
FLEETWOOD BOROUGH AUTHORITY WASTEWATER TREATMENT FACILITY

RICHMOND TOWNSHIP, BERKS COUNTY, PENNSYLVANIA
NPDES Permit No. PA0021636



ORGANIC LOADING STUDY

-Prepared by-
Erick M. Ammon
Water Program Specialist
Bureau of Clean Water
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101



July 2024

Disclaimers:

Pennsylvania Regulations at 25 Pa. Code § 91.12 state, inter alia, that “Employees of the Department [Department of Environmental Protection] may not act as consulting engineers for a party...”. This report and the and any recommendations represent an interpretation of data collected during the project and the best professional judgement of Department staff. Permittees, in conjunction with certified wastewater operator(s) and consulting engineer(s), should continue. an independent investigation to determine the cause(s) of the elevated organic loading, and implement any corrective actions required to address the elevated organic loading conditions.

The mention of a brand of equipment is in no way an endorsement for any specific company. The Pennsylvania Department of Environmental Protection urges the facility owner / permittee to research available products and select those which are the most applicable for its situation and compatible with existing equipment.

The goal of the Pennsylvania Department of Environmental Protection Wastewater Technical Assistance Program is to improve receiving water quality through troubleshooting, training, and monitoring. Permittees are encouraged to achieve effluent quality above and beyond current permit requirements.

Executive Summary

The Fleetwood Borough Authority (Fleetwood) wastewater treatment facility (facility) is in Richmond Township, Berks County, Pennsylvania. The facility treats wastewater generated by domestic, commercial, and one industrial source in Fleetwood Borough and parts of Richmond Township, Berks County. From November 2023 through January 2024, the Pennsylvania Department of Environmental Protection (PADEP) Bureau of Clean Water - Wastewater Technical Assistance Program (WWTAP) partnered with certified wastewater operators and consulting engineers at the facility to characterize the organic loading of raw influent flows.

Previous composite sampling of influent wastewater by the facility operators demonstrated that the facility periodically receives influent slug loads with organic concentrations that exceed the upper limit in the expected range of organic loading (300 milligrams per liter (mg/L)) used by PADEP to design sewage treatment facilities. Fleetwood has investigated this issue but has been unable to identify the exact source(s) of the slug loads.

For this study, WWTAP staff employed a HACH Ultra-Violet Absorbance Spectrophotometer (UVAS) continuous-monitoring probe and associated HACH SC-200 probe controller for deployment at Fleetwood. The UVAS probe operates by measuring the energy absorption of organic carbon bonds in dissolved organics in wastewater, tuned to a specific wavelength of UV light. The probe can select for Total Organic Carbon (TOC,) Chemical Oxygen Demand (COD,) or 5-day Biochemical Oxygen Demand (BOD₅), in a variety of wastewater streams. BOD₅ is the amount of oxygen required to stabilize biodegradable organic matter within a five-day period under aerobic conditions (microbial oxidation of pollutants.) BOD₅ concentration data, as used in this report, represents organic loading in the WWTF raw influent flow.

Data from the UVAS probe allowed the facility operators to monitor influent organic concentration around-the-clock in real time. A review of this data showed that contributing source or sources frequently discharges high-strength organic slug loads to the WWTF. Graphs of organic concentration data indicated that elevated organic loading is unpredictable; however, slug loads will adversely affect wastewater treatment performance and effluent quality, resulting in potential permit compliance issues and degradation of waters of the Commonwealth.

Recommendations

Based on recorded evidence of frequent and unpredictable organic slug loads and discussions among the parties to this study, WWTAP staff has the following recommendations address slug loads and elevated organic loading at the facility:

- a. As noted in WWTAP reports provided during the project, the facility receives periodic slug loads of high organic strength wastewater (BOD₅ >250 mg/L). The BOD₅ data provided by the UVAS probe do not support an ability to predict when these periodic discharges occur, but Fleetwood staff should continue to investigate slug loads when they are detected. The WWTAP project summary reports are included as Attachment G of this report.
- b. Fleetwood should request that its large industrial and commercial dischargers provide notification or schedules for processing of different products to better prepare for variable pretreatment system discharge BOD₅ concentrations and influent organic loading.

-
- c. Fleetwood should request that dischargers known to frequently release high-strength waste should randomly sample pretreatment discharges for pollutants listed in Industrial Pretreatment Program permits (IPP permit). It may be advantageous for Fleetwood to issue of an amended IPP permit that includes a pretreatment system discharge sampling calendar.

WWTF Influent Organic Loading Evaluation

Background

In early 2023, technical assistance staff from the United States Environmental Protection Agency Region III Water Division (EPA) and the PADEP WWTAP partnered with Fleetwood WWTF operators and their consulting engineer to demonstrate the benefits of using continuous monitoring equipment for operation of the three-stage, 0.70 million gallons per day (MGD) Evoqua Orbal oxidation ditch (activated sludge biomass) treatment system. During the demonstration, EPA and WWTAP technical assistance staff installed HACH continuous monitoring probes for dissolved oxygen (D.O.) and Oxidation/Reduction Potential (ORP) and control & networking equipment to monitor operating conditions in the WWTF activated sludge treatment system. The final report developed by EPA technical assistance and PADEP WWTAP staff included a summary of data collected by the D.O and ORP probes and recommendations for Fleetwood to permanently install a system of continuous monitoring equipment to optimize WWTF

During the EPA and PADEP WWTAP project in early 2023, an additional concern arose related to whether Fleetwood's regulation of non-domestic and industrial dischargers under its Industrial Pretreatment Program is adequate. Fleetwood has issued one IPP permit for a facility in the sewer service area that operates an industrial wastewater pre-treatment system. Fleetwood public works staff and WWTF operators were concerned that the pre-treated wastewater from the facility appeared to be suppressing D.O. levels within the oxidation ditch because of elevated organic loading. Data collected using the D.O. probes identified potential slug discharges of elevated organic loading to the WWTF. Subsequently, the EPA technical assistance staff recommended that PADEP WWTAP conduct an additional study to monitor influent organic loading to the WWTF.

Discharges of wastewater from industrial and non-domestic facilities to the Fleetwood sewer service area are the most likely cause of the elevated organic loading in the WWTF influent flow. A review of Discharge Monitoring Report (DMR) and annual Chapter 94 Report data by WWTAP staff does not indicate that the WWTF is hydraulically or organically overloaded. However, persistent and irregular slug load discharges to the facility do adversely impact its treatment efficiency and will ultimately degrade effluent water quality to the receiving stream.

Scope of Organic Loading Study

From November 30th, 2023, through January 19th, 2024, DEP WWTAP staff deployed continuous-monitoring equipment to characterize influent organic loading (as BOD₅) at the Fleetwood WWTF. In cooperation with the PADEP Southcentral Regional Office Clean Water Program staff, WWTAP engaged Fleetwood to develop a project to evaluate elevated organic strength wastewater influent flow at the WWTF. The evaluation team follows in Attachment A, for reference.

The Fleetwood organic loading study was limited to the organic loading (as BOD₅ concentrations) of influent wastewater at the WWTF and did not consider primary treatment, flow equalization, the secondary activated sludge treatment system, sludge wasting and disposal rates, or the disinfection

processes. The WWTAP Project Outline for the Fleetwood Organic Loading Study is included as Attachment D, for reference.

Fleetwood WWTF & Sewer Service Area

Fleetwood owns and operates the sanitary sewer collection and conveyance system (SSCS), which receives flow from connections in Fleetwood Borough and Richmond Township. The WWTF is located along Crosskill Road near the town of Bowers in Berks County, and discharges treated wastewater to Willow Creek, a tributary of the Schuylkill River, under NPDES Permit No. PA 0063878.

Fleetwood is a three-stage oxidation ditch (activated sludge) treatment system with a design hydraulic capacity of 0.882 MGD and an organic (BOD_5) loading limit of 1,706 pounds per day (lb./day). A review of monthly Discharge Monitoring Report (DMR) and annual Municipal Wasteload Management (Chapter 94) Report data submitted by Fleetwood showed that the WWTF has averaged about 0.45 MGD of flow and 715 lb./day of organic loading for the period analyzed. The facility owner and engineer anticipate upgrading the facility in the near future to optimize treatment efficiencies. A schematic of the Fleetwood WWTF is included as Figure E-1 in Attachment E for reference.

The majority of WWTF flow is domestic wastewater from residential homes and commercial properties. However, the sewer service area includes a discharge of pretreated industrial wastewater that requires Fleetwood to develop and implement an EPA Industrial Pretreatment Program (IPP). The IPP authorizes Fleetwood to issue permits that require industrial users to comply with applicable federal, state, and local pretreatment standards for discharges of wastewater to the sewer service area. Under the IPP, Fleetwood issued one (1) IPP Permit (No. 2023-01) for the pretreated discharge of industrial wastewater from Sunsweet Growers, Inc. (Sunsweet), a food processing facility in Fleetwood Borough. The Sunsweet IPP permit approves the discharge of up to 0.130 MGD of flow, which constitutes up to 28% of the influent flow to the WWTP based on the 2023 Chapter 94 Report, and up to 300 mg/L of BOD_5 to the Fleetwood sewer system.

Additional, localized sampling and wastewater characterization should be completed by Fleetwood to determine the source(s) of high organic strength wastewater in the sewer service area. However, a review of documentation submitted to the PADEP and data from the UVAS probe indicates that Sunsweet may be the largest single source of organic loading to the Fleetwood with the potential to impact treatment capacity.

WWTAP Continuous Monitoring Equipment Deployment

Raw influent from the sanitary sewer system enters WWTF by gravity flow. Influent passes through “Muffin Monster” grinder, receives return flows from other treatment units (centrate), and continues into an influent pumping station wet well. The UVAS probe was installed in the influent trough prior to the Muffin Monster grinder to ensure that no internal return flows impact the probe readings. A schematic of the UVAS probe installation locations at Fleetwood WWTF is included as Figure E-1 in Attachment E for reference.

The UVAS probe was installed using adjustable mounting systems bolted to the fiberglass safety railing installed above the WWTF primary treatment and influent pumping station wet well. The adjustable mounting systems allow WWTAP staff to install UVAS probes at approximately half the depth of flow levels in the influent trough during "normal" flow periods, and to align the probe body in the trough to prevent the sensor window from becoming obscured by the accumulation of detritus (rags & "flushable" wipes) and microbial growth. The probe was connected to a HACH SC200 probe controller with a data display for monitoring influent BOD₅ concentrations, adjusting probe programs, and probe data log transfers.



Figure 1: Photo of UVAS continuous monitoring probe installation location in the Fleetwood WWTF influent trough

At the request of the facility wastewater operators, WWTAP staff provided a demonstration of probe cleaning procedures and developed guidance for downloading UVAS data from the HACH SC200 probe controller. This training and guidance provided an opportunity for the facility wastewater operators to participate in the study by completing weekly probe cleaning and data downloads that would normally fall to WWTAP staff. A copy of the HACH SC200 probe controller data download guidance developed by WWTAP staff is included in Attachment K of this report. WWTAP staff visited the WWTF periodically to communicate with the wastewater operators and authority representatives, observe the operation of the continuous monitoring equipment, and clean the probes to ensure proper functionality.

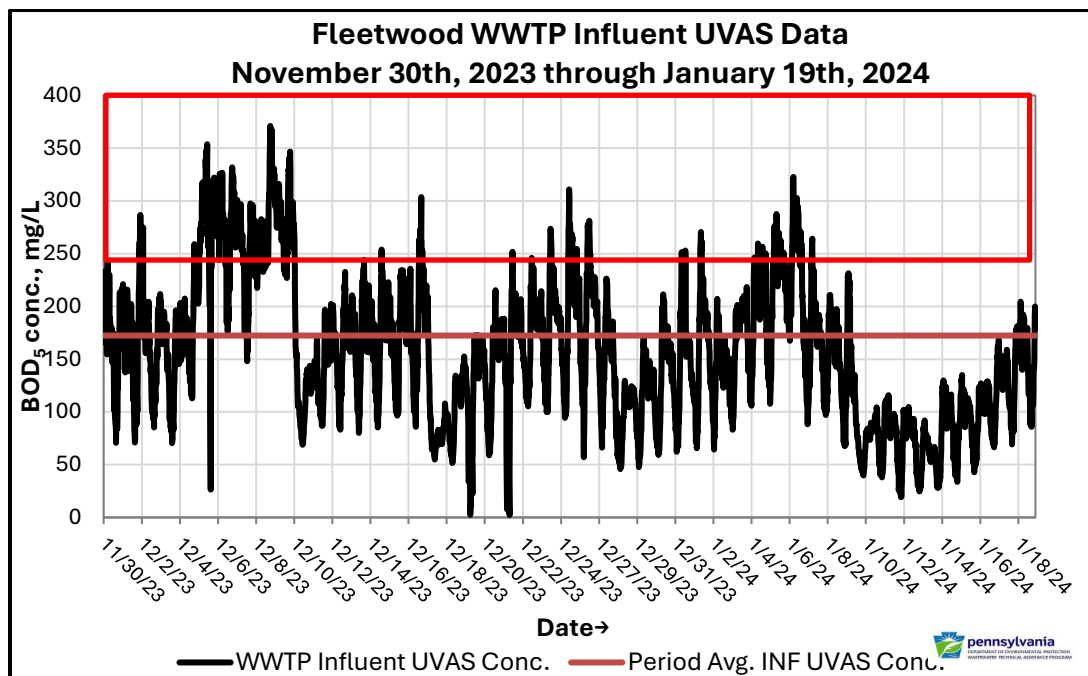
At the request of WWTAP, facility operations staff collected weekly influent grab samples for analysis of BOD₅ during the continuous monitoring equipment deployment period. WWTAP staff used the results of those BOD₅ grab samples to check accuracy of UVAS probe data. Over the duration of the study, the influent BOD₅ grab sample results were normally within 20% of the BOD₅ concentrations provided by the UVAS probe. WWTAP staff did not make any additional changes to the correction factor set for the UVAS probe (1.0) at deployment.

Organic Loading Study Results

Over the period of study, data collected identified that the WWTF receives frequent discharges containing BOD₅ concentrations (organic loading) that exceed the normal expected range for treatment facilities designed to treat wastewater generated from domestic sources. A review of UVAS probe data indicates that influent discharges with highest BOD₅ concentrations in the WWTF influent flow often occurred on weekends between late Friday and early Monday.

Weekly project updates were provided by WWTAP to Fleetwood and its wastewater engineering consultants. The updates included a summary of UVAS data (maximum and minimum BOD₅ concentration) and graphs of UVAS probe data presenting daily, weekly, and all-time data collected to date during the study period. UVAS data summary graphs and copies of the WWTAP weekly project updates are included in Appendix E and F of this report.

While the maximum concentrations recorded by the UVAS probe readings were different from week-to-week, the regular frequency of elevated organic loading peaks indicate that there is an ongoing slug discharge of elevated organic strength wastewater to the sewer service area. A graph of UVAS probe data with BOD₅ concentration peaks highlighted in red are included below.



Graph 1) UVAS data collected between November 30th, 2023, and January 19th, 2024. Elevated BOD₅ concentration data (>250 mg/L) are highlighted in red.

As stated previously, the most likely cause of the elevated organic loading in the WWTF influent flow may be discharges of industrial and nondomestic wastewater from facilities in the sewer service area. These discharges can contain elevated levels of pollutants (including BOD₅) that impact the ability the WWTF activated sludge biota to adequately treat wastewater. Without additional sampling and flow monitoring in the collection system and increased monitoring of facilities with industrial and nondomestic wastewater discharges, it is difficult to accurately predict the timing of any slug loads from suspected facilities due to the dynamics of sewer system flows and I&I influences.

Most daily findings and recommendations were communicated to the Operator-in-Responsible-Charge when WWTAP staff were on site. During the study, it was readily apparent that the WWTF is being operated in a satisfactory manner consistent with prescribed operating guidelines.

WWTAP strongly recommends that Fleetwood complete a comprehensive survey of commercial, non-domestic, and industrial facilities in the service area and develop information on those facilities with the potential to discharge high organic strength wastewater (schools, recreational & food establishments, etc.) in its sewer service area.

Fleetwood Sewer Use Ordinance Review

Discharges of pollutants (including BOD₅) by facilities that discharge industrial and non-domestic wastewater can cause interference or pass through at the WWTF and limit the ability of the treatment system to adequately treat wastewater to comply with NPDES Permit requirements, DEP Rules & Regulations, and state and federal laws. Fleetwood, as authorized under section B.1.D.3 of its NPDES Permit, has the authority to require dischargers of industrial and non-domestic wastewater to characterize and monitor all discharges to the sewer service area.

Specifically, the Fleetwood NPDES Permit states “For all POTWs, where pollutants contributed by indirect dischargers result in interference or pass through, and a violation is likely to recur, the permittee shall develop and enforce specific limits for indirect dischargers and other users, as appropriate, that together with appropriate facility or operational changes, are necessary to ensure renewed or continued compliance with this permit or sludge use or disposal practices. Where POTWs do not have an approved Pretreatment Program, the permittee shall submit a copy of such limits to DEP when developed. (25 Pa. Code § 92a.47(d))”

As part of this study, WWTAP staff reviewed the Fleetwood Ordinance No. 571, referred to in this report as the “Sewer Use Ordinance”, which includes the requirements for wastewater discharges into the Fleetwood SSCS to determine whether Fleetwood provides adequate guidance for effective oversight and control of industrial and non-domestic wastewater discharges in the sewer service area. WWTAP staff have determined that Fleetwood’s Sewer Ordinance include comprehensive guidance regarding industrial and non-domestic wastewater discharges to the sewer service area. A copy of the Fleetwood Ordinance No. 571 is included with this report as Attachment I, for reference. Fleetwood should continue to perform periodic reviews of its Sewer Use Ordinance to ensure that the existing requirements include adequate guidance for; maximum pollutant discharge concentrations, prohibited discharge standards, accidental and slug discharge control plans, discharge self-monitoring and reporting, and the development of local limits.

The Environmental Protection Agency’s (EPA) Model Pretreatment Ordinance and Guidance Manual for Preventing Interference at POTWs are also available at the following links:

EPA Industrial Pretreatment Program resources

<https://www.epa.gov/npdes/national-pretreatment-program>

EPA Model Pretreatment Ordinance

https://www3.epa.gov/npdes/pubs/pretreatment_model_suo.pdf

EPA Guidance Manual for Preventing Interference at POTWs

<https://www.epa.gov/sites/production/files/2015-10/documents/owm0194.pdf>

Acknowledgements

WWTAP would like to thank members and staff of the Fleetwood Borough Municipal Authority, staff from the Fleetwood department of public works, the consulting engineers from Entech, and the WWTF daily operators & operator-in-responsible-charge, for the opportunity to perform this study and for their participation in the monitoring of the plant influent and performance of this evaluation.

THIS PAGE INTENTIONALLY BLANK

ATTACHMENTS:

Attachment A	Fleetwood WWTF Influent Organic Loading Study Team
Attachment B	DEP Wastewater Technical Assistance Program
Attachment C	WWTAP Continuous Monitoring Equipment
Attachment D	WWTAP Project Outline - Fleetwood WWTF Organic Loading Study
Attachment E	Fleetwood WWTF Reference Schematics
Attachment F	WWTAP - Fleetwood WWTF UVAS Data Summary Graphs
Attachment G	WWTAP - Fleetwood WWTF UVAS Weekly Summary Reports
Attachment H	Existing Fleetwood Sewer Ordinance (Ordinance No. 571)
Attachment I	Fleetwood Industrial Pretreatment Permit No. 2023-01 (Sunsweet)
Attachment J	Recommended Process Control Testing
Attachment K	WWTAP HACH SC200 Probe Controller Data Download Guidance

- ❖ *Complete copies of documentation referenced in the report attachments are included in the Adobe PDF file of this report.*
 - Please access the embedded documents via the “attachments” sidebar in Adobe.
 - Menu>View>Show/Hide>Side panels>Attachments
- ❖ *WWTAP will provide Fleetwood with a compressed (ZIP) folder with the final report that includes complete copies of documentation referenced in the attachments.*

THIS PAGE INTENTIONALLY BLANK

ATTACHMENT A: FLEETWOOD WWTF INFLUENT ORGANIC LOADING STUDY TEAM

<i>Pennsylvania Department of Environmental Protection</i>	
Erick M. Ammon Water Program Specialist Wastewater Technical Assistance Program Bureau of Clean Water PADEP Rachel Carson State Office Building 400 Market St., 11 th Floor Harrisburg, PA 17101 (717) 772-8911 or eammon@pa.gov	Marc Austin Neville, M.Sc. Water Program Specialist Wastewater Technical Assistance Program Bureau of Clean Water PADEP Rachel Carson State Office Building 400 Market St., POB 8774 Harrisburg, PA 17105-8774 (717) 772-4019 or mneville@pa.gov
Adam Aponte Water Quality Specialist Clean Water Program PADEP Reading District Office 1005 Crossroads Blvd. Reading, PA 19605 (610) 916-0132 or adaponte@pa.gov	Heather L. Dock Water Quality Specialist Supervisor Clean Water Program PADEP Southcentral Regional Office 909 Elmerton Ave. Harrisburg, PA 17110 (717) 439-5080 or hdock@pa.gov
<i>US Environmental Protection Agency</i>	
Walter Higgins EPA Region III Water Division Infrastructure and Assistance Section (3WP32) Four Penn Center 1600 John F Kennedy Blvd Philadelphia, PA 19103-2852 (215) 814-5476 or higgins.walter@epa.gov	
<i>Fleetwood Borough Authority, Wastewater System Owner/Operator</i>	
Craig Conrad Director of Public Works Fleetwood Borough Authority 110 West Arch Street, Suite 104 Fleetwood, PA 19522 610-944-8220 ext. 200 or craigc@Fleetwoodboro.com	
Cody DeLay WWTF Operator-In-Responsible-Charge Fleetwood Borough Public Works 611 Crisscross Road Fleetwood, PA 19522 (484) 387-2700 or delayc@fleetwoodboro.com	Tim Keeling WWTF Operator Fleetwood Borough Public Works 611 Crisscross Road Fleetwood, PA (484) 221-7016 or tkeeling@fleetwoodboro.com
<i>Entech Engineering, Fleetwood Wastewater System Contract Engineer</i>	
Dale Miller, L.O. Operations Specialist Entech Engineering, Inc. (610) 373-3345 ext. 1157 or DMiller@entecheng.com	

THIS PAGE INTENTIONALLY BLANK

ATTACHMENT B: DEP WASTEWATER TECHNICAL ASSISTANCE PROGRAM

The PADEP Bureau of Clean Water Wastewater Technical Assistance Program offers a broad range of services including compliance assistance and on-site training in basic operational practices. An element of the program, the Wastewater Treatment Evaluation (WTE) employs instrument-based monitoring and analysis as an option for diagnosing problems and monitoring performance. This service, as originally constituted, seeks to improve effluent water quality at wastewater treatment facilities through establishment of sound process monitoring and control practices, and it is done with an emphasis on low-cost, easily practicable process adjustments rather than capital improvements and expenditures, although the latter is sometimes the only alternative to improving effluent compliance. Other aspects of WWTAP provide compliance assistance to facility owners and operators, but the instrument-based analysis seeks to build on existing compliance by promoting best practices, including laboratory-based monitoring, to achieve improvements in effluent quality that go beyond the basic requirements of a facility's NPDES permit.

Sometimes, it is not possible to enact low-cost improvements to a wastewater treatment process, and recommendations are made to investigate alternative treatment technologies that will incur significant capital investment to achieve improved effluent quality and more efficient operational practices. When this becomes evident, the data produced using instrumentation in a WWTAP study may provide the basis for such recommendations. PADEP strongly recommends that facility owners and operators work with their preferred consulting engineers to properly evaluate and implement any of a wide array of process improvements that ensure high-quality treated effluent.

WWTAP staff are not inspectors with the enforcement divisions; rather, they are licensed wastewater treatment operators employed as peer instructors who work to diagnose and recommend operational improvements using basic operational process monitoring and control. DEP's Operations Division in its Bureau of Clean Water, working under terms of a federal grant to minimize nutrient pollution in wastewater treatment effluents, deploys an array of continuous-monitoring immersion probes and a small wastewater process monitoring laboratory to client sites within the Commonwealth for up to eight weeks to diagnose operational problems and to optimize treatment processes.

THIS PAGE INTENTIONALLY BLANK

ATTACHMENT C: WWTAP CONTINUOUS MONITORING EQUIPMENT

Digital Continuous Monitoring Probes

- 1 x HACH SC200s controller
- 1 x UVASplus SC probe

Various poles, mounts, connectors, extension cords, & appurtenances.



Figure C-1: Photo of UVAS continuous monitoring probe installation location in the Fleetwood WWTF influent trough from November 30th, 2023, through January 19th, 2024.



Figure C-2: Photo of HACH SC200 controller and UVAS continuous monitoring probe mounting installation location in the Fleetwood WWTF primary treatment from November 30th, 2023, through January 19th, 2024.

THIS PAGE INTENTIONALLY BLANK

ATTACHMENT D: WWTAP PROJECT OUTLINE: FLEETWOOD WWTF ORGANIC LOADING STUDY

PADEP Wastewater Technical Assistance Program Project Outline

Fleetwood Borough Wastewater Treatment Plant - NPDES Permit No. PA0021636

The Fleetwood Borough Wastewater Treatment Plant (WWTP) reported elevated influent Biochemical Oxygen Demand, 5-day (BOD5) concentrations.

Sampling of the WWTP influent flows indicates that the facility receives discharges wastewater with elevated concentrations of Biochemical Oxygen Demand, 5-day (BOD5) from a customer in its sewer service area. The elevated BOD5 sample results indicate increased organic loading to the WWTP that may cause upsets and/or interference with the WWTP activated sludge treatment biota and reduced treatment capacity. US Environmental Protection Agency (EPA) Technical Assistance program staff requested that the Pennsylvania Department of Environmental Protection (PADEP) Wastewater Technical Assistance Program (WWTAP) deploy continuous monitoring equipment at Fleetwood WWTP to monitor the organic strength of influent flows at the Fleetwood WWTP.

On November 30, 2023, WWTAP staff installed a HACH ultraviolet absorbance/% transmittance spectrum (UVAS) Plus SC continuous monitoring probe and HACH controller equipment in the Fleetwood WWTP influent trough prior to all return flows. The HACH UVAS probe is programmed to collect data calibrated to Biochemical Oxygen Demand (BOD) every fifteen (15) minutes. WWTAP staff returned to the WWTP on December 5, 2023, to provide training for Fleetwood WWTP operations staff regarding operation & maintenance/cleaning of the UVAS probe and the download and transfer UVAS probe data to WWTAP staff for analysis and reporting.

Timeline: six to eight (6-8) weeks from deployment to striking of equipment.

WWTAP Continuous Monitoring Equipment:

- HACH UVAS Probe (BOD setting)

- Probe mounting equipment

- Handrail mount kit (bracket, support assembly, pipe assembly, swivel assembly)

- HACH SC200 controller with SD Card

- SC200 mounting equipment

Upon request, PADEP WWTAP may deploy a SIGMA Portable Composite Sampler with discrete sample bottle set (24-hourly samples), sample tubing, weighted strainer, and power cable for sampling at the Fleetwood WWTP or in the Fleetwood sanitary sewer service area.

WWTAP requests for Fleetwood:

WWTAP staff recommends that Fleetwood collect Influent BOD5 grab samples concurrent with monitoring equipment installation & startup. Additionally, weekly influent BOD5 influent grab samples are recommended for project duration and/or with observed qualitative changes in WWTP influent flow. WWTAP staff requests that WWTP influent BOD5 grab sample results be shared to check accuracy of UVAS probe data during the study.

Document 1: FLEETWOOD WWTF Organic Study - WWTAP Project Outline

THIS PAGE INTENTIONALLY BLANK

ATTACHMENT E: FLEETWOOD WWTF REFERENCE SCHEMATIC:

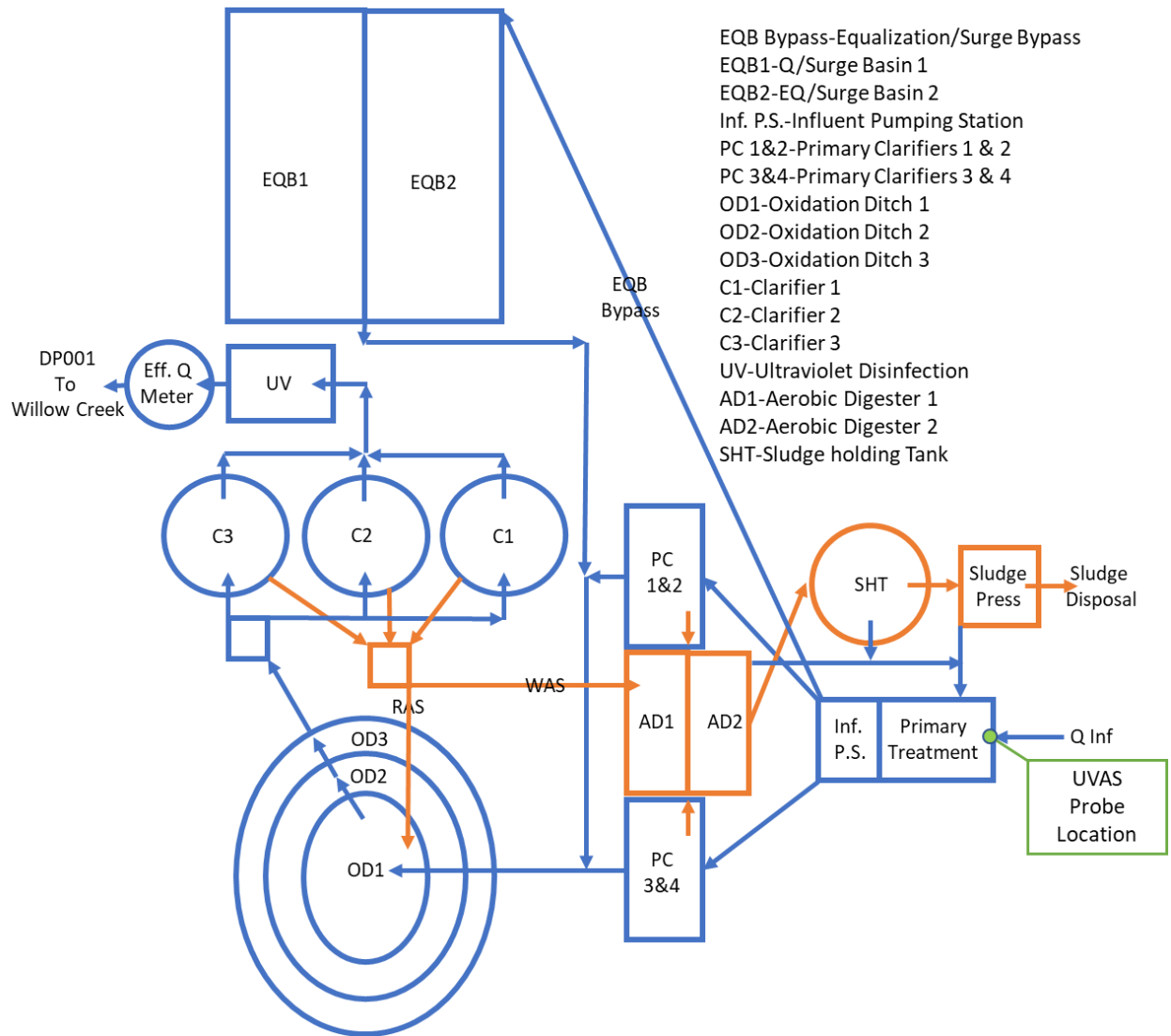


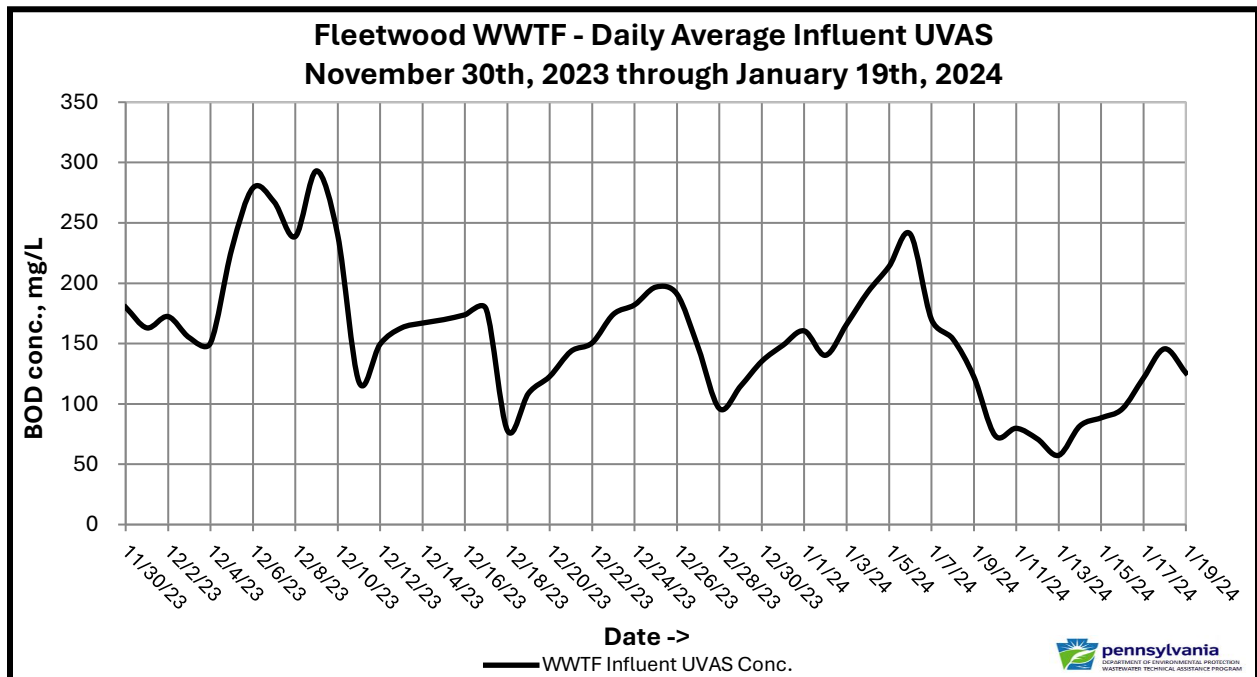
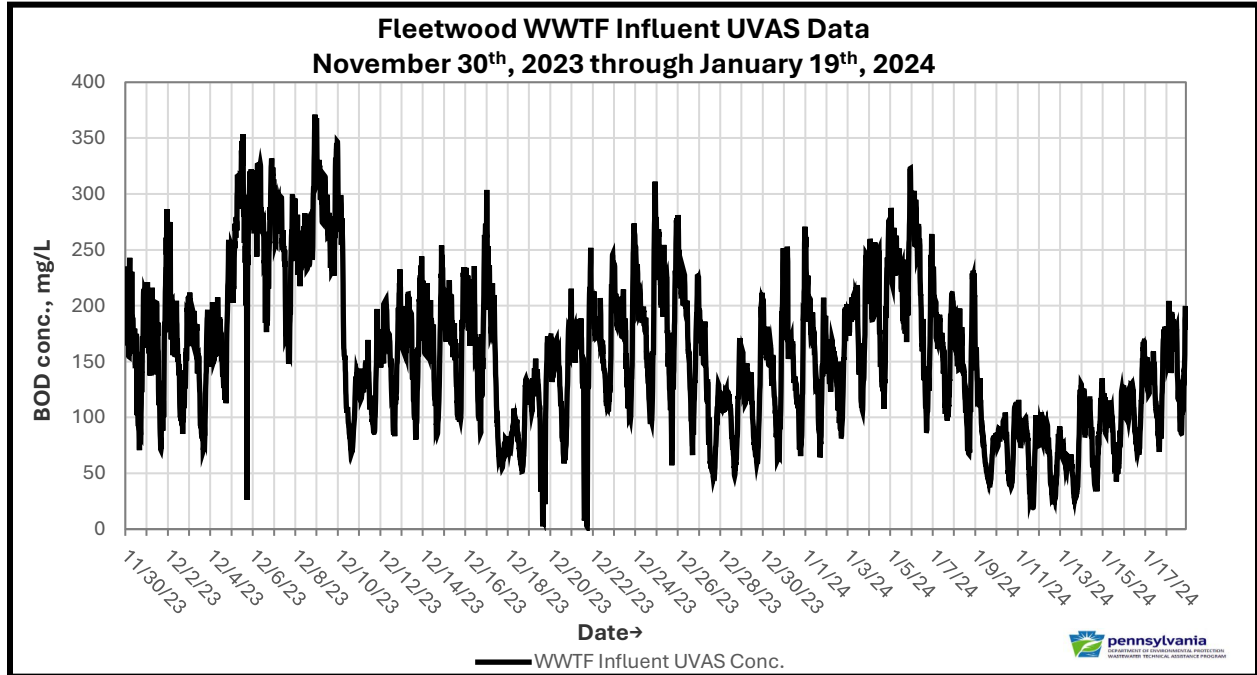
Figure E-1: WWTAP UVAS continuous monitoring probe installation locations at Fleetwood WWTF from November 30th, 2023, through January 19th, 2024.

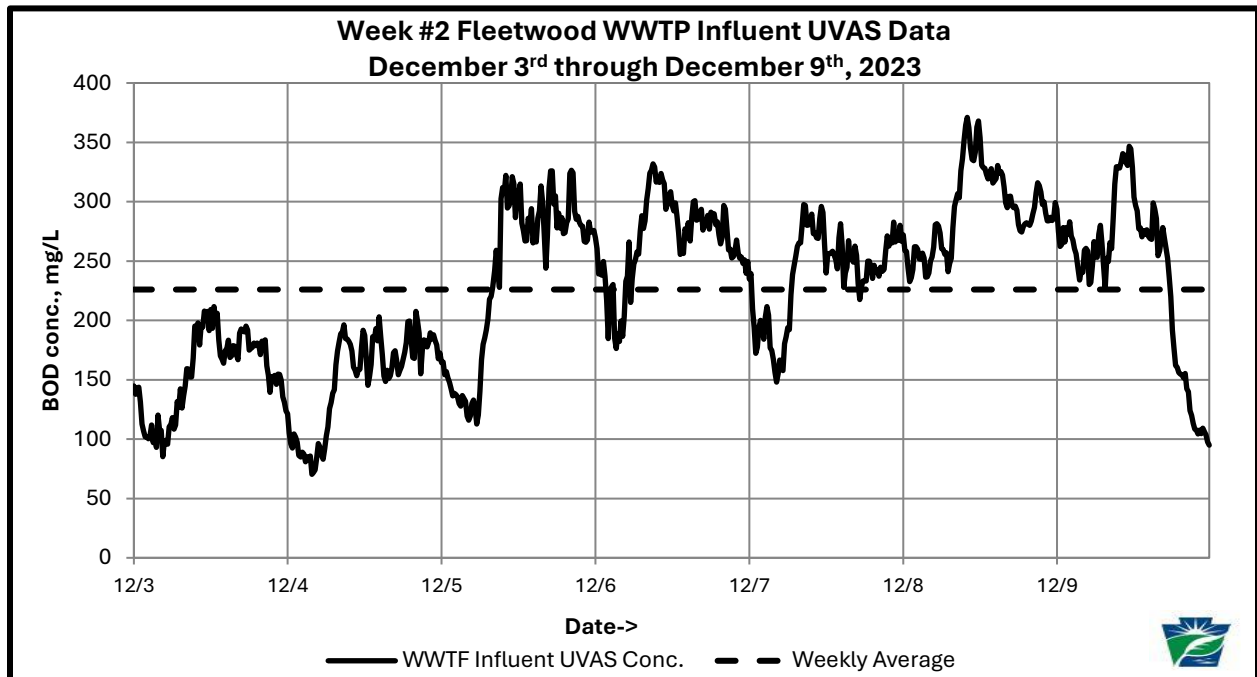
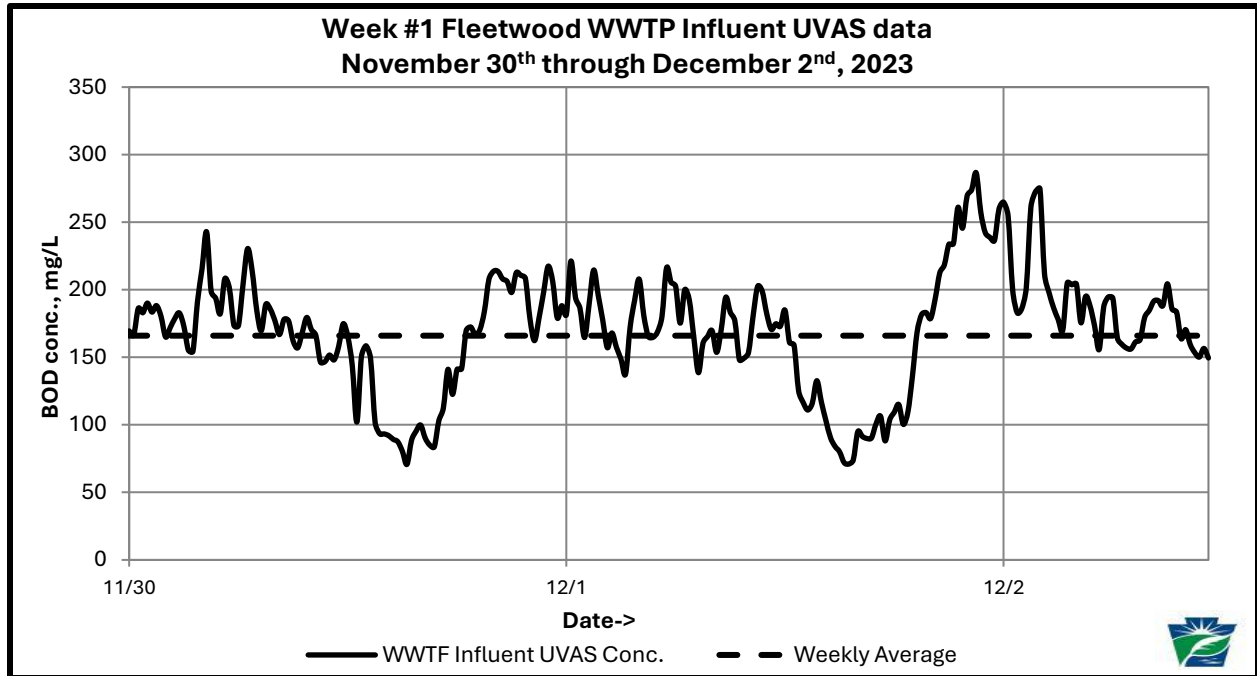
1

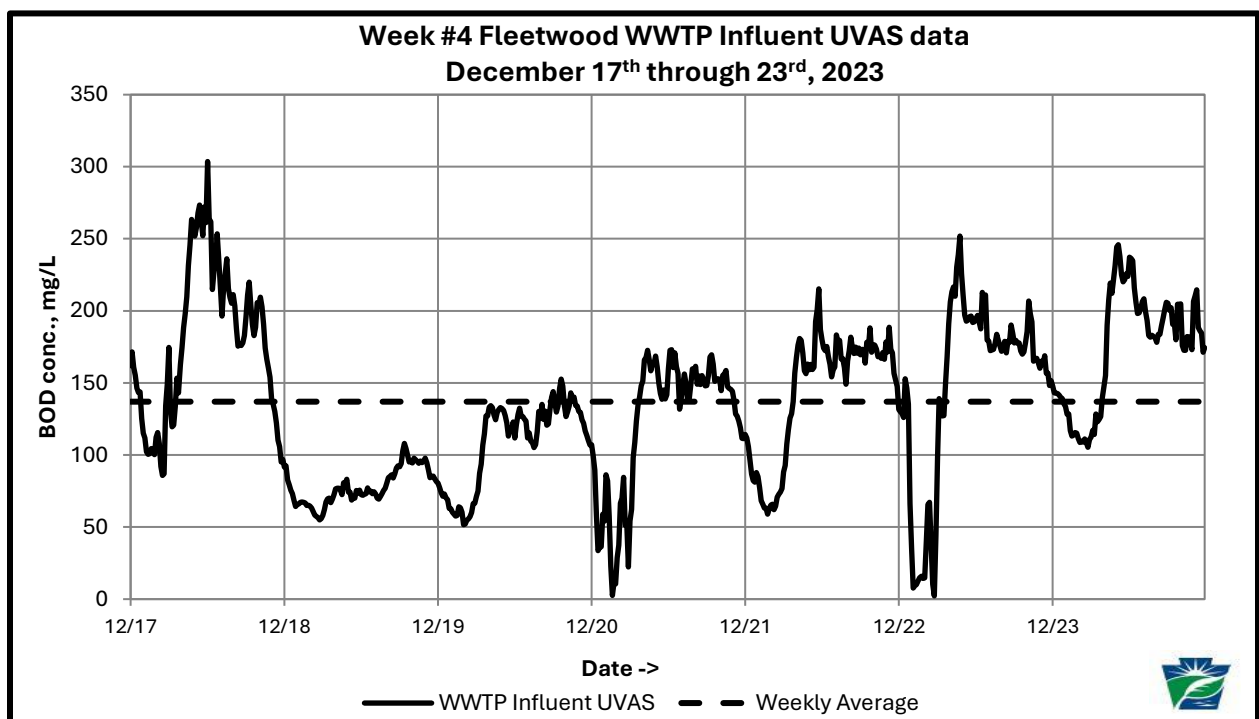
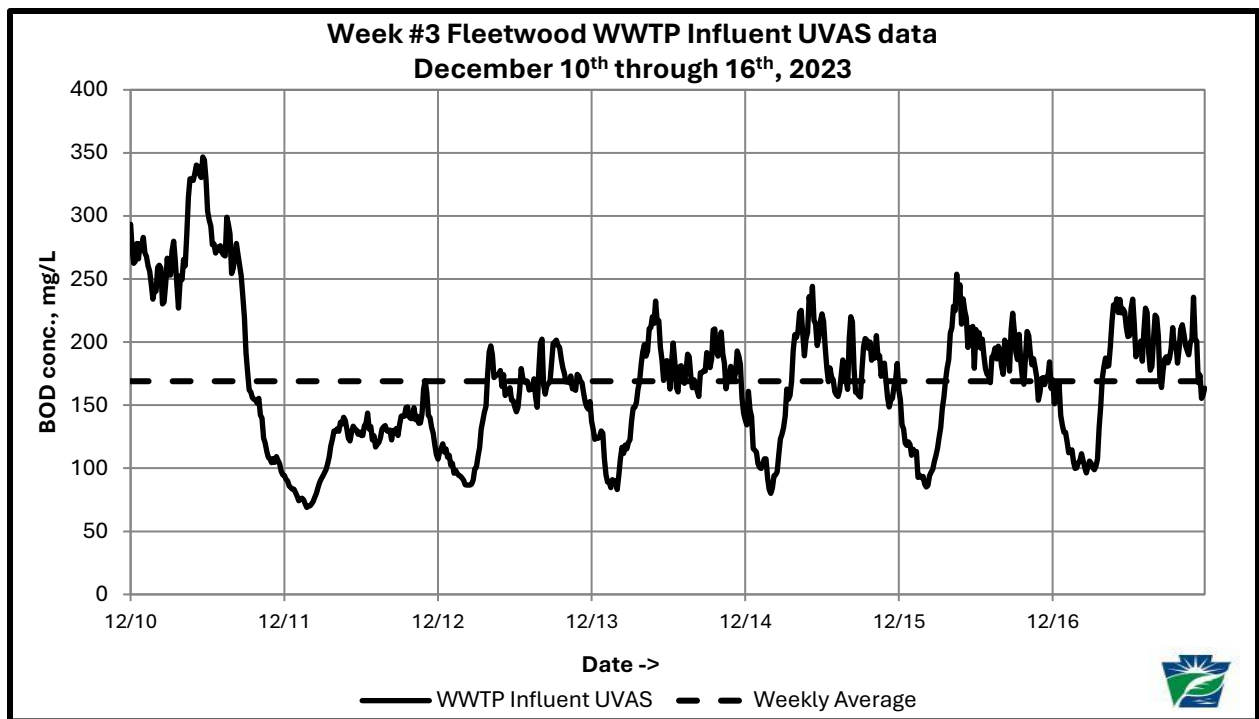


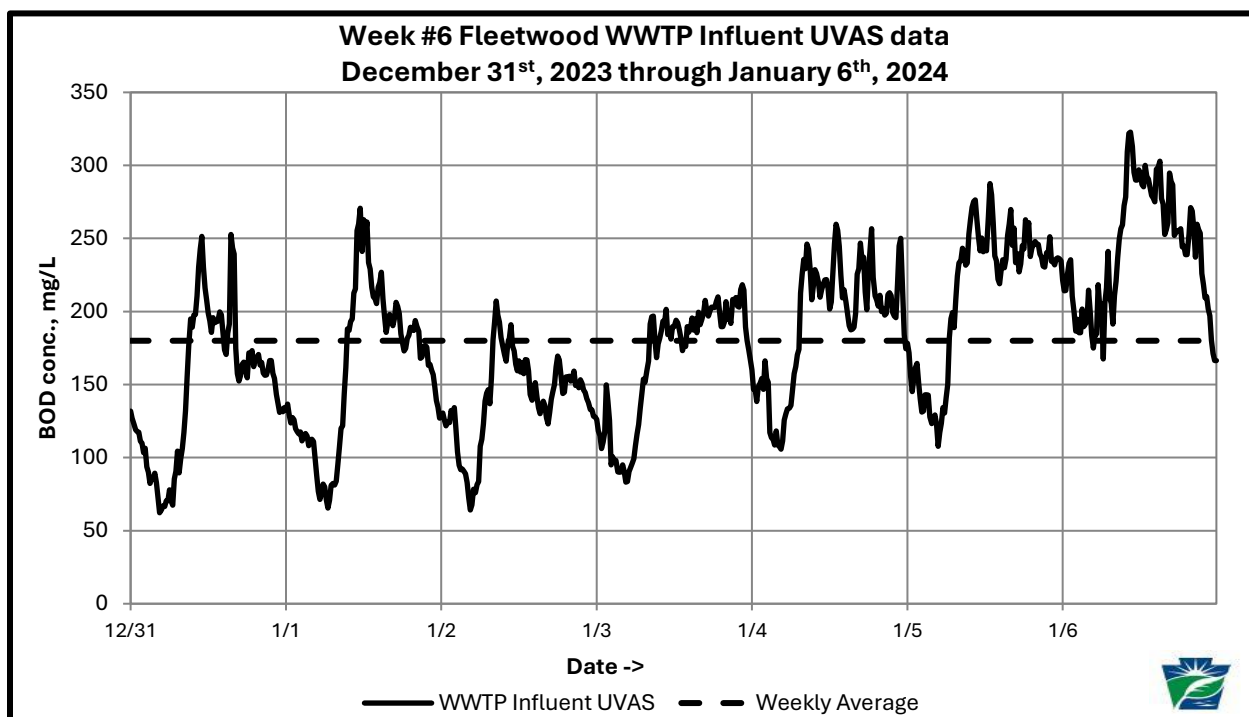
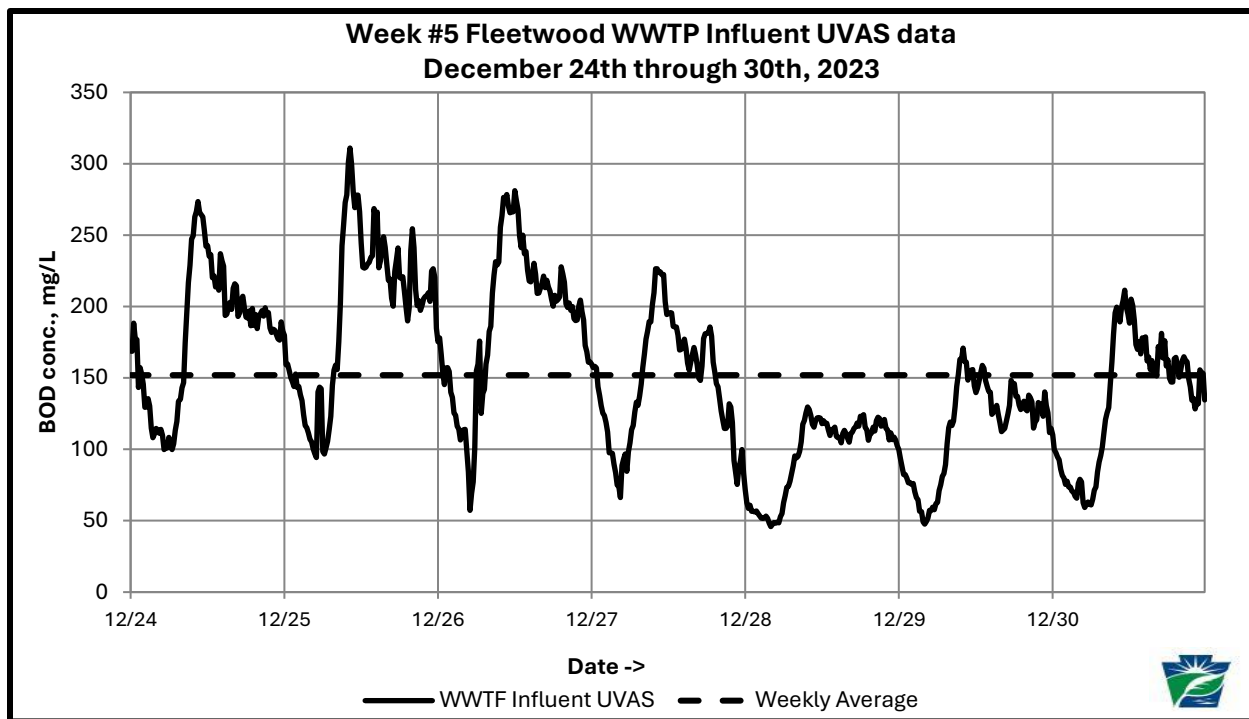
Figure E-2: Fleetwood WWTF Treatment System Diagram (from 2023 WQM Part II Permit Application).

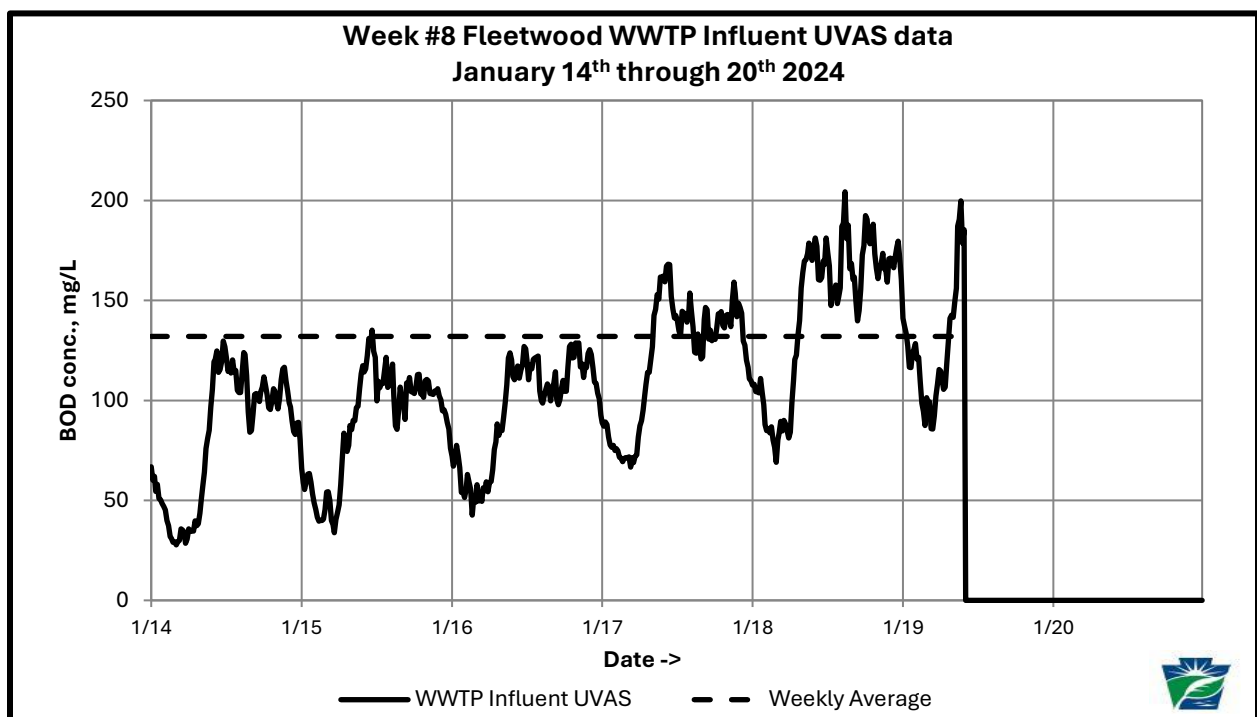
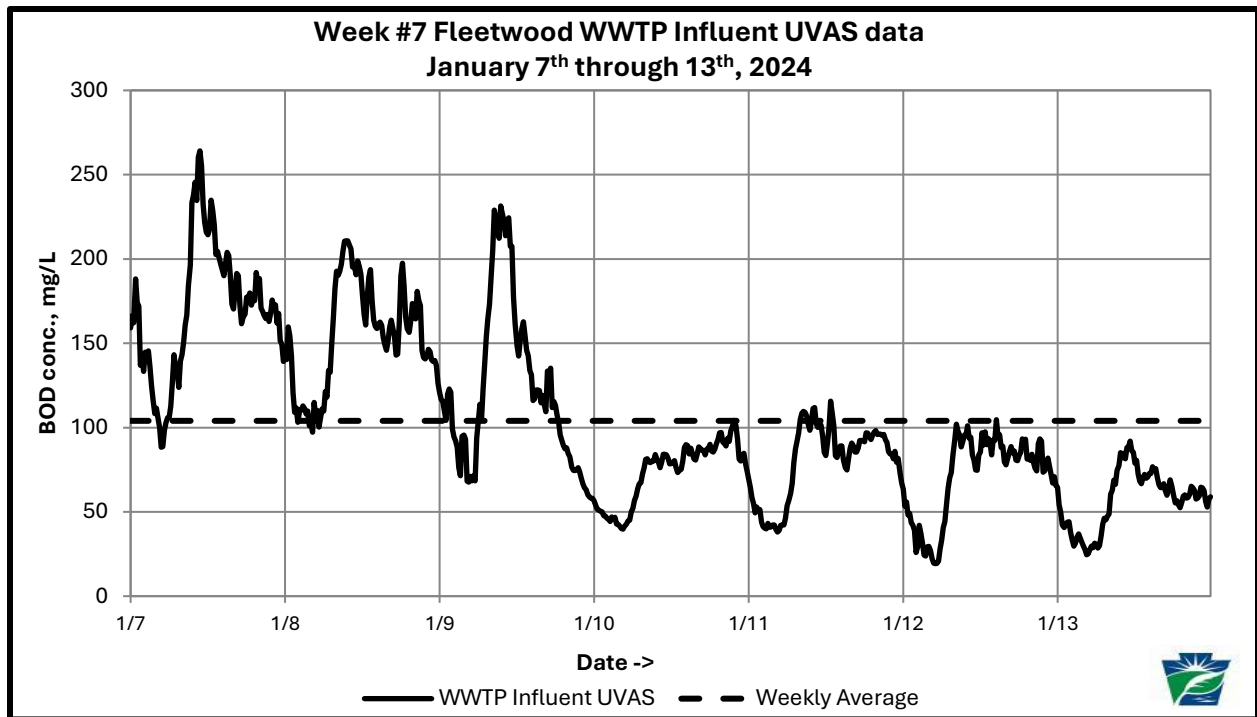
ATTACHMENT F: WWTAP - FLEETWOOD WWTF UVAS DATA SUMMARY GRAPHS











- ❖ *WWTAP assembled daily graphs of UVAS plus SC continuous monitoring data. Daily graphs are included in the weekly reports provided in Attachment G and may be provided upon request.*

THIS PAGE INTENTIONALLY BLANK

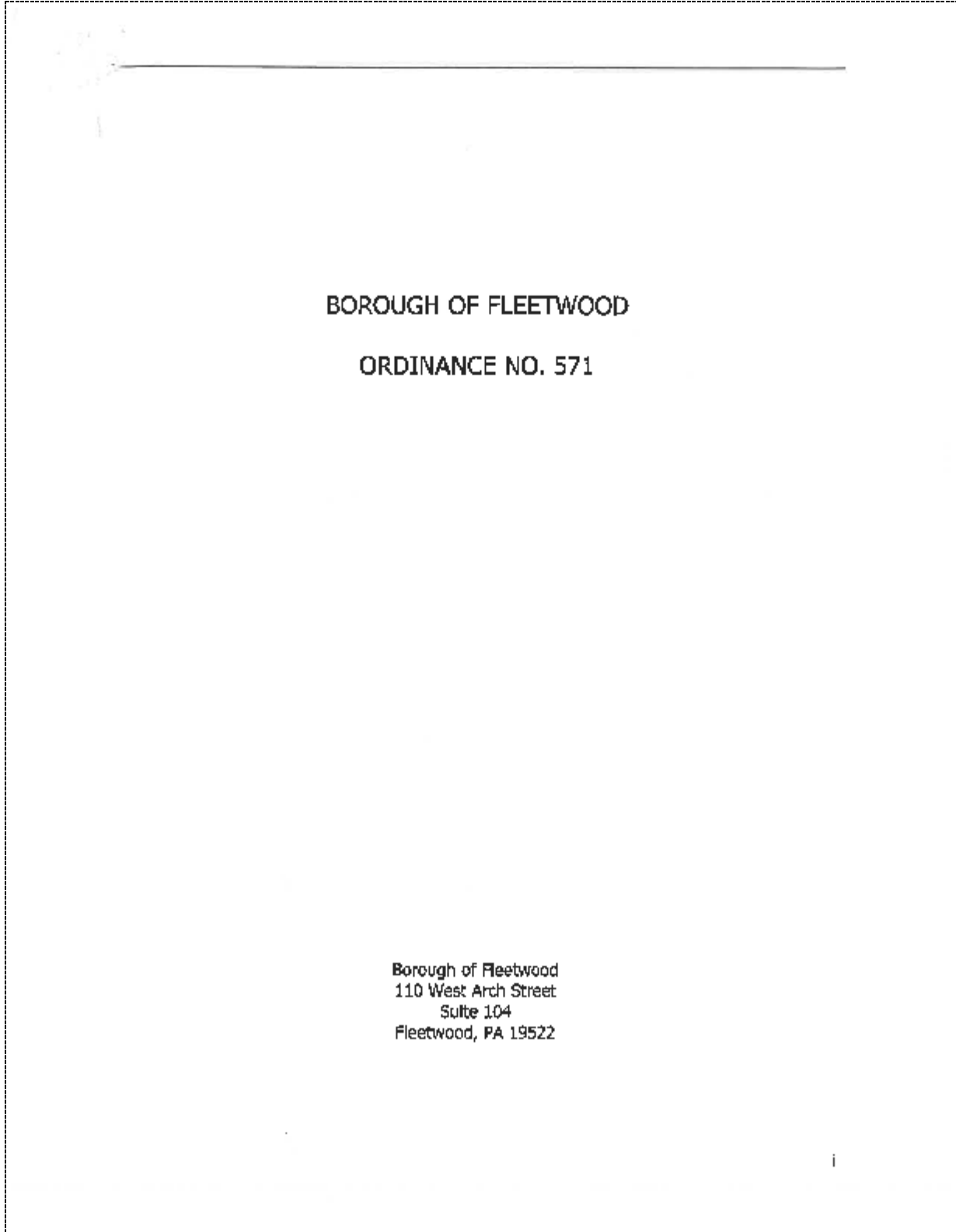
ATTACHMENT G: WWTAP– FLEETWOOD WWTF UVAS WEEKLY SUMMARY REPORTS:

<u>Project Update - PADEP Wastewater Technical Assistance Program</u> Fleetwood Borough Wastewater Treatment Plant UVAS (BOD) Continuous Monitoring Data collected from November 30th through December 5th, 2023 On November 30th, 2023, PADEP Wastewater Technical Assistance Program (WWTAP) staff installed continuous monitoring equipment at the Fleetwood wastewater treatment plant (WWTP) to investigate high organic strength influent wastewater discharges in the WWTP sewer service area. WWTAP staff installed one HACH Ultraviolet Absorbance/Transmittance Spectrum (UVAS) probes at the WWTP with a HACH SC200 controller and display unit. The HACH UVAS probe was programmed to collect data calibrated to Biochemical Oxygen Demand (BOD) every fifteen (15) minutes. The UVAS probe was installed in the WWTP influent trough prior to the return of all treatment unit return flows. Additionally, WWTP operations staff collected a grab sample of WWTP influent flow on November 30, 2023, for laboratory analysis of BOD5. The result of this grab sample (and any subsequent influent BOD5 grab samples) will be used to adjust UVAS probe data to ensure that the probe is recording accurate data. On October 5th, WWTAP staff visited the WWTP to transfer UVAS probe data for review and to provide training for WWTP operations staff regarding operation and maintenance/cleaning of the UVAS probe and the transfer UVAS probe data. A preliminary review of UVAS probe data for November 30th through December 5th by WWTAP staff observed that the WWTP received the highest strength organic wastewater (286 mg/L by concentration) on Saturday, December 2nd, 2023.	<u>Project Update - PADEP Wastewater Technical Assistance Program</u> Fleetwood Borough Wastewater Treatment Plant UVAS (BOD) Continuous Monitoring Data - December 5th, 2023, through January 9th, 2024 On November 30th, 2023, PADEP Wastewater Technical Assistance Program (WWTAP) staff installed continuous monitoring equipment at the Fleetwood wastewater treatment plant (WWTP) to investigate high organic strength influent wastewater discharges in the WWTP sewer service area. WWTAP staff installed one HACH Ultraviolet Absorbance/Transmittance Spectrum (UVAS) probes at the WWTP with a HACH SC200 controller and display unit. The HACH UVAS probe was programmed to collect data calibrated to Biochemical Oxygen Demand (BOD) every fifteen (15) minutes. The UVAS probe was installed in the WWTP influent trough prior to the return of all treatment unit return flows. Additionally, WWTP operations staff collected a grab sample of WWTP influent flow on November 30, 2023, for laboratory analysis of BOD5. The result of this grab sample (and any subsequent influent BOD5 grab samples) will be used to adjust UVAS probe data to ensure that the probe is recording accurate data. On January 9th, 2024, WWTAP staff visited the WWTP to download UVAS probe data and to clean the probe. A preliminary review of UVAS probe data recorded between December 5th, 2023, and January 9th, 2024, indicates that the continuous monitoring equipment recorded a number of influent BOD5 peak concentrations greater than three hundred (300) milligrams per liter (mg/L). This is a concern because the maximum concentration of influent BOD5 for facilities primarily designed to treat domestic sewage/wastewater should not exceed 300 mg/L and elevated organic loading to the WWTP can impact the ability of the activated sludge biota to provide adequate treatment to maintain compliance with that NPDES Permit conditions & final effluent discharge limits. The first graph on page #2 of this update highlights organic loading events where peak BOD5 concentrations were measured at >300mg/L in red. Maximum BOD5 value measured by UVAS continuous monitoring probe (12/5/23-1/9/24): 371.0 mg/L, Friday December 9th, 2023 @10:00 Average BOD5 calculated from UVAS continuous monitoring probe data (12/5/23-1/9/24): 174 mg/L
Document 2: Fleetwood UVAS Summary 20231130-20231205	Document 3: Fleetwood UVAS Summary 20231130-20231205

Documents 2 & 3: WWTAP Progress Reports for Fleetwood WWTF Organic Study

THIS PAGE INTENTIONALLY BLANK

ATTACHMENT H: EXISTING FLEETWOOD SEWER ORDINANCE (ORDINANCE NO. 571):



Document 4: Fleetwood WWTF Organic Study – Sewer Use Ordinance

THIS PAGE INTENTIONALLY BLANK

ATTACHMENT I: FLEETWOOD INDUSTRIAL PRETREATMENT PERMIT NO. 2023-01 (SUNSWEET):

**BOROUGH OF FLEETWOOD
INDUSTRIAL PRETREATMENT PROGRAM
INDUSTRIAL DISCHARGE PERMIT
2023-01
SUNSWEET GROWERS, INC.
Permit expires July 31, 2026**

Document 5: Fleetwood–Sunsweet Industrial Pretreatment Permit (2023-01)

THIS PAGE INTENTIONALLY BLANK

ATTACHMENT J: RECOMMENDED PROCESS CONTROL TESTING

The following table provides the minimum recommended influent wastewater testing and monitoring parameters at a WWTF. These parameters, and the frequency of testing, should be determined by the WWTF design and operational strategy. WWTF operators may need to test and monitor additional parameters to ensure optimization of treatment and treatment unit capacities. It is important that facility operators complete testing on the influent wastewater to determine loadings and pollutant removal efficiencies of all treatment units.

Influent Wastewater Monitoring Parameters	
cBOD ₅	24-Hour Composite
Total Suspended Solids (TSS)	24-Hour Composite
Ammonia-Nitrogen (NH ₃ -N)	24-Hour Composite
Phosphorous (Ortho - PO ₄)	24-Hour Composite
pH	Grab
Temperature	Grab
Alkalinity	Grab
Flow (MGD)	Continuous monitoring
Visual/Aromatic Observations	Document unusual conditions

*Recommended monitoring for *cBOD₅, TSS, NH₃-N, PO₄-P, & Alkalinity includes concentration (mg/L) & loading (lb./day)*

The following table provides recommended for process control testing for a wastewater treatment facility with activated sludge treatment units. The actual testing completed by WWTF operators and how frequently testing is completed should be facility specific. If an operator is not sure about the type and frequency of process control testing needed to properly operate and maintain the WWTF, please consult your engineer and state regulatory officials.

Process Control Testing	WWTAP Notes/Comments
Dissolved Oxygen	Best done with continuous monitoring within the reactor. Calibration of DO sensors should be checked weekly.
Oxidation Reduction Potential (ORP)	Best done with continuous monitoring within the reactor.
Nitrate (NO ₃)	Best done with continuous monitoring within the reactor. Occasional grabs (check calibration) are recommended.
Nitrite (NO ₂)	Can be a grab sample at various intervals. Nitrite can be associated with incomplete nitrification or incomplete denitrification. Excess nitrite can be a factor maintaining chlorine residual.
Ammonia-Nitrogen (NH ₃ -N)	Best done with continuous monitoring within the reactor. Occasional grabs (check calibration) are recommended.
MLSS & MLVSS and reasonable estimates of solids under aeration.	This test is essential for determining the lb. of solids you have under aeration. The use of a centrifuge spin can provide quick and reasonable estimates of solids under aeration. With an increase in MCRT, the MLVSS should decrease.

Mean Cell Residence Time	MCRT is a calculation. Determines the lb. of solids in the system & solids leaving the system (WAS & Effluent).
Food to Microorganism Ratio	F/M is a calculation. Food (BOD) coming into system lb. of solids under aeration
Sludge Volume Index (SVI)	SVI is a calculation 30 Minute Settleability Result ml/L MLSS mg/L / 1000
Microscopic Examination	Microscopic observation of the biomass to determine the relative predominance of organisms and to spot troublesome filamentous organisms.
30 Minute Settleability	To help quantify the amount of sludge in the system and to determine settling characteristics. Must be used in conjunction with MLSS to determine SVI.
Alkalinity	This is normally a grab sample. 100 mg/L in effluent recommended for complete nitrification. Alkalinity concentration should not be <50 mg/L at any point in the system, especially for facilities that must nitrify
pH	This can be done through continuous monitoring or through a grab sample. Alkalinity is more important. Drastic changes in pH will occur when alkalinity is consumed.
Temperature	The temperature will determine how lively your biological activity will be every 10°C change in temperature results in biological activity either doubling (warmer temps) or cutting in half (for colder temps).
Dissolved Oxygen Uptake Rate (DOUR)	Useful test for determining the respiration rate of the activated sludge biomass. Can be used to determine treatability of waste.
Amount and concentration of sludge wasted from each SBR	A facility should regularly quantify the amount of sludge removed from the system to maintain a proper mass balance.
Recycle flows	This could include flows such as supernatant from aerobic digesters or filtrate from dewatering or thickening activity Recycle flows can be high in nutrients (N&P) as well as BOD

The operator should also log any abnormal plant conditions and quantifiable weather conditions such as daily High/Low temperature and amount (if any) precipitation.

ATTACHMENT K: WWTAP UVASSC DATA DOWNLOAD GUIDANCE

Downloading Probe Data to SC200 Controller SD Card

PADEP WWTAP Fleetwood Project - UVAS Probe Data Retrieval Guidance

SC200 Data Transfer to SD Card

- Open SC200 Clear Plastic Cover
- Push Menu Key
- Select SD Card Setup
- Select Save Logs
- Push Enter Key to Save All Logs (Enter key on the right of the arrows has a check "✓" mark.)
 - By Default, All Logs are Selected
- Select Time Period
 - Select "Last Month"
- Push Enter Key to Transfer Data
- Wait for "Transfer Complete" to show in screen
- Open SC200 SD Card Port Door
 - Use a Phillips screwdriver to unfasten the card cover and seal: back the screws out until the cover opens, but the screws should not be completely removed... they are retained in the cover plate.)
- Eject SD Card:
 - Press the spine of the card inward, and the spring clamp will release the card.

Save Data File from SD Card to a computer.

- Open SD Card "Fleetwood" in File Explorer
- Copy & Paste Folder Named "HACH" to Desktop/File Folder
- In the Desktop/File Folder, rename "HACH" Folder to Today's Date (i.e. "20231130")
- Compress/Zip Data Folder
 - 1- Right-click on "20231130"
 - 2- Scroll to "Send To"
 - 3- Select "Compressed (Zipped) folder"

Email compressed folder "20231130" to eammon@pa.gov

Eject SD Card via System Tray:

Some computers still require you to use the "Safely Remove Hardware" utility found in your Windows system tray.

Replace SD Card in SC200:

Important: Be sure that the SD card notch faces downward, and the metal contacts face leftward, when inserting the SD card into the slot. Never force the SD card. The spring connector should lock it in place. Close the cover and turn the screws to fasten it, but don't over-torque the screws.

THIS PAGE INTENTIONALLY BLANK



