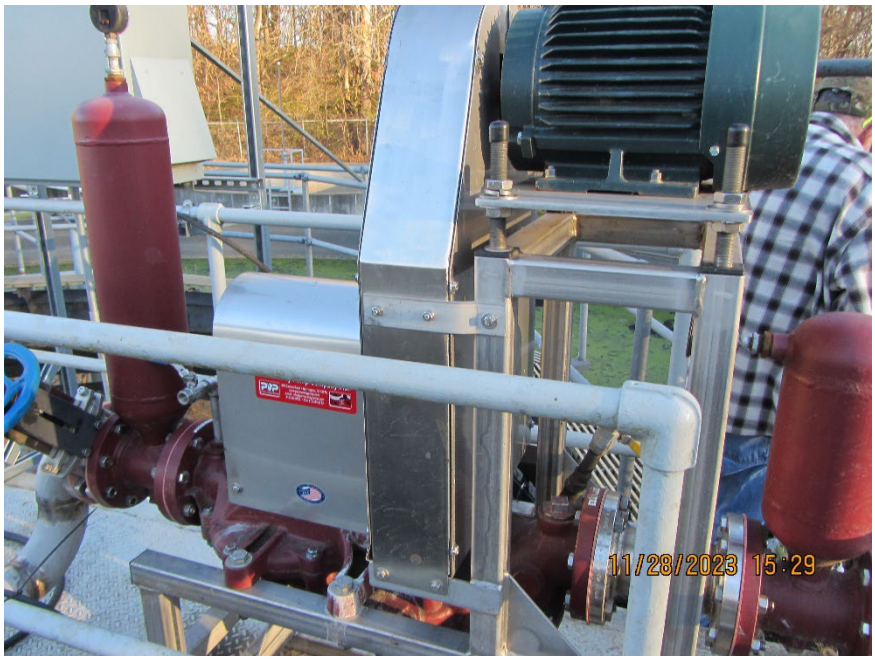
10: IMG_0408
Description: North digester
Location: Southeast of primary clarifier and east of ASU
Camera Direction: Southeast
Date/Time: 11/28/23, 3:10 p.m.

11: IMG_0409
Description: South digester
Location: South of north digester and east of ASU
Camera Direction: East
Date/Time: 11/28/23, 3:20 p.m.

12: IMG_0410
Description: Pipe with flow from the primary clarifier wet well into the ASU
Location: ASU
Camera Direction: Northwest
Date/Time: 11/28/23, 3:25 p.m.

13: IMG_0411
Description: Secondary clarifier in foreground, reaeration basin in background
Location: ASU
Camera Direction: Southwest
Date/Time: 11/28/23, 3:26 p.m.

14: IMG_0412
Description: Secondary clarifer in foreground, digester in background
Location: ASU
Camera Direction: Southeast
Date/Time: 11/28/23, 3:27 p.m.



15: IMG_0413
Description: Return sludge pump
Location: ASU
Camera Direction: East
Date/Time: 11/28/23, 3:29 p.m.

16: IMG_0414
Description: Effluent from the return sludge pump to the reaeration basin
Location: ASU
Camera Direction: South
Date/Time: 11/28/23, 3:29 p.m.

17: IMG_0415
Description: Reaeration basin
Location: ASU
Camera Direction: West
Date/Time: 11/28/23, 3:35 p.m.

18: IMG_0416
Description: Final clarifier
Location: Northwest of ASU
Camera Direction: Wes
Date/Time: 11/28/23, 3:40 p.m.

19: IMG_0417
Description: Effluent sampling location
Location: Final clarifier
Camera Direction: Northeast
Date/Time: 11/28/23, 3:54 p.m.

20: IMG_0418
Description: Outfall 001 (middle pipe)
Location: Seminary Creek, about 200 feet west of the final clarifier
Camera Direction: South
Date/Time: 11/28/23, 4:00 p.m.

21: IMG_0419
Description: Outfall 002
Location: Seminary Creek, just south of Outfall 001
Camera Direction: North
Date/Time: 11/28/23, 4:04 p.m.

22: IMG_0420
Description: Dissolved oxygen meter display
Location: North side of final clarifier
Camera Direction: East
Date/Time: 11/28/23, 4:16 p.m.

23: IMG_0421
Description: Stormwater tank
Location: North of final clarifier
Camera Direction: Southwest
Date/Time: 11/28/23, 4:17 p.m.