



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES

Memphis Environmental Field Office
8383 Wolf Lake Drive
Bartlett, TN 38133
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February 2, 2023

Mr. Michael Walker
City Manager
10001 U.S. Highway 70
Lakeland, TN 38002

Re: Compliance Sampling Inspection
Lakeland Sewage Treatment Plant
NPDES Permit No. TN0078255
Shelby County

Dear Mr. Walker:

On Wednesday, December 13, 2023, Ms. Brittany Gibson, Mr. Kyle Mabry, and Mr. Brandon Stuart with the Division of Water Resources, Memphis Environmental Field Office (DWR/MEFO), along with Mr. John Goodwin, Environmental Protection Agency – Region 4 (EPA), conducted a Compliance Sampling Inspection (CSI) of the City of Lakeland's Sewage Treatment Plant (STP). The purpose of this inspection was to determine the plant's compliance with the National Pollutant Discharge Elimination System (NPDES) permit, verify the accuracy of the facility's self-monitoring program, and collect effluent samples for analysis. Upon arrival at the facility, Ms. Gibson, Mr. Mabry, Mr. Stuart, and Mr. Goodwin met with Mr. Spencer Smalley, Wastewater Supervisor, and Mr. Cade McMillian, Senior Wastewater Manager. Attached you will find the Compliance Sampling Inspection (CSI) Report and corresponding photo documentation which summarize the findings of the CSI. The following are items to note regarding the inspection:

- The Lakeland STP reported eight (8) exceedances of its permit limits during the period from January 2022 through November 2023. Explanation of each exceedance did accompany the designated MOR.
- The NPDES permit for the Lakeland STP with permit number TN0078255 expires on September 30, 2027. Ms. Gibson reminded Mr. Spencer and Mr. McMillian during the inspection that the permit renewal application needs to be submitted to the Nashville Central Office no later than 180 days prior to the current permit expiration date.
- The Lakeland STP conducted quarterly biomonitoring of its effluent at Outfall 001 during December 2023. All biomonitoring tests met the value set forth in the NPDES permit.

- The Lakeland STP reported three (3) Sanitary Sewer Overflows (SSOs) Dry Weather events during the period of January 2022 through November 2023.

The Division appreciates the cooperation and assistance of Mr. Smalley and Mr. McMillian during the inspection. Compliance with the terms and conditions of the permit helps to ensure that the State's waters are protected from harmful pollutants. If you have any questions or comments regarding this inspection, please contact Brittany Gibson at (901) 633-6931 or Brittany.Gibson@tn.gov.

Sincerely,



Brittany Gibson
Environmental Scientist II
Division of Water Resources
Memphis Environmental Field Office

cc: TDEC/DWR/MEFO – File

ec: Spencer Smalley – Wastewater Supervisor
Cade McMillian – Senior Wastewater Manager

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Water Resources

Memphis Environmental Field Office, 8383 Wolf Lake Drive, Bartlett, TN

38133 1-888-891-8332 (TDEC)

**Compliance Sampling Inspection for NPDES
Permits**

Facility Name: Lakeland STP	NPDES Permit Number: TN0078255
Permit Effective Date: October 1, 2022	Permit Expiration Date: September 30, 2027
Date and Time of Inspection: 12/13/2023	Inspector Name: Brittany Gibson

Official Contact Person Name: Michael Walker, Lakeland City Manager	
Address: 10001 U.S. Highway 70 Lakeland, TN 38002	Phone Number: (901) 867-2717
	Email: citymanager@lakelandtn.org

Summary of Findings and Comments

On Wednesday, December 13, 2023, Ms. Brittany Gibson, Mr. Kyle Mabry, and Mr. Brandon Stuart with the Division of Water Resources, Memphis Environmental Field Office (DWR/MEFO), along with Mr. John Goodwin, Environmental Protection Agency – Region 4 (EPA), conducted a Compliance Sampling Inspection (CSI) at the Lakeland Sewage Treatment Plant (STP) located in Shelby County, Tennessee. Ms. Gibson, along with Mr. Mabry, Mr. Stuart, and Mr. Goodwin met with Mr. Spencer Smalley, Wastewater Supervisor, and Mr. Cade McMillian, Senior Wastewater Manager. The purpose of this inspection was to determine the plant’s compliance with the National Pollutant Discharge System (NPDES) permit, verify the accuracy of the facility’s self-monitoring program/records, and collect effluent samples for analysis. Ms. Gibson inspected the treatment system, the lab, and reviewed the facility’s records/documentation. Effluent samples were also collected. The effluent samples for this inspection were collected on December 12, 2023, due to scheduling conflicts with the facility’s biomonitoring sampling event. The following is a summary of the findings and observations.

I. Permit

The NPDES permit for the Lakeland STP with permit number TN0078255 expires on September 30, 2027. The permit became effective on October 1, 2022. A copy of the NPDES permit was available for review in a binder at the plant’s laboratory. Ms. Gibson reminded Mr. Spencer and Mr. McMillian during the inspection that the renewal application needs to be submitted to Nashville Central Office (NCO) no later than 180 days prior to the current expiration date.

The NPDES permit authorizes the discharge of treated municipal wastewater via Outfall 001 into the Loosahatchie River at mile 24.1.

The City of Lakeland is authorized under the NPDES permit to discharge through Outfall 001 from a treatment system with a design capacity of up to 4.5 Million Gallons per Day (MGD).

The Lakeland STP discharge effluent characteristic and monitoring requirements are as follows:

- CBOD – Three Per Week Composite
- Total Suspended Solids (TSS) – Three Per Week Composite
- Ammonia Nitrogen (NH₃) – Three Per Week Composite
- Total Nitrogen – Monthly Composite
- Total Phosphorus – Monthly Composite
- *E. coli* – Three Per Week Grab
- Settleable Solids – Three Per Week Grab
- Dissolved Oxygen – Five Per Week Grab
- pH – Five Per Week Grab
- Flow – Daily Continuous
- IC25 – Quarterly Composite

II. Records/Reports

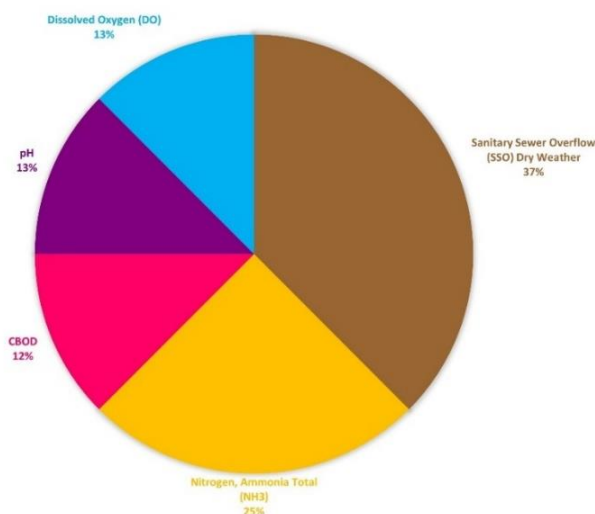
The Lakeland STP is enrolled in NetDMR, an electronic mechanism used to submit DMRs to the Division of Water Resources. Effluent limitations/values for the evaluation period of January 2022 through November 2023 were reported successfully. Site records and reports for the treatment system were observed and appeared to be maintained as required by the NPDES permit.

III. Facility Site Review

The Lakeland STP utilizes a Sequencing Batch Reactor (SBR) system. *“The sequencing batch reactor (SBR) is a fill-and-draw activated sludge system for wastewater treatment. In this system, wastewater is added to a single “batch” reactor, treated to remove undesirable components, and then discharged. Equalization, aeration, and clarification can all be achieved using a single batch reactor. To optimize the performance of the system, two or more batch reactors are used in a predetermined sequence of operations.” - EPA 932-F-99-073.* The SBR system consists of a headworks area that includes a wet well (photo 1), bar screen (photo 2), and grit chamber (photo 3). From the headwork area the wastewater is pumped to the SBR for intensive aeration (photo 4). After intensive aeration, the wastewater is allowed sufficient time to settle to the bottom of the reactor prior to the wastewater entering the equalization (EQ) basin (photo 5). From the EQ basin, the treated wastewater is disinfected using ultraviolet (UV) lights (photo 6). A cascade system (step aeration) (photo 7) is located near the effluent discharge point (photo 8) to enhance the dissolved oxygen (DO) in the effluent prior to discharging to the Loosahatchie River.

The Lakeland STP reported eight (8) exceedances of its NPDES permit limits during the evaluation period from January 2022 through November 2023:

Exceedance Events



2022

February: SSO Dry Weather

July: SSO Dry Weather

October: Ammonia Nitrogen (NH₃) & CBOD

November: pH

2023

June: SSO Dry Weather

August: Ammonia Nitrogen (NH₃)

November: DO

Explanation of these exceedance events did accompany the DMRs. According to the DMR explanations, most of these events were caused by aeration issues (bad weather, power outages, malfunctioning parts, etc.).

Ms. Gibson went to the Lakeland STP on December 11, 2023, to custody seal the effluent composite sampler (photo 13) to ensure the integrity of the sample was maintained. Ms. Gibson also visited the outfall on this day and took pictures of the outfall sign and the discharge point into the Loosahatchie River. The Lakeland STP's outfall is only accessible via a side-by-side ATV. On December 12, 2023, Ms. Gibson collected grab and composite effluent samples while on site. These samples were collected at the pit (photo 9) adjacent to the cascade system, the UV light station (*E.coli* sample), and the effluent composite sampler. The custody seal was still intact the day of the sampling event. The intake tubing was clean and the temperature in the sampler was maintained below 6°C. The effluent samples were packed in a cooler with ice and shipped via FedEx to the Tennessee Department of Health Laboratory Services (TDHLS) in Nashville for analysis. The composite samples were tested for Total Suspended Solids (TSS), Total Nitrogen (N), Total Phosphorus (P), and Carbonaceous Biochemical Oxygen Demand (CBOD). Settable Solids was collected as a grab sample per the permit and was also shipped to the TDHLS. Another grab effluent sample for *E. coli* was collected and delivered to Waypoint Analytical Laboratory (WAL) in Memphis for analysis. On December 14, 2023, the DWR received the *E. coli* test result from WAL. On January 8, 2024, the DWR received the test results from the TDHLS. *These results did not include the Total Ammonia Nitrogen (NH₃) analysis results. This was due to a Chain-Of-Custody (COC) error; Ms. Gibson did not check the "Nitrogen, Ammonia" box on the COC form.* The analytical results met the values set forth in the NPDES permit for the Lakeland STP. The results are illustrated in Table 1.

Table 1

Parameter	Permit Limit	DWR Results
TSS	< 45 mg/L	< 10.0 mg/L
Settable Solids	< 1.0 mL/L	< 0.200 mL/L
N	Report in mg/L	1.95 mg/L
P	Report in mg/L	3.72 mg/L
CBOD	< 40 mg/L	4.88 mg/L
<i>E. coli</i>	< 941 MPN/100mL	< 1 MPN/100mL

The parameters for Dissolved Oxygen (DO) and pH were measured in the field during the inspection. The recorded values met the limits set forth in the NPDES permit for the Lakeland STP. These values for DO and pH were measured using a Eureka Water Meter, Manta+20 model, and recorded using the MantaLink App for iPhone. Water Meter #2 was used during the inspection and was calibrated the morning of the inspection. A drift check was also performed once the calibration was complete. The calibration and drift check of Water Meter #2 both successfully passed. The field measurements are illustrated in Table 2.

Table 2

Parameter	Permit Limit		DWR Results
Dissolved Oxygen (DO)	> 5 mg/L		7.75 mg/L
pH	> 6.0	< 9.0	6.87

The Lakeland STP also conducts quarterly biomonitoring (IC25 on Ceriodaphnia and Pimephales) of its effluent at Outfall 001. The most recent test was conducted in December 2023. All biomonitoring tests met the value set forth in the permit.

IV. Effluent/Receiving Waters

At the time of the inspection, there was a discharge from the STP (photo 8), which eventually flows into the Loosahatchie River. The discharge was clear and odor free. The inspection of Outfall 001 at mile 24.1 of the Loosahatchie River (photo 15) occurred on December 11, 2023. Mr. Smalley drove Ms. Gibson to the outfall in a side-by-side ATV. The information on the outfall discharge sign was consistent with the permit requirements (photo 14).

V. Flow Measurement

Digital flow meters are installed to measure the influent flow at the headworks and the effluent flow after the UV system before leaving the STP. The digital flow meters were operational during the time of the inspection. The devices are calibrated annually by LabTronX, an independent contractor located in Nashville, TN. The certifications by LabTronX were available at the plant. The devices were last calibrated in October 2023.

VI. Self-Compliance Program

The Lakeland STP has automatic, time-proportional samplers set up to collect composite samples of the influent and effluent. The automatic samplers provide adequate refrigeration during the sampling period. Each sampler is equipped with a composite sample bottle and a thermometer. The readings on the thermometers in the samplers were below 6°C as required by the permit. The automatic composite samplers can collect a sufficient sample for all parameter analyses. According to Mr. Smalley, the individual sampler is set up to collect 120 ml per aliquot which is in accordance with EPA's Science and Ecosystem Support Division's Operating Procedure (*SESDPROC-306-R3*). The EPA's operating procedure mandates that the individual sample aliquot be at least 100 ml in volume if the sampler uses a peristaltic pump.

The plant's electrical outlets are used to operate the samplers for the time required to complete the sampling. The Lakeland STP has a back-up generator for use during power outages. According to Mr. Smalley, the emergency generator is tested weekly, every Monday @ 1 p.m.

According to Mr. Smalley, Mr. Cade McMillian, the Senior Wastewater Manager, collects composite samples of the influent and the effluent for analysis. The analyses for CBOD and Total Nitrogen (N) are conducted at Waypoint Laboratory (WAL), in Memphis. Total Suspended Solids (TSS), Total Phosphorous (P), Settleable Solids, Total Ammonia Nitrogen (NH₃), and *E.coli* analyses are conducted at the STP laboratory.

Dissolved Oxygen (DO), temperature, and pH are effluent parameters routinely measured by Mr. McMillian at the time of sample collection as mandated by the STP's NPDES permit.

A review of the chain-of-custodies revealed that the samples being shipped in coolers to WAL were maintained below 6°C as required by 40 CFR, Part 136.

VII. Compliance Schedule

The treatment system is not under any compliance schedule currently, except for the NPDES permit requirements.

VIII. Laboratory

A Standard Operating Procedure (SOP) for field parameter measurement was available for review at the STP laboratory. The SOP covers sampling procedures, field equipment calibration instructions, and quality control (QC) procedures for field equipment.

The calibration logs of the pH and DO meters were inspected. The calibrations for both meters were properly documented. Three buffer solutions with a pH of 4, 7, and 10 are utilized in the calibration of the pH meter. All buffer solutions were within their expiration dates. The DO meter was calibrated according to the instructions noted in the manufacturer's manual.

IX. Operations and Maintenance

The STP appeared to be operating properly at the time of inspection. The Lakeland STP reported three (3) Sanitary Sewer Overflow (SSO) Dry Weather events during the period from January 2022 through November 2023.

X. Sludge Handling

Lakeland uses an aerated lagoon as an aerobic digester and for sludge wasting (photo 10). The sludge is then thickened (photo 11) and dewatered by the addition of polymers and the use of a filter press (photo 12).

Treated sludge cake is disposed of by transporting the filter cake to the North Shelby landfill in Memphis, TN. Land disposal of the filter cake into the landfill is regulated by the Division of Solid Waste Management. Since the filter cake is land disposed and not land applied, the 40 CFR 503 regulations do not apply.

Photographic Log

Facility Name: Lakeland STP	Site Location: Shelby County	Permit No.: TN0078255
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Photo No. 1	Date 12-13-2023	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;"> ACCURACY 7 m DATUM WGS84 35.27258°N 089.74035°W DIRECTION 237 deg(T) </div>  <div style="writing-mode: vertical-rl; font-size: small;"> 2023-12-13 09:11:20-06:00 </div> </div>
Description View of the headworks.		

Photo No. 2	Date 12-13-2023	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;"> ACCURACY 4 m DATUM WGS84 35.27272°N 089.74050°W DIRECTION 233 deg(T) </div>  <div style="writing-mode: vertical-rl; font-size: small;"> 2023-12-13 09:13:29-06:00 </div> </div>
Description View of the bar screen.		

Photographic Log

Facility Name: Lakeland STP	Site Location: Shelby County	Permit No.: TN0078255
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Photo No.	Date
3	12-13-2023

Description
View of the grit chamber. The grit chamber flows into the Sequence Batch Reactor (SBR).




Photo No.	Date
4	12-13-2023

Description
View of the aeration basins. The aeration basins are cleaned every two (2) months.



Photographic Log

Facility Name: Lakeland STP	Site Location: Shelby County	Permit No.: TN0078255
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Photo No. 5	Date 12-13-2023	
Description View of the equalization (EQ) basin.		

ACCURACY 5 m
DATUM WGS84

 35.27350°N
089.74112°W

 DIRECTION
283 deg(T)

2023-12-13
09:19:22-06:00

Photo No. 6	Date 12-13-2023	
Description View of ultraviolet (UV) lights used for disinfecting the effluent. The <i>E.coli</i> grab sample was collected at this station post UV disinfection.		

DIRECTION
262 deg(T)

35.27393°N
089.74132°W

ACCURACY 4 m
DATUM WGS84

2023-12-13
09:21:03-06:00

Photographic Log

Facility Name: Lakeland STP	Site Location: Shelby County	Permit No.: TN0078255
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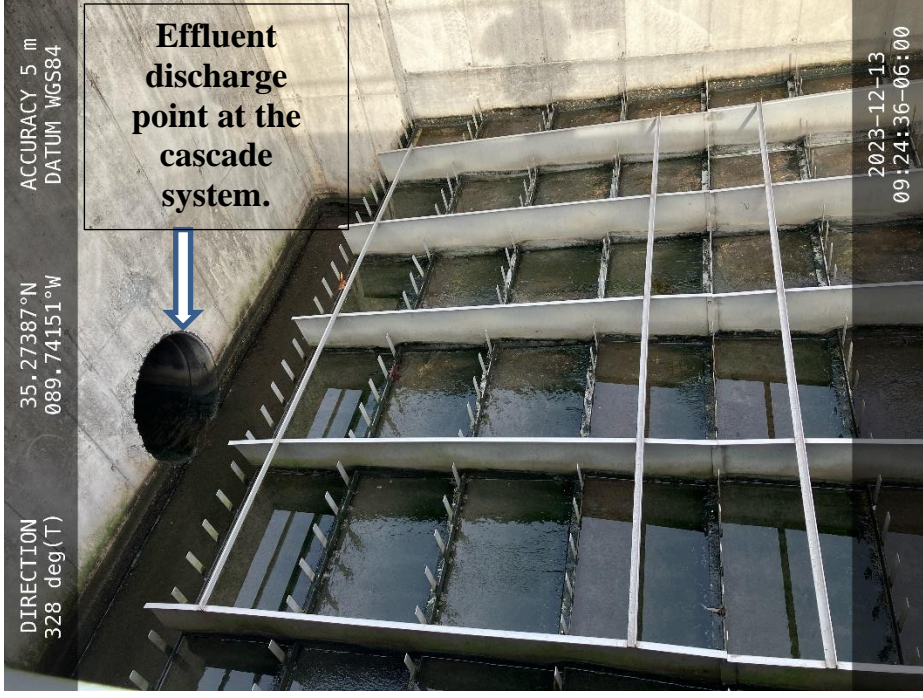
Photo No. 7	Date 12-13-2023	<div style="display: flex; justify-content: space-between; font-size: small;"> DIRECTION 272 deg(T) 35.27388°N 089.74149°W ACCURACY 4 m DATUM WGS84 </div>  <div style="text-align: right; font-size: x-small;"> 2023-12-13 09:23:29-06:00 </div>
Description View of the cascade system.		

Photo No. 8	Date 12-13-2023	<div style="display: flex; justify-content: space-between; font-size: small;"> DIRECTION 328 deg(T) 35.27387°N 089.74151°W ACCURACY 5 m DATUM WGS84 </div> <div style="text-align: center; margin-bottom: 10px;"> <p>Effluent discharge point at the cascade system.</p>  </div>  <div style="text-align: right; font-size: x-small;"> 2023-12-13 09:24:36-06:00 </div>
Description View of the effluent from the STP prior to discharging off-site and into the Loosahatchie River. At the time of this photo, the cascade system was not actively discharging. It is on a timed system and had already discharged for the day. The effluent was clear at the time of the inspection.		

Photographic Log




Facility Name: Lakeland STP		Site Location: Shelby County	Permit No.: TN0078255
Photo No. 9	Date 12-13-2023	DIRECTION 313 deg(T) 35.27386°N ACCURACY 5 m 089.74167°W DATUM WGS84	
Description View of the grab sample pit. This is where the grab effluent samples were collected.			
		2023-12-13 09:25:04-06:00	

Photo No. 10	Date 12-13-2023	DIRECTION 92 deg(T) 35.27391°N ACCURACY 5 m 089.74128°W DATUM WGS84	
Description View of the aerobic digester used for sludge wasting.			
		2023-12-13 09:26:27-06:00	

Photographic Log

Facility Name: Lakeland STP	Site Location: Shelby County	Permit No.: TN0078255
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Photo No. 11	Date 12-13-2023		ACCURACY 5 m DATUM WGS84 35.27300°N 089.74034°W DIRECTION 104 deg (T)	2023-12-13 09:28:55-06:00
Description View of the sludge thickener.				

Photo No. 12	Date 12-12-2023		ACCURACY 4 m DATUM WGS84 35.27293°N 089.74007°W DIRECTION 34 deg (T)	2023-12-13 09:30:44-06:00
Description View of the filter press used for dewatering the sludge.				

Photographic Log

Facility Name: Lakeland STP	Site Location: Lakeland, Shelby County	Permit No.: TN0078255
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Photo No. 13	Date 12-11-2023	<div style="display: flex; justify-content: space-between; font-size: small;"> DIRECTION 352 deg (T) 35.27380°N 089.74145°W ACCURACY 5 m DATUM WGS84 </div>  <div style="text-align: right; font-size: x-small;"> 2023-12-11 09:12:29-06:00 </div>
Description		
View of the effluent composite sampler. It was custody sealed by Ms. Gibson on 12/11/23. The custody seal was still intact the day of the sampling event. The intake tubing was clean and the temperature in the sampler was maintained below 6°C.		

Photo No. 14	Date 12-11-2023	<div style="display: flex; justify-content: space-between; font-size: x-small;"> ACCURACY 4 m DATUM WGS84 35.28199°N 089.74093°W DIRECTION 197 deg (T) </div>  <div style="text-align: right; font-size: x-small;"> 2023-12-11 09:26:46-06:00 </div>
Description		
View of outfall sign at the Loosahatchie River bank. The information on the sign was consistent with the permit requirements.		

Photographic Log

Facility Name: Lakeland STP	Site Location: Shelby County	Permit No.: TN0078255
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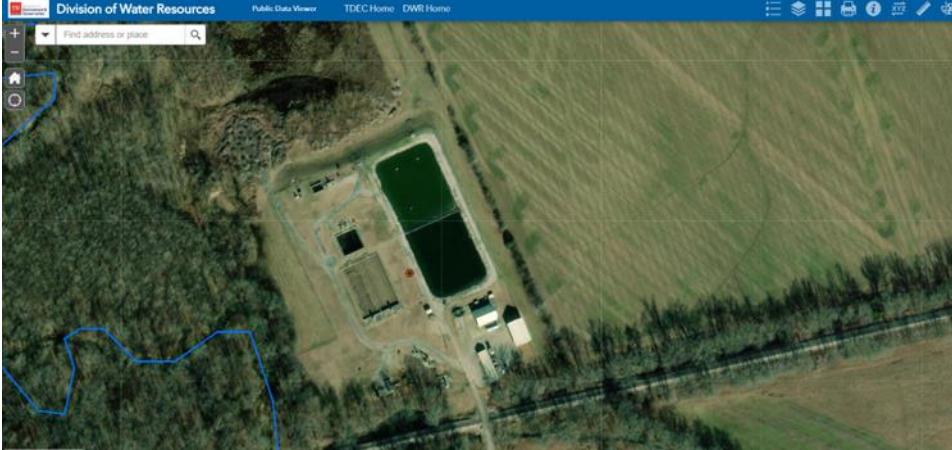
Photo No. 15	Date 12-11-2023	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;"> ACCURACY 5 m DATUM WGS84 35.28208°N 089.74091°W DIRECTION 344 deg(T) </div>  <div style="writing-mode: vertical-rl; font-size: small;"> 2023-12-11 09:27:19-06:00 </div> </div>
Description View of outfall discharge point along the Loosahatchie River.		

Photo No. 16	Date 12-13-2023	
Description Aerial view of the Lakeland STP (Scotts Creek Wastewater Treatment Plant).		