

PROJECT DESIGN AND SAMPLING PLAN

PFAS in Wastewater *James Thompson- A pilot Study*

Department of Natural Resources and Environmental Control

Division of Water

89 Kings Highway
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Table of Contents

1.0 INTRODUCTION	2
2.0 FACILITY DESCRIPTION	3
3.0 PROPOSED SAMPLING PLAN	5
3.1 Additional On-Site Groundwater Sampling.....	7
3.2 Surface Water Sampling.....	8
3.3 Downgradient Domestic Wells	9
3.4 Water Supply.....	9
3.5 Sediments	9
3.6 Sample Naming Protocol	10
4.0 PROJECT SCHEDULE.....	12
5.0 QUALITY ASSURANCE AND QUALITY CONTROL.....	13
6.0 SUMMARY	14
REFERENCES	15
REVISION CHANGE LOG.....	16

1.0 INTRODUCTION

In July 2023, the Delaware Department of Natural Resources and Environmental Control (DNREC), Division of Water (DOW) launched a screening study of PFAS in wastewater which included sampling of influent, effluent, soils from spray application fields and rapid infiltration basins (RIBs) for the discharge receiving media, and soil, groundwater and adjacent surface water for post-discharge monitoring. Fifteen wastewater treatment facilities and disposal sites over the entire state were selected for the study. Sites were chosen to include varying sources of influent (residential, municipal, industrial) and disposal methods. A total of 56 influent, 56 effluent, 92 groundwater, 20 surface water, and 39 soil samples are being collected from wastewater treatment and disposal facilities in this screening study (DNREC, April 2023).

Upon the receipt and evaluation of the laboratory analysis results from the first two rounds of sampling, James Thompson, a fabric processing plant with an onsite wastewater treatment and disposal facility, was selected as a pilot site for further studies due to an elevated PFAS in the samples. The facility has a long operational history, and a broad range of media available for characterization around the site including, influent, effluent, soil, surface water, groundwater, and treatment residuals/sediments. This document outlines the design of the pilot study as well as the associated sampling plan.



2.0 FACILITY DESCRIPTION

J. Thompson and Company, Inc. is a fabric processing facility located in Greenwood, Delaware (Figure 2-1). Opened in 1971, the company originally had been producing 60,000 to 100,000 gallons per day of wastewater from fabric finishing, fabric dyeing, fabric rinsing, burlap bleaching, boiler blow down water, and water conditioner back washing. Daily wastewater discharge has decreased in recent years with an average of 27,700 GPD in 2022. Dyeing and bleaching operations have also been reduced in recent years and totally ceased as of late April 2023. Currently, no wastewater is being discharged into the storage pond.

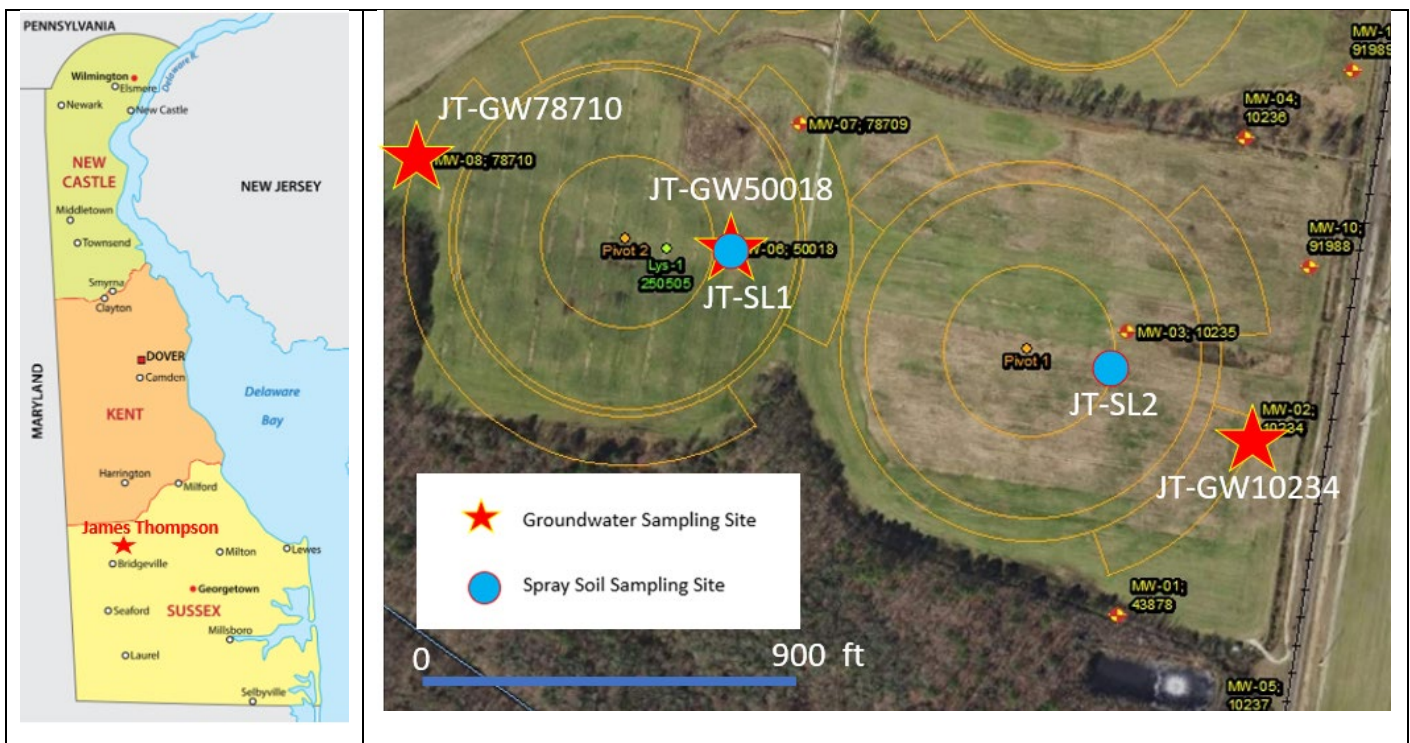


Figure 2-1 Location of the James Thompson facility with the Screening Study Sampling Sites

While in operation, the pretreatment facility consisted of a sediment ditch with bar screens, two sediment pits, two pumps to convey wastewater to the aerated storage lagoon, a magnetic flow meter with a chart recorder and totalizer, a surge control system and a low pressure cut off system. The treated wastewater was spray irrigated via a three center pivot system and a stationary sprinkler zone onto 45.15 acres planted in orchard grass, alfalfa and corn.

Several domestic wells within 1.5 miles downgradient of the facility were found to be contaminated in 1983 with sodium, chloride, and high total dissolved solids. DNREC-US EPA conducted a Preliminary Assessment and a Site Inspection (PA/SI) between 1984 and 1986 (DE-0070). Groundwater monitoring wells were installed at the site. Sampling during the PA/SI included area water supplies, groundwater, surface water, and the on-site lagoon. As of July 2018, the site is administratively closed. No Further Action is required (EPA, 1986 & DNREC, 2023).



3.0 PROPOSED SAMPLING PLAN

Three monitoring wells at the facility were selected for groundwater sampling during the original screening study started in July 2023 (DNREC ID:78710, 50018 and 10234). In the same study, 5 soil samples were collected from 2 locations at different depth (JT-SL1 and JT-SL2; see Figure 2-1 for site locations). Treated wastewater (mixed with stormwater) samples from the storage pond, were also collected. PFAS were detected in the storage pond, groundwater as well as the soil samples collected from the facility (Figures 3-1, 3-2 and 3-3).

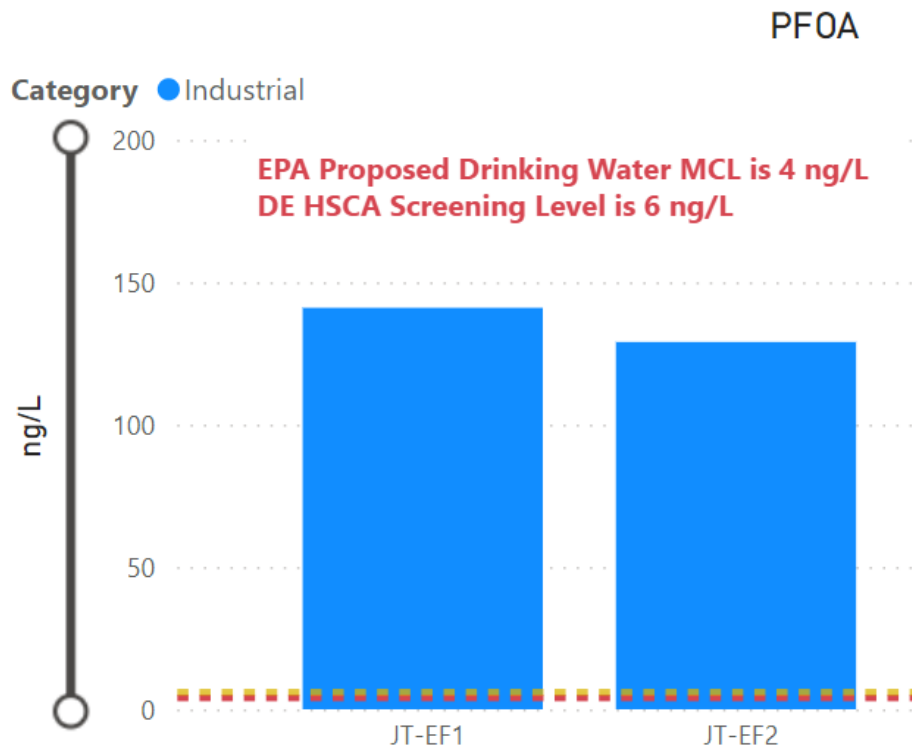


Figure 3-1 PFOA concentration in James Thompson effluent

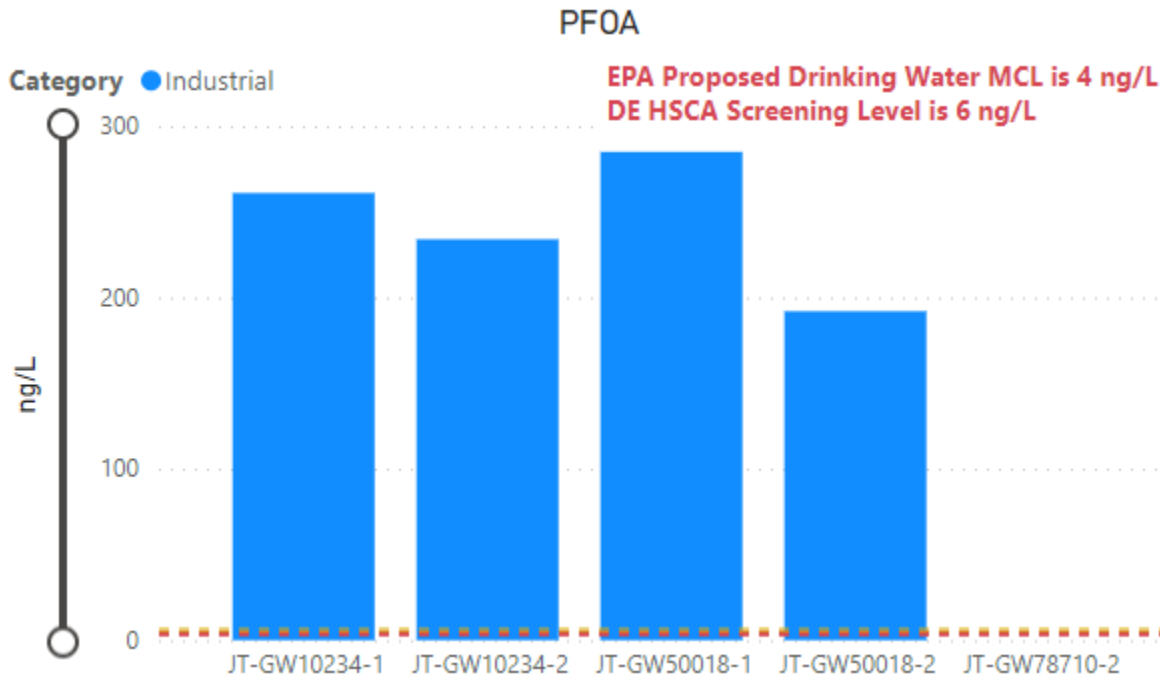


Figure 3-2 PFOA concentration in James Thompson groundwater samples

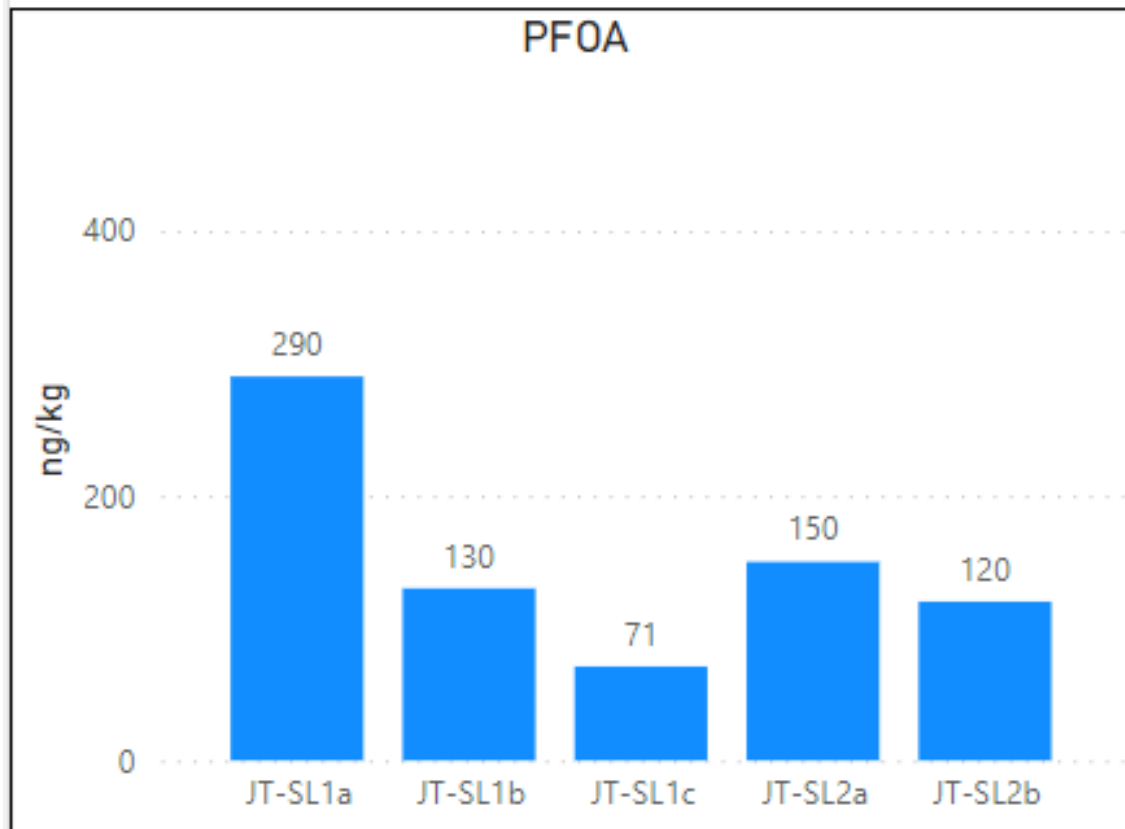


Figure 3-3 PFOA concentration in James Thompson spray field soil samples



Due to these findings a decision was made to conduct a further PFAS investigation which will include additional sampling of:

- groundwater from two additional monitoring wells at the facility
- surface water out of the two creeks downgradient from the facility
- groundwater from nearby downgradient domestic wells
- the facility water supply prior to any processing, and
- sediments from the effluent pre-spray storage pond.

3.1 Additional On-Site Groundwater Sampling

Three monitoring wells have been sampled (quarterly) during the original screening study. Two more downgradient wells were selected for this pilot study to confirm and better define the scale of PFAS presence: JT-GW91988 (MW-10) and JT-GW10237 (MW-05), as shown on Figure 3-3. The total monitoring wells selected, therefore, will be 5 (1 upgradient and 4 downgradient).

Groundwater from the proposed wells for this study will be sampled quarterly for a year, same as the other three sampled during the original screening study.

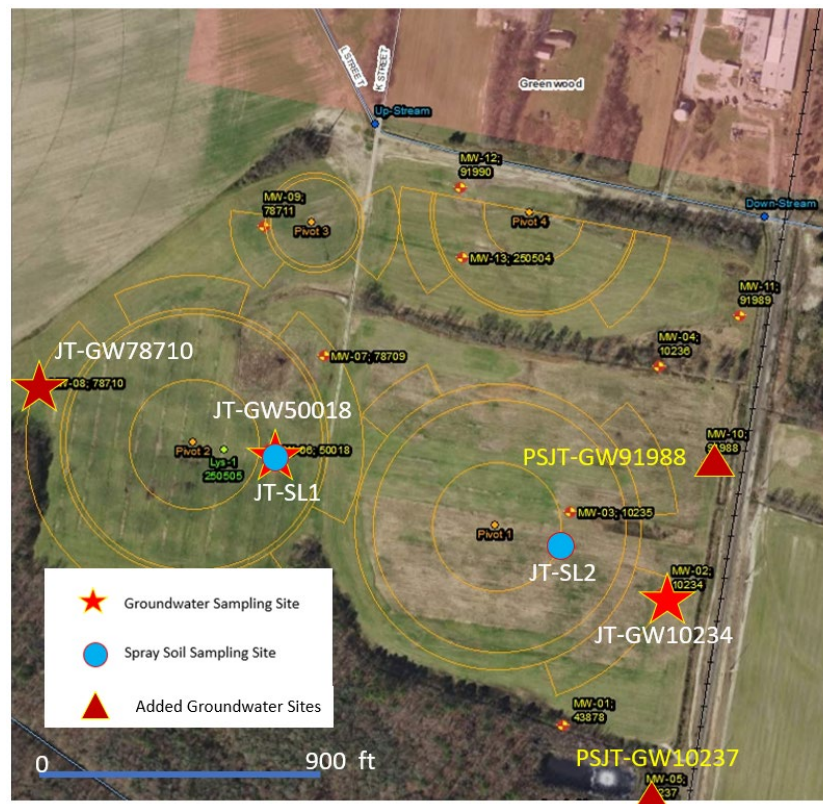


Figure 3-4 Proposed additional groundwater sampling sites.



3.2 Surface Water Sampling

The Grubby Neck Branch, to the south of the facility and the Cart Branch, to the east of the facility, are both likely receiving groundwater from the spray fields of the facility. Five surface water sampling locations were selected (Figure 3-5). Samples will be collected after at least 7 precipitation-free days to limit any surface water runoff or nearby vadose zone transport into the creeks.

Surface water from the proposed sites will be sampled twice (6 months apart). DNREC is considering deploying passive samplers at some (or all) of the sites.

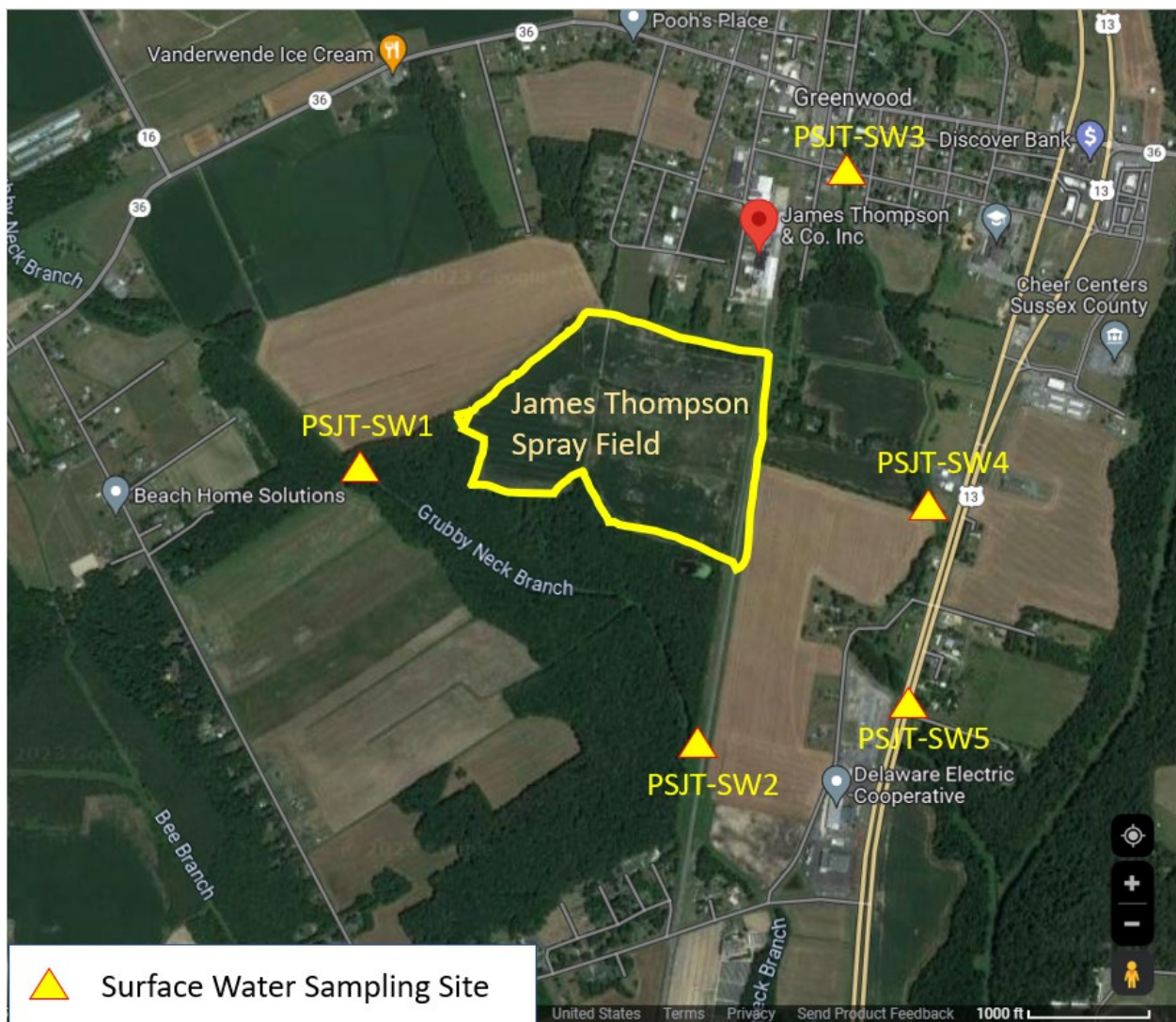


Figure 3-5 Proposed surface water sampling sites

3.3 Downgradient Domestic Wells

Four residences downgradient from the effluent spray field were identified and sampling of their drinking water well is planned for this study. While one of the four wells is completed at depth of 300 feet (within a confined aquifer), the rest were installed in the unconfined aquifer. DNREC has obtained signed forms from the 4 residences to sample their drinking water. Test kits for general water quality parameters (i.e., nitrate, nitrite, iron, fluoride, alkalinity, pH, chloride, sulfate, sodium, and hardness) will be obtained from Delaware Office of Drinking Water and samples will be collected at the same time while sampling for PFAS.

Domestic wells at proposed residences will be sampled twice (maximum) for the study. If there is a presence of PFAS compounds in any of the first-round samples, a second confirmatory sample will be collected. If PFAS is not detected, no additional sampling will be conducted.

3.4 Water Supply

Source water used at the facility will be sampled to identify the potential existence of PFAS in the water supply. DNREC will coordinate with the operator to decide the best sampling location.

The water supply will be sampled maximum twice. If any PFAS is detected, a confirmation sample will be collected.

In case that the water supply was/is sourced from the town of Greenwood, no sampling is needed since the Greenwood water supply was sampled for PFAS in another study by DNREC.

3.5 Sediments

Historically, effluent from the operations was discharged into a storage pond before being used for crop irrigation. Over time, suspended solids in treated wastewater accumulate as residual sediment on the bottom of the storage pond. Since no wastewater is generated with current limited operations at the facility (thus no sludge/biosolids), sediments from the bottom of the storage pond will likely resemble the historic sludge generated from the wastewater treatment plant of the facility. Three sediment samples from different locations of the storage pond will be collected (Figure 3-4).

The collection of sediment samples will require a boat, in addition to an appropriate sampler, to access 2 out of 3 of the proposed sampling locations. A rowboat was sighted on the bank of the pond during a site visit in December 2023.

Sediment samples will be collected once from the proposed sampling locations.

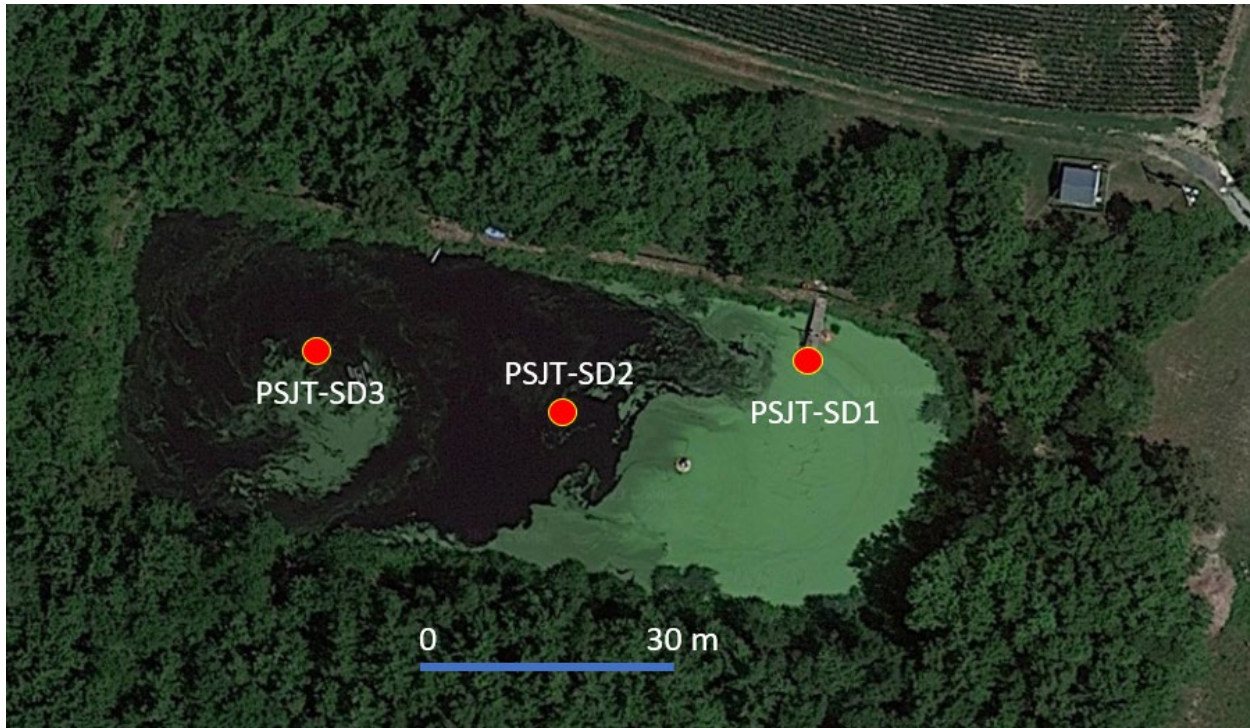


Figure 3-4 Proposed sediment sampling locations at the bottom of the effluent storage pond

3.6 Sample Naming Protocol

Samples will be named in the following format.

- *Water Supply*: PS, Facility Code-WS (*Round*), where PS stands for Pilot Study, Facility Code is defined as, JT=James Thompson; WS is water supply; and *Round* is the number of sampling event. For example, **PSJT-WS-1** will be the water supply sample collected from the James Thompson Facility during the first sampling event of the pilot project.
- *Groundwater*: PS, Facility Code-GW+DNREC ID-(*Quarter*), where PS stands for Pilot Study, Facility Code = JT for James Thompson; GW = groundwater; DNREC ID is the unique well permit ID issued by DNREC; and *Quarter* is the number of quarterly sampling event. For example, **PSJT-GW10237-2** will be the groundwater sample collected from the

James Thompson well whose DNREC ID is 10237 during the second (quarter) sampling event of the pilot study.

- *Domestic Wells:* PS, Facility Code-GW+DNREC ID-(*Round*), where PS stands for Pilot Study, Facility Code = JT for James Thompson; DW = domestic wells; DNREC ID is the unique well permit ID issued by DNREC; and *Round* is the number of sampling event. For example, PSJT-DW100543-1 will be the groundwater sample collected from the James Thompson downgradient domestic well whose DNREC ID is 100543 during the first sampling event of the pilot study.
- *Sediments:* PS, Facility Code-SW (*Site Number*)-1, where PS stands for Pilot Study, Facility Code = JT; SD=sediments; *Site Number* 1-3 (as marked on the sampling location map); and *1* for the single sampling event. For example, PSJT-SD2-1 will be the sediment sample collected from the James Thompson facility at site #2 during the sole sampling event of the pilot study.
- *Surface water:* PS, Facility Code-SW (*Site Number*)-(Round), where PS stands for Pilot Study, Facility Code = JT; SW=surface water; *Site Number* 1-5 (as marked on the sampling location map); and *Round* is the number of the sampling event. For example, PSJT-SW1-2 will be the surface water sample collected from the James Thompson facility at site #1 during the second sampling event of the pilot study.



4.0 PROJECT SCHEDULE

This project design and sampling plan will be finalized in December 2023. It is anticipated that field sampling will start in January 2024.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

A Quality Assurance Project Plan (QAPP) will be developed for this study before the start of sampling. DNREC will select qualified contractors and laboratories to perform sample collection and analysis. These contractors will be required to submit Standard Operating Procedures (SOPs) and Quality Assurance and Quality Control Plans (QA/QC) to DNREC for approval prior to contracting. All samples (influent, effluent, groundwater, and soils) will be analyzed using EPA Method 1633.

6.0 SUMMARY

DNREC- Division of Water intends to conduct a pilot study on PFAS in wastewater at the James Thompson facility. A total of 21 samples have been collected from James Thompson during the original screening study, including 12 groundwater, 4 effluent and 5 soil samples. In addition to those collected during for the screening study, a total of 28 (maximum) water samples for this pilot study will be collected, including 16 groundwater samples (8 from added on-site monitoring wells, and 8 maximum from domestic wells), 10 surface water samples, and 2 (maximum) facility water supply samples. Furthermore, 3 sediment samples from the effluent storage lagoon will also be collected for this study. Field sampling is expected to start in January 2024.

REFERENCES

- DNREC, 2023: Site Fact Sheet for James Thompson & Co Inc (DE-0070). *by* Remediation Section, Division of Waste and Hazardous Substances; pp. 3
- DNREC, 2022: Project Design and Sampling Plan- PFAS in Biosolids: Characterization and Fate. *by* Division of Water, Department of Natural Resources and Environmental Control (DNREC); September 2022, pp. 14
- DNREC, 2022: Project Design and Sampling Plan- PFAS in Wastewater: Characterization and Fate. *by* Division of Water, Department of Natural Resources and Environmental Control (DNREC); April 2023, pp. 36.
- US EPA, 1986: Site Inspection of J. Thompson and Company (R-585-3-5-15). *by* NUS Corporation for the Hazardous Site Control Division of US EPA; January 1986, pp. 277



REVISION CHANGE LOG