Onondaga County Department of Water Environment Protection

Oak Orchard Industrial Wastewater Treatment Plant and Water Reclamation Facility

Conceptual Design Engineering Report

Prepared for
OCDWEP
SPDES No. NY0030317
Syracuse, NY
November 11, 2025

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List of Abbreviations

µm	micrometer
AACE	Association for the Advancement of Cost Engineering International
BC	Brown and Caldwell
BFE	base flood elevation
BNR	biological nitrogen removal
BOD	biochemical oxygen demand
$CaCO_3$	calcium carbonate
CAPEX	Capital Expenditures
CCI	Construction Cost Index
CIP	clean in place
CO2	carbon dioxide
COD	chemical oxygen demand
CPES	Critical Path Engineering Solutions
DAC	Disadvantaged Communities
DB	design build
DO	dissolved oxygen
EDR	Environmental Design & Research
ENR	Engineers News Record
EPC	engineering, procurement, and construction
EPRI	Electric Power Research Institute
EQ	equalization
ERM	Environmental Resources Mapper
FAB	Fabrication Facility/Building
FEL	front end loading
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
GC	General Contractor
gpd	gallons per day
gpd/ft2	gallons per day per square foot
gph	gallons per hours
H_2O_2	hydrogen peroxide
H_2SO_4	sulfuric acid
H_3PO_4	phosphoric acid
HERO	high-efficiency reverse osmosis
HP	horsepower
HRT	hydraulic retention time
I&C	instrumentation and controls
IPA	isopropyl alcohol
IPaC	Information for Planning and Consultation
IWWTP	industrial wastewater treatment plant
IX	ion exchange
lb/day	pounds per day
lb/yr	pounds per year
MBR	membrane bioreactor
MCRT	mean cell residence time
MF	microfiltration
MF/UF	microfiltration/ultrafiltration
MG	million gallons
mg/L	milligrams per liter
MGD	million gallons per day
mJ/cm^2	millijoules per square centimeter
MLE	Modified Ludzack-Ettinger
MLSS	mixed liquor suspended solids
mm	millimeter
MM	million
mV	millivolt
MVR	mechanical vapor recompression
N_2O	nitrous oxide
NaOCl	sodium hypochlorite
NaOH	sodium hydroxide
ND	non-detect
NF	nanofiltration
NH_3-N	ammonia nitrogen
NH_4+	ammonium
NHP	National Heritage Program
NO_3-N	nitrate nitrogen
NWI	National Wetlands Inventory
NYSDEC	New York State Department of Environmental Conservation
O&M	operations and maintenance
OA	owner's advisor
°C	degrees Celsius
OCDWEP	Onondaga County Department of Water Environment Protection

OCIDA	Onondaga County Industrial Development Agency
OCWA	Onondaga County Water Authority
°F	degrees Fahrenheit
OPEX	Operating Expenditures
ORP	oxidation reduction potential
PD	positive displacement
PEJA	Potential Environmental Justice Areas
PFAS	per and polyfluoroalkyl substances
PFD	process flow diagram
PO_4-P	ortho phosphorous
POTW	Publicly Owned Treatment Works
PUB	Public Utilities Board
RAS	return activated sludge
RFE	Ready for Equipment
RFI	request for information
RFM	Ready for Manufacturing
RFP	request for proposal
RO	reverse osmosis
RPR	Resident Project Representative
SAC	strong acid cation
SBA	strong base anion
SCADA	Supervisory Control and Data Acquisition
scf/day	standard cubic feet per day
SIC	Standard Industry Classification
SPDES	State Permit Discharge Elimination System
TBEL	federal technology based effluent limits
TBLL	technically based local limits
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TKN	Total Kjeldahl nitrogen
TMAH	tetramethylammonium hydroxide
TMP	transmembrane pressure
TOC	total organic carbon
TP	total phosphorous
TSS	total suspended solids
TTO	total toxic organics
UF	ultrafiltration
UPW	ultrapure water
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
UV	ultraviolet
UVT	ultraviolet transmittance
VSS	volatile suspended solids
WAC	weak acid cation
WAS	waste activated sludge
WHO	World Health Organization
WOTUS	Waters of the United States
WQBEL	Water Quality Based Effluent Limits
WQS	Water Quality Standards
WRF	water reclamation facility
WWTP	wastewater treatment plant

Executive Summary

Micron Technology, Inc. (Micron) is proposing to construct a semiconductor manufacturing campus in the Town of Clay, New York. There will be a total of four Fabrication Facilities (Fabrication 1 [FAB1], Fabrication 2 [FAB2], Fabrication 3 [FAB3], and Fabrication 4 [FAB4]) built in two phases. FAB1 and FAB2 will be constructed in Phase 1, while FAB3 and FAB4 will be constructed in Phase 2.

Onondaga County through the Onondaga County Department of Water Environment Protection (OCDWEP) is working with Micron to provide sanitary and process wastewater treatment and reclaimed water for ultrapure water (UPW) and cooling water. For process wastewater and reclaimed wastewater for cooling water, OCDWEP is in the process of procurement of design build (DB) engineering procurement and construction (EPC) services for a greenfield industrial wastewater treatment plant (IWWTP) and water reclamation facility (WRF) to be collocated at their Oak Orchard Wastewater Treatment Plant (Municipal WWTP) site. As part of development of the request for proposal (RFP) for bidding EPC services, OCDWEP has contracted Critical Path Engineering Solutions (CPES), Environmental Design & Research (EDR), and Brown and Caldwell (BC), a subconsultant to EDR, for support with owner's advisor (OA) services for the procurement and oversite of the EPC through final design.

The Project consists of a new IWWTP WRF and associated force mains to serve the industrial discharge from the new Micron Facility. The new IWWTP WRF will be located on the existing Municipal WWTP site. The Municipal WWTP is in the process of being upgraded in capacity to accommodate additional sanitary wastewater and provide reclaimed water for UPW as required by Micron to meet sustainability goals and mitigate any gaps in supply of Onondaga County Water Authority (OCWA) water to Micron.

A total of 11 alternatives, in addition to the no-action and green infrastructure alternatives, were developed for the IWWTP WRF based on the following criteria:

1. Water quality and quantity data provided by Micron
2. Discharge water quality requirements as outlined in the existing Oak Orchard State Permit Discharge Elimination System (SPDES) permit
3. OCDWEP's objectives: reliability, cost, phasing, schedule, risk, health and safety, operability, accessibility, aesthetics, adaptability, county and industrial standards.

Alternative 10 was selected from the 11 to meet Micron FAB1 discharge requirements. Alternative 11 was selected as an addition to Alternative 10 to meet Micron FAB2 discharge and reclaimed water requirements. Together these comprise the IWWTP WRF in support of Micron's Phase 1 manufacturing campus.

A maximum design condition flow of 8.25 million gallons per day (MGD) for FAB1 and an additional flow of 8.25 MGD for FAB2 was used, along with the criteria above, as the basis of design for the development of the alternatives. The 11 alternatives outline the combination of treatment techniques within biological, physical, and chemical treatment to meet the discharge and water reuse requirements. An alternatives analysis evaluation was performed, and two technically feasible alternatives were further developed to be selected as the recommended alternatives for the IWWTP WRF.

Alternative 10 will provide biological treatment for the wastewater generated during the operation of FAB1, with the ability to upgrade the biological treatment capacity when FAB2 is online. This alternative consists of an equalization tank to provide constant volume equalization and a diversion tank to provide for the peak influent concentrations and/or off-specification water. The biological treatment includes the Modified Ludzack Ettinger (MLE) process which uses an anoxic tank upstream of the aerobic tank to provide nitrogen removal through nitrification and denitrification. The wastewater flow from the aerobic tanks then passes through a membrane bioreactor (MBR) where internal immersed hollow fiber ultrafiltration (UF) membranes provide solids removal. From the MBR, the flow passes through ultraviolet (UV) disinfection to treat potential pathogenic organisms before being discharged to the internal outfall 01B to the Oak Orchard campus outfall pipe. The waste activated sludge (WAS) from the MBR is thickened via a combination of gravity thickeners and centrifuges, and the solids produced from these processes are intended to be disposed of in a landfill. Specific disposal locations and criteria will be investigated as the design progresses.

Alternative 11 will provide biological and physical/chemical treatment for the wastewater generated to treat the combined 16.5 MGD of flow during the operation of both FAB1 and FAB2. The FAB2 alternative has the same biological treatment setup as Alternative 10 but with additional trains to meet the increased capacity of 16.5 MGD. Following MBR treatment, the wastewater flow goes through an ion exchange (IX) process using a strong acid cation to remove magnesium and calcium alkalinity in addition to magnesium and calcium non-alkalinity to reduce scaling in the reverse osmosis (RO) treatment. Following the IX process, a decarbonization stripper is used to remove carbon dioxide in the wastewater to further reduce corrosion and scaling tendencies in the downstream processes. The carbon dioxide stripped wastewater then passes through RO treatment where the permeate is sent through UV treatment and can be either discharged in the Oneida River or reused by Micron as reclaim water. The RO concentrate is further treated through an evaporator and crystallizer system to reduce the amount of overall brine for hauling and disposal offsite. Specific details of the disposal of brine solids separated through dewatering will be developed as this design is progressed. The condensate from the evaporator and crystallizer systems can be blended with the RO permeate before being sent through UV disinfection and either discharged or used for reclaimed purposes.

Section 1

Project Background and History

Micron Technology, Inc. (Micron) is proposing to construct a semiconductor manufacturing campus in the Town of Clay, New York, at the White Pine Commerce Park, an approximately 1,400-acre Industrial Park. Wastewater is generated from the manufacturing of semiconductors and other devices on silicon wafers. Micron's facility aligns with Standard Industry Classification (SIC) 3674 for Semiconductors and Related Devices aligning with US EPA 40 CFR Part 469, Subpart A, Electrical and Electronic Components industrial point source categorical limitations. In general, the semiconductor wafers will be manufactured at this campus with soldering and packaging for ultimate applications completed at another facility.

There will be a total of four Fabrication Buildings (e.g., Fabrication 1 [FAB1], Fabrication 2 [FAB2], Fabrication 3 [FAB3], and Fabrication 4 [FAB4]) FAB1 and FAB2 will be constructed first. FAB1 is projected for groundbreaking in November 2025, with construction complete by July 2028 and full steady state production by July 2030. FAB1 Ready for Equipment (RFE) validation testing where the readiness of the facility systems such as cleanroom pressurization, humidity, and temperature is confirmed, is anticipated in April 2028. Ready for Manufacturing (RFM) validation testing, where the toolset producing the silicon wafers is verified, is anticipated to start in July 2028, and then production in November 2028. FAB2 will be completed over a similar three plus year period with full steady state production by Summer of 2035. Micron's wastewater quantities, quality, and requirements for the installation of FAB1 and FAB2 are discussed in this Engineering Report.

Onondaga County through the Onondaga County Department of Water Environment and Protection (OCDWEP) is working with Micron to provide sanitary and process wastewater treatment and reclaimed water for cooling water and ultrapure water (UPW) makeup water. Additionally, the Onondaga County Water Authority (OCWA) is working with Micron to provide potable water for production (e.g., cooling and ultrapure water production) as well as sanitary uses by site personnel.

For process wastewater and reclaim wastewater for cooling water, OCDWEP is in the process of procurement of design build (DB) engineering procurement and construction (EPC) services for a greenfield industrial wastewater treatment plant (IWWTP) and water reclamation facility (WRF) to be collocated at their Oak Orchard Wastewater Treatment Plant (Municipal WWTP) site. As part of development of the request for proposal (RFP) for bidding EPC services, OCDWEP has contracted Critical Path Engineering Solutions (CPES), Environmental Design & Research (EDR), and Brown and Caldwell (BC), a subconsultant to EDR, for support with owner's advisor (OA) services for the EPC procurement and oversite through detailed design, referred to as the OA Team in this Report.

BC is working with EDR and CPES to complete both a conceptual and preliminary design of the IWWTP WRF to facilitate permitting and DB EPC procurement for the IWWTP WRF infrastructure. The current level of project and design development is between the conceptual or front-end loading (FEL) 0 and FEL 1 stage whereas up to 10 percent of the engineering is complete with approximately 10 percent of the total project defined. As such, high level process flow diagrams, material balances, major equipment sizing, major equipment lists, and general arrangement drawings were completed. BC will advance this concept to a preliminary design between a FEL1 and FEL 2 stage where up to 20% of the engineering will be complete and the project further defined approximately 15% of the project defined for a Class 4 cost estimate per Association for the Advancement of Cost Engineering International (AACE) requirements. The New York State Department of Environmental Conservation

(NYSDEC) would typically require preliminary design level materials, however to help NYSDEC and the multiple stakeholders involved begin to become familiar with the project, this report has been prepared to accompany the conceptual level design. The report will be revised and submitted to accompany the preliminary design which is scheduled to be completed in November of 2025.

The IWWTP WRF will be built in two steps associated with Micron's projected discharges from FAB1 and FAB2. An initial IWWTP will be designed to serve FAB1 with additional IWWTP and WRF capabilities added for FAB2. Discharges from the IWWTP WRF will be discharged through the internal outfall 01B to the Oneida River through the combined Oak Orchard Campus Outfall 001. The IWWTP WRF conceptual design is the focus of this Engineering Report. The subsequent preliminary design will be completed by November 2025.

OCDWEP is currently contracted with Carollo Engineers (Carollo) to upgrade Municipal WWTP capacity and treatment for initial or bridge wastewater treatment for sanitary and process wastewater during early 2028/2029 as a “bridge” or stop gap until the IWWTP WRF is complete. Longer term, the upgraded Municipal WWTP will only provide sanitary wastewater treatment for Micron, with initial supplemental UPW make-up water until the IWWTP has WRF capabilities for cooling water when FAB2 upgrade is complete. Municipal WWTP will also supply recycled water to Micron for UPW makeup. The engineering report for the Oak Orchard municipal upgrades and reclaimed water will be submitted under separate cover by Carollo Engineers to the New York State Department of Environmental Conservation (NYSDEC) for permitting and review purposes.

Carollo is leading the New York State Permit Discharge Elimination System (SPDES) effort with support as needed by the OA team for both the OOWTP and the IWWTP WRF. The IWWTP WRF design concept described herein is based primarily on the initial SPDES compliance, permitting, and modeling work lead by BC, where potential SPDES permit requirements were developed based on NYSDEC guidelines on outfall mixing and modeling considerations to the Oneida River, Municipal WWTP discharges, and the IWWTP WRF.

1.1 Site Information

1.1.1 Location

The Project consists of a new IWWTP WRF and associated force mains to serve the industrial discharge from the new Micron Facility. The project will be located at the existing Oak Orchard WWTP at 4300 Oak Orchard Road and the adjacent conveyance corridor. The conveyance corridor connects the Micron Site located on Caughdenoy Road to the IWWTP location. The Conveyance Corridor follows Verplank Road, west of Caughdenoy Road towards the Oak Orchard Site for approximately 0.5 miles, and then through several easements through back lots for another mile and a half to the Oak Orchard Site. A figure showing the project location is located in Appendix A.

1.1.2 Geologic Conditions

The USDA Web Soil Survey was reviewed to obtain a summary of soil conditions within the project area. Based on the soils data provided, the topography is flat to rolling, with slopes between zero and 6 percent. The soils on the site are primarily in Hydraulic Soils Groups C and C/D indicating poorly drained soils.

Soil borings completed in the area indicate areas of existing fill consisting of silts, silty sand or cobbles and boulders, as well as areas of lacustrine deposits consisting of silts, silty clays and sand. The soil boring logs are included in Appendix B.

A subsurface geotechnical program including additional borings along the conveyance corridor from Micron to the IWWTP site will be established.

1.1.2.1 Environmental Resources

A preliminary review of environmental resources was conducted including a desktop review of publicly available information and on-site wetland delineations. Desktop reviews of the NYSDEC Environmental Resources Mapper (ERM) and the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) were conducted to identify environmentally sensitive areas that may be present within the project area.

Review of the ERM indicates the following:

- One NYSDEC-mapped stream is located within the project area. This is a Class C stream (Mud Creek) which flows to the north along the western edge of the project area. The stream continues beyond the project boundary and discharges into the Oneida River.
- USFWS National Wetlands Inventory (NWI) mapping shows the presence of three freshwater ponds and three riverine wetlands within the project area along Mud Creek to the west. Additionally, the conveyance route may intersect one freshwater forested/shrub wetland adjacent to, but outside of, the eastern boundary of the project area.
- One previously mapped NYSDEC freshwater wetland exists within the project area along the banks of Mud Creek to the west and a freshwater pond to the east, and two exist to the east along the proposed conveyance route.
- The project area is not located above or adjacent to a primary or sole source aquifer.
- The project area is in the vicinity of state-listed (i.e., endangered, threatened, or rare) plants and animals. Further consultation with the NYSDEC Regional Office is ongoing to determine whether the project may be harmful to state-listed species or their habitats. If it is determined that impacts to these species may occur, mitigation and/or minimization coordination may be required.

Review of the IPaC system indicates the following:

- Project activities could potentially affect the following federally protected species: northern long-eared bat (Myotis septentrionalis; endangered), the Indiana bat (Myotis sodalis; endangered), the tricolored bat (Perimyotis subflavus; proposed endangered), and the monarch butterfly (Danaus plexippus; proposed threatened).
- Review of the Natural Heritage Program (NHP) indicates the following in addition to the IPaC system:
  - Project activities could potentially affect the following species: Pied-billed grebe (Podilymbus podiceps; threatened), Bald eagle (Haliaeetus leucocephalus; threatened), Lake sturgeon (Acipenser fluvescens; threatened), and Hairy small-leaved tick trefoil (Desmodium ciliare; threatened).
- A habitat suitability assessment was completed for the Oak Orchard site and an assessment of the Conveyance Corridor is in progress. The assessment of the Oak Orchard site determined that impacts to the monarch butterfly, Lake sturgeon, Pied-Billed grebe are not likely to be affected by the project. Impacts to bats or bat habitat are not expected to occur if tree cutting and clearing can be avoided. Impacts to monarch butterflies are not expected to occur if disruption of large areas of milkweed and nectaring vegetation can be avoided. This information is being confirmed through ongoing federal agency coordination. If it is determined that impact avoidance is not feasible (e.g., tree clearing required or habitat is impacted), then additional minimization (e.g., adherence to time of year clearing restrictions) and/or mitigation coordination may be required as part of federal agency review.
- Additionally, EDR conducted site-specific wetland delineation within the Oak Orchard Site on July 30 and 31, 2024. A total of five wetlands and five streams were identified in the project

area, totaling 6.95 acres and 2,837 linear feet, respectively. Impacts to these wetland resources will require permits from the U.S Army Corps of Engineers (USACE) and/or NYSDEC.

- Two constructed wastewater treatment lagoons are located within the project area. The boundaries of these features were digitized based on arial imagery and verified in the field. The wastewater lagoons are presumed to be non-jurisdictional features as wastewater treatment facilities are specifically listed by the USACE as exclusions from Waters of the United States (WOTUS).

  Ramboll conducted wetland delineations within the Conveyance Corridor encompassing the 99-foot easement corridor along the proposed conveyance route between August 26 and September 18, 2024. Eleven wetlands were identified, including palustrine forested, palustrine scrub-shrub, and palustrine emergent wetlands, totaling 7.25 acres within the 23.1-acre easement corridor.

The review indicates that early coordination with USACE/NYSDEC will be essential for this project and as such, preliminary jurisdictional determination and mitigation planning is being coordinated and performed.

1.1.2.2 Floodplain Considerations

Portions of the Oak Orchard Site are within flood areas designated by Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs; included in Appendix C of the final submittal of this report). A majority of the site is in Zone X (minimal to moderate flood hazard area) with the westernmost edge of the site, adjacent to Mud Creek, being Zone AE (high flood hazard area) and a regulatory Floodway with a base flood elevation (BFE) of 369. A portion of the northern portion of the site is also located in Zone AE with a BFE of 369. The project area is not located above or adjacent to a primary or sole source aquifer.

As per the New York State Flood Risk Management Guidance, the final design will include elevation adjustments as follows:

- Non-critical equipment should be designed at least 2 feet above the BFE and the corresponding horizontal floodplain.
- Critical equipment should be designed at least 3 feet above BFE, or the 500-yr floodplain, whichever is more restrictive.

1.1.2.3 Project Impacts to Potential Environmental Justice Areas or Disadvantages Communities

Based on the Potential Environmental Justice Areas (PEJA) provided by the NYSDEC, the project area is not located within a PEJA or a Disadvantaged Communities (DAC).

1.2 Ownership and Service Area

The IWWTP and conveyance piping will be owned by the OCDWEP. As the project develops, OCDWEP will determine if OCDWEP will operate the facility or contract the operations to a third party. The IWWTP WRF will treat the industrial wastewater discharged by the new Micron manufacturing facility located approximately 2 miles away. The IWWTP service area will be limited to the Micron Campus initially. However, if additional users would like to discharge industrial wastewater to the IWWTP in the future, an evaluation of the proposed wastewater will be conducted to determine if service can be provided. The evaluation will be conducted through OCDWEP's industrial discharge permit application process.

1.3 Design Flows

FAB1 will be constructed first with full steady state production expected in July 2030. FAB2 construction will follow with steady state production expected in summer 2035. The wastewater flows from FAB1 and FAB2 are shown in Table 1-1.

Table 1-1. Wastewater Flows from FAB1 and FAB2

		FAB1			FAB1 and FAB2 Combined		
		Summer Average	Winter Average	Max Design Concentration	Summer Average	Winter Average	Max Design Concentration
Flow	MGD	6.8	8.25	8.25	13.60	16.5	16.5
	gpm	4,724	5,729	5,729	9,447	11,458	11,458

1.3.1 Population Data Obtained from the U.S. Census Bureau.

While the population is projected to grow, the Industrial WWTP will only provide service to industrial users and will be independent of population.

1.3.1.1 Planned and Anticipated Development

At this time, there are no planned or anticipated additional users for the IWWTP.

1.4 Existing Facilities and Present Condition

The new IWWTP WRF will be located on the existing Municipal WWTP site. The Municipal WWTP treats the municipal wastewater from the area. It is currently being upgraded in capacity and with water reclamation capabilities to accommodate additional sanitary wastewater and provide reclaimed water as required by Micron after the completion of FAB1. The Municipal WWTP expansion project is a separate project but has been and will continue to be closely coordinated with the IWWTP WRF project. The effluent from the IWWTP WRF discharges through internal outfall 01B to the combined Oak Orchard Campus Outfall 001.

The IWWTP WRF is located in the northern portion of the Municipal WWTP site near the Oneida River. A portion of the site currently contains a solar panel array and radio tower that will be demolished prior to the construction of this project.

1.4.1 Design Flows and Waste Loads – from Micron

Currently, there are no existing facilities on the project site. Micron proposes construction of a new semiconductor fabrication facility for the Town of Clay, New York, at the White Pine Commerce Park managed by the Onondaga County Industrial Development Agency (OCIDA) in Onondaga County. Up to four FABs are currently proposed over a 20-year period. FAB1 through FAB4 are anticipated to be fully completed by July 2030, July 2035, July 2040, and July 2045, respectively. The project is to be divided into two phases – Phase 1 will involve the construction of FAB1 and FAB2. Phase 2 will involve the construction of FAB3 and FAB4. Micron will provide UPW, decentralized wastewater, wastewater, and water reclamation treatment on their site with 60- and 55-percent water reclamation in the summer and winter periods, respectively.

1.4.1.1 Analysis of Production Rates for Processing and/or Manufacturing Operations -From Micron

Micron plans to use potable water provided by OCWA and will discharge early works (e.g., construction, RFE, and RFM) production and sanitary wastewater to OCDWEP Municipal WWTP as a bridge until the IWWTP WRF is completed. Ultimately, when the completed IWWTP for FAB1 has been expanded to include the WRF for FAB2, the IWWTP facilities will provide production wastewater treatment and reclaimed water for cooling water to Micron. A project schedule is presented in Appendix D.

1.4.1.1.1 Micron Provided Data

Micron's plan for UPW, decentralized wastewater, on-site wastewater, and water reclamation treatment has been evolving since 2023 with a complex semiconductor toolset planned for this facility. Micron's EPC firm that is completing a FEL3 for the fabrication facility has recently retained a vendor that will help Micron better define their wastewater discharge water quality and quantity at completion. Until that time, Micron has shared potential discharge options resulting in varying water quality and quantities.

Water quantities are generally contingent on the seasonal evaporative cooling and target water reclamation requirements. Micron anticipates needing between 1 and 5 million gallons (MG) of cooling water with higher volumes required in the summer months. Micron currently is targeting up to 60 percent water reuse or reclamation to meet Micron's sustainability goals for FAB1. This could increase during the progression of additional fabrication facilities and technologies. It is anticipated that Micron will share information on anticipated diurnal variations in flow that can be used to verify equalization strategies incorporated into the treatment system design.

Water quality is contingent upon the level of treatment that Micron will provide on-site. As a result, Micron will rely on total dissolved solids (TDS) being managed primarily with their wastewater discharges. Micron is considering different options with varying levels of chemical, physical, and biological treatment at their site. More site treatment generally results in less wastewater discharges from the fabrication facility because it facilitates more water reuse onsite. The OCDWEP team has been working with Micron to optimize the on-site treatment, working to minimize the amount of treatment needed at the IWWTP.

Wastewater Discharge

The most recent Micron data provided per the March 2025 OCDWEP Industrial Wastewater Discharge Permit Application and Questionnaire includes select parameters for the projected combined wastewater flow that will require treatment. These are also referred to by Micron as the latest Option 2.1 Rev 1. The projected wastewater discharge is presented in Table 1-2 below along with parameters estimated for use in modeling necessary in the development, sizing, and evaluation of the treatment of the two alternatives for the conceptual design discussed in Section 2.

Table 1-2. FAB1 and FAB2 Evaluation Basis of Design

Parameter[1]	Units	FAB1			FAB1 and FAB2 Combined		
		Summer Average	Winter Average	Maximum Design Condition	Summer Average	Winter Average	Maximum Design Condition[2]
Flow	MGD	6.80	8.25	8.25	13.6	16.5	16.5
	gpm	4,724	5,729	5,729	9,448	11,458	11,458
Influent Temperature	°C	30	25	30	30	25	30
	°F	86	77	86	86	77	86
pH		7.0	7.2	7	7.0	7.2	7.0
Total Organic Carbon (TOC)	mg/L	109	90	163	109	90	163
	lb/day	6,164	6,186	11,213	12,363	12,385	22,426
Chemical Oxygen Demand (COD)	mg/L	848	699	1,272	848	699	1,272
	lb/day	48,106	48,106	87,520	96,212	96,212	175,040
Total Suspended Solids (TSS)	mg/L	98	80	300	98	80	300
	lb/day	5,578	5,532	20,642	11,156	11,064	41,284
Total Dissolved Solids (TDS)	mg/L	1,826	1,515	3,400	1,826	1,515	3,400
	lb/day	103,561	104,243	233,937	207,122	298,486	467,874
Volatile Suspended Solids (VSS)	mg/L	20	16	60	20	16	60
	lb/day	1,116	1,106	4,128	2,232	2,212	8,256
Total Kjeldahl Nitrogen (TKN)	mg/L	75	75	75	75	75	75
	lb/day	4,255	5,160	5,160	8,510	10,320	10,320
Ammonia (NH_3) as N	mg/L - N	75	75	75	75	75	75
	lb/day	4,255	5,160	5,160	8,510	10,320	10,320
Nitrate (NO_3) as N	mg/L	59	49	89	59	49	89
	lb/day	3,370	3,371	6,132	6,740	6,742	12,264
Total Phosphorous (TP)[3]	mg/L	1.8	1.5	1.8	1.8	1.5	1.8
	lb/day	102	107	124	204	214	248
Phosphate (PO_4) as P	mg/L	17	14	17	17	14	17
	lb/day	964	995	1,170	1,928	1,990	2,340
Total Alkalinity[3]	mg/L	Not Provided					
	lb/day						
Aluminum (Al)	mg/L	0.80	0.72	0.80	0.80	0.72	0.80
	lb/day	45	50	55	90	100	110

Table 1-2. FAB1 and FAB2 Evaluation Basis of Design							
Parameter[1]	Units	FAB1			FAB1 and FAB2 Combined		
		Summer Average	Winter Average	Maximum Design Condition	Summer Average	Winter Average	Maximum Design Condition[2]
Barium (Ba)	mg/L	0.40	0.31	0.40	0.40	0.31	0.40
	lb/day	23	21	28	46	42	56
Calcium (Ca)	mg/L	104	87	104	104	87	104
	lb/day	5,902	5,974	7,158	11,804	11,948	14,316
Chloride (Cl)	mg/L	179	150	179	179	150	179
	lb/day	10,154	10,303	12,316	20,308	20,606	24,632
Copper (Cu)	mg/L	0.41	0.33	0.41	0.41	0.33	0.41
	lb/day	23	23	28	46	46	56
Fluoride (F)	mg/L	9.2	7.6	9.2	9.2	7.6	9.2
	lb/day	521	524	632	1,042	1,048	1,264
Magnesium (Mg)	mg/L	19	17	19	19	17	19
	lb/day	1,078	1,137	1,307	2,156	2,274	2,614
Total Silica (TSi)	mg/L as SiO2	57	47	57	57	47	57
	lb/day	3,243	3,233	3,933	6,486	6,466	7,866
Sodium (Na)	mg/L	234	194	234	234	194	234
	lb/day	13,275	13,359	16,100	26,550	26,718	32,200
Sulfate (SO_4)	mg/L	763	635	763	763	635	763
	lb/day	43,284	43,700	52,498	86,568	87,400	104,996
Isopropyl Alcohol (IPA)	mg/L	206	190	206	206	190	206
	lb/day	11,681	13,102	14,167	23,362	26,204	28,334
Hydrogen Peroxide (H_2O_2)	mg/L	50	50	50	50	50	50
	lb/day	2,836	3,440	3,440	5,672	6,880	6,880
Tetramethylammonium Hydroxide (TMAH)	mg/L	49	40	49	49	40	49
	lb/day	2,764	2,764	3,353	5,528	5,528	6,706

1. *During the preparation of this report, Micron revised the projected effluent wastewater characterization. These new values will be considered during the preparation of the preliminary design report.*
2. *FAB1 Maximum Design Condition doubled for FAB2 Maximum Design Condition, which includes all flows to treatment system.*
3. *Peaking factor of 1.5 considered for peak day conditions*

Noteworthy Wastewater Parameters

The following are noteworthy assumptions and information provided in the Micron discharge basis of design criteria for Alternatives 10 and 11.

- Isopropyl Alcohol (IPA) – IPA makes up the majority of the organic/chemical oxygen demand (COD) or carbon loading of the wastewater discharges and is readily degradable at the concentrations provided. Adding additional IPA past what has been considered would result in further nitrate reduction and increased biomass production. Additional carbon sources should be investigated if the available IPA is unable to provide sufficient carbon for the treatment of the wastewater.
- TDS – TDS is the total material residue that includes inorganic and organics in water that can pass through a 0.45 to 1.5 micrometer (µm) filter that the Standard Methods allows. Values provided by Micron as part of the Option 2.1 Rev 1 water quality data Chemistry Data.
- Total Suspended Solids (TSS) – TSS is the particulate matter in the wastewater stream that is made up of both inorganic (fixed) solids and organic solids. Most of the solids discharged are anticipated to be inorganic solids. Average TSS values were included as part of the Option 2.1 Rev 1 Chemistry Data.
- Volatile Suspended Solids (VSS) – Organic makeup of TSS consisting of both inert and biodegradable solids. VSS was assumed to be 20 percent of the TSS values reported.
- Total Kjeldahl Nitrogen (TKN) – Total concentration of organic nitrogen and ammonia. The value of 75 milligrams per liter (mg/L) is based on maximum allowable discharge Micron is able to discharge per Micron's Preliminary Wastewater agreement with Onondaga County dated 02/07/25.
- Tetramethylammonium Hydroxide (TMAH) – TMAH is biodegradable and a critical chemical widely used for photolithography and etching. It therefore one of the primary constituents discharged contributing to TKN, and ultimately ammonia nitrogen to be nitrified.
- Ammonia Nitrogen (NH_3-N) – Ammonium (NH_4+) value included as part of Option 2.1 Rev 1 Chemistry Data. Value is presented as NH_3-N to represent the nitrogen concentration in the waste stream. Assumed value is equal to TKN with no organic nitrogen in the wastewater.
- Total Phosphorous (TP) –Total concentration of both dissolved and particulate phosphorous which is further made up of ortho phosphorous, inorganic, and soluble organic phosphorous. Assumed that all TP would consist of ortho phosphorous.
- Ortho Phosphorous (PO4-P) – Ortho phosphorous is the simple form of phosphorous available for use as macronutrient. Assumed that PO4-P values were equal to TP values.
- Chemical Oxygen Demand (COD) – Average values provided by Micron based on information captured in models developed by FTD solutions for Micron.
- Hydrogen Peroxide (H_2O_2) – H_2O_2 discharged from production would be limited to 50 mg/L in order to reduce the supplemental COD requirements and/or other (e.g., catalase, sulfite, etc.) reducing chemicals.
- Per and Polyfluoroalkyl Substances (PFAS) and mercury – Micron stated during the workshops that PFAS and mercury are anticipated in low concentrations in the waste load coming from their facilities. These compounds will be limited in the discharge from Micron to a level that can be removed in the biological treatment to values below the discharge requirements.
- Azoles – Based on Micron's organic wastewater constituents document provided on December 16, 2024, the total azoles from Micron coming to the IWWTP WRF amounted to 10,681 pounds per year (lb/yr). The total azoles are composed of 1,2,4-triazole (8,677 lb/yr), 1-hydroxybenzotriazole (1,508 lb/yr), and 6-methylbenzotriazole (496 lb/yr). At the design summer flow of 6.8 million gallons per day (MGD), the total azoles load corresponds to a concentration of 0.52 mg/L. At the design winter flow of 8.25 MGD, the total azoles load corresponds to a concentration of 0.41 milligrams per liter (mg/L). Based on BC's previous work

and literature, further reduction of total azoles may be required before discharge to the biological treatment system.

- Silica – Data on silica was provided as Total Silica. No further information was provided on reactive versus non-reactive silica. It was assumed that all silica is reactive to be conservative when designing the reclaim water treatment.
- Micronutrients – Metals in the influent were reviewed to understand if micronutrients needed to be added to promote biological growth and removal of constituents in the wastewater. Values published by Dr. James Young were considered. Additional information is needed to understand if micronutrient addition is necessary for cobalt, iron, and nickel. Values for calcium, copper, magnesium, and sodium are understood to be available at concentrations that meet this demand. Due to the sludge age considered for treatment of this wastewater, addition of typical micronutrients were assumed to be non-essential in meeting treatment requirements. However, the addition of iron, cobalt, nickel, zinc or other micronutrients may improve dewaterability and can be tested on a trial basis following startup of the IWWTP.
- Sanitary - It was assumed that no sanitary wastewater will be coming to the IWWTP WRF. Addition of sanitary would introduce debris that could impact the downstream process. Carbon provided by the sanitary would be minimal compared to IPA.
- Temperature- Documentation provided by Micron indicates that processes temperature will range between 72°F and 89°F. The cold temperature of 77°F was considered for winter and 86°F for summer based on temperature modeling performed by BC.
- Alkalinity – Alkalinity is the summation of bases that allow for buffering above a pH of 4.5 with the majority of alkalinity being associated with carbonate compounds. Assumed sufficient alkalinity.
- pH - A value of 7.0 was assumed based on information captured in models developed by FTD solutions for Micron.

Reclaim Water Requirements

Micron also provided water quality criteria for cooling water requirements that are shown in Table 1-3 below.

Table 1-3. PUB NEWater Quality (Typical Values)

Parameters	Unit	WHO Guideline Value*	Typical Value
Microbiological Parameters			
Escherichia coli (E. coli)	colony forming units (cfu)/100mL	<1	<1
Heterotrophic Plate Count (HPC)	cfu/mL	-	<1
Physical Parameters			
Color	Hazen	-	<5
Conductivity	Microseimens per centimeter (μS/cm)	-	<250
Chlorine	mg/L	5	<2
pH Value	Units	-	7.0-8.5
Total Dissolved Solids (TDS)	mg/L	-	<150

Table 1-3. PUB NEWater Quality (Typical Values)			
Parameters	Unit	WHO Guideline Value*	Typical Value
Turbidity	Nephelometric Turbidity Units (NTU)	5	<5
Chemical Parameters			
Ammonia (as N)	mg/L	-	<1.0
Aluminum	mg/L	-	<0.1
Barium	mg/L	1.3	<0.1
Boron	mg/L	2.4	<0.5
Calcium	mg/L	-	<20
Chloride	mg/L	-	<20
Copper	mg/L	2	<0.05
Fluoride	mg/L	1.5	<0.5
Iron	mg/L	-	<0.04
Manganese	mg/L	-	<0.05
Nitrate (as N)	mg/L	11	<5
Sodium	mg/L	-	<20
Sulphate	mg/L	-	<5
Silica (as SiO_2)	mg/L	-	<3
Strontium	mg/L	-	<0.1
Total Trihalomethanes Ratio	-	<1	<0.04
Total Organic Carbon (TOC)	mg/L	-	<5
Total Hardness (as $CaCO_3$)	mg/L	-	<50
Zinc	mg/L	-	<0.1

Urea: <0.005 mg/L or non-detect (ND)

The NEWater potable water standards were developed primarily for industrial and cooling purposes at semiconductor manufacturing plants, petrochemical plants, industrial parks, and commercial buildings. PUB NEWater Quality criteria exceed typical US industry water quality criteria for cooling towers as defined by SPX, BAC, Electric Power Research Institute (EPRI), and Puckorius/CTI. US cooling towers can utilize lesser quality water, and the OA Team will work with Micron to establish the Water Quality Criteria for Cooling Towers in the next phase of the design.

The reclaim water will have an internal outfall at the IWWTP WRF for monitoring of discharge quality.

1.4.2 Discharge Requirements

This section provides a description of potential pretreatment limits as well as considerations for discharge of residuals from the IWWTP. At the completion of FAB1, the IWWTP will have an internal outfall (preliminarily named “outfall 01B”) and monitoring station which is then combined with the Municipal WWTP discharge to Outfall 001. This outfall is being designed by Carollo.

At the completion of FAB2, the IWWTP will include the WRF which will have a discharge and monitoring station for the reclaim water pumped back to Micron.

1.4.2.1 Industrial Point Source `Pretreatment Limits

Micron has indicated the facility is subject to 40 CFR Part 469—Electrical and Electronic Components Point Source Category, Subpart A—Semiconductor Subcategory. Micron has applied for a permit from OCDWEP, and this permit will contain the total toxic organics (TTO) effluent limitations included in 40 CFR 469.18 Pretreatment standards for new sources. In addition to the federal technology based effluent limits (TBELs), technically based local limits (TBLLs) will also be developed and incorporated for protection of pass-through and interference. Pretreatment permit limits are anticipated to include, but not limited to, PFAS, mercury, hydrogen peroxide, cyanide, and metals.

1.4.2.2 Preliminary Estimates on the NY SPDES Permit Limits

The Municipal WWTP currently operates under SPDES Permit NY0030317, with treated wastewater discharged to the Oneida River via existing Outfall 001. The current SPDES permit is included in Appendix E of this report. OCDWEP is planning to replace the existing Municipal WWTP outfall; the IWWTP will connect to the new outfall as internal outfall 01B. Both treatment trains will operate under a single SPDES Permit, with internal outfalls at the effluent of each before combining. Water Quality Based Effluent Limits (WQBELs) will be applied at the combined Outfall 001 while TBELs will apply at the internal outfalls, and as allocated by the owner, if need be, for the Municipal WWTP and IWWTP.

Carollo is preparing an SPDES permit modification application to request inclusion of all planned changes to the Municipal WWTP as well as an addition of the IWWTP for Micron's FAB1 and FAB2. FAB3 and FAB4 are not being included in this permit modification request because these are outside the 5-year permitting window.

NYS Surface Water Quality Standards (WQS) for Class B waters apply to the Oneida River. NYSDEC guidance for development of WQBELs using dilution modeling are documented in NYSDEC's Technical and Operational Guidance Series (TOGS) 1.3.1 (July 1996). Carollo is in the process of modeling dilution using the CORMIX model to determine the appropriate WQBELs for the combined Municipal WTP and IWWTP discharge to protect surface water quality in the Oneida River. Without the completed CORMIX model results, conservative assumptions were made on the amount of assimilative capacity and mixing achievable with a new diffuser. In addition to the mixing provided by diffuser design, several other factors impact WQBELs including background instream concentrations (still under investigation), in stream critical low flows (still under investigation), and instream modeling of oxygen demanding substances (still under investigation). Carollo is investigating these variables with support from OA as needed. In the interim, assumptions were made to account for these variables to predict projected WQBELs (included in Appendix F). More definitive WQBELs will replace these values after further coordination with Carollo and NYSDEC. Final WQBELs will be available in the modified SPDES Permit.

1.4.2.3 Landfill Requirements for Biosolids and Brine Solids

Solids produced will be disposed of according to federal, state, and local regulations to ensure environmental and public health protection. The solids will need to be disposed of according to the contents and quality as determined through waste characterizations (toxicity characteristic leaching procedure [TCLP], moisture, etc.) Specific requirements will be detailed as design progresses. Landfilling of biosolids will be done in accordance with 6 CRR-NY 363-7.1 (j) (i.e., biosolids will be stabilized, dewatered to at least 20-percent solids, and exhibit no free liquid as defined by SW-846 Method 9095 - Paint Filter Liquids Test). Options for landfilling in the NY state area are limited and thus solids handling will be a focus of the design as it progresses.

Additionally, when FAB2 becomes operational, brine solids will be generated and require disposal. Pilot testing is recommended during FAB1 operation to generate water that can be used to create brine solids that can be analyzed to determine if characteristics are nonhazardous in accordance with 6 CRR-NY 371, with additional treatment considerations, if warranted. Brine solids disposal options being further investigated include landfilling in an industrial waste landfill or transporting to either Pennsylvania or Ohio for deep well injection at an existing disposal facility.

1.5 Definition of the Problem

Micron is proposing to construct a semiconductor manufacturing campus in the Town of Clay, New York, at the White Pine Commerce Park (Micron Campus). The Micron Campus will be built-out in phases over an approximate 20-year period. It will consist of the construction of at least two FABs. The FABs are plants where silicon wafers are turned into integrated circuits and computer chips that power personal computers, cell phones, and other electronic devices. To support the Micron Campus, OCDWEP is proposing to construct, operate, and maintain a new IWWTP WRF to treat the industrial wastewater produced by FAB productions and provide reclaim water.

1.6 Financial Status

OCDWEP is responsible for the infrastructure and maintenance of six wastewater treatment plants, approximately 185 pump stations, and nearly 2,000 miles of sewer pipe. The system, in conjunction with locally owned sewer infrastructure, serves approximately 410,000 residents within the County's Consolidated Sanitary District. The County's budget generates revenue through multiple sources, primarily through the Sewer Unit Charge.

The Sewer Unit Charge is a user fee billed to all properties that have a connection to the County's sanitary sewer system. The fee supports the costs associated with the operation and maintenance of the six wastewater treatment plants. It also provides funding for necessary capital improvements.

As this project includes OCDWEP's first and only facility dedicated to treating industrial wastewater, a Single User Industrial Sewer Use Fee is being developed to support the costs associated with the operation and maintenance on the IWWTP facility as well as capital cost. If additional industrial users are approved to discharge, the industrial user fee will be adjusted accordingly to a multi-user industrial fee, including any improvements or capital needed at that time to receive additional wastewater.

Section 2

Summary and Comparison of Alternatives

2.1 Alternative Comparison Criteria

Appendix G provides a summary comparison matrix of the 11 alternatives considered for the Onondaga County IWWTP WRF during the conceptual engineering effort. Additionally, Appendix G provides block flow diagrams for each. These alternatives were developed considering, but not limited to, the following requirements developed by OCDWEP:

1. Reliability: The proposed IWWTP shall continuously operate and meet applicable law and contract standards such that the needs of OCDWEP, Micron, Onondaga County, its residents and other stakeholders are met throughout the design, construction, and operation; providing reliable long-term operation.
2. Anticipated Cost: Design shall focus on capital and life-cycle costs through alternatives evaluation, collaboration, and value engineering with consideration for construction and long-term operation.
3. Phasing: Design and execution shall include forward thinking and phasing to provide a logical cost-effective plan to meet future expansion and/or modifications to operations that may be needed for changing wastewater conditions or applicable law.
4. Schedule: Project will be a progressive design-build. The schedule is tight and will be a driver for success with completion dates identified herein for design, construction, commissioning, and operation. Meeting the milestone dates will be critical. Onondaga County and State Agency representatives intend to meet in September 2025 to discuss design-build approach for the IWWTP project and will include details on how design-build will be implemented, expectations on design submissions, and schedule.
5. Risk: Risks shall be clearly identified. OCDWEP IWWT team and the design-build team shall work collaboratively to reduce risk during the design and bidding phases of the project.
6. Health and Safety: Implement an effective safety program that incorporates OCDWEP standards and industry best practices.
7. Operability: IWWTP WRF shall be designed for ease of operations and to protect operations staff from injury.
8. Accessibility: IWWTP WRF shall be easily accessible for operations, outside deliveries, and hauling of waste.
9. Aesthetics: IWWTP WRF shall not impact the surrounding community from a visual or odor standpoint.
10. Adaptability: Controls are flexible to adapt and be modified as needed to changing conditions and drive operational improvements and efficiencies.
11. Standards: Project design shall meet OCDWEP county standards as well as industry standards where applicable within project cost structure and objectives.
12. Footprint: The IWWTP WRF layout shall fit within the footprint identified by OCDWEP.

2.1.1 Alternatives 1 through 3

Alternatives 1 through 3 were ruled out because of the following:

- Inability to meet anticipated SPDES requirements in particular with TDS.
- Each alternative resulted in large quantities of chemical treatment solids from softening and calcium sulfate precipitation.
- Applying chemical clarification on the entire influent flow required large area requirements for the clarifiers in addition to greater TDS contribution.
- No removal of sodium and chlorides.
- Cycling effects of TDS with reverse osmosis (RO) reject recycle.

2.1.2 Alternatives 4 through 6

Alternatives 4 through 6 were determined not to be feasible because of the following:

- Larger footprint with Bardenpho biological nitrogen removal (BNR), strong base anion (SBA) IX, and RO reject chemical treatment systems.
- Larger quantities of residuals resulting from both chemical and thermal treatment systems.
- Largest number of unit processes applied to treatment resulting in higher costs.
- Largest amount of chemicals required including supplemental COD, acids, bases, sodium aluminate, magnesium hydroxide, and lime.
- Most operational complexity.

2.1.3 Alternatives 7 through 9

Alternatives 7 through 9 were determined not to be feasible because of the following:

- Larger footprint with Bardenpho BNR (alternative 9 only), SBA IX, and RO reject chemical treatment systems
- Larger quantities of residuals resulting from both chemical and thermal treatment systems
- Largest number of unit processes applied to treatment resulting in higher costs
- Largest amount of chemicals required including supplemental COD, acids, bases, sodium aluminate, magnesium hydroxide, and lime
- Most operational complexity

2.1.4 Alternatives 10 and 11

See Section 3 below.

Section 3

Alternative Analysis

Due to the changes in water quality and quantities prescribed by Micron associated with the advancement of their engineering for the Fabrication Facility, the advancement of the SPDES permit modeling and development work to define discharge water quality requirements and OCDWEP's objectives, a total of 11 alternatives for the IWWTP WRF were developed. These alternatives were evaluated and screened to find a feasible alternative for advancement of the engineering work for use in the EPC RFP as part of the conceptual design work. This will be further developed into a preliminary design for the EPC RFP by November 2025. The complete list of alternatives developed, considered, and selected are presented in Section 3 below. The alternatives that were selected and have been developed as design concepts are presented below. These will be further refined with advancement of the engineering as part of the preliminary design.

No Action was not considered a feasible alternative as Micron's facility will generate a complex industrial wastewater stream that the existing Oak Orchard facility is not designed, sized, or equipped to handle at full load. A new construction project to treat the industrial wastewater stream from Micron is the only available option for the total fabrication facilities' wastewater flows. No information for additional industrial facilities was available during this phase of design.

At the current level of design, green infrastructure has not been included in the design. It will be considered when the design begins to include site civil engineering. It is assumed this project will increase the impervious area and therefore stormwater outfalls to the local surface water will be necessary.

The two technically feasible IWWTP WRF alternatives for treatment of Micron's process wastewater discharges are described in the following sections. Alternative 10 discusses the treatment process for FAB1, and Alternative 11 discusses the treatment for the additional flow once FAB2 is operating.

3.1 Alternative 10: Micron Fabrication Facility 1 Treatment IWWTP

Alternative 10 provides biological treatment for the wastewater generated during the operation of FAB1 that can be upgraded for FAB2 (with additional biological treatment in like kind and chemical physical treatment for reclaim water – see Section 3.2 Alternative 11).

3.1.1 Proposed Design Concept

A conceptual design for Alternative 10 is included as Appendix H. This includes the following:

1. A high-level process flow diagram (PFD) depicting the IWWTP.
2. A mass balance which predicts the performance of the system by detailing the flow and water quality of individual streams through the treatment process. The balance was also used to size equipment. This mass balance will be refined while working with Micron to establish pretreatment permit and treatment requirements at the fabrication facilities.
3. A major equipment list which provides details of the equipment included in this alternative.
4. A general arrangement is included to show the preliminary location of the equipment on the site.

Figure H-1 in Appendix H provides a PFD for the FAB1 IWWTP. Industrial wastewater from FAB1 will be pumped from Micron's wastewater pump station to the IWWTP facility located adjacent to the

Municipal WWTP. The first component of the IWWTP is an equalization tank used to dampen the influent loading variations. The system also includes a diversion tank to contain slug loads and high flows from the Micron facility and bleed the slugs/excess flow into the equalization tank for conveyance into the treatment system. Flow from the equalization tank is pumped though self-cleaning horizontal filters to protect the downstream ultrafiltration (UF) membranes treatment trains from stringy materials and solids greater than 2 millimeters. The screened wastewater then flows into two parallel anoxic reactors. During anoxic treatment, nitrates in the wastewater will be denitrified utilizing residual carbon from the influent wastewater. The effluent from the anoxic tank will flow by gravity to the aerobic tank where organics will be degraded and ammonia will be nitrified. The treated wastewater from the aerobic tank flows by gravity to the membrane bioreactor (MBR) where the UF membranes pump filtered wastewater to the effluent tank. Up to 80 percent of the forward flow is pumped back to the anoxic zone to remove nitrates and nitrites generated in the nitrification process while the remaining 20 percent is bypassed. The 80 percent that is returned will be returned from the MBR at 4X the forward flow. Water collected in the effluent tank is now very low in solids, organics, and nitrogen. The effluent is then pumped to ultraviolet (UV) disinfection and discharged to the Municipal WWTP outfall with ultimate discharge to the Oneida River.

Biosolids from the membrane tank are recycled to the bioreactors or wasted to solids handling which is comprised of gravity thickening followed by centrifugation for dewatering.

The majority of the tankage for the process is shared wall concrete construction to minimize the footprint of the treatment system.

3.1.1.1 Equalization Tank

A 3-MG above ground concrete equalization tank will receive influent to be treated by the biological treatment process. The equalization tank will be equipped with an eductor or jet type mixing system to blend the contents. The function of the equalization tank will be to reduce peaks in flow and concentrations as a means to maintain a normalized or equalized flow. Normalized flow aids in providing consistent treatment and reducing peaks experienced. Because the construction is anticipated to be shared wall concrete tanks for the FAB1 system, the equalization tank (and diversion tank described in Section 3.1.1.2 below) are designed for the FAB2 flow to simplify construction. A minimum hydraulic retention time (HRT) of four hours was considered for the equalization tank under a peak flow of 16.5 MGD for the combined FAB1 and FAB2 discharge. The short retention time for four hours along with the H_2O_2 in the influent will minimize the risk of biological growth and related odor concerns. By installing the equalization tank ahead of FAB1, time for the construction and installation for FAB2 would be reduced. This will be operated at a constant volume. By operating at a constant volume, any variations in the influent wastewater would be reduced. Equalization sizing may be revised based upon diurnal flow information provided by Micron as their design progresses (see Section 1.4.1.1).

Continuous complete mixing would be necessary for the equalization tank. Tank mixing would be accomplished through the use of an eductor. The eductor relies on the use of a mix pump to pump the contents of the equalization tank through the eductors in a pipe header system in the tank. The forward or motive flow through an eductor results in a venturi effect or vacuum such that each unit volume of forward flow pumped through the eductor typically results in up to four- to-six-unit volume of flow being combined resulting in a high rate of mixing thereby turning the tank volume over four to six times per day. The liquid leaving the eductor would be discharged at an increased rate (direct and induced flow) resulting in a completely mixed environment.

3.1.1.2 Diversion Tank

A 3-MG above ground concrete offline diversion tank is included for use in conditions where surplus volume is discharged and/or further dampening of wastewater influent loads are required (such as maintenance activities). The contents of the diversion tank would be discharged to the equalization tank. This tank is also equipped with eductor or jet type mixing to blend the contents and will provide additional equalization and allow off-specification discharges to be metered back into the mainstream wastewater to be treated to avoid upset conditions. A minimum HRT of four hours was considered for diversion of 16.5 MGD under the combined Micron FAB1 and FAB2 discharge. This tank would operate as needed and not on a continuous basis. Like the equalization tank, the diversion tank would rely on the use of an eductor for a complete mixed environment.

The contents of the diversion tank would be pumped back to the equalization tank. The discharge from the diversion tank will be discharged at a controlled pace to minimize variability in downstream loading.

3.1.1.3 Influent Screening

Process water collected in the equalization tank will be pumped through horizontal self-cleaning stainless-steel screens with perforations of 2 millimeters (mm) to capture fine particles that have the potential to foul downstream treatment equipment (such as UF and RO processes). The screened water would then discharge to the biological treatment system. The backwash generated from the screens will discharge to the downstream gravity thickeners ahead of dewatering.

3.1.2 Biological Treatment

The screened influent would discharge to completely mixed above ground concrete anoxic tanks. The anoxic process is conducted by a group of heterotrophic organisms that require organic carbon to reduce nitrate. IPA in the influent is able to serve as the carbon source to facilitate this process. External carbon sources can be evaluated to understand if other carbon sources such as MicroC, acetate, methanol, or glycol provide more efficient treatment compared to IPA alone. Each anoxic tank was sized for 1.05 MG. Each anoxic tank would operate at an oxidation reduction potential (ORP) of -100 to 50 millivolt (mV) and dissolved oxygen (DO) concentration less than 0.5 mg/L. Operating at the reduced ORP would facilitate the removal of organics and nitrate. The contents of the tank would be kept completely mixed to allow biomass to remain in suspension and in contact with organics and nitrate. Mixing would be accomplished by low-speed vertical mixers These were considered due to the low energy usage of these mixers and ability to minimize oxygen entrainment. In this process nitrate would be converted to nitrogen gas. During the anoxic process alkalinity would be produced to aid in regulating pH. The pH in that anoxic tank should remain between 6.5 and 7.5.

Effluent from each anoxic tank will flow by gravity to a 5.7-MG above ground concrete aerobic treatment tank. The aerobic treatment tank would serve to reduce NH_3-N and organics discharged from the anoxic tank. The aerobic treatment tank will rely on an online sensor to monitor DO concentration in the aeration tanks continuously. Positive displacement (PD) blowers will be started and adjusted as needed to maintain a DO of 2 mg/L in the mixed liquor. As an alternative to DO, use of ORP probes may be considered to target select ORP ranges. 800 horsepower (HP) of blowers will satisfy oxygen transfer needs of under average conditions while 1300 HP of blowers would be needed to satisfy oxygen transfer needs under peak conditions. Each aeration tank would be equipped with an aeration grid to accommodate operation of 1300 HP of blowers simultaneously. The pH in the aeration tank should remain between a pH of 6.5 to 7.5.

Alkalinity in the form of 50-percent sodium hydroxide (NaOH) will be added as needed to control pH and maintain effluent bicarbonate alkalinity. Additional phosphorous will be added as 75-percent phosphoric acid (H_3PO_4) to meet the phosphorous macronutrient deficiency. Addition of 75-percent

H_3PO_4 is anticipated to range from 28 gallons per day (gpd) to 54 gpd. Micronutrient deficiencies are not expected based on the makeup of the influent wastewater.

3.1.3 Membrane Bioreactor

Liquid solids separation will be provided by a submerged UF membrane coupled with the anoxic and aerobic bioreactors (MBR) to produce high-quality effluent. Water from the aerobic biological treatment tank for the biological treatment process will overflow by gravity to the above ground concrete membrane tanks operating in parallel. Outside-in, dead-end-flow, hollow fiber membranes were considered for these alternatives. Permeate pumps pull clean water through the membranes into the BIOX effluent tank at 7 to 10 gpd per square foot of membrane (gpd/ft^2).

During FAB1 conditions, the treated effluent from the permeate tank will be pumped to UV treatment for disinfection. Biomass maintained in the MBR tanks will be returned to the anoxic tanks as return activated sludge [RAS]) or wasted from the treatment process as waste activated sludge (WAS) to maintain an optimal mean cell residence time (MCRT). An MCRT of 25 days was considered for the Modified Ludzack Ettinger (MLE) process. By operating at an MCRT of 25 days, more robust treatment of the influent constituents would be provided compared to an MCRT of 8 days implemented at a typical municipal wastewater treatment facility. Operation at a lower MCRT is possible but may result in increased biological wasting and reduced effluent quality. Both RAS and WAS pumps will be operated to handle these streams. While RAS is recycled, the WAS from the MBRs will be pumped from the membrane tank to a gravity sludge thickener to further concentrate the biological solids ahead of centrifuge dewatering.

The MBR includes scour blowers and chemical dosing equipment. Both of these systems are utilized to aid in increasing the transmembrane pressure (TMP) due to biological and chemical fouling. The scour blowers provide a high burst of air to scour sludge buildup on the MBR membranes. These operate continuously during operation. As part of maintenance of the MBR systems, clean in place (CIP) chemical cleanings are implemented. Chemical cleanings typically rely on the use of sodium hypochlorite (NaOCl) to reduce biological fouling and citric acid to reduce inorganic scale. The chemicals are dosed to the CIP tank. The equipment used to dose these chemicals is included as part of the MBR system. Periodically, the UF membranes will require a deeper recovery clean. Membranes are sized to be able to take one unit out of service at a time for a deep recovery clean as needed. Due to the constituents in the influent (e.g., silica), coordination with the MBR vendor should be considered for pilot or bench scale testing to validate the performance of the MBR as well as the chemical cleaning regime to consider prior to startup.

3.1.4 Solids Handling

Alternative 10 will produce waste biosolids from the MBR process. Under the average FAB1 basis of design, the MLSS is anticipated to be low (<4,000 mg/L). Biosolids generated in the IWWTP are expected to be considerably more difficult than municipal biosolids to dewater due to the lack of fibers and solids in the influent stream. To increase the concentration of the solids and reduce dewatering time, a 70-ft diameter above ground steel sludge thickener was included to allow solids to thicken to approximately 12,000 mg/L. The settled solids will be pumped to centrifuges while the supernatant from the gravity thickeners will flow by gravity to a sump located in the wastewater operations building. A single thickener was considered as the solids can be pumped directly from the MBR to the centrifuges if needed if maintenance is required for the thickener.

Polymer would be added to the feed line for the centrifuges to improve the dewaterability. Through the use of a centrifuge, chemically conditioned sludge with a solids content exceeding 20 percent will be generated. The process will be adjusted based upon landfill requirements, but it is expected that lime and/or another bulking agent will be added during the sludge handling process. The dewatered sludge generated from the centrifuges will be collected and disposed of offsite in a landfill. Alternative 10 only produces biological solids, no other solids requiring disposal result from the treatment process during this phase of operation. Chemical solids will be produced under Alternative 11 and are discussed in Section 3.2.6. Disposal options for the biological and chemical solids will be further investigated as the design progresses as discussed in Section 1.4.2.3.

The liquid generated (centrate) from the centrifuge will be captured in the centrate sump located below the centrifuges. Liquid collected in the centrate sump will be pumped back to the front of the biological treatment process. Pumping sump contents to the equalization tank was not considered as this could result in unintended biological seeding that would degrade readily degradable substrate.

There is potential for odors in the solids handling building due to the use of sulfur reducing agents in the upstream Micron operations to ensure longevity of equipment, minimize pipe corrosion, and minimize semiconductor wafer contamination. Vapor phase scrubbers will be used to provide odor control in the solids handling building, allowing for multiple air changes to reduce odor. A determination will be made in the next phase of the design whether a bioscrubber or a carbon scrubber for vapor phase will be used for this application. The scrubbers may be determined to be unnecessary if lime or other stabilization techniques are used in the solids handling process.

3.1.5 pH Control and UV Treatment

Effluent from the MBR is stored in the BIOX Effluent Tank. This tank serves three purposes. The first is for chemical addition for final pH adjustment to ensure the effluent is within the required pH range. The second is to act as a clean water supply tank for the CIP processes which clean the membranes in the MBR. The third purpose is to act as a wet-well for pumping the treated water to UV disinfection and discharge.

At FAB1, the biologically treated effluent will undergo UV disinfection. It is unlikely that the discharge will contain any pathogens but UV treatment will act as a safeguard and provide quality assurance in the event that reuse of this water is considered in the future. . The current specification targets an industry UV dose of 30 millijoules per square centimeter (mJ/cm^2) (up to 8.25 MGD flow). This design assumes a minimum UV transmittance (UVT) of approximately 65 percent for the biological effluent. The system will utilize low pressure UV lamps and is sized to disinfect the full flow from the biological treatment process.

3.1.6 Discharge

After the UV process and prior to discharge through the 001B outfall, the treated and disinfected wastewater flows through a sampling location equipped with a composite sampler and flow meter for compliance monitoring.

3.1.7 Stormwater

Currently, the treatment system is in the conceptual design phase. Stormwater management will be considered during future design phases. It is recognized that the site will be creating significant impervious areas and there will likely be multiple stormwater outfalls to the Oneida River or local tributaries and therefore the State of New York’s approaches to green infrastructure should be considered in the development of the site.

3.1.8 Impact on Existing Facility

This is a greenfield project with separate treatment processes from the Municipal WWTP, and no direct impact to the facility is anticipated.

3.1.9 Outfall Configuration

Carollo is designing a new outfall in conjunction with the appropriate agencies. The IWWTP will be assigned a separate, internal outfall (preliminarily called "outfall 01B") for monitoring and compliance purposes prior to combining with Municipal WWTP flow and discharging via outfall 001 to the Oneida River. Compliance monitoring will occur at the internal outfall 01B, as required in the final SPDES permit that will be issued by NYDEC.

3.1.10 Land Requirements

This project will be contained in the Oak Orchard site which is owned by OCDWEP. It is not anticipated that additional land will be required for the IWWTP. A general arrangement drawing is included in Appendix H of this document.

3.1.11 Environmental Impacts and Mitigation Measures

The proposed alternatives would have minimal impact on the environmental resources in the project area. The IWWTP location would be adjacent to the existing Municipal WWTP. Efforts will be made to avoid impacts to environmental resources (e.g., wetlands, streams, habitat) to the maximum extent practicable. Any unavoidable impacts will be minimized and reviewed with the appropriate agencies in support of a USACE Permit and/or NYSDEC Article 24 permit. Any loss of wetland would be mitigated per USACE and/or NYSDEC requirements. Other best management practices to be implemented such that adverse environmental impact can be avoided or minimized include limited tree clearing, clearing during winter months, implementation of erosion and sediment control measures, and site monitoring/inspections during construction.

3.1.12 Potential to Meet Limits by DEC

Alternative 10 was developed to comply with the anticipated discharge requirements for the internal outfall 01B as well as the overall compliance for the combined flow to Outfall 001. Appendix H presents mass balances prepared under several conditions (Winter Average, Summer Average, and Maximum Design Concentration) to predict the water quality of the discharges. The mass balances also present the biological modeling results, other performance assumptions, estimated chemicals usages, and residual solids produced. Preliminary calculations indicate that this alternative will comply with projected limits; however, potential compliance should be reevaluated upon the receipt of the finalized SPDES limits from NYSDEC.

3.1.13 Wastes Discharged

Biological solids generated in Alternative 10 will be thickened and dewatered as required to meet appropriate landfill requirements including but not limited to paint filter, proctor density, and TCLP tests. These requirements will be better defined as part of the preliminary design of these alternatives (see Section 1.4.2.3).

Table 3-1 summarizes the solids or waste quantity estimates for IWWTP for FAB1.

Table 3-1. Waste Discharged from FAB1	
Flow (MGD)	8.25
Daily Biological Solid Waste (wet lbs/d)	77,165
Yearly Biological Solid Waste (wet ton/yr)	14,083
Daily Chemical Solid Waste (lbs/d)	N/A
Yearly Chemical Solid Waste (lbs/d)	N/A
Daily Discharge to Outfall (MG)	8.07
Yearly Discharge to Outfall (MG)	2,946

3.1.14 Identify Water and Energy Efficiency Measures Used

This project is part of a wholistic approach regarding Micron's use of water and its impact on Onondaga County. The approach aims to recycle wastewater into cooling and other high-quality streams for use by Micron to reduce Micron's impact on the local water supply. The estimated electrical and natural gas demands for Alternative 10 are shown in Table 3-2 and Table 3-3, respectively.

Table 3-2. Estimated Electrical Demand from Equipment for Alternative 10

	Connected Load	Demand Load
Total (HP)	4,236	3,179
Total (MW)	3.2	2.4

Table 3-3. Estimated Peak Natural Gas Demands Summary for Alternative 10

	Units	FAB1
Natural Gas for Building Heating	cf/hr	15,213

The common wall construction approach was selected to help reduce footprint and site impacts, but it also allows for gravity flows through a majority of the system, reducing pumping and energy requirements. The side water depth of the tanks was selected to increase oxygen transfer and therefore allow for reduced blower power.

As the design progresses to include facilities and infrastructure, energy efficiency considerations will be incorporated. Appendix I presents a list of energy efficiency best practices.

3.1.15 Demonstrate Future Climate Risks

The site is currently owned by OCDWEP. The site is not located in the floodplain and all critical equipment will be located 3 ft above the 100-yr flood elevation. Additional climate risks will be assessed as the design is progressed.

Preliminary emissions have been calculated for FAB1 wastewater treatment. Carbon dioxide (CO_2) and nitrous oxide (N_2O) emissions were estimated based on what could be generated from the biological treatment process for FAB1. The CO_2 produced for treatment of the influent under the summer average condition was calculated to be 385,500 standard cubic feet per day (scf/day) with an N_2O production of 270 scf/day. Under the winter average condition, CO_2 produced during treatment of the influent was calculated to be 362,800 scf/day with an N_2O production of 338 scf/day.

3.1.16 Security and Cyber Security

Micron relies on a great deal of reliability from the IWWTP including cybersecurity. This will be included in further design activities as the project progresses.

Constructability and Schedule

Where applicable, the treatment plant will include skid mounted and modular type equipment systems to improve constructability efficiencies and schedule. The OA Team as part of the conceptual design has developed a preliminary Gantt Chart style schedule presented in Appendix D. This schedule will be updated during the advancement of engineering on the IWWTP WRF preliminary design. It will include all schedule aspects and impacts related to the IWWTP WRF that can be identified during the preliminary design as well as incorporating NYS permitting schedules.

3.2 Alternative 11: Fabrication Facilities 1 and 2 Supplemental Treatment IWWTP WRF

Following the completion of FAB2, the IWWTP will be required to treat flows from both FAB1 and FAB2. This requires essentially doubling the biological treatment and biosolids management systems described in Alternative 10. It also requires adding chemical and physical treatment for appropriate TDS and other water quality criteria removal to comply with anticipated NY SPDES permit requirements, and a WRF to meet Micron's reclaim water requirements. Alternative 11 below describes the IWWTP WRF.

3.2.1 Proposed Design Concept

A conceptual design for Alternative 11 is included as Appendix J.

1. A high-level PFD depicting the IWWTP WRF.
2. A mass balance which predicts the performance of the system by detailing the flow and water quality of individual streams through the treatment process. The balance was also used to size equipment.
3. A major equipment list which provides details of the additional equipment necessary to upgrade Alternative 10 to Alternative 11 is included in this alternative.
4. A general arrangement is included to show the preliminary location of the equipment on the site.

Figure J-1 in Appendix J provides a PFD for the IWWTP WRF for FAB1 and FAB2 combined treatment. Wastewater from FAB2 will be combined with FAB1 and will be delivered via the same distribution system as FAB1. It is assumed that the wastewater produced by FAB2 will be of the same volume and quality as FAB1 and therefore will double the influent flow and loads to the IWWTP.

The equalization and diversion tank described in Section 3.1 was sized to be able to accommodate the peak FAB2 design flow of 16.5 MGD, which includes the peak flow from FAB1. Therefore, following the completion of FAB2, Micron's industrial wastewater will flow into the same equalization tank to help reduce variations in the loading to the treatment system. Flow can be directed to the diversion tank and bled back into the equalization tank as needed. New pumps and piping will be provided to tie Alternative 11 into the existing FAB1 (Alternative 10) treatment system. Wastewater is then screened and treated in anoxic and aerobic bioreactors to remove nitrogen and organics. A second thickener would be added along with an additional centrifuge to increase dewatering capacity. MBRs would use UF to remove solids from the wastewater which are processed in the same systems as in Alternative 10. However, due to the increased flow and loads, the MBR effluent now requires treatment to remove TDS prior to discharge to meet anticipated SPDES requirements. Removal of TDS requires RO treatment; however, to protect the RO membranes, the wastewater is pretreated using strong acid cation (SAC) IX to remove calcium and magnesium and reduce the scaling potential for the RO membranes. The IX effluent then passes through a decarbonator to reduce the potential for carbonate scaling on the RO membranes. Pretreated water is then pumped though RO membranes to remove TDS from the wastewater. The RO permeate will be disinfected and returned to Micron as reclaim water and to the blend tank to be discharged to the shared outfall.

Brine or TDS concentrate from the RO reject is treated using an evaporator followed by a crystallizer to further concentrate the TDS and generate brine solid slurry. The salt slurry is then further dewatered using centrifuges. The centrifuged solids are then disposed of off-site. Condensate water from the evaporation and crystallization processes are collected and will be reclaimed and/or discharged.

3.2.2 Biological Treatment

Further treatment capacity will be needed to treat the wastewater once production has increased with the startup of FAB2. To provide additional treatment capacity, the same treatment process considered for FAB1 will be duplicated to handle the doubling of wastewater flow and loads.

The treatment process considered for FAB2 will operate in parallel to the treatment process for FAB1. In addition to providing more treatment capacity, adding a duplicate treatment train would provide redundancy and allow for operations to be more flexible during non-peak conditions. Anoxic, aerobic, and MBR tanks will be constructed of reinforced concrete.

3.2.2.1 Performance

The anoxic, aerobic, and MBR treatment process will primarily be used to reduce COD/BOD and nitrogen species (TKN, NH_3-N, NO_3-N). Some metals will be reduced in the biological treatment process, and there will be some reduction of bio-accumulative metals like mercury and arsenic that sorb to solids and are removed from the system as waste (at low levels that do not make the sludge hazardous). The MBR will polish the aerobic treatment effluent prior to further treatment.

3.2.2.2 Redundancy

FAB1 contains two treatment trains. Each of the FAB1 trains is sized to treat 50 percent of the flow and load of the total influent stream for FAB1. The FAB2 system adds two additional trains for a total of four identical trains. This process was designed to both limit the sludge concentration in the MBR tanks as well as allow for one train to be taken out of service (if needed) for maintenance or repair; additional wastewater would be diverted to the treatment trains in service. Blowers used for the biological treatment process would be installed such that two to three blowers would operate at any given time for FAB1 under the average summer and winter conditions. While three to four blowers would be required to handle peak summer and winter conditions, a fifth spare blower would be added to maintain an N+1 redundancy. Five additional blowers would be installed for the additional aeration tank capacity required for FAB2. This allows for the entire design flow to be treated in three trains with one train down for service.

3.2.2.3 Reliability

Micron operations will require continuous wastewater treatment and therefore, reliability to prevent downtime and to ensure compliance must be included in the design. Pretreatment limits to Micron will be clearly delegated in the pretreatment permit and enforced as needed to maintain continuity of treatment and compliance. Reliability of the biological treatment process will rely on scheduling and implementing routine maintenance of the equipment. The MBR treatment process will require periodic deep cleans as well as replacement of MBR modules.

If the sludge thickener requires removal from service, the UF membrane reject rate will be adjusted to produce 12,000 mg/L mixed liquor suspended solids (MLSS) concentration in the membrane tank during sludge dewatering periods. This value reflects the highest concentration considered for MBR operations based on input provided by MBR vendors. Under this scenario, sludge will be wasted directly from the membrane tank to polymer conditioning just upstream of the centrifuges.

3.2.3 RO Pretreatment

Pretreatment prior to the RO to remove scale-forming ions like calcium and magnesium is critical for reducing membrane fouling and scaling, reducing antiscalant chemistry consumption, and extending the life and efficiency of the RO system. The proposed RO pretreatment is designed to remove hardness (i.e., calcium and magnesium) associated with carbonate alkalinity as well as other hardness associated with sulfate. The presence of calcium would create high scaling potential for minerals such as calcium carbonate, calcium phosphate, calcium sulfate, and calcium silicate. The presence of magnesium would create high scaling potential for magnesium hydroxide.

Given the level of hardness, alkalinity and sulfate, a SAC IX was selected as the first pretreatment step for the high pH RO. Cold lime softening, antiscalant addition, and weak acid cation (WAC) ion exchange (IX) were considered but were ruled out given the water quality and efficiency of those unit process applications and the desired or targeted RO efficiency.

The excess carbonate alkalinity coming out of the SAC units will be converted to carbon dioxide with the addition of sulfuric acid to a pH setpoint of approximately 4.3. After sulfuric acid addition, the free CO2 will be removed from the water through the forced air stripping decarbonation system. This will prevent the carbon dioxide from being converted back to alkalinity before the RO treatment process and will increase the caustic required for high pH RO operation.

Prior to feeding the water to the RO system, the pH must be increased. This will be done with the addition of sodium hydroxide to achieve influent pH of approximately 10. This two-step pretreatment process coupled with increasing the pH of the RO influent reduces nearly all scaling potential for the RO system, greatly reducing cleaning frequency and increasing membrane life, even up to 95-percent recovery.

3.2.3.1 Performance

The strong acid IX system will reduce the hardness of the RO influent to less than 0.5 mg/L as calcium carbonate ($CaCO_3$) and the calcium concentration to less than 0.1 mg/L as ion. The acidification and decarbonators will reduce the carbon dioxide concentration of the RO influent to less than 8 mg/L.

3.2.3.2 Redundancy

The IX vessels and decarbonators will be installed in an N+1 fashion, meaning there will be one redundant standby unit.

3.2.3.3 Reliability

Reliability of the RO pretreatment system will be dependent on the maintenance and scheduled downtime of individual component and trains. For the IX system, the critical control factor will be monitoring resin performance. Though the total hardness going into the IX system is relatively low, the wastewater TDS concentration (principally sodium and sulfate) may increase the frequency of resin regeneration. The systems will need to be regularly monitored to determine when regeneration is needed and take vessels offline as necessary. Monitoring and control strategies will be developed as programming and detailed design continue.

For the decarbonation system, the primary concern will be ensuring routine maintenance is conducted, including any necessary cleaning for biofouling.

For all RO pretreatment systems, critical spare parts should be kept on hand to minimize downtime.

3.2.4 RO System

The RO system treats effluent from the IX system. Depending on the reclaim water demands, permeate from the RO is either conveyed back to the Micron for reuse or discharged to the outfall. Concentrate from the RO is conveyed to the brine chemical treatment for further concentration and treatment.

Removing dissolved salts and minerals from water is most commonly accomplished using high pressure nanofiltration or RO membranes. Separation takes place by diffusion through the membrane in lieu of water movement through pores as is the case with low pressure membranes or with other forms of particulate filtration. Microfiltration (MF) and UF are not applicable to this discussion because they remove only particulate matter and microbes. RO membranes were selected over nanofiltration (NF) due to the high concentrations of monovalent and multivalent ions and silica present in the wastewater and low dissolved solids water quality requirements for internal water recycling and discharge.

Pressures required to achieve effective process success can be quite high and are primarily related to the level of dissolved solids in the feed supply, with pressure increasing significantly as dissolved solids concentration rises. Pressure is also indirectly related to temperature, with higher pressures required for colder water. Additionally, RO membranes are subject to fouling due to organic and inorganic content in the feed stream. Fouling is acceptable as long as it is reversible and membrane permeability can be reasonably restored through chemical treatment. Antiscalant chemicals can be applied in specific applications to extend membrane life and optimize operation by controlling scale formed. The IX treatment upstream of the RO is designed to reduce the membrane fouling tendencies for calcium, magnesium, and barium of the water and reduce antiscalant usage.

RO treatment will be required to both meet the discharge requirements and provide reclaim water once FAB2 is online due to the higher TDS concentrations in the influent IWWTP stream. RO treatment will also be required to meet the reclaim requirements for multiple parameters including TDS, total organic carbon (TOC), nitrate, silica, and sulfate. During the process technology evaluation, several varieties of RO system membranes and configurations were evaluated. A high pH RO configuration was selected for Alternative 11. It parallels the original High-Efficiency Reverse Osmosis (HERO) process where patents have expired and is currently being trademarked by Aquatech. It is designed to overcome the limitations of conventional RO systems, particularly when dealing with challenging feedwaters such as those high in silica, organics, or scaling compounds. Unlike traditional RO, which operates at neutral pH and is prone to membrane fouling and scaling, a high pH RO operates at a high pH (e.g., typically above 9), which helps reduce scaling, enhance membrane performance, and increase water recovery rates, often exceeding 90 percent. This makes the RO configuration selected for the IWWTP WRF critical for water reuse quality and minimal waste generation. In comparison to the previous conventional RO systems that were evaluated in the earlier alternatives, it typically achieves lower recovery rates and requires more frequent maintenance due to fouling and scaling issues plus eliminates the need for separate silica treatment.

The HERO process offers significant operational advantages over a conventional RO design due tolerance for silica and TOC that typically result in RO membrane fouling and frequent cleaning.

HERO operates at a high pH range where silica solubility is enhanced. This high pH operation also reduces TOC fouling since the RO is effectively operating in a cleaning pH regime continuously. With the HERO process, the concentrate directed to the downstream thermal system will be hardness free and at a high pH, enabling the use of an unseeded evaporative process.

One additional important consideration is disposal of the RO concentrate stream which will be too concentrated to discharge back to the Oneida River. Therefore, it must be concentrated further and turned into a solid for offsite disposal. Brine treatment processes have a high capital cost, so every effort must be made to minimize the volume of the RO concentrate stream. The high recovery RO from the HERO process will allow a TDS concentration factor of about 13.

Brackish water membranes are preferred due to their lower energy requirements, effective removal of monovalent ions, fouling resistance, and cost effectiveness (when compared to sea water membranes). However, seawater membranes may be necessary in either the third and fourth, second through fourth, or in all RO stages (depending on the project state) to meet the Publicly Owned Treatment Works (POTW) discharge limits for nitrate or reclaim criteria for sodium or sulfate.

The RO system sizing was determined using AWC Proton membrane projection software. The models were run using brackish water membranes and a five-stage, single-pass configuration. Model runs were conducted using the projected water quality out of the RO pretreatment system and increasing system size as necessary to accommodate flow and optimize permeate recovery. See Appendix J Mass Balance for model results.

BC has experience with a semi-conductor wastewater treatment facility achieving greater than 95 percent recovery using high pH RO. BC's conversations with two RO vendors experienced with semi-conductor/microelectronics wastewater indicated that recovery rates for an RO system in this application would range from 95 to 98 percent. The RO projections performed by BC were based on a 95-percent recovery rate. However, the mass balance uses a conservative 92.5-percent recovery to consider minor downtimes during clean in place (CIP), unit switches, and to provide a safety margin.

A summary of the RO system equipment and their associated capacities are included in Appendix J – Equipment List.

3.2.4.1 Performance

The RO system will need to be able to meet the PUB NEWater Quality reclaim water quality criteria specified for reclaim. Additionally, since any reclaim water that is not used onsite will be blended with the biological treatment system that was bypassed around the IX and RO systems and discharged to the outfall, RO permeate will also need to meet the water quality criteria specified for POTW discharge. The most critical of these is the discharge limit for TDS.

It is recommended that pilot testing of any RO system be performed during the operation of FAB1 to verify system performance, fouling rates, and recovery from cleaning processes.

3.2.4.2 Redundancy

The RO system will be installed in an N+1 fashion, meaning there will be one redundant standby unit.

3.2.4.3 Reliability

Reliability of the RO system will be dependent on the downtime of individual components and trains. With the relatively high recovery and salt content of the concentrate stream, it will be imperative to maintain all process monitoring equipment and chemical feed systems. While the HERO process is much more resistant to fouling and scaling than a conventional RO process, operating parameters such as TMP, flows, and flux values must be monitored for signs of fouling, and CIP operations must be initiated when target values are reached to prevent irreversible fouling. Critical spare parts should be kept on hand as well to minimize downtime during unplanned maintenance activities.

3.2.5 Thermal Treatment

Considering the scale and design parameters of the wastewater from FAB1 and FAB2, the only feasible brine treatment method for the IWWTP was brine concentration followed by solidification using a crystallizer. The brine concentrator or evaporator further concentrates the brine from the RO process to at least 225,000 mg/L. The majority of the flow processed by this system is returned as near-pure water, which is blended with RO permeate and sent back to Micron for use as reclaimed water, while the blowdown is directed to a crystallizer/centrifuge for solidification. Mechanical vapor recompression (MVR) will be used for brine concentration, utilizing a combination of heat and vapor compression/expansion to evaporate water from the brine.

After brine concentration, the solidification process involves vertical tube falling film evaporation, forced circulation crystallization, and centrifugation. The crystallizer and concentrator work together using heat, vapor compression, and centrifugation to remove nearly all residual water. This results in granular salt containing approximately 10 to 15-percent moisture content that can be hauled offsite for disposal. A list of the thermal treatment equipment used in the brine treatment process is provided in Appendix J – Equipment List.

3.2.5.1 Performance

The primary goal of the brine concentrator and crystallizer is to produce dewatered brine solids to facilitate offsite disposal. To accomplish this, the MVR-driven evaporator concentrates the brine to approximately 225,000 mg/L TDS to feed the crystallizer. Additionally, the crystallizer must further concentrate the brine past saturation limits to precipitate salt crystals. The centrifuge is then capable of dewatering the salt crystals from the brine to produce a salt cake with approximately 10 to 15-percent moisture content for offsite disposal.

3.2.5.2 Redundancy

Both the evaporator and crystallizer have two units sized at 100-percent capacity to provide full redundancy.

3.2.6 Solids Handling

Biological solids for Alternative 11 are handled in the same manner as Alternative 10. As the flow and loads are doubled due to the addition of FAB2, the biological solids handling equipment from Alternative 10 is duplicated to provide the necessary capacity.

Alternative 11 also requires solids handling for the residual brine solids from the crystallization process. The crystallization process will produce a salt slurry that is approximately 50-percent solids. This slurry is then pumped to one of two chemical centrifuges that will generate a waste solid for disposal. Each centrifuge is capable of dewatering approximately 60 gpm of salt slurry and will produce a salt cake with water content of 10 to 15 percent. These solids will require disposal as described above in Section 1.4.2.3. Options such as stabilization with concrete prior to landfilling and deep well injection will be investigated during the development of the design.

3.2.7 UV

For the FAB2 expansion, the IWWTP will also supply reclaimed water for cooling purposes. The UV system will be upsized such that it can accommodate either the RO permeate flow, a portion of the biological flow, or the entire biological effluent from FAB1 and FAB2 for 16.5 MGD of discharge. The system will be designed with reactors and interconnecting piping, valves, and appurtenances to direct flow through the appropriate reactor chambers and deliver the target UV dose of 30 mJ/cm^2. The RO permeate, intended for use as reclaimed cooling water, will also be UV disinfected to minimize downstream biological growth. With an expected UVT of 96 percent or higher, the RO permeate will require a lower UV disinfection dose compared to the biological effluent. For the FAB1 and FAB2 expansion, the UV system will be sized with N+1 (2x 100%) redundancy to handle capacities of 16.5 MGD and 33 MGD, respectively.

While unlikely to significantly affect the current design, updated regulatory disinfection requirements and footprint constraints could influence minor changes in the required UV system design.

3.2.8 Discharge

Reclaim water will be comprised of RO permeate that is UV disinfected and conveyed to Micron. Flow pumped from the RO Permeate Tank will be measured with a flow meter. An online conductivity probe will be used as an indicator of adequate performance of the RO membrane system. If an increase in the permeate conductivity is observed, reclaim flow can be stopped and diverted to either the outfall, where it is expected to still be of adequate quality for discharge, or recirculated back to the head of the IWWTP at the Equalization Tank for further treatment.

Treated effluent from the biological MBR system that bypasses the RO is combined in the Blend Tank with the remainder of the RO permeate that is not used for reclaim purposes and is then pumped to the UV disinfection system. Following UV disinfection, it is combined with the Municipal WWTP for discharge to the Oneida River through the existing outfall 01B.

3.2.9 Stormwater

As stated above for Alternative 10, stormwater management will be investigated during future design stages. It is recognized that the site will be creating significant impervious area, and there will likely be multiple stormwater outfalls to the Oneida River or local tributaries. Therefore, the State of New York’s approaches to green infrastructure should be considered in the development of the site.

3.2.10 Impact On Existing Facility

This will expand the IWWTP to receive the wastewater generated by the completion of FAB2 and provide additional reclaim volume back to Micron.

3.2.11 Outfall Configuration

Carollo is designing a new outfall in conjunction with the appropriate agencies. The IWWTP will be assigned a separate, internal outfall (preliminarily called “outfall 01B”) for monitoring and compliance purposes prior to combining with Municipal WWTP flow and discharging via outfall 001 to the Oneida River. Compliance monitoring will occur at the internal outfall 01B, as required in the final SPDES permit that will be issued by NYDEC.

3.2.12 Land Requirements

This project will be contained to the Oak Orchard site which is owned by OCDWEP. The additional equipment required for Alternative 11 will be located in the same area as Alternative 10. It is not anticipated that additional land will be required for the IWWTP WRF. A general arrangement drawing is included in Appendix J of this document.

3.2.13 Environmental Impacts and mitigation measures

This alternative would have minimal impact on the environmental resources in the project area. The additional IWWTP WRF equipment would be adjacent to the system established in Alternative 10, near the existing Municipal WWTP. Efforts will be made to avoid impacts to environmental resources (e.g., wetlands, streams, habitat) to the maximum extent practicable. Any unavoidable impacts will be minimized and reviewed with the appropriate agencies in support of a USACE Permit and/or NYSDEC Article 24 permit. Any loss of wetland would be mitigated per USACE and/or NYSDEC requirements. Other best management practices to be implemented such that adverse environmental impact can be avoided or minimized include limited tree clearing, clearing during winter months, implementation of erosion and sediment control measures, and site monitoring/inspections during construction.

3.2.14 Potential to Meet Limits by DEC

Alternative 11 was developed to comply with the anticipated discharge requirements for the internal outfall 01B as well as the overall compliance for the combined flow to Outfall 001 as well as provide high quality reclaim water to Micron. Mass balances (Appendix J) were prepared under several conditions (Winter Average, Summer Average, and Maximum Design Concentration) to predict the water quality of the discharges. The mass balance also presents the biological modeling results, RO software projections, other performance assumptions, estimated chemicals usages, and residual solids produced. The flow to post-biological treatment systems were adjusted for each condition to meet a reclaim demand from the IWWTP of up to 6 MGD while also maintaining an effluent TDS concentration from the IWWTP. Preliminary calculations indicate that this alternative will comply with projected limits; however, potential compliance should be reevaluated upon the receipt of the finalized SPDES limits from NYSDEC.

3.2.15 Wastes Discharged

The biological solids and chemical solids produced following biological, physical, and chemical treatment for FAB2 will be dewatered and disposed offsite. Table 3-4 summarizes the solids or waste quantity estimates for IWWTP for FAB2.

Table 3-4. Waste Discharged from FAB2

Influent Flow (MGD)	16.5
Daily Biological Solid Waste (wet lbs/d)	154,323
Annual Biological Solid Waste (wet ton/yr)	28,164
Daily Crystallizer Brine Solid Waste (wet lbs/d)	146,961
Annual Crystallizer Brine Solid Waste (wet ton/yr)	26,820
Daily Discharge to Outfall (MG)	12.1
Annual Discharge to Outfall (MG)	4,417
Annual Reclaim Flow to Micron (MG)	1,460

3.2.16 Identify Water and Energy Efficiency Measures Used

This project is part of a wholistic approach regarding Micron's use of water and its impact on Onondaga County. The approach aims to recycle wastewater into cooling and other high-quality streams for use by Micron to reduce Micron's impact on the local water supply. The Alternative 11 IWWTP will be designed to produce up to 6 MGD of reclaim water. The estimated electrical and natural gas demands for Alternative 11 are shown in Table 3-5 and Table 3-6, respectively.

Table 3-5. Estimated Electrical Demand from Equipment for Alternative 11

	Connected Load	Demand Load
Total (HP)	39,788	28,063
Total (MW)	29.7	20.9

Table 3-6. Estimated Peak Natural Gas Demands Summary for Alternative 11

Natural Gas for Boiler (cf/hr)	10,607
Natural Gas for Building Heating (cf/hr)	19,784
Combined Gas Demand (cf/hr)	30,391

As the design progresses to include facilities and infrastructure, energy efficiency considerations will be incorporated. A list of energy efficiency best practices is listed in Appendix I.

3.2.17 Demonstrate Future Climate Risks

The site is currently owned by OCDWEP. The site is not located in the floodplain and all critical equipment will be located 3 ft above the 100-yr flood elevation. Additional climate risks will be assessed as the design is progressed.

Emissions have been calculated for FAB2 wastewater treatment. Carbon dioxide (CO_2) and nitrous oxide (N_2O) emissions were estimated based on what could be generated from the biological treatment process for FAB2. The CO_2 produced for biological treatment of the influent under the summer average condition was calculated to be 771,000 scf/day with an N_2O production of 540 scf/day. Under the winter average condition, CO_2 produced during treatment of the influent under calculated to be 725,600 scf/day with an N_2O production of 676 scf/day. These future climate risks will be better defined as preliminary engineering progresses.

3.2.18 Security and Cyber Security

Micron depends on a great deal of reliability from the IWWTP including cybersecurity. This will be included in further design activities as the project progresses.

3.2.19 Constructability and Schedule

Where applicable, the treatment plant will include skid mounted and modular type equipment systems to improve constructability efficiencies and schedule. The OA Team as part of the conceptual design has developed a preliminary Gantt Chart style schedule presented in Appendix D. This schedule will be updated during the advancement of engineering on the IWWTP WRF preliminary design. It will include all schedule aspects and impacts related to the IWWTP WRF that can be identified during the preliminary design as well as incorporate NYS permitting schedules.

3.3 Conveyance

To convey industrial wastewater to the new IWWTP as well as reclaimed water back to the Micron facility, several forcemains will be constructed. The forcemains will be located within a designated utility corridor known as the Conveyance Corridor. The corridor is a maximum of 99-feet wide and a minimum of 49.5-feet wide and follows Verplank Road, west of Caughdenoy Road towards the Oak Orchard Site for approximately 0.5 miles and then through several easements through back lots for another mile and a half to the Oak Orchard Site. The corridor crosses the CSX railroad, goes through

Onondaga County Department of Transportation Right-of-Ways, and through several easements along the way. Appendix A contains a project location map that includes the proposed corridor route. The timeline for the conveyance corridor is expected to follow that of the new IWWTP.

Conveyance Corridor Layout

The utility corridor will house several conveyance pipes (forcemains) bringing wastewater and reclaim water to and from the IWWTP and WRF site. The following pipes are included in the proposed layout:

- Three 30-inch pipes for conveyance from Micron to IWWTP WRF (two active, one redundant)
- Four 20-inch pipes for reclaim for cooling water to Micron (one active, one redundant)
- Two 20-inch pipes for reclaim for UPW makeup to Micron (one active, one redundant)

A section and view of the Conveyance corridor layout in the 99-foot wide and 49.5-foot wide section in included in Appendix K.

Utility Corridor Basis of Design

The utility corridor piping layout is based on the following flows:

Table 3-7. Utility Corridor Piping

Use (per FAB)	Flow (MGD)
Industrial WW to IWWTP WRF Campus	8.25 per FAB (16.5 FABs 1&2)
Reclaim Water for cooling water	2 per FAB (up to 4)
Reclaim Water for UPW makeup	2 per FAB (up to 4)

The forcemains will be HDPE pipe installed primarily by horizontal directional drilling (HDD) to avoid wetland and other environmental disturbances.

Section 4

Recommended Alternative

Based on the assessment performed by BC, Alternative 10 was selected to meet the requirements of FAB1. Alternative 11 was selected to meet the demands of FAB2, including the continuing operation of FAB1.

4.1 Basis of Selection

The basis of selection of Alternatives 10 and 11 from the other alternatives includes but is not limited to the following requirements established by OCDWEP and detailed above in Section 2.1: reliability, preliminary cost estimates, phasing, schedule, risk, health and safety, operability, accessibility, aesthetics, adaptability, standards, and footprint.: Alternatives 10 and 11 were selected for further development in the preliminary design because they align best with meeting these criteria.

4.2 Project Schedule

The OA Team as part of the conceptual design has begun to develop a detailed project controls Primavera P6 schedule for the IWWTP WRF. This will be available during the advancement of engineering on the IWWTP WRF preliminary design. It will include all schedule aspects and impacts related to the IWWTP WRF that can be identified during the preliminary design. As such it will include latest estimates of the NYS EIS, SPDES, and air permit schedule and milestones. The current schedule is presented in Appendix D.

4.3 Next Steps

As discussed throughout the document, the OA Team will advance the engineering on Alternatives 10 and 11 to complete a preliminary design and EPC RFP by November 2025. A subsequent NYS Engineering Report could be completed at that time, recognizing that additional changes to the preliminary design are anticipated with the selected EPC Firm that will actually complete the final design, procurement, and installation of the IWWTP WRF.

The IWWTP will be fully compliant with all applicable federal, state, and local permitting requirements. The design will ensure compliance with NYSPDES permit effluent limitations and requirements. The design will also take into account compliance with all applicable air quality regulations. This includes adherence to the Clean Air Act and NYSDEC air permitting requirements for emissions from treatment processes, odor control systems, and/or standby generators. Compliance will be verified for solid waste management requirements under 6 NYCRR Part 360 for handling biosolids and residuals. Management of all residuals, including any sludges, biosolids, etc. will be designed to ensure compliance with 6 NYCRR Part 360 solid waste regulations to ensure safe handling, storage, and disposal or reuse. Environmental assessments, public health safeguards, and resilience measures will continue to be evaluated and progressed with the design to ensure sustainable and regulatory-compliant operations from construction through long-term use.

Section 5

Maps and Figures

5.1 Project Location Map

Project location figure is presented in Appendix A.

5.2 Proposed Site Layout

The general arrangement layout in this scope of work was developed for two scenarios. Layout 1 is presented as part of Appendix H and corresponds to treatment Alternative 10, which addresses wastewater from FAB1 only. Layout 2 was developed for treatment Alternative 11 that includes wastewater from FAB2 and also accounts for future capacity needs related to FAB2 and is presented as part of the design package in Appendix J.

This current scope does not account for potential expansions to treat wastewater from FAB3 and FAB4. A rough estimate for the additional space required to accommodate FAB3 and FAB4 would be approximately double the footprint of Layout 2 and would require additional land purchase in this area.

Both layouts incorporate equipment for the proposed treatment processes as well as associated supporting structures (e.g., buildings). Due to the limited available footprint, several key assumptions were made including:

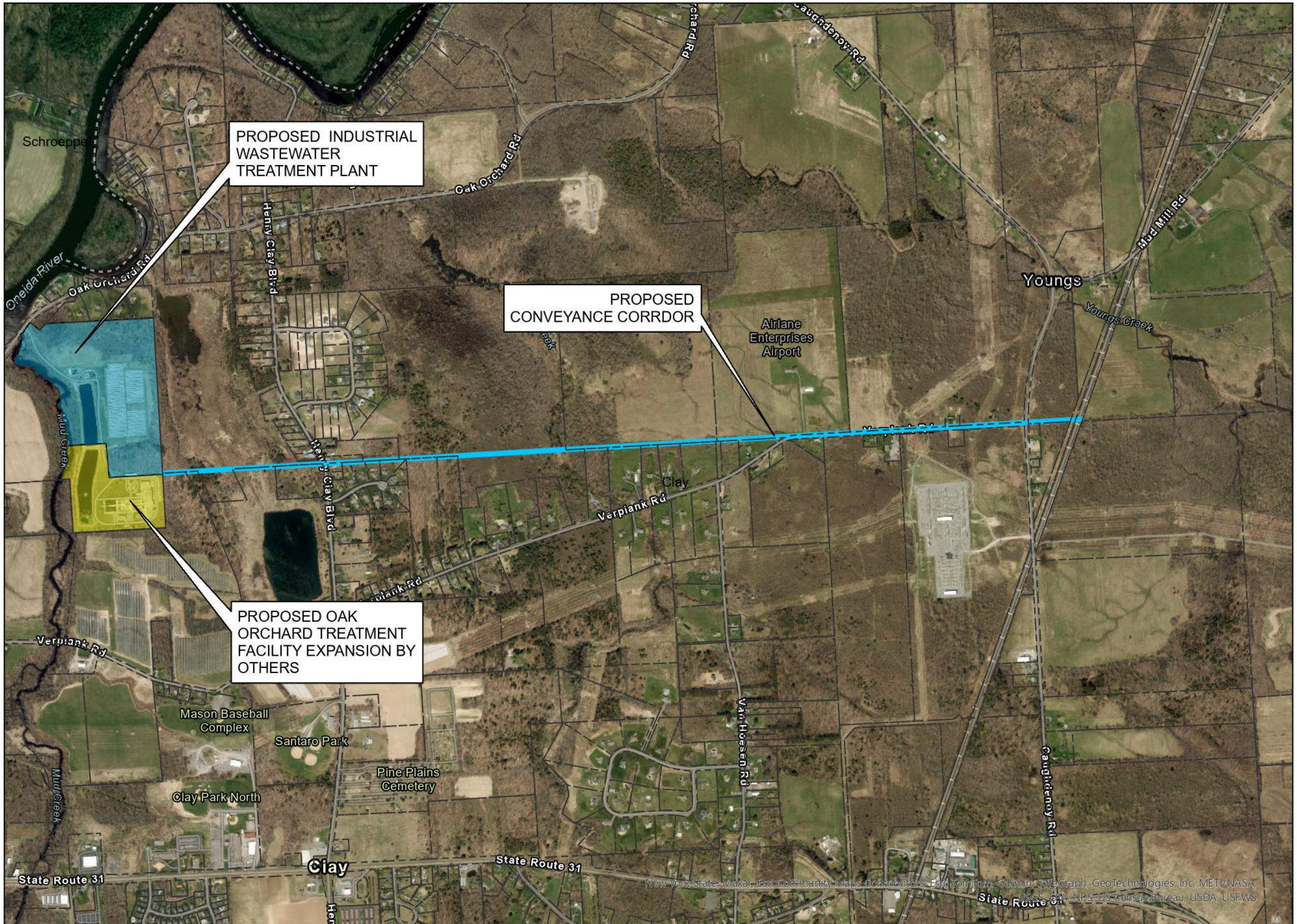
- Shared wall construction for biological treatment systems,
- Side water depth of 30 feet for the relevant tanks, and
- A height limitation of 100 feet.

5.3 Proposed Process Flow Diagrams

A PFD for each of the viable treatment options, Alternatives 10 and 11, are included in the respective design packages located in Appendix H and J.

Appendix A: Project Location Map

PROPOSED INDUSTRIAL WASTEWATER TREATMENT PLANT AND CONVEYANCE CORRIDOR



OCDWEP Industrial Wastewater Treatment Plant and Conveyance Corridor Location Map

Town of Clay, Onondaga County, New York

Property Boundaries

Conveyance Corridor

0 300 600 1,200 Feet

Prepared June 13, 2025
Basemap: World Imagery

EDR

Appendix B: Soil Borings

116 Gruner Road
Buffalo, NY 14227
716.770.0078
whitestoneassoc.com

January 21, 2025

via email

ENVIRONMENTAL DESIGN AND RESEARCH
217 Montgomery Street
Suite 1100
Syracuse, New York 13202

Attention: Ms. Abaigeal Doyle
Project Engineer

**Regarding: PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED MICRON MEGAFAB WASTEWATER TREATMENT PLANT
OAK ORCHARD ROAD AND HENRY CLAY BOULEVARD
TAX ID NO.: 312489031000001016001000
CLAY, ONONDAGA COUNTY, NEW YORK
WHITESTONE PROJECT NO.: PRY34323G.R24**

Dear Ms. Doyle:

Whitestone Associates Engineering & Geology NY, PLLC (Whitestone) has completed a limited geotechnical investigation at the above-referenced site. The purpose of the limited investigation was to evaluate the existing subsurface conditions prior to final site design and further investigations. Whitestone's scope of services consisted of conducting widely spaced test borings within the anticipated areas under consideration for construction of a new wastewater treatment plant associated with the Micron Megafab facility.

1.0 PROJECT DESCRIPTION

1.1 Site Location and Existing Conditions

The project site is located at 4300 Oak Orchard Road in the Town of Clay, Onondaga County, New York. The western portion of the site under consideration is partially developed with the Oak Orchard Wastewater Treatment plant servicing the Town of Clay and a solar power generation array. The central portion of the site consisting of wetlands and brush covered property was observed to be significantly lower in elevation and reportedly previously utilized as a sand and gravel borrow pit. Areas of the subject site along the eastern boundary (along Henry Clay Boulevard) were observed to be at a relatively higher elevation than the center portion, moderately wooded, and interspersed with residential homes.

1.2 Site Geology

Based on a review of the *Surficial Geologic Map of New York – Finger Lakes Sheet (1989)*, the site is underlain by lacustrine sand soils – a well sorted, stratified deposit associated with large bodies of water. The *Geologic Map of New York – Finger Lakes Sheet (1995)* indicates that the site is underlain by Upper Silurian-age Lockport Group bedrock, consisting of the Oak Orchard and Penfield formation dolostone.

1.3 Proposed Construction

Based on correspondence with Environmental Design and Research (EDR) the site is under consideration for development with the Micron Megafab Wastewater Treatment Plant. Detailed construction and grading information was not available at the time of this investigation.

2.0 FIELD AND LABORATORY WORK

2.1 Field Work

Field exploration at the project site was conducted by means of twelve widely spaced borings (identified as B-1 through B-12) advanced with a Central Mine Equipment 550X all-terrain vehicle (ATV) mounted drill rig equipped with hollow stem augers and split-spoon sampling techniques. The borings were terminated at depths ranging from approximately 24 feet below ground surface (fbgs) to 30 fbgs. The locations of the subsurface tests are shown on the accompanying *Boring Location Plan* included as Figure 1. *Records of Subsurface Exploration* are provided in Appendix A.

The tests were conducted in the presence of a Whitestone engineer who conducted field tests, recorded visual classifications, and collected samples of the various strata encountered. The tests were located in the field using a handheld Garmin GPSMAP 66SR GPS unit. These locations are presumed to be accurate within a few feet.

The borings and Standard Penetration Tests (SPTs) were conducted in general accordance with ASTM International (ASTM) designation D 1586. The SPT resistance value (N) can be used as an indicator of the consistency of fine-grained soils and the relative density of coarse-grained soils. The N-value for various soil types can be correlated with the engineering behavior of earthworks and foundations.

Groundwater level observations, where encountered, were recorded during and immediately after the completion of field operations prior to backfilling the tests. Seasonal variations, temperature effects, man-made effects, and recent rainfall conditions may influence the levels of the groundwater, and the observed levels will depend on the permeability of the soils. Groundwater elevations derived from sources other than seasonally observed groundwater monitor wells may not be representative of true groundwater levels.

2.2 Laboratory Program

Representative samples of strata encountered in selected borings were subjected to a laboratory program that consisted of moisture content determinations (ASTM D-2216). The results of the moisture content tests are included on the *Records of Subsurface Exploration* provided in Appendix A of this report.

3.0 SUBSURFACE CONDITIONS

The subsurface soil conditions encountered within the subsurface tests consisted of the following generalized strata in order of increasing depth. *Records of Subsurface Exploration* are provided in Appendix A.

Existing Fill: Several borings (Borings B-4, B-6, B-8, B-9 and B-12) encountered existing fill consisting of reworked native silts, silty sand or cobbles and boulders with variable amounts of silt. The existing fill extended to depths ranging between approximately 2 fbgs and 8 fbgs where encountered.

Lacustrine Deposits: Underlying the existing fill material, the borings encountered natural lacustrine deposits that generally consisted of silts (USCS: ML), silty clays (USCS: CL) and sands with variable amounts of silt (USCS: SP-SM). Naturally cemented soils were observed in the upper portion of borings B-10 and B-12. Strata of peat soils (USCS: PT) were observed in borings B-6 and B-8.

Groundwater: No groundwater was encountered at the completion of drilling in the following borings: B-2, B-3, B-8, B-9, B-10 and B-11. Groundwater was encountered at depths ranging from 4.7 fbgs to 29.2 fbgs in the remaining borings at the completion of sampling. Groundwater levels should be expected to fluctuate seasonally and following periods of precipitation.

4.0 CLOSING

Whitestone appreciates the opportunity to be of service to Environmental Design and Research for this project. Please note that Whitestone has the capability to conduct additional geotechnical investigation and engineering services upon final design and site work approval. Please contact us with any questions or comments regarding this report.

Sincerely,

WHITESTONE ASSOCIATES, INC.

Frank R. Minnolera Jr., PG
Field Services Manager

Ryan R. Roy, PE
Vice President

WHITESTONE

FIGURE 1
Boring Location Plan

WHITESTONE

500 CANAL VIEW BOULEVARD, SUITE 700, ROCHESTER, NY 14623
585.252.6879 WHITESTONEASSOC.COM

DRAWING TITLE:
BORING LOCATION PLAN

CLIENT:
ENVIRONMENTAL DESIGN & RESEARCH

PROJECT:
PROPOSED MICRON MEGAFAB WASTEWATER TREATMENT PLANT
HENRY CLAY BOULEVARD
CLAY, ONONDAGA COUNTY, NEW YORK

PROJECT #: PRY34323.R24	
DESIGNED BY: MR	PROJ. MGR.: CG
DATE: 1/20/25	FIGURE: 1
SCALE: 1" = 300'	

P:\Proposal Folders\2024\PRY34323G.R24\Drawings and Plans\cad\PRY34323.R24.dwg

APPENDIX A
Records of Subsurface Exploration

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/17/2024	**Water Depth (feet bgs) | Elevation (feet)**		**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/17/2024			
Proposed Location:		**Logged By:**	F. Minnolera	**During:**	8.0 |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD	**Contractor:**	NSD	**At Completion:**	7.1 |	**At Completion:** |
	Split Barrel Sampler	**Equipment:**	CME-550X	**24 Hours:**	|	**24 Hours:** |

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	TOPSOIL - 0.4'	
0.0 - 2.0	1		1 - 3 - 5 - 5	19	8		SILT	Brown SILT, trace sand (moist, loose, ML)	MC = 41.0%
2.0 - 4.0	2		4 - 5 - 3 - 4	16	8				MC = 22.0%
4.0 - 6.0	3		3 - 4 - 4 - 5	18	8	5.0			MC = 21.6%
6.0' - 8.0	4		3 - 5 - 5 - 5	17	10		SILTY CLAY	Brown Silty CLAY, trace sand (moist, stiff, CL)	MC = 32.9%
8.0 -10.0	5		2 - 3 - 3 - 4	21	6			Becomes medium, moist -wet	MC = 26.6%
10.0 - 12.0	6		2 - 2 - 2 - 2	19	4	10.0			MC = 27.6%
15.0 - 17.0	7		3 - 3 - 3 - 3	23	6	15.0			MC = 28.3%
20.0 - 22.0	8		3 - 3 - 3 - 3	19	6	20.0		Becomes wet	MC = 27.8%
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/17/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/17/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** 8.0 |	
Drill / Test Method:	3 1/4" ID HSA and 2" O.D. Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** 7.1 |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0			
25.0 - 27.0	9	X	2 - 2 - 3 - 3	22	5		SILT	Gray SILT, trace sand, occasional clay partings (wet, loose, ML)	MC = 24.3%
28.0 - 30.0	10	X	3 - 2 - 3 - 3	22	5	30.0			MC = 18.3%
								Boring Log B-1 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-2

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/17/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/17/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** none |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	TOPSOIL - 0.6'	
0.0 - 2.0	1	X	1 - 3 - 3 - 4	18	6		SILT	Orange-Brown SILT, trace sand (moist, loose, ML)	
2.0 - 4.0	2	X	4 - 4 - 6 - 7	19	10				
4.0 - 6.0	3	X	3 - 3 - 5 - 5	20	8	5.0		Becomes brown	
6.0' - 8.0	4	X	3 - 2 - 4 - 5	24	6				
8.0 -10.0	5	X	3 - 4 - 3 - 4	23	7			Contains occasional clay partings, becomes moist-wet	
10.0 - 12.0	6	X	1 - 2 - 3 - 5	23	5	10.0	SILTY CLAY	Brown Silty CLAY, trace sand, occasional Silt seams (moist, medium, CL)	
15.0 - 17.0	7	X	2 - 3 - 2 - 2	22	5	15.0	SILT	Brown-Gray SILT, trace sand, occasional Clay partings (wet, loose, ML)	
20.0 - 22.0	8	X	3 - 5 - 2 - 1	24	7	20.0			
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-2

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/18/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/18/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD	**Contractor:**	NSD	**At Completion:** none |	**At Completion:** |
	Split Barrel Sampler	**Equipment:**	CME-550X	**24 Hours:** |	**24 Hours:** |

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0		Brown-Gray SILT, trace sand, occasional Clay partings (wet, loose, ML) (Cont.)	
25.0 - 27.0	9	X	2 - 1 - 2 - 1	9	3			Becomes very loose	
28.0 - 30.0	10	X	3 - 3 - 3 - 4	24	6			Becomes loose	
						30.0		Boring Log B-2 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-3

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/18/2024	**Water Depth | Elevation (feet bgs) | (feet)**	**Cave-In Depth | Elevation (feet bgs) | (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/18/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** none |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						0.0	TOPSOIL	TOPSOIL - 0.5'	
0.0 - 2.0	1	X	2 - 3 - 4 - 3	18	7		SILT	Brown SILT, trace sand, trace organic matter (moist, loose, ML)	MC = 18.1%
2.0 - 4.0	2	X	5 - 6 - 7 - 7	17	13		SILTY CLAY	Brown Silty CLAY, trace sand (moist, stiff, CL)	MC = 30.7%
4.0 - 6.0	3	X	4 - 6 - 6 - 6	17	12	5.0	SILT	Borwn SILT, trace sand, occasional clay partings (moist, medium dense, ML)	MC = 22.6%
6.0 - 8.0	4	X	4 - 6 - 5 - 4	19	11				MC = 24.7%
8.0 -10.0	5	X	2 - 2 - 3 - 2	18	5			Becomes loose	MC = 22.6%
10.0 - 12.0	6	X	1 - 2 - 3 - 2	15	5	10.0			MC = 23.5%
15.0 - 17.0	7	X	1 - 2 - 1 - 6	24	3	15.0	SILTY CLAY	Gray Silty CLAY, trace sand (wet, soft, CL)	MC = 26.3%
20.0 - 22.0	8	X	2 - 4 - 2 - 3	21	6	20.0	SILT	Gray SILT, trace sand, occasional clay partings (moist-wet, loose, ML)	MC = 25.6%
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-3

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/18/2024	**Water Depth (feet bgs) | Elevation (feet)**		**Cave-In Depth (feet bgs) | Elevation (feet)**	
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/18/2024				
Proposed Location:		**Logged By:**	F. Minnolera	**During:**	|		
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:**	none |	**At Completion:**	|
		Equipment:	CME-550X	**24 Hours:**	|	**24 Hours:**	|

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0	SILT	Gray SILT, trace sand, occasional clay partings (moist-wet, loose, ML) (cont.)	
25.0 - 27.0	9	X	2 - 1 - 2 - 1	24	3			Becomes wet, very loose	MC = 31.8%
28.0 - 30.0	10	X	1 - 2 - 1 - 1	24	3	30.0			MC = 22.7%
								Boring Log B-3 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/18/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/18/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** 11.3 |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** 26.9 |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	TOPSOIL	TOPSOIL - 0.6'	
0.0 - 2.0	1	X	1 - 1 - 4 - 6	16	5		FILL	Orange-Brown and Black Silty SAND (moist, FILL)	
2.0 - 4.0	2	X	4 - 4 - 5 - 4	16	9		SILTY CLAY	Brown Silty CLAY, trace sand (moist, stiff, CL)	
4.0 - 6.0	3	X	3 - 3 - 3 - 3	19	6	5.0	SILT	Brown SILT, trace sand, occasional clay partings (moist, loose, ML)	
6.0' - 8.0	4	X	2 - 2 - 1 - 2	20	3		SILTY CLAY	Brown Silty CLAY, trace sand (wet, soft, CL)	
8.0 -10.0	5	X	2 - 3 - 2 - 3	18	5			Contains occasional silt partings	
10.0 - 12.0	6	X	4 - 4 - 4 - 4	19	8	10.0	SILT	Brown SILT, trace sand, occasional clay partings (moist, loose, ML)	
15.0 - 17.0	7	X	6 - 6 - 7 - 8	15	13	15.0	SAND	Brown poorly graded SAND (fine grained), trace silt (moist, medium dense, SP)	
20.0 - 22.0	8	X	3 - 3 - 4 - 9	17	7	20.0		Becomes wet, loose	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-4

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/18/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/18/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** 11.3 |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** 26.9 |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						25.0	SILT	Brown SILT, trace sand, occasional fine sand lenses (wet, medium dense, ML)	
25.0 - 27.0	9	X	8 - 15 - 12 - 12	16	27				
28.0 - 30.0	10	X	8 - 10 - 11 - 9	17	21			Becomes gray	
						30.0		Boring Log B-4 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-5

Project: Micron WWTP - Preliminary Investigation		**WAI Project No.:** PRY34323	
Location: 4300 Oak Orchard Road, Clay, Onondaga County, NY		**Client:** Environmental Design and Research	
Surface Elevation: ± NS feet	**Date Started:** 12/19/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth: 30.0 feet bgs	**Date Completed:** 12/19/2024		
Proposed Location:	**Logged By:** F. Minnolera	**During:** |	
Drill / Test Method: 3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:** NSD	**At Completion:** 24.2 |	**At Completion:** |
	Equipment: CME-550X	**24 Hours:** |	**24 Hours:** |

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)		(Classification)	
						0.0	TOPSOIL	TOPSOIL - 0.5'	
0.0 - 2.0	1	X	2 - 3 - 3 - 3	17	6		SILT	Brown SILT, trace sand, occasional clay partings (moist, loose, ML)	
2.0 - 4.0	2	X	2 - 3 - 3 - 2	15	8				
4.0 - 6.0	3	X	3 - 4 - 5 - 5	16	9	5.0			
6.0' - 8.0	4	X	5 - 5 - 5 - 4	16	10		SILTY CLAY	Brown Silty CLAY, trace sand, occasional silt partings (moist-wet, stiff, CL)	
8.0 -10.0	5	X	3 - 3 - 3 - 4	24	6			Becomes soft	
10.0 - 12.0	6	X	1 - 1 - 1 - 1	20	2	10.0			
						15.0			
15.0 - 17.0	7	X	1 - 2 - 2 - 1	20	4				
						20.0			
20.0 - 22.0	8	X	2 - 2 - 1 - 2	24	3				
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/19/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/19/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** 24.2 |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						25.0			
25.0 - 27.0	9	X	2 - 2 - 2 - 2	24	4		SILT	Gray SILT, trace sand, occasional clay partings (wet, loose, ML)	
28.0 - 30.0	10	X	2 - 3 - 3 - 2	16	6	30.0			
								Boring Log B-5 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-6

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/19/2024	**Water Depth | Elevation (feet bgs) | (feet)**	**Cave-In Depth | Elevation (feet bgs) | (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/19/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** 12.6 |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** 17.5 |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	TOPSOIL	TOPSOIL - 0.5'	
0.0 - 2.0	1	X	1 - 1 - 4 - 4	14	5		FILL	Brown SILT, trace gravel, trace clay (moist, FILL)	
2.0 - 4.0	2	X	5 - 5 - 6 - 5	12	11		FILL		
4.0 - 6.0	3	X	4 - 5 - 5 - 4	20	10	5.0	FILL		
6.0' - 8.0	4	X	4 - 5 - 4 - 4	14	9		FILL	Becomes brown-gray, contains trace organic matter	
8.0 -10.0	5	X	2 - 2 - 4 - 6	10	6		SILT	Black SILT, trace peat (moist, loose, OL)	
10.0 - 12.0	6	X	2 - 3 - 4 - 5	18	7	10.0	SAND	Brown Silty SAND (fine grained),occasional clay partings (wet, loose, SM)	
						15.0	SAND		
15.0 - 17.0	7	X	WOH - 3 - 2 - 2	17	5		SAND		
							SAND		
20.0 - 22.0	8	X	3 - 4 - 1 - 2	18	5	20.0	SILT	Gray SILT, trace sand, trace clay (wet, loose, ML)	
						25.0	SILT		

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-6

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/19/2024	**Water Depth (feet bgs) | Elevation (feet)**		**Cave-In Depth (feet bgs) | Elevation (feet)**	
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/19/2024				
Proposed Location:		**Logged By:**	F. Minnolera	**During:**	12.6 |		
Drill / Test Method:	3 1/4" ID HSA and 2" OD	**Contractor:**	NSD	**At Completion:**	17.5 |	**At Completion:**	|
	Split Barrel Sampler	**Equipment:**	CME-550X	**24 Hours:**	|	**24 Hours:**	|

SAMPLE INFORMATION Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						25.0	SILT	Gray SILT, trace sand, trace clay (wet, loose, ML) (cont.)	
25.0 - 27.0	9	X	3 - 2 - 2 - 3	13	4				
28.0 - 30.0	10	X	2 - 2 - 2 - 1	17	4	30.0			
								Boring Log B-6 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-7

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/20/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/20/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** 4.7 |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	TOPSOIL	TOPSOIL - 0.6'	
0.0 - 2.0	1	X	1 - 2 - 3 - 3	17	5		SILT	Brown SILT, trace sand (moist, loose, ML)	
2.0 - 4.0	2	X	2 - 3 - 2 - 4	16	5		SILTY CLAY	Brown Silty CLAY, trace sand, occasional silt partings (moist, medium, CL)	
4.0 - 6.0	3	X	2 - 2 - 1 - 2	22	3	5.0		Becomes soft	
6.0' - 8.0	4	X	2 - 1 - 2 - 1	23	3			Becomes wet, contains occasional silt seams	
8.0 -10.0	5	X	1 - 1 - 1 - 2	21	2				
10.0 - 12.0	6	X	2 - 2 - 3 - 4	22	5	10.0	SAND	Brown Silty SAND (fine grained), occasional silty clay seams (wet, loose, SM)	
15.0 - 17.0	7	X	5 - 5 - 7 - 9	21	12	15.0	SILT	Brown SILT, trace sand, occasional fine sand lenses (moist-wet, medium dense, ML)	
20.0 - 22.0	8	X	3 - 4 - 5 - 4	17	9	20.0		Becomes gray, loose	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation: ± NS feet	**Date Started:** 12/20/2024	**Water Depth (feet bgs)**	**Elevation (feet)**	**Cave-In Depth (feet bgs)**	**Elevation (feet)**
Termination Depth: 30.0 feet bgs	**Date Completed:** 12/20/2024				
Proposed Location:	**Logged By:** F. Minnolera	**During:** 4.7			
Drill / Test Method: 3 1/4" ID HSA and 2" OD	**Contractor:** NSD	**At Completion:**		**At Completion:**	
Split Barrel Sampler	**Equipment:** CME-550X	**24 Hours:**		**24 Hours:**	

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						25.0	SILT	Brown SILT, trace sand, occasional fine sand lenses (moist-wet, loose, ML) (cont.)	
25.0 - 27.0	9	X	2 - 3 - 4 - 3	23	7				
28.0 - 30.0	10	X	3 - 4 - 5 - 7	24	9	30.0		Boring Log B-7 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-8

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/19/2024		**Water Depth (feet bgs)**	**Elevation (feet)**		**Cave-In Depth (feet bgs)**	**Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/19/2024	**During:**					
Proposed Location:		**Logged By:**	F. Minnolera	**At Completion:**	none		**At Completion:**		
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**24 Hours:**			**24 Hours:**		
		Equipment:	CME-550X						

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	TOPSOIL	TOPSOIL - 0.4'	
0.0 - 2.0	1	X	1 - 4 - 8 - 9	18	12		FILL	Brown-gray and black Sandy SILT, trace clay, trace cobble fragments (moist, FILL)	
2.0 - 4.0	2	X	9 - 18 - 17 - 10	15	35				
4.0 - 6.0	3	X	5 - 23 - 16 - 9	16	39	5.0			
6.0' - 8.0	4	X	6 - 8 - 8 - 9	15	16		SILT	Gray-black organic SILT, trace sand, trace peat (moist, medium dense, ML-OL)	
8.0 -10.0	5	X	11 - 5 - 4 - 4	15	9	10.0			
10.0 - 12.0	6	X	1 - 2 - 3 - 4	14	5		SILTY CLAY	Gray-black organic Silty CLAY, trace sand (moist, medium, CL-OL)	
						15.0			
15.0 - 17.0	7	X	2 - 3 - 2 - 2	24	5		PEAT	Black PEAT (moist, loose, PT)	
						20.0			
20.0 - 22.0	8	X	2 - 2 - 2 - 2	22	4		SILT	Gray SILT, trace sand (moist, loose, ML)	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/19/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/19/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** none |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						25.0	SILT	Gray SILT, trace sand (moist, loose, ML) (cont.)	
25.0 - 27.0	9	X	2 - 4 - 5 - 6	20	9				
28.0 - 30.0	10	X	3 - 4 - 5 - 5	22	9	30.0			
								Boring Log B-8 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-9

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/20/2024	**Water Depth (feet bgs) | Elevation (feet)**		**Cave-In Depth (feet bgs) | Elevation (feet)**	
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/20/2024				
Proposed Location:		**Logged By:**	F. Minnolera	**During:**	18.7 |		
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:**	None |	**At Completion:**	|
		Equipment:	CME-550X	**24 Hours:**	|	**24 Hours:**	|

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	GRAVEL	CRUSHED STONE (0.2')	
0.0 - 2.0	1	X	5 - 5 - 5 - 4	13	10		FILL	Dark-brown and black Sandy SILT, trace gravel (moist, FILL)	
2.0 - 4.0	2	X	2 - 7 - 6 - 8	14	13		SILT	Brown SILT, trace sand, trace clay (moist, medium dense, ML)	MC = 14.5%
								Becomes brown gray	MC = 17.5%
4.0 - 6.0	3	X	4 - 5 - 5 - 4	18	10	5.0			
								Becomes dark gray	MC = 18.6%
6.0 - 8.0	4	X	6 - 5 - 6 - 6	10	11				
8.0 -10.0	5	X	2 - 3 - 4 - 6	21	7		SILTY CLAY	Brown Silty CLAY, trace sand, occasional silt seams (moist, medium, CL)	MC = 16.2%
10.0 - 12.0	6	X	4 - 5 - 5 - 7	22	10	10.0		Becomes moist-wet, stiff	MC = 36.7%
15.0 - 17.0	7	X	3 - 4 - 2 - 2	22	6	15.0	SILT	Brown SILT, trace sand (moist, loose, ML)	MC = 24.7%
20.0 - 22.0	8	X	1 - 2 - 3 - 2	16	5	20.0	SILTY CLAY	Brown-gray Silty CLAY, trace sand, occasional fine sand lenses (wet, medium, CL)	MC = 27.9%
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/20/2024		**Water Depth (feet bgs) | Elevation (feet)**		**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/20/2024				
Proposed Location:		**Logged By:**	F. Minnolera	**During:**	18.7 |		
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:**	none |	**At Completion:**	|
		Equipment:	CME-550X	**24 Hours:**	|	**24 Hours:**	|

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						25.0	SILTY CLAY	Brown-gray Silty CLAY, trace sand, occasional fine sand lenses (wet, medium, CL) (cont.)	
25.0 - 27.0	9	X	3 - 4 - 3 - 4	24	7				MC = 30.7%
28.0 - 30.0	10	X	3 - 4 - 4 - 5	19	8	30.0			MC = 20.8%
								Boring Log B-9 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-10

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/17/2024	**Water Depth | Elevation (feet bgs) | (feet)**		**Cave-In Depth | Elevation (feet bgs) | (feet)**	
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/17/2024				
Proposed Location:		**Logged By:**	F. Minnolera	**During:**	|		
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:**	none |	**At Completion:**	|
		Equipment:	CME-550X	**24 Hours:**	|	**24 Hours:**	|

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	TOPSOIL	TOPSOIL - 0.6'	
0.0 - 2.0	1	X	2 - 3 - 7 - 9	12	10		SANDY LOAM	Red-brown Silty SAND with Gravel (moist,loose, SM)	
2.0 - 2.9	2	X	35 - 50/0.4	8	REF		SAND	Brown-gray Gravelly SAND with Silt (moist, very dense, SW-SM - cemented soils)	MC = 3.5%
							SAND	Brown Silty SAND (fine grained)(moist, medium dense, SP-SM)	
4.0 - 6.0	3	X	4 - 5 - 6 - 7	18	11	5.0			MC = 6.0%
6.0 - 8.0	4	X	6 - 5 - 5 - 6	13	10			Contains occasional silt partings	MC = 6.9%
8.0 -10.0	5	X	4 - 6 - 5 - 6	14	11				MC = 6.9%
10.0 - 12.0	6	X	4 - 5 - 5 - 6	14	10	10.0			MC = 7.1%
						15.0			
15.0 - 17.0	7	X	7 - 5 - 7 - 9	16	12		SAND	Brown poorly graded (fine grained) SAND, trace silt (moist, medium dense, SP)	MC = 7.1%
						20.0			
20.0 - 22.0	8	X	9 - 12 - 15 - 17	14	27		SAND	Brown Silty SAND (fine grained)(moist, medium dense, SM)	MC = 6.9%
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-10

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/16/2024		**Water Depth (feet bgs) | Elevation (feet)**		**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/16/2024				
Proposed Location:		**Logged By:**	F. Minnolera	**During:**	|		
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:**	none |	**At Completion:**	|
		Equipment:	CME-550X	**24 Hours:**	|	**24 Hours:**	|

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0	SAND	Brown Silty SAND (fine grained)(moist, medium dense, SM)(Cont.)	
25.0 - 27.0	9	X	3 - 4 - 5 - 7	14	9			Becomes loose	MC = 2.6%
28.0-30.0	10	X	5 - 9 - 12 - 16	15	21	30.0		Becomes medium dense	MC = 3.2%
								Boring Log B-10 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

RECORD OF SUBSURFACE EXPLORATION

WHITESTONE

Boring No.: B-11

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/17/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/17/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:** none |	**At Completion:** |
		Equipment:	CME-550X	**24 Hours:** |	**24 Hours:** |

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	TOPSOIL	TOPSOIL - 0.7'	
0.0 - 2.0	1	X	1 - WOH - 1 - 1	11	1		SAND	Brown poorly graded (fine grained) SAND, trace silt (moist, very loose, SP)	
2.0 - 4.0	2	X	1 - 2 - 2 - 2	13	4			Becomes loose	
4.0 - 6.0	3	X	2 - 3 - 3 - 3	16	6	5.0	SAND	Brown Silty SAND (fine to medium grained)(moist, loose, SP-SM)	
6.0' - 8.0	4	X	4 - 3 - 4 - 5	15	7				
8.0 -10.0	5	X	3 - 5 - 6 - 6	14	11		SAND	Brown poorly graded (fine grained) SAND, trace silt (moist, medium dense, SP)	
10.0 - 12.0	6	X	4 - 5 - 6 - 8	14	11	10.0			
						15.0			
15.0 - 17.0	7	X	4 - 5 - 7 - 7	18	12				
						20.0			
20.0 - 22.0	8	X	4 - 6 - 8 - 8	15	14		SAND	Brown Silty SAND (fine to medium grained) moist, medium dense, SP-SM)	
						25.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-11

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/17/2024		**Water Depth (feet bgs)**	**Elevation (feet)**	**Cave-In Depth (feet bgs)**	**Elevation (feet)**
Termination Depth:	30.0 feet bgs	**Date Completed:**	12/17/2024					
Proposed Location:		**Logged By:**	F. Minnolera	**During:**				
Drill / Test Method:	3 1/4" ID HSA and 2" OD Split Barrel Sampler	**Contractor:**	NSD	**At Completion:**	none		**At Completion:**	
		Equipment:	CME-550X	**24 Hours:**			**24 Hours:**	

SAMPLE INFORMATION						DEPTH	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	(feet)			
						25.0	SAND	Brown Silty SAND (fine to medium grained) moist, medium dense, SP-SM)(Cont.)	
25.0 - 27.0	9	X	20 - 18 - 22 - 21	16	39			Becomes dense	
28.0 - 30.0	10	X	10 - 12 - 13 - 18	15	25			Becomes medium dense	
						30.0		Boring Log B-11 Terminated at a Depth of 30.0 Feet Below Ground Surface	
						35.0			
						40.0			
						45.0			
						50.0			

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

RECORD OF SUBSURFACE EXPLORATION

Boring No.: B-12

Project:	Micron WWTP - Preliminary Investigation	**WAI Project No.:**	PRY34323
Location:	4300 Oak Orchard Road, Clay, Onondaga County, NY	**Client:**	Environmental Design and Research

Surface Elevation:	± NS feet	**Date Started:**	12/17/2024	**Water Depth (feet bgs) | Elevation (feet)**	**Cave-In Depth (feet bgs) | Elevation (feet)**
Termination Depth:	24.3 feet bgs	**Date Completed:**	12/17/2024		
Proposed Location:		**Logged By:**	F. Minnolera	**During:** 6.0 |	
Drill / Test Method:	3 1/4" ID HSA and 2" OD	**Contractor:**	NSD	**At Completion:** 8.6 |	**At Completion:** |
	Split Barrel Sampler	**Equipment:**	CME-550X	**24 Hours:** |	**24 Hours:** |

Depth (feet)	No	Type	Blows Per 6"	Rec. (in.)	N	DEPTH (feet)	STRATA	DESCRIPTION OF MATERIALS (Classification)	REMARKS
						0.0	TOPSOIL	TOPSOIL - 0.6'	
0.0 - 2.0	1	X	6 - 20 - 30 - 37	6	50		FILL	AUGER THROUGH SANDSTONE AND GRANITE COBBLES AND BOULDERS TO 4' DEPTH (POSSIBLE FILL)	
4.0 - 6.0	2	X	16 - 15 - 21 - 24	24	36	5.0	SAND	Brown Gravelly SAND with Silt, slightly cemented soils (fine to coarse grained)(moist, dense, SM)	Very rugged augering encountered from grade to completion of boring
6.0' - 8.0	3	X	11 - 17 - 12 - 12	13	29			Becomes medium dense	
8.0 -10.0	4	X	11 - 10 - 10 - 10	12	20		GRAVEL	Brown-Gray Sandy GRAVEL with Silt (fine to coarse grained) (wet, medium dense, GW-GM)	
10.0 - 12.0	5	X	14 - 9 - 10 - 7	9	19	10.0	SAND	Brown-gray well graded SAND, trace silt (moist, medium dense, SW)	
13.0 - 15.0	6	X	11 - 7 - 21 - 9	12	28	15.0			
18.0 - 20.0	7	X	14 - 21 - 28 - 29	20	49	20.0		Becomes dense, contains occasional cobble fragments	
23.0 - 24.3	8	X	54 - 37 - 50/0.3	7	REF			Becomes very dense	
						25.0		Boring Log B-12 Terminated with sampler refusal at a Depth of 24.3 Feet Below Ground Surface	

NOTES: bgs = below ground surface, NA = Not Applicable, NE = Not Encountered, NS = Not Surveyed, P = Perched

WHITESTONE

APPENDIX B
Supplemental Information
(USCS, Terms & Symbols)

500 CANAL VIEW BOULEVARD
ROCHESTER, NY 14623
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whitestoneassoc.com

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS <u>LARGER</u> THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION <u>RETAINED</u> ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION <u>PASSING</u> NO. 4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS <u>SMALLER</u> THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMITS <u>LESS</u> THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMITS <u>GREATER</u> THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS FOR SAMPLES WITH 5% TO 12% FINES

GRADATION*

% FINER BY WEIGHT	
TRACE	1% TO 10%
LITTLE	10% TO 20%
SOME	20% TO 35%
AND	35% TO 50%

COMPACTNESS*
Sand and/or Gravel

	RELATIVE DENSITY
LOOSE	0% TO 40%
MEDIUM DENSE	40% TO 70%
DENSE	70% TO 90%
VERY DENSE	90% TO 100%

CONSISTENCY*
Clay and/or Silt

	RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT
VERY SOFT	LESS THAN 250
SOFT	250 TO 500
MEDIUM	500 TO 1000
STIFF	1000 TO 2000
VERY STIFF	2000 TO 4000
HARD	GREATER THAN 4000

** VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.*

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GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

N: Standard Penetration Value: Blows per ft. of a 140 lb. hammer falling 30" on a 2" O.D. split-spoon.
Qu: Unconfined compressive strength, TSF.
Qp: Penetrometer value, unconfined compressive strength, TSF.
Mc: Moisture content, %.
LL: Liquid limit, %.
PI: Plasticity index, %.
δd: Natural dry density, PCF.
▼: Apparent groundwater level at time noted after completion of boring.

DRILLING AND SAMPLING SYMBOLS

NE: Not Encountered (Groundwater was not encountered).
SS: Split-Spoon - 1 ⅜" I.D., 2" O.D., except where noted.
ST: Shelby Tube - 3" O.D., except where noted.
AU: Auger Sample.
OB: Diamond Bit.
CB: Carbide Bit
WS: Washed Sample.

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

Term (Non-Cohesive Soils)	Standard Penetration Resistance
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

Term (Cohesive Soils)	Qu (TSF)
Very Soft	0 - 0.25
Soft	0.25 - 0.50
Firm (Medium)	0.50 - 1.00
Stiff	1.00 - 2.00
Very Stiff	2.00 - 4.00
Hard	4.00+

PARTICLE SIZE

Boulders	8 in.+	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074mm		

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Subsurface Investigation

NOT A PART OF THE CONTRACT

C-36-731
Oak Orchard Water Pollution Control Plant

Contract IX A - General
Contract IX B - Electrical
Contract IX C - Heating & Ventilating
Contract IX D - Plumbing
Contract IX E - Oxygen Generation & Dissolution System
Contract IX F - Sludge Treatment Process

County of Onondaga, New York
Department of Drainage & Sanitation
Clay Sanitary District
January, 1978

AS ADV

9A-D OPEN 4/10/78
9E+F OPEN 3/20/78

O'BRIEN & GERE
ENGINEERS, INC.

parratt wolff inc
FISHER RD., EAST SYRACUSE, N.Y. 13057
TELEPHONE AREA CODE 315/437-1429

January 7, 1975

O'Brien & Gere Engineers, Inc.
1304 Buckley Road
Syracuse, New York 13202

Attention: Mr. Raj Maniktala

Re: 74130
Oak Orchard Treatment Plant
Clay, New York

Gentlemen:

Enclosed are the logs of nine test borings made for you for the above project.

Samples from these borings have been delivered to your office this date under separate cover.

The borings were made at points located in the field by you and were drilled in accordance with standard ASTM methods for split-barrel sampling in soils and coring in rock.

A soil profile at the site consists generally of twenty-five to forty-five feet of loose sand and silt overylaying a dense sand and gravel. Below this granular material is the bedrock, an interbedded shale and limestone. The rock was found at depths below existing ground surface ranging from thirty feet to fifty-seven feet. The rock was cored in each test boring.

Ground water depths are noted on the boring logs.

Very truly yours,

PARRATT-WOLFF, INC.

Steffen Wolff
SW/jw
Enclosures

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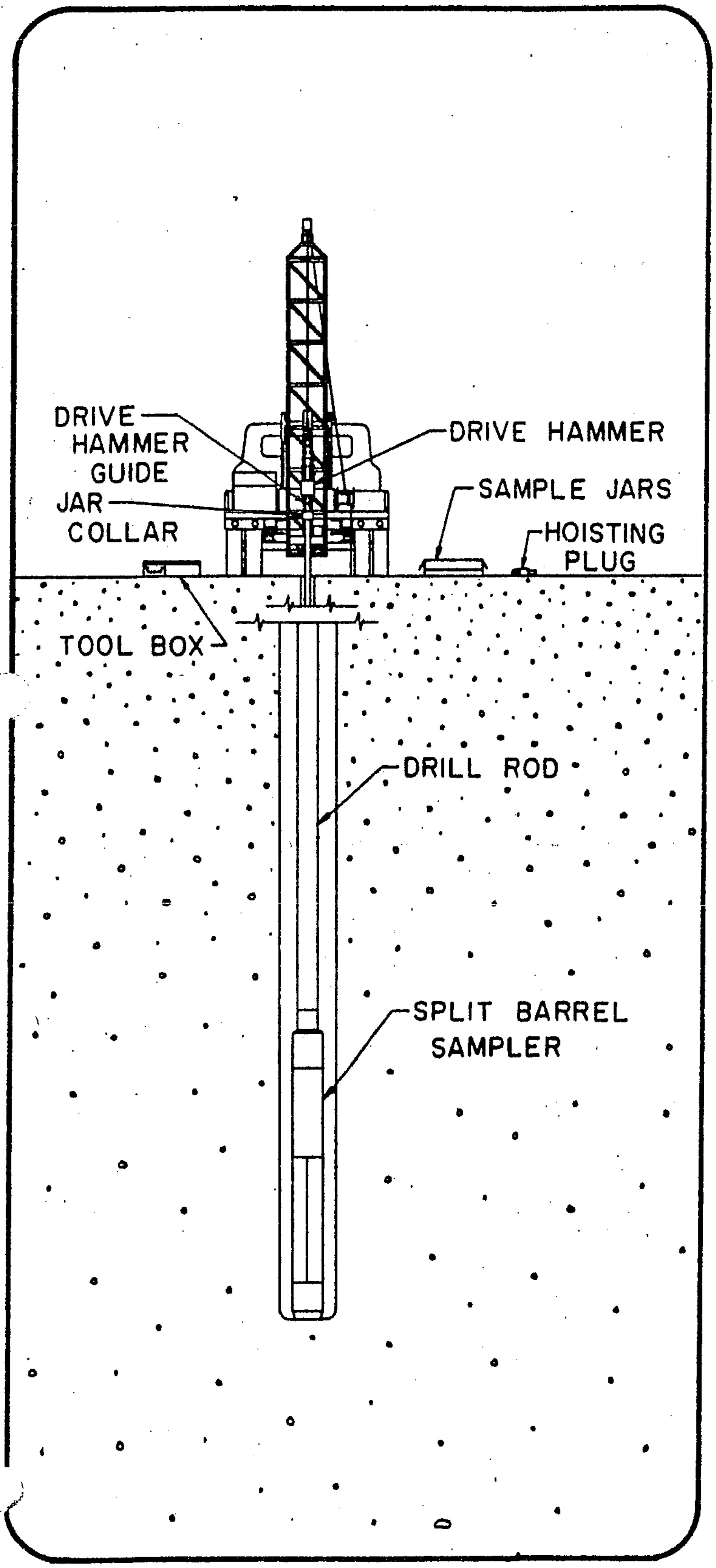
TELEPHONE AREA CODE 315/437-1429



Split barrel sampling

The following excerpts are from "Standard Method for penetration test and split-barrel sampling of soils."[1] (ASTM designation: D-1586-67 AASHO Designation: T-206-70.)

1. Scope

1.1 This method describes a procedure for using a split-barrel sampler to obtain respresentative samples of soil for identification purposes and other laboratory tests, and to obtain a measure of the resistance of the soil to penetration of the sampler.

2. Apparatus

2.1 Drilling Equipment – Any drilling equipment shall be acceptable that provides a reasonably clean hole before insertion of the sampler to ensure that the penetration test is performed on undisturbed soil, and that will permit the driving of the sampler to obtain the sample and penetration record in accordance with the procedure described in 3. Procedure. To avoid "whips" under the blows of the hammer, it is recommended that the drill rod have stiffness equal to or greater than the A-rod. An "A" rod is a hollow drill rod or "steel" having an outside diameter of 1-5/8 in. or 41.2 mm and an inside diameter of 1-1/8 in. or 28.5 mm, through which the rotary motion of drilling is transferred from the drilling motor to the cutting bit. A stiffer drill rod is suggested for holes deeper than 50 ft (15m). The hole shall be limited in diameter to between 2-1/4 and 6 in. (57.2 and 152mm).

2.2 Split-Barrel Sampler – The sampler shall be constructed with the dimensions indicated (in Fig. 1.) The drive shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The coupling head shall have four 1/2-in. (12.7-mm) (minimum diameter) vent ports and shall contain a ball check valve. If sizes other than the 2-in. (50.8-mm) sampler are permitted, the size shall be conspicuously noted on all penetration records.

2.3 Drive Weight Assembly – The assembly shall consist of a 140-lb (63.5-kg) weight, a driving head, and a guide permitting a free fall of 30 in. (0.76 m). Special precautions shall be taken to ensure that the energy of the falling weight is not reduced by friction between the drive weight and the guides.

2.4 Accessory Equipment – Labels, data sheets, sample jars, paraffin, and other necessary supplies should accompany the sampling equipment.

SOIL SAMPLING METHODS

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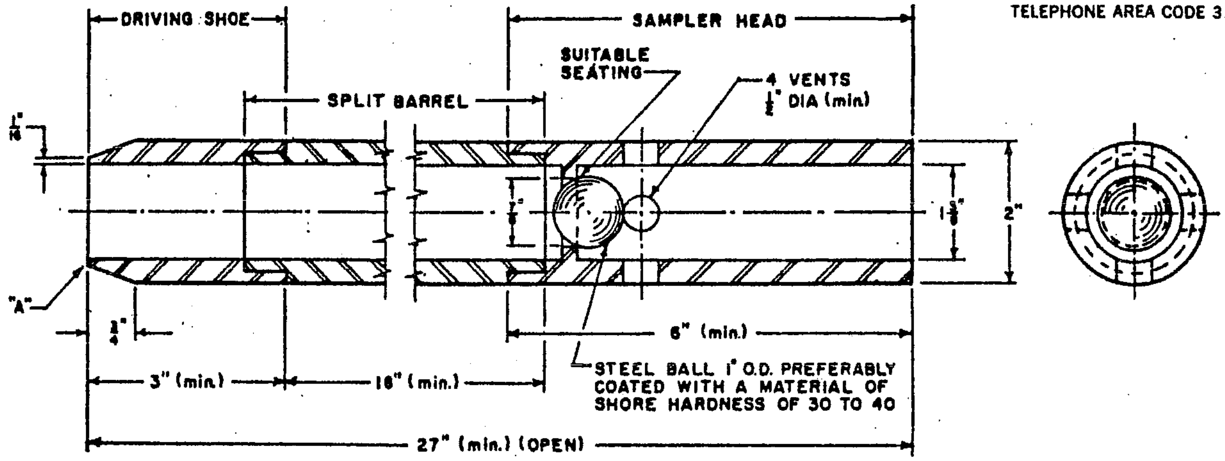

Note 1 – Split barrel may be 1-1/2 in. inside diameter provided it contains a liner of 16-gage wall thickness.

Note 2 – Core retainers in the driving shoe to prevent loss of sample are permitted.

Note 3 – The corners at A may be slightly rounded.

Table of Metric Equivalents.

In.	Mm	Cm	In.	Mm	Cm
1/16 (16 gage)	1.5	...	2	...	5.08
1/2	12.7	...	3	...	7.62
3/4	19.0	1.90	6	...	15.24
7/8	22.2	2.22	18	...	45.72
1-3/8	34.9	3.49	27	68.58	
1-1/2	38.1	3.81			

Fig. 1 – Standard Split Barrel Sampler Assembly

3. Procedure

3.1 Clear out the hole to sampling elevation using equipment that will ensure that the material to be sampled is not disturbed by the operation. In saturated sands and silts withdraw the drill bit slowly to prevent loosening of the soil around the hole. Maintain the water level in the hole at or above ground water level.

3.2 In no case shall a bottom-discharge bit be permitted. (Side-discharge bits are permissible.) The process of jetting through an open-tube sampler and then sampling when the desired depth is reached shall not be permitted. Where casing is used, it may not be driven below sampling elevation. Record any loss of circulation or excess pressure in drilling fluid during advancing of holes.

3.3 With the sampler resting on the bottom of the hole, drive the sampler with blows from the 140-lb (63.5 kg) hammer falling 30 in. (0.76 m) until either 18 in. (0.45 m) have been penetrated or 100 blows have been applied.

3.4 Repeat this operation at intervals not longer than 5 ft (1.5 m) in homogeneous strata and at every change of strata.

3.5 Record the number of blows required to effect each 6 in. (0.15 m) of penetration or fractions thereof. The first 6 in. (0.15 m) is considered to be a seating drive. The number of blows required for the second and third 6 in. (0.15 m) of penetration added is termed the penetration resistance, N. If the sampler is driven less than 18 in. (0.45 m), the penetration resistance is that for the last 1 ft (0.30 m) of penetration (if less than 1 ft (0.30 m) is penetrated, the logs shall state the number of blows and the fraction of 1 ft (0.30 m) penetrated).

3.6 Bring the sampler to the surface and open. Describe carefully typical samples of soils recovered as to composition, structure, consistency, color, and condition; then put into jars without ramming. Seal them with wax or hermetically seal to prevent evaporation of the soil moisture. Affix labels to the jar or make notations on the covers (or both) bearing job designation, boring number, sample number, depth penetration record, and length of recovery. Protect samples against extreme temperature changes.

4. Report

4.1 Data obtained in borings shall be recorded in the field and shall include the following:

4.1.1 Name and location of job,
4.1.2 Date of boring – start, finish,
4.1.3 Boring number and coordinate, if available,
4.1.4 Surface elevation, if available,
4.1.5 Sample number and depth,
4.1.6 Method of advancing sampler, penetration and recovery lengths,
4.1.7 Type and size of sampler,
4.1.8 Description of soil,
4.1.9 Thickness of layer,
4.1.10 Depth to water surface; to loss of water; to artesian head; time at which reading was made,
4.1.11 Type and make of machine,
4.1.12 Size of casing, depth of cased hole,
4.1.13 Number of blows per 6 in. (0.15 m).
4.1.14 Names of crewmen, and
4.1.15 Weather, remarks.

---

[1]Under the standardization procedure of the Society, this method is under the jurisdiction of the ASTM Committee D-18 on Soil and Rock for Engineering Purposes. A list of members may be found in the ASTM Year Book.

Current edition accepted October 20, 1967. Originally issued, 1958. Replaces D-1586-64T.

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GENERAL NOTES

1. The soil logs, notes and other test data shown are the result of interpretations made by representatives of Parratt-Wolff Inc. from personal observations made during the exploration period of samples of subsurface materials recovered during exploration and records of exploration as prepared by the drill operator.

2. Explanation of the classifications and terms:

a. Bedrock - Natural solid mineral matter occurring in great thickness and extent in its natural location. It is classified according to geological type and structure (joints, bedding, etc.) and described as solid, weathered, broken, fragmented or decomposed depending on its condition.

b. Soils - Sediments or other unconsolidated accumulations of particles produced by the physical and chemical disintegration of rocks and which may or may not contain organic matter.

PENETRATION RESISTANCE

COHESIONLESS SOILS

Blows per Ft.	Relative Density
0 to 4	Very Loose
4 to 10	Loose
10 to 30	Medium
30 to 50	Dense
Over 50	Very Dense

COHESIVE SOILS

Blows per Ft.	Consistency
0 to 2	Very Soft
2 to 4	Soft
4 to 8	Medium
8 to 15	Stiff
15 to 30	Very Stiff
Over 30	Hard

Size Component Terms

Boulder		larger than 8 inches
Cobble or Small Stone		8 inches to 3 inches
Gravel	course	3 inches to 3/4 inch
	medium	3/4 inch to 4.76 mm
Sand	coarse	4.76 mm to 2.00 mm (#10 sieve)
	medium	2.00 mm to 0.42 mm (#40 sieve)
	fine	0.42 mm to 0.074 mm (#200 sieve)
Silt and Clay		finer than 0.074 mm

Proportion Terms by Weight

Major component is shown with all letters capitalized.

Minor component percentage terms of total sample are:

and	40 to 50 percent
some	20 to 40 percent
little	10 to 20 percent
trace	1 to 10 percent

c. Gradation Terms - The terms coarse, medium and fine are used to describe gradation of Sands and Gravel.

d. The terms used to describe the various soil components and proportions are arrived at by visual estimates of the recovered soil samples. Other terms are used when the recovered samples are not truly representative of the natural materials, such as, soil containing numerous cobbles and boulders which cannot be sampled, thinly stratified soils, organic soils, and fills.

e. Ground Water - The measurement was made during exploration work or immediately after completion, unless otherwise noted. The depth recorded is influenced by exploration methods, the soil type and weather conditions during exploration. Where no water was found it is so indicated. It is anticipated that the ground water will rise during periods of wet weather. In addition, perched ground water above the water levels indicated (or above the bottom of the hole where no ground water is indicated) may be encountered at changes in soil strata or top of rock.

parratt wolff inc

15 DEANE LANE CAZENOVIA, N.Y. 13035

TEST BORING LOG

PROJECT Jankowski Site
Clay, New York

HOLE NO. 11-36-73-605

LOCATION N 1,167,550 - E 598, 800

SURF. ELEV. 385

DATE STARTED 7/27/73 COMPLETED 7/27/73 JOB NO. 7384

GROUND WATER Depth on completion 5'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

AUGER BORING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					Brown moist fine sandy SILT to sandy CLAY
5'0"					
			1	8'-10'	
10'0"					10'0"
			2	10'-12'	Brown moist clayey SILT to silty CLAY, trace fine sand
15'0"					
					18'0"
20'0"			3	18'-20'	Gray moist SILT, trace fine sand
					Bottom of boring 20'0"

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Jankowski Site
Clay, New York

LOCATION N 1,167,300 - E 599,100

HOLE NO. 12-37-73-606

SURF. ELEV. 380

DATE STARTED 7/27/73 COMPLETED 7/27/73

JOB NO. 7384

GROUND WATER Depth on completion 10'0"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

AUGER BORING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					Brown moist fine sandy SILT
5'0"					
					8'0"
10'0"			1	8'-10'	Brown moist clayey SILT to silty CLAY, trace fine sand 11'0"
					Gray wet SILT, trace fine sand
15'0"					
					Bottom of boring 15'0"

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Jankowski Site
Clay, New York

LOCATION N 1,166,800 - E 599,200

HOLE NO. 13-38-73-607

SURF. ELEV. 375

DATE STARTED 7/27/73 COMPLETED 7/27/73

JOB NO. 7384

GROUND WATER Depth on completion 10'0"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

AUGER BORING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					Brown moist to wet clayey SILT to silty CLAY, trace fine sand
5'0"					
					8'2"
10'0"					Gray wet SILT, trace fine sand
					Bottom of boring 10'0"

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Jankowski Site
Clay, New York

HOLE NO. 14-39-73-608

LOCATION N 1,166,000 - E 599,050

SURF. ELEV. 370

DATE STARTED 7/27/73 COMPLETED 7/27/73

JOB NO. 7384

GROUND WATER Dry on completion

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

AUGER BORING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
5'0"					Brown moist clayey SILT to silty CLAY, trace fine sand
					Bottom of boring 5'0"

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Jankowski Site
Clay, New York

LOCATION N 1,167,500 - E 599,250

HOLE NO. 15-40-73-609

SURF. ELEV. 390

DATE STARTED 7/27/73 COMPLETED 7/27/73

JOB NO. 7384

GROUND WATER Depth on completion 11'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

AUGER BORING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
			1	1'0"-2'6"	Brown dry to wet clayey SILT to silty CLAY, trace fine sand
5'0"					
10'0"					
			2	13'0"-15'0	
15'0"					
					18'0"
					Gray wet SILT, trace fine sand
20'0"					
25'0"					
					Bottom of boring 25'0"

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT: Jankowski Site
Clay, New York

LOCATION: N 1,167,000 - E 599,500

HOLE NO. 16-41-73-610

SURF. ELEV. 395

DATE STARTED 7/27/73 COMPLETED 7/27/73

JOB NO. 7384

GROUND WATER Depth after 3 hours 30'0"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

AUGER BORING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					Brown moist fine sandy SILT
					4'0"
5'0"					Brown moist clayey SILT to silty CLAY, trace fine sand
10'0"					
					12'6"
15'0"					Gray wet SILT, trace fine sand
20'0"					
25'0"					
30'0"					30'0"
					Bottom of boring 30'0"

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Jankowski Site
Clay, New York

LOCATION N 1,166,500 - E 599,500

HOLE NO. 17-42-73-611

SURF. ELEV. 385

DATE STARTED 7/27/73 COMPLETED 7/27/73

JOB NO. 7384

GROUND WATER Depth on completion 13'0"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

AUGER BORING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					Brown moist fine sandy SILT
5'0"					4'6"
					Brown moist clayey SILT to silty CLAY, trace fine sand
10'0"					
					13'0"
15'0"					Gray moist SILT, trace fine sand
20'0"					
					Bottom of boring 20'0"

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Jankowski Site
Clay, New York

HOLE NO. 18-43-73-612

LOCATION N 1,166,125 - E 599,375

SURF. ELEV. 390

DATE STARTED 7/27/73 COMPLETED 7/27/73

JOB NO. 7384

GROUND WATER Depth on completion 22'0"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

AUGER BORING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					Brown dry to moist clayey SILT to silty CLAY, trace fine sand
5'0"					
10'0"					
					14'0"
					Gray moist SILT, trace fine sand
15'0"					
20'0"					
25'0"					
					Bottom of boring 25'0"

parratt wolff inc

TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT	Jankowski Site Clay, New York	HOLE NO.	19-44-73-613
LOCATION	N 1,165,750 - E 599,250	SURF. ELEV.	390
DATE STARTED	7/27/73 COMPLETED 7/27/73	JOB NO.	7384
GROUND WATER	Depth on completion 22'0"		

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

AUGER BORING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					Brown dry to moist clayey SILT to silty CLAY, trace fine sand
5'0"					
10'0"					13'6"
15'0"					Gray wet SILT, trace fine sand 18'2"
20'0"					Gray coarse to fine SAND and coarse to fine gravel, some silt 20'0"
					Gray wet SILT, trace fine sand 22'6"
25'0"					Gray coarse to fine SAND and coarse to fine GRAVEL, some silt
		12/16	1	25'-27'	
		16/30			
					Bottom of boring 27'0"

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant — HOLE NO. 30-74-524

LOCATION Clay, New York — SURF. ELEV. 383.2

DATE STARTED 12/18/74 — COMPLETED 12/19/74 — JOB NO. 74130

GROUND WATER Depth after 14 hours 7'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 1 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		1/15	1	0'0"	Brown moist soft SILT and CLAY,
		2/1		2'0"	trace tree roots and fine sand
		3/3	2	2'-3'	3'0"
		6/9	3	3'-4'	Brown moist stiff SILT, trace
5'0"		6/6	4	4'0"-	clay, fine sand and organic
		6/6		6'0"	matter 6'0"
▽ W.L.		4/4	5	6'-7'	Brown wet medium stiff SILT,
		4/3	6	7'-8'	little clay and fine sand
		2/2	7	8'-9'	9'0"
10'0"		4/3	8	9'-10'	Brown gray wet medium stiff
		1/1	9	10'-11'	SILT and CLAY 10'0"
		1/2	10	11'-12'	Gray wet very soft SILT,
		1/2	11	12'-13'	little clay, trace fine sand
		3/7	12	13'-14'	
15'0"		2/1	13	14'0"-	
		2/1		16'0"	
		3/2	14	16'0"-	
		1/1		18'0"	
		1/2	15	18'-19'	
20'0"		3/3	16	19'-20'	20'0"
		4/4	17	20'0"-	Gray wet loose SILT and fine
		5		21'6"	SAND
					24'0"
25'0"					Gray wet stiff SILT, little
		4/9	18A	25'-26'	clay 26'0"
		22	18B	26'0"-	Gray moist dense fine to coarse
				26'6"	SAND and fine to medium GRAVEL,
					some silt, trace clay 28'0"
30'0"					Black moist very dense silty
		20/22	19	30'0"-	sandy weathered SHALE
		50		31'2"	
		2"			
35'0"					Top of rock 35'0"
					Run #1, 35'0" - 40'0"
					Rec. 20" - 33%
					Gray thin bedded weathered
					SHALE

Bottom [illegible]

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 30

LOCATION Clay, New York

SURF. ELEV. 383.2

DATE STARTED 12/18/74 COMPLETED 12/19/74

JOB NO. 74130

GROUND WATER Depth after 14 hours 7'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 2 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					NOTE: Coring time in rock 4 minutes per foot; no water loss.

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 31-74-525

LOCATION Clay, New York

SURF. ELEV. 385.5

DATE STARTED 12/17/74 COMPLETED 12/17/74

JOB NO. 74130

GROUND WATER Depth on completion 9'3"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 1 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		1/5	1	0'0"-	Brown moist stiff to very
		4/5		2'0"	stiff SILT, trace fine sand,
		4/6	2	2'0"-	clay and topsoil
		8/12		4'0"	
5'0"		4/4	3	4'0"-	4'6"
		6/4		6'0"	Brown moist stiff SILT,
W.L.		4/4	4	6'0"-	trace fine sand
		3/4		8'0"	
		4/4	5	8'0"-	
10'0"		3/4		10'0"	
		4/4	6	10'0"-	10'6"
		5/4		12'0"	Gray wet stiff to soft SILT,
		3/2	7	12'0"-	trace fine sand
		3/3		14'0"	
15'0"		2/3	8	14'0"-	
		3/2		16'0"-	
		3/3	9	16'0"-	
		2/3		18'0"	
		2/2	10	18'0"-	
20'0"		2/2		20'0"	
		2/7	11	20'0"-	20'6"
		9		21'6"	Brown wet medium dense fine
					SAND and fine to medium
					GRAVEL, little silt
25'0"					
		6/12	12	25'0"-	
		20		26'6"	
30'0"					29'0"
		19/24	13	30'0"-	Black moist very dense silty
		34		31'6"	weathered SHALE
					Top of rock 34'0"
35'0"					Run #1, 34'0" - 39'0"
					Rec. 14" - 23%
					Gray thin bedded weathered
					SHALE
40'0"					39'0"

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant HOLE NO. 31

LOCATION Clay, New York SURF. ELEV. 386.5

DATE STARTED 12/17/74 COMPLETED 12/17/74 JOB NO. 74130

GROUND WATER Depth on completion 9'3"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					Run #2, 39'0" - 44'0" Rec. 50" - 83% Gray weathered SHALE and LIMESTONE
45'0"					Bottom of boring 44'0"
					NOTE: Coring time in Run #1- 3-4 minutes per foot; Run #2-6-7 minutes per foot; no water loss.
50'0"					

Parratt Wolff Inc. — FISHER ROAD, EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant — HOLE NO. 32-74-526

LOCATION Clay, New York — SURF. ELEV. 403.1

DATE STARTED 12/18/74 — COMPLETED 12/19/74 — JOB NO. 74130

GROUND WATER Depth on completion 25'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		5/7	1	0'0"-	Brown-black moist stiff to very stiff SILT, trace fine sand, clay and topsoil
		8		1'6"	
5'0"					
		6/7	2	5'0"-	
		10		6'6"	
10'0"					
		4/6	3	10'0"-	
		6/8		12'0"	
		3/6	4	12'0"-	
		9/11		14'0"	
15'0"		5/7	5	14'0"-	
		10/14		16'0"	
		10/8	6	16'0"-	
		11/14		18'0"	
		12/10	7	18'0"-	19'6"
20'0"		8/7		20'0"	
		6/7	8	20'0"-	Brown moist very stiff to medium stiff SILT, little fine sand
		9/8		22'0"	
		7/7	9	22'0"-	
		8/7		24'0"	
25'0" ▽		2/3	10	24'0"-	
W.L.		2/2		26'0"	
		2/2	11	26'0"-	
		3/2		28'0"	
		3/3	12	28'0"-	
30'0"		3/2		30'0"	
		3/3	13	30'0"-	
		2/3		32'0"	
35'0"					
		1/2	14	35'0"-	
		4		36'6"	
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 32-74-526

LOCATION Clay, New York

SURF. ELEV. 403.1

DATE STARTED 12/18/74 COMPLETED 12/19/74

JOB NO. 74130

GROUND WATER Depth on completion 25'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		9/8 11	15	40'0"- 41'6"	Brown wet medium dense medium to fine SAND, trace fine gravel
45'0"					45'6"
		4/16 18	16	45'0"- 46'6"	Black moist dense SILT and weathered SHALE
50'0"					50'0"
		17/22 60	17	50'0"- 51'6"	Black dry very dense silty weathered SHALE
55'0"					
		75/2"	18	55'0"- 55'2" No Rec.	Top of rock 57'4"
					Run #1, 57'4" - 62'4" Rec. 37" - 62% Gray weathered SHALE and LIMESTONE
60'0"					
					Bottom of boring 62'4"
65'0"					NOTE: Coring time in rock 5-6 minutes per foot; no water loss.

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 33-74-527

LOCATION Clay, New York

SURF. ELEV. 392.8

DATE STARTED 12/17/74 COMPLETED 12/18/74

JOB NO. 74130

GROUND WATER Depth on completion 13'7"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		1/1	1	0'0"-	Brown moist stiff to hard
		5/8		2'0"	SILT, trace fine sand, clay
		8/10	2	2'0"-	and topsoil
		15/18		4'0"	
5'0"		9/9	3	4'0"-	
		9/9		6'0"	6'0"
		8/8	4	6'0"-	Brown moist very stiff to
		10/9		8'0"	stiff SILT, little fine sand
		8/6	5	8'0"-	
10'0"		5/5		10'0"	9'6"
		4/5	6	10'0"-	Gray moist stiff to medium
W.L. ▽		4/4		12'0"	stiff SILT, little fine sand
		4/4	7	12'0"-	
		5/4		14'0"	
15'0"		5/4	8	14'0"-	
		4/2		16'0"	
		2/2	9	16'0"-	
		2/2		18'0"	
		3/2	10	18'0"-	
20'0"		3/3		20'0"	20'6"
		3/7	11	20'0"-	
		8		21'6"	Gray-brown wet medium dense
					fine SAND, some silt
					24'0"
25'0"					Brown wet very loose to
		5/1	12	25'0"-	medium dense fine SAND, trace
		1		26'6"	silt
30'0"					
		7/6	13	30'0"-	
		13		31'6"	
35'0"					
		3/6	14	35'0"-	
		7		36'6"	
				No Rec.	
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 33-74-527

LOCATION Clay, New York

SURF. ELEV. 392.8

DATE STARTED 12/17/74 COMPLETED 12/18/74

JOB NO. 74130

GROUND WATER Depth on completion 13'7"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		4/4	15	40'0"-41'6"	Brown wet very loose to medium dense fine SAND, trace silt
		5			
45'0"					46'0"
		9/17	6	45'0"-46'3"	Black moist very dense silty weathered SHALE
		50/3"			
					Top of rock 49'6"
50'0"					Run #1, 49'6" - 54'6" Rec. 35" - 58% Gray weathered SHALE and LIMESTONE
55'0"					Bottom of boring 54'6"
					NOTE: Coring time in rock 5 minutes per foot; no water loss.

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 34-74-528

LOCATION Clay, New York

SURF. ELEV. 392.4

DATE STARTED 1/2/75 COMPLETED 1/3/75

JOB NO. 74130

GROUND WATER Depth on completion 8'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 1 OF 1

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		2/2	1	0'0"-	Brown wet medium stiff to
		4/4		2'0"	stiff SILT, some fine sand
		3/3	2	2'0"-	and clay
		5/5		4'0"	
5'0"		3/4	3	4'0"-	
WL		5/6		6'0"	
		6/7	4	6'0"-	
		5/5		8'0"	8'0"
		2/2	5	8'0"-	Gray wet soft SILT and CLAY
10'0"		2/2		10'0"	
		1/2	6	10'0"-	
		2/1		12'0"	
		2/1	7	12'0"-	
		1/3		14'0"	14'0"
15'0"		1/3	8	14'0"-	Gray wet loose SILT, trace
		3/3		16'0"	clay
		3/3	9	16'0"-	
		2/5		18'0"	18'0"
		6/11	10	18'0"-	Gray wet dense fine SAND,
20'0"		19/17		20'0"	some silt
		12/13	11	20'0"-	
		16		21'6"	
25'0"					25'0"
		8/10	12	25'0"-	Black moist medium dense
		13		26'6"	fine SAND and fine to coarse
					GRAVEL, little silt 28'0"
					Black moist dense SILT with
30'0"					embedded shale gravel and
		13/20	13	30'0"-	fine sand
		25		31'6"	Top of rock 30'4"
					Run #1, 30'4" - 35'4"
					Rec. 38" - 63%
35'0"					Gray weathered SHALE, some
		50	14	30'0"	limestone
		0"			Bottom of boring 35'4"
					NOTE: Coring time in rock 4
40'0"					minutes per foot; no

water loss

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant — HOLE NO. 35-74-529

LOCATION Clay, New York — SURF. ELEV. 394.0

DATE STARTED 12/24/74 — COMPLETED 12/31/74 — JOB NO. 74130

GROUND WATER Depth after 72 hours 16'0"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 1 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		1/1	1	0'0"-	Brown moist loose SILT,
		2/4		2'0"	trace fine sand 2'0"
		4/4	2	2'0"-	Brown wet stiff SILT,
		5/5		4'0"	little clay, trace fine
5'0"		4/9	3	4'0"-	sand
		8/8		6'0"	
		5/4	4	6'0"-	
		5/5		8'0"	8'0"
		2/2	5	8'0"-	Brown wet medium stiff
10'0"		3/2		10'0"	SILT, some fine sand 10'0"
		1/3	6	10'0"-	Gray wet medium stiff SILT,
		2/3		12'0"	little clay and fine sand
		2/2	7	12'0"-	
		2/2		14'0"	
15'0"		3/3	8	14'0"-	15'0"
WL		5/6	9	15'0"	Gray wet medium dense fine
		6/5	10	15'0"-	SAND and SILT
		6/7		16'0"	18'0"
		5/4	11	16'0"-	Gray wet loose fine SAND,
20'0"		3/3		18'0"	some silt
		4/1	12	18'0"-	
		2		20'0"	
				20'0"-	
				21'6"	
25'0"					
		6/5	13	25'0"-	
		5		26'6"	
30'0"					
		3/3	14	30'0"-	
		3		31'6"	
35'0"					
		6/5	15	35'0"-	36'0"
		5		36'6"	Black wet loose coarse to
					fine GRAVEL and coarse to
40'0"					fine SAND, little silt

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant — HOLE NO. 35-74-529

LOCATION Clay, New York — SURF. ELEV. 394.0

DATE STARTED 12/24/74 — COMPLETED 12/31/74 — JOB NO. 74130

GROUND WATER Depth after 72 hours 16'0"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		10/13 14	16	40'0"- 41'6"	Black wet medium dense coarse to fine GRAVEL and coarse to fine SAND, little silt 43'0"
45'0"		50/50 3"	17	45'0"- 45'9"	Black moist very dense fine SAND, some fine to coarse gravel, trace silt
50'0"					Top of rock 49'0"
					Run #1, 49'0" - 54'0" Rec. 36" - 60% Gray-black weathered SHALE and LIMESTONE
55'0"					Bottom of boring 54'0"
					NOTE: Coring time in rock 4 minutes per foot; no water loss.

parratt wolff inc.

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 36-74-530

LOCATION Clay, New York

SURF. ELEV. 393.2

DATE STARTED 12/23/74 COMPLETED 12/23/74

JOB NO. 74130

GROUND WATER Struck water @ 4'0" while drilling-depth after 16 hours 16'0"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		1/1	1	0'-1'	Brown wet very soft TOPSOIL 1'0"
		2/3	2	1'-2'	Brown moist medium stiff to stiff SILT and CLAY
		3/5	3	2'-3'	
		8/8	4	3'-4'	4'0"
5'0"		2/3	5	4'0"-	Brown wet loose SILT, little fine sand
		1/1		6'0"	
		4/3	6	6'-7'	7'0"
		2/3	7	7'-8'	Brown moist medium stiff SILT and CLAY
		2/3	8	8'-9'	
10'0"		4/4	9	9'-10'	
		1/2	10	10'-11'	11'0"
		1/2	11	11'-12'	Gray wet very loose SILT, trace fine sand
		2/2	12	12'-13'	
		2/1	13	13'-14'	
15'0"		1/3	14	14'-15'	15'0"
		6/8	15	15'-16'	Gray moist to wet medium dense fine SAND
W.L.		6/10	16	16'0"-	
		9/10		18'0"	18'0"
		3/3	17	18'0"-	Gray wet loose to medium dense fine SAND and SILT
20'0"		4/4		20'0"	
		3/3	18	20'0"-	
		3		21'6"	
25'0"					
		5/6	19	25'0"-	
		7		26'6"	
30'0"					
		4/5	20	30'0"-	
		6		31'6"	
35'0"					
		3/5	21	35'0"-	
		6		36'6"	
					38'0"
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 36-74-530

LOCATION Clay, New York

SURF. ELEV. 393.2

DATE STARTED 12/23/74 COMPLETED 12/23/74

JOB NO. 74130

GROUND WATER Struck water @ 4'0" while drilling- depth after 16 hours 16'0"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		10/18	22	40'0"-	Black wet dense to very dense
		16		41'6"	coarse to fine GRAVEL and
					coarse to fine SAND, some silt
45'0"					
		28/50	23	45'0"-	
				46'0"	
50'0"					Top of rock 49'3"
					Run #1, 49'3" - 54'3"
					Rec. 17" - 28%
					Gray weathered SHALE and
					LIMESTONE
55'0"					Bottom of boring 54'3"
					NOTE: Coring time in rock 4 minutes per foot; no water loss.
60'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 37-74-531

LOCATION Clay, New York

SURF. ELEV. 396.7

DATE STARTED 12/17/74 COMPLETED 12/18/74

JOB NO. 74130

GROUND WATER Depth after 12 hours 6'3"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 1 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		1/2	1	0'-1'	Brown moist soft SILT and
		2/5	2	1'-2'	TOPSOIL 1'0"
		5/4	3	2'0"-	Brown moist to wet stiff to
		5/5		4'0"	soft SILT, trace fine sand
5'0"		2/2	4	4'-5'	
▽ W.L.		4/6	5	5'-6'	
		4/4	6	6'-7'	
		3/4	7	7'-8'	
		3/3	8	8'-9'	
10'0"		4/5	9	9'-10'	
		2/3	10	10'-11'	
		4/5	11	11'-12'	12'0"
		2/2	12	12'0"-	Gray wet soft SILT, little
		1/2		14'0"	clay, trace fine sand
15'0"		2/2	13	14'-15'	
		2/6	14	15'-16'	16'0"
		6/8	15	16'0"-	Brown moist medium dense
		10/13		18'0"	fine SAND, some silt 18'0"
		12/14	16	18'0"-	Gray wet medium dense to
20'0"		13/13		20'0"	loose fine SAND, trace silt
		9/8	17	20'0"-	
		6		21'6"	
25'0"					
		6/5	18	25'0"-	
		3		26'6"	
30'0"					
		5/6	19	30'0"-	
		6		31'6"	
35'0"					
		3/3	20	35'0"-	
		3		36'6"	
40'0"					

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 37-74-531

LOCATION Clay, New York

SURF. ELEV. 396.7

DATE STARTED 12/17/74 COMPLETED 12/18/74

JOB NO. 74130

GROUND WATER Depth after 12 hours 6'3"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 2 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		3/2 3	21	40'0"- 41'6"	Gray wet loose to medium dense fine SAND, trace silt
45'0"		6/5 6	22	45'0"- 46'6"	
50'0"		4/5 6	23	50'0"- 51'6"	52'0"
					Black moist hard silty weathered SHALE Top of rock 53'6"
55'0"					Run #1, 53'6" - 58'6" Rec. 31" - 52% Gray weathered SHALE and LIMESTONE
					Bottom of boring 58'6"
					NOTE: Coring time in rock 4 minutes per foot; no water loss.

Parratt Wolff Inc.

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT: Oak Orchard Treatment Plant — HOLE NO. 38-74-532

LOCATION: Clay, New York — SURF. ELEV. 391.4

DATE STARTED: 12/20/74 — COMPLETED: 12/20/74 — JOB NO. 74130

GROUND WATER: Depth after 16 hours 4'3"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 1 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		2/2	1	0'0"-	Brown moist stiff SILT and CLAY
W.L.		4/5		2'0"	
		4/5	2	2'0"-	
		6/8		4'0"	4'0"
5'0"		5/8	3	4'-5'	Brown wet stiff to very stiff SILT, little clay
		8/10	4	5'-6'	
		5/8	5	6'0"-	
		8/7		8'0"	8'0"
		2/3	6	8'-9'	Brown wet soft CLAY and SILT
10'0"		3/3	7	9'-10'	9'0"
		1/1	8	10'-11'	Gray wet medium stiff soft to medium stiff SILT, some clay, trace fine sand
		1/2	9	11'-12'	
		2/2	10	12'-13'	Lagoon [illegible]
		3/2	11	13'-14'	
15'0"		1/2	12	14'-15'	
		2/1	13	15'-16'	
		2/1	14	16'-17'	
		1/2	15	17'-18'	
		1/2	16	18'-19'	
20'0"		3/5	17	19'-20'	20'0"
		3/2	18	20'0"-	Gray wet loose SILT, trace fine sand
		2		21'6"	
25'0"					
		3/4	19	25'0"-	
		6		26'6"	
30'0"					
		2/3	20	30'0"-	
		2		31'6"	
35'0"					35'0"
		5/6	21	35'0"-	Black wet medium dense fine to coarse GRAVEL and fine to coarse SAND, some silt
		7		36'6"	
40'0"					

parratt wolff inc
FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant HOLE NO. 38

LOCATION Clay, New York SURF. ELEV. 74-532

DATE STARTED 12/20/74 COMPLETED 12/20/74 JOB NO. 74130

GROUND WATER Depth after 16 hours 4'3"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		10/24	22	40'0"-	Black moist very dense fine
		45		41'6"	to coarse SHALE GRAVEL, fine
					SAND and SILT
45'0"					
		75		45'0"	
		0"			
					Top of rock 48'3"
50'0"					Run #1, 48'3" - 53'3"
					Rec. 30" - 50%
					Gray weathered SHALE, some
					limestone
55'0"					Bottom of boring 53'3"
					NOTE: Coring time in rock 3-4 minutes per foot; no water loss.

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant — HOLE NO. 39-74-533

LOCATION Clay, New York — SURF. ELEV. 390.9

DATE STARTED 2/10/75 — COMPLETED 2/10/75 — JOB NO. 74130

GROUND WATER Depth on completion 25'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		6/7 7	1	1'0"- 2'6"	Dark brown saturated medium dense SILT, little fine sand and roots 3'0"
5'0"		5/8 9	2	5'0"- 6'6"	Brown wet medium dense SILT, little fine sand 9'0"
10'0"		3/2 2	3	10'0"- 11'6"	Gray wet loose SILT, little fine sand, trace clay
15'0"		2/2 2	4	15'0"- 16'6"	
20'0"		2/4 4	5	20'0"- 21'6"	21'0"
					Gray saturated loose fine SAND, some silt
25'0" ▽ WL		4/4 3	6	25'0"- 26'6"	
30'0"		3/2 3	7	30'0"- 31'6"	
35'0"		2/2 2	8	35'0"- 36'6"	37'6"
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 39-74-533

LOCATION Clay, New York

SURF. ELEV. 390.9

DATE STARTED 2/10/75 COMPLETED 2/10/75

JOB NO. 74130

GROUND WATER Depth on completion 25'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		9/11	9	40'0"-	Gray wet dense coarse to fine
		35		41'6"	GRAVEL, some coarse to fine
					sand, trace silt 43'0"
					Dark brown wet very dense
45'0"					
		44/32	10	45'0"-	coarse to fine GRAVEL, some
		73		46'6"	coarse to fine sand, some silt
		75	11	48'0"-	Top of rock 48'1"
		1"		48'1"	Run #1, 48'1" - 53'1"
50'0"				No Rec.	Rec. 36" - 60%
					Gray weathered SHALE and
					LIMESTONE
55'0"					Bottom of boring 53'1"
					NOTE: Coring time in rock 4 minutes per foot; no water loss.

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 40-74-534

LOCATION Clay, New York

SURF. ELEV. 395.4

DATE STARTED 2/11/75 COMPLETED 2/11/75

JOB NO. 74130

GROUND WATER Depth after 12 hours 9'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 1 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
5'0"		6/5 5	1	1'0"- 2'6"	Brown moist loose SILT, trace fine sand and roots 2'6" Brown wet medium dense SILT, some fine sand
10'0" WL		7/8 9	2	5'0"- 6'6"	10'6"
15'0"		4/2 2	3	10'0"- 11'6"	Brown wet soft SILT, trace fine sand and clay 15'6"
20'0"		1/6 8	4	15'0"- 16'6"	Brown saturated medium dense fine SAND, trace silt
25'0"		5/7 7	5	20'0"- 21'6"	
30'0"		5/5 5	6	25'0"- 26'6"	
35'0"		6/8 9	7	30'0"- 31'6"	
40'0"		6/9 14	8	35'0"- 36'6"	

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 40-74-534

LOCATION Clay, New York

SURF. ELEV. 395.4

DATE STARTED 2/11/75 COMPLETED 2/11/75

JOB NO. 74130

GROUND WATER Depth after 12 hours 9'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 2 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		5/4 4	9	40'0"- 41'6"	Brown saturated medium dense fine SAND, trace silt 42'6"
45'0"					Brown gray wet medium dense to very dense coarse to fine GRAVEL, some medium to fine sand, little silt
		7/8 10	10	45'0"- 46'6"	
50'0"					51'0"
		33/46 75/4" 75/0"	11	50'0"- 51'4"	Gray-black wet very dense SILT, some coarse to medium gravel, trace sand Top of rock 53'0"
55'0"					Run #1, 53'0" - 58'0" Rec. 44" - 73% Gray weathered SHALE and LIMESTONE
60'0"					Bottom of boring 58'0"
					NOTE: Coring time in rock 3-4 minutes per foot; no water loss.

Parratt Wolff Inc.

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 41-74-535

LOCATION Clay, New York

SURF. ELEV. 390.3

DATE STARTED 2/12/75 COMPLETED 2/12/75

JOB NO. 74130

GROUND WATER See note

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 1 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		5/7 6	1	1'0"- 2'6"	Brown wet medium dense to very loose SILT, some fine sand, trace clay
5'0" ▽ WL		5/8 9	2	5'0"- 6'6"	
10'0"		2/1 2	3	10'0"- 11'6"	
15'0"		1/1 3	4	15'0"- 16'6"	17'0"
					Brown saturated loose fine SAND, little silt
20'0"		5/5 4	5	20'0"- 21'6"	
25'0"		3/4 4	6	25'0"- 26'6"	
30'0"		3/2 3	7	30'0"- 31'6"	34'0"
35'0"		9/13 12	8	35'0"- 36'6"	Gray-black wet medium dense SILT and coarse to medium GRAVEL, little fine sand
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 41-74-535

LOCATION Clay, New York

SURF. ELEV. 390.3

DATE STARTED 2/12/75 COMPLETED 2/12/75

JOB NO. 74130

GROUND WATER See note

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		23/29	9	40'0"-	41'4"
		37		41'6"	Dark gray wet very dense silty weathered SHALE
45'0"					
		34/45	10	45'0"-	Top of rock 46'6"
		76		46'6"	Run #1, 46'6" - 51'6" Rec. 46" - 77% Gray weathered SHALE and LIMESTONE
50'0"					
					Bottom of boring 51'6"
55'0"					NOTE: Coring time in rock 4 minutes per foot; no water loss.
					Water depth with boring complete and cased to 46'6" @ 13'4"' water depth after pulling casing 5'6".

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 42-74-536

LOCATION Clay, New York

SURF. ELEV. 389.8

DATE STARTED 2/12/75 COMPLETED 2/12/75

JOB NO. 74130

GROUND WATER Depth on completion 12'4"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		9/7 8	1	1'0"- 2'6"	Brown wet medium dense SILT, little fine sand and roots 2'0"
5'0"					Brown wet medium dense SILT, trace fine sand
		6/7 7	2	5'0"- 6'6"	8'0"
10'0"					Gray-brown wet soft clayey SILT, trace fine sand
WL		1/2 2	3	10'0"- 11'6"	
15'0"					15'8"
		1/1 1	4	15'0"- 16'6"	Brown saturated loose to medium dense fine SAND, little silt
20'0"					
		4/3 3	5	20'0"- 21'6"	
25'0"					
		6/9 7	6	25'0"- 26'6"	
30'0"					
		2/2 2	7	30'0"- 31'6"	
35'0"					
		6/7 9	8	35'0"- 36'6"	36'9"
40'0"					Gray wet medium dense medium to fine SAND and coarse to medium GRAVEL, trace silt

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 42-74-536

LOCATION Clay, New York

SURF. ELEV. 389.8

DATE STARTED 2/12/75 COMPLETED 2/12/75

JOB NO. 74130

GROUND WATER Depth on completion 12'4"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		12/13	9	40'0"-	
		10		41'6"	42'0"
					Dark gray wet very dense silty weathered SHALE
45'0"					
		26/45	10	45'0"-	
		80		46'3"	Top of rock 47'0"
		3"			Run #1, 47'0" - 52'0" Rec. 34" - 57% Gray weathered SHALE and LIMESTONE
50'0"					
					Bottom of boring 52'0"
55'0"					NOTE: Coring time in rock 3-4 minutes per foot; no water loss.

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 43-74-537

LOCATION Clay, New York

SURF. ELEV. 389.0

DATE STARTED 2/19/75 COMPLETED 2/19/75

JOB NO. 74130

GROUND WATER Depth on completion 8'5"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		5/6 8	1	1'0"- 2'6"	Brown moist medium dense to very loose SILT
5'0"		4/5 5	2	5'0"- 6'6"	
WL ▼					
10'0"		1/1 2	3	10'0"- 11'6"	14'0"
15'0"		4/4 5	4	15'0"- 16'6"	Gray wet loose fine SAND, little silt 17'6"
					Gray wet loose SILT and fine SAND
20'0"		3/4 5	5	20'0"- 21'6"	
25'0"		4/4 5	6	25'0"- 26'6"	
30'0"		2/3 2	7	30'0"- 31'6"	
35'0"		4/5 5	8	35'0"- 36'6"	37'6"
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 43-74-537

LOCATION Clay, New York

SURF. ELEV. 389.0

DATE STARTED 2/19/75 COMPLETED 2/19/75

JOB NO. 74130

GROUND WATER Depth on completion 8'5"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 2 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		7/9 13	9	40'0"- 41'6"	Gray wet medium dense coarse to medium GRAVEL, some medium to fine sand and silt 43'0"
45'0"		26/55	10	45'0"- 46'0"	Gray-black moist very dense SILT and medium to fine embedded GRAVEL Top of rock 46'0"
50'0"					Run #1, 46'0" - 51'0" Rec. 30" - 50% Gray weathered SHALE and LIMESTONE
55'0"					Bottom of boring 51'0" NOTE: Coring time in rock 4-5 minutes per foot; no water loss.

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 44-74-538

LOCATION Clay, New York

SURF. ELEV. 389.4

DATE STARTED 2/20/75 COMPLETED 2/21/75

JOB NO. 74130

GROUND WATER Struck water @ 6'0" while drilling

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		4/7 7	1	1'0"- 2'6"	Brown moist medium dense SILT, little fine sand
5'0" WL		5/6 7	2	5'0"- 6'6"	9'0"
10'0"		2/2 2	3	10'0"- 11'6"	Gray wet soft SILT, trace fine sand
15'0"		1/2 1	4	15'0"- 16'6"	
20'0"		1/1 1	5	20'0"- 21'6"	24'0"
25'0"		5/10 8	6	25'0"- 26'6"	Gray wet medium dense to loose fine SAND, some silt
30'0"		4/4 4	7	30'0"- 31'6"	
35'0"		5/5 5	8	35'0"- 36'6"	35'0" Black wet medium dense medium to fine SAND and fine to coarse GRAVEL, little silt
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 44-74-538

LOCATION Clay, New York

SURF. ELEV. 389.4

DATE STARTED 2/20/75 COMPLETED 2/21/75

JOB NO. 74130

GROUND WATER Struck water @ 6'0" while drilling

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		15/25	9	40'0"-	Black moist very dense SILT
		36		41'6"	and fine to coarse GRAVEL,
					trace fine sand 43'4"
					BOULDER
45'0"					Top of rock 44'4"
					Run #1, 44'4" - 49'4"
					Rec. 25" - 60%
					Gray weathered SHALE and
					LIMESTONE
50'0"					Bottom of boring 49'4"
					NOTE: Coring time in rock 5 minutes per foot; no water loss.
55'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 45-74-539

LOCATION Clay, New York

SURF. ELEV. 388.3

DATE STARTED 2/20/75 COMPLETED 2/20/75

JOB NO. 74130

GROUND WATER Struck water @ 8'0" while drilling

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		5/8 10	1	1'0"- 2'6"	Brown moist medium dense SILT, trace fine sand
5'0"		5/6 5	2	5'0"- 6'6"	[8'0"]
WL					
10'0"		1/1 1	3	10'0"- 11'6"	Gray wet very loose SILT, trace fine sand
15'0"		1/1 1	4	15'0"- 16'6"	
20'0"		1/1 1	5	20'0"- 21'6"	
25'0"		5/3 3	6	25'0"- 26'6"	[27'0"]
30'0"		2/4 5	7	30'0"- 31'6"	Gray wet loose fine to medium SAND, trace fine gravel and silt [32'9"]
		50/1"	8	33'7"- 33'8"	Black moist very dense SILT, little medium to fine GRAVEL Top of rock [33'8"]
35'0"					Run #1, 33'8" - 38'8" Rec. 42" - 70% Gray weathered SHALE and LIMESTONE
40'0"					

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 45-74-539

LOCATION Clay, New York

SURF. ELEV. 388.3

DATE STARTED 2/20/75 COMPLETED 2/20/75

JOB NO. 74130

GROUND WATER Struck water @ 8'0" while drilling

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					NOTE: Coring time in rock 4 minutes per foot; lost drill water in open seam from 36'8" - 37'2".

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 46-74-540

LOCATION Clay, New York

SURF. ELEV. 391.4

DATE STARTED 2/18/75 COMPLETED 2/19/75

JOB NO. 74130

GROUND WATER Depth on completion 16'2"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		4/9 11	1	1'0"- 2'6"	Brown-black moist medium dense SILT, trace roots and fine sand
5'0"		4/8 11	2	5'0"- 6'6"	8'0"
10'0"		5/5 5	3	10'0"- 11'6"	Brown moist loose fine SAND and SILT 13'6"
15'0" WL		2/2 3	4	15'0"- 16'6"	Brown wet loose SILT, trace fine sand
20'0"		2/2 2	5	20'0"- 21'6"	
25'0"		3/4 4	6	25'0"- 26'6"	29'0"
30'0"		4/4 4	7	30'0"- 31'6"	Brown saturated loose SILT and fine SAND 35'0"
35'0"		4/4 5	8	35'0"- 36'6"	Brown wet loose SILT, trace fine sand 37'4"
40'0"					Gray wet very dense SILT and medium to fine embedded GRAVEL,

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 46-74-540

LOCATION Clay, New York

SURF. ELEV. 391.4

DATE STARTED 2/18/75 COMPLETED 2/19/75

JOB NO. 74130

GROUND WATER Depth on completion 16'2"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL	
		10/17	9	40'0"-	trace fine sand	
		75		41'4"	Top of rock	41'8"
		4"			Run #1, 41'8" - 46'8"	
45'0"					Rec. 17" - 28%	
					Gray fractured weathered SHALE	46'8"
					Ran quarry bit from 46'8" - 47'0"	47'0"
50'0"					Run #2, 47'0" - 52'0"	
					Rec. 36" - 60%	
					Gray weathered SHALE and LIMESTONE	
55'0"					Bottom of boring	52'0"
					NOTE: Coring time in rock on Run #1/ 5-6 minutes per foot, Run #2/ 4 minutes per foot; no water loss.	

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FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant — HOLE NO. 47-74-541

LOCATION Clay, New York — SURF. ELEV. 396.8

DATE STARTED 2/17/75 COMPLETED 2/18/75 — JOB NO. 74130

GROUND WATER Depth on completion 16'10"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		6/7 9	1	1'0"- 2'6"	Brown wet medium dense SILT, little roots 3'0"
5'0"		6/11 15	2	5'0"- 6'6"	Brown moist medium dense SILT, trace wood 6'0" Brown moist loose to medium dense SILT, little fine sand
10'0"		3/4 5	3	10'0"- 11'6"	
15'0" WL		7/7 6	4	15'0"- 16'6"	19'0"
20'0"		1/2 2	5	20'0"- 21'6"	Gray wet loose to medium dense SILT, little fine sand
25'0"		1/6 7	6	25'0"- 26'6"	
30'0"		2/3 3	7	30'0"- 31'6"	34'6"
35'0"		2/4 4	8	35'0"- 36'6"	Gray wet loose fine SAND, little silt
40'0"					40'0"

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 47-74-541

LOCATION Clay, New York

SURF. ELEV. 396.8

DATE STARTED 2/18/75 COMPLETED 2/19/75

JOB NO. 74130

GROUND WATER Depth on completion 16'10"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 2 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		4/6	9	40'0"-	Gray wet medium dense SILT
		7		41'6"	and fine SAND
45'0"					
		7/6	10	45'0"-	
		7		46'6"	47'6"
					Gray wet medium dense SILT and medium to fine GRAVEL,
50'0"					
		7/6	11	50'0"-	little medium to fine sand
		10		51'6"	52'6"
					Gray wet very dense silty weathered medium to fine
55'0"					GRAVEL
		75/4"	12	55'0"-55'4"	Top of rock 55'4"
					Run #1, 55'4" - 60'4"
					Rec. 35" - 58%
					Gray weathered SHALE and LIMESTONE
60'0"					Bottom of boring 60'4"
					NOTE: Coring time in rock 4 minutes per foot; no water loss.
65'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 48-74-542

LOCATION Clay, New York

SURF. ELEV. 387.8

DATE STARTED 2/21/75 COMPLETED 2/21/75

JOB NO. 74130

GROUND WATER Struck water @ 6'0" while drilling

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		3/4 5	1	1'0"- 2'6"	Brown moist loose SILT 4'6"
5'0" WL		4/5 6	2	5'0"- 6'6"	Brown wet medium dense SILT, some fine sand 8'0"
					Brown wet very loose SILT, trace fine sand 12'0"
10'0"		3/2 2	3	10'0"- 11'6"	
					Gray wet very loose SILT, trace fine sand
15'0"		1/1 1	4	15'0"- 16'6"	
20'0"		1/2 2	5	20'0"- 21'6"	24'0"
25'0"		5/5 8	6	25'0"- 26'6"	Gray wet medium dense SILT and fine SAND, little fine to coarse embedded gravel
30'0"		5/13 6	7	30'0"- 31'6"	34'0"
35'0"		11/19 26	8	35'0"- 36'6"	Black moist dense SILT and fine to coarse GRAVEL, some medium to fine sand
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant HOLE NO. 48-74-542

LOCATION Clay, New York SURF. ELEV. 387.8

DATE STARTED 2/21/75 COMPLETED 2/21/75 JOB NO. 74130

GROUND WATER Struck water @ 6'0" while drilling

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		31/50 3"	9	40'0"-40'9"	Black moist very dense SILT, some fine to coarse gravel, trace weathered shale and fine sand
45'0"					Top of rock 43'6"
					Run #1, 43'6" - 48'6" Rec. 39" - 65% Gray weathered SHALE and LIMESTONE
50'0"					Bottom of boring 48'6"
					NOTE: Coring time in rock 4 minutes per foot; no water loss.
55'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 49-74-543

LOCATION Clay, New York

SURF. ELEV. 387.0

DATE STARTED 2/13/75 COMPLETED 2/14/75

JOB NO. 74130

GROUND WATER Depth on completion 12'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		4/4 5	1	1'0"-2'6"	Brown moist loose SILT, trace fine sand
5'0"		6/7 9	2	5'0"-6'6"	8'0"
10'0"		3/3 3	3	10'0"-11'6"	Gray wet loose SILT, trace fine sand
WL					
15'0"		1/2 1	4	15'0"-16'6"	
20'0"		1/2 3	5	20'0"-21'6"	24'0"
25'0"		2/4 4	6	25'0"-26'6"	Gray wet loose to medium dense fine SAND, some silt, trace fine embedded gravel
30'0"		7/8 9	7	30'0"-31'6"	
35'0"		4/5 5	8	35'0"-36'6"	37'0"
40'0"					Gray wet very dense coarse to medium GRAVEL, some silt, little medium to fine sand

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 49-74-543

LOCATION Clay, New York

SURF. ELEV. 387.0

DATE STARTED 2/13/75 COMPLETED 2/14/75

JOB NO. 74130

GROUND WATER Depth on completion 12'6"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		14/75 2"	9	40'0"-40'8"	Gray wet very dense coarse to medium GRAVEL, some silt, little medium to fine sand
45'0"		75 2"	10	43'0"-43'2"	Top of rock 45'0"
					Run #1, 45'0" - 50'0" Rec. 36" - 60% Gray weathered SHALE and LIMESTONE
50'0"					Bottom of boring 50'0"
					NOTE: Coring time in rock 3-4 minutes per foot; no water loss.

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 50-74-544

LOCATION Clay, New York

SURF. ELEV. 390.5

DATE STARTED 2/25/75 COMPLETED 2/25/75

JOB NO. 74130

GROUND WATER Depth on completion 11'3"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		14/16 18	1	1'0"- 2'6"	Brown wet dense coarse to fine GRAVEL, little coarse to fine sand, little silt 3'0" Brown wet loose SILT, trace fine sand
5'0"		6/4 3	2	5'0"- 6'6"	
10'0" WL		3/2 3	3	10'0"- 11'6"	14'0"
15'0"		2/3 2	4	15'0"- 16'6"	Brown wet loose SILT with thin layers fine sand 20'0"
20'0"		1/1 3	5	20'0"- 21'6"	Gray-brown wet loose fine SAND and SILT 24'0"
25'0"		6/9 9	6	25'0"- 26'6"	Gray-brown saturated medium dense SILT, little fine sand
30'0"		5/7 12	7	30'0"- 31'6"	
35'0"		6/15 12	8	35'0"- 36'6"	
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 50-74-544

LOCATION Clay, New York

SURF. ELEV. 390.5

DATE STARTED 2/25/75 COMPLETED 2/25/75

JOB NO. 74130

GROUND WATER Depth on completion 11'3"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 OF 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		15/18	9	40'0"-	Gray-brown saturated medium
		21		41'6"	dense SILT, little fine sand
45'0"					
		8/11	10	45'0"-	
		15		46'6"	47'0"
					Gray wet medium dense coarse to fine GRAVEL, some coarse
50'0"		150	11	49'6"-	to fine sand, little silt
				50'0"	Top of rock 50'0"
					Run #1, 50'0" - 55'0" Rec. 46" - 77% Gray weathered SHALE and LIMESTONE
55'0"					
					Bottom of boring 55'0"
					NOTE: Coring time in rock 3-4 minutes per foot; partial water loss.

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 51-74-545

LOCATION Clay, New York

SURF. ELEV. 390.3

DATE STARTED 2/25/75 COMPLETED 2/25/75

JOB NO. 74130

GROUND WATER Depth on completion 16'8"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

BORING MADE WITH HOLLOW STEM AUGER CASING

SHEET 1 OF 2

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		12/15 18	1	1'0"-2'6"	Brown wet dense coarse to fine GRAVEL and SILT, little medium to fine sand 2'6"
5'0"		3/4 5	2	5'0"-6'6"	Brown moist medium dense SILT, trace fine sand
10'0"		5/7 4	3	10'0"-11'6"	14'0"
15'0" WL		5/3 5	4	15'0"-16'6"	Brown wet loose fine SAND, trace silt 19'0"
20'0"		1/1 3	5	20'0"-21'6"	Gray-brown wet very loose SILT, little fine sand
25'0"		3/1 2	6	25'0"-26'6"	
30'0"		4/7 8	7	30'0"-31'6"	
35'0"		4/7 8	8	35'0"-36'6"	
40'0"					

parratt wolff inc

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

TEST BORING LOG

PROJECT Oak Orchard Treatment Plant

HOLE NO. 51-[illegible]-545

LOCATION Clay, New York

SURF. ELEV. 390.3

DATE STARTED 2/25/75 **COMPLETED** 2/25/75

JOB NO. 74130

GROUND WATER Depth on completion 16'8"

N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 2 **OF** 2

BORING MADE WITH HOLLOW STEM AUGER CASING

DEPTH	C	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
		8/13	9	40'0"-	Gray-brown wet very loose
		12		41'[illegible]"	SILT, little fine sand 43'0"
45'0"					Gray moist medium dense fine SAND and SILT, trace
		8/13	10A	45'0"-	
		12	10B	46'0"	fine gravel 46'0"
				46'0"- 46'6"	Dark gray moist very dense coarse to fine GRAVEL and SILT
50'0"					Top of rock 50'8"
		75	11	50'0"-	Run #1, 50'8" - 55'8"
		3"		50'3"	Rec. 32" - 53%
					Gray weathered SHALE and LIMESTONE
55'0"					
					Bottom of boring 55'8"
60'0"					NOTE: Coring time in rock 4 minutes per foot; lost all water @ 51'0".

Appendix C: Floodplain Considerations

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was New York State Plane Central Zone (FIPS zone 3102). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on the Flood Insurance Rate Map (FIRM) was derived from digital orthophotography provided by the New York Office of Cyber Security and Critical Infrastructure Coordination from photography dated April 2006.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

This digital FIRM was produced through a unique cooperative partnership between the New York State Department of Environmental Conservation (NYSDEC) and FEMA. As part of the effort, NYSDEC has joined in a Cooperative Technical Partnership agreement to produce and maintain FEMA's digital FIRMS.

76° 13' 07.5" 920000 FT JOINS PANEL 0077 925000 FT 76° 11' 15"

43° 13' 07.5" 43° 13' 07.5"

1170000 FT

1165000 FT

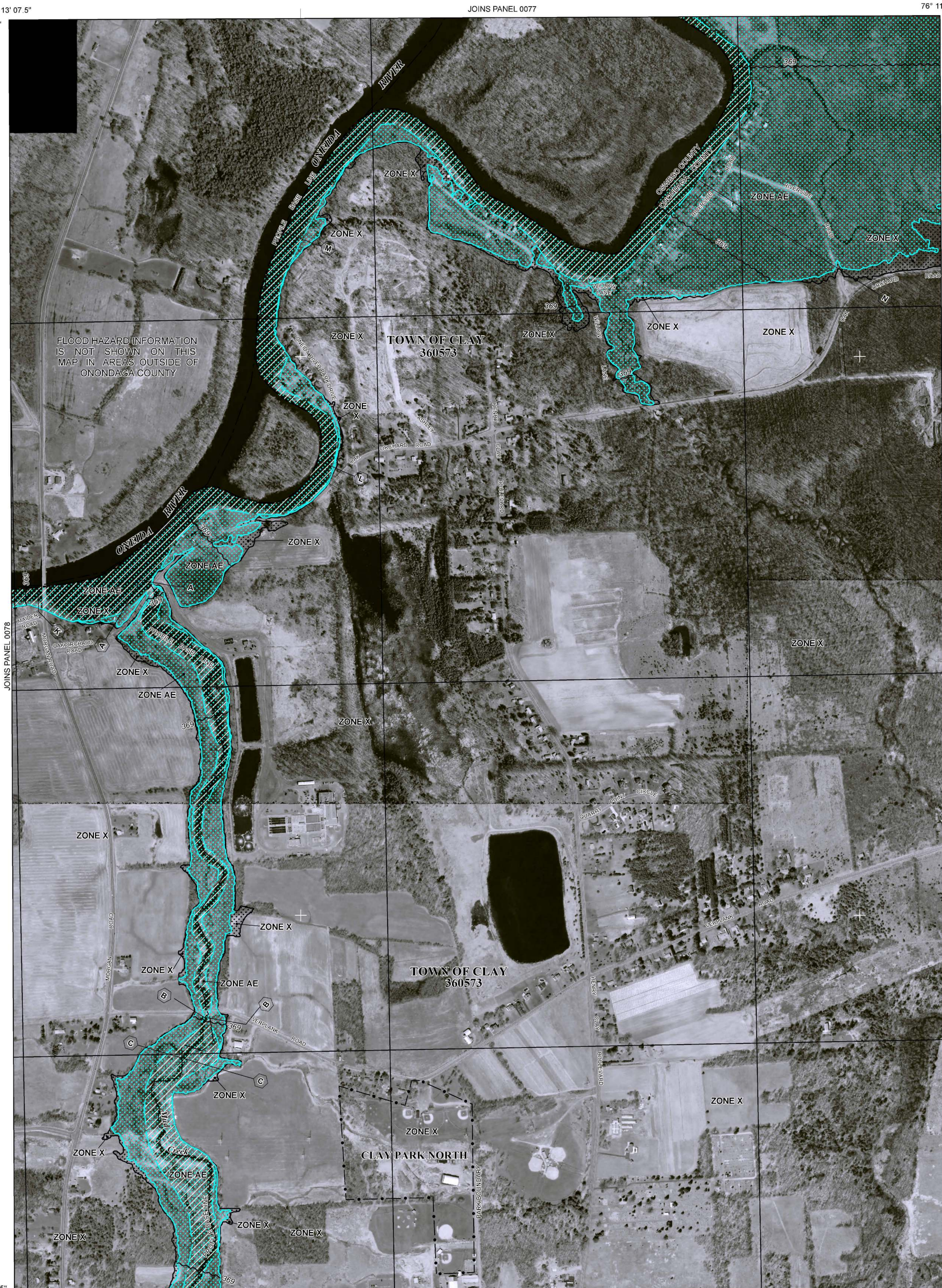
JOINS PANEL 0078

JOINS PANEL 0083

$^{47}85^{000m}$N

$^{47}84^{000m}$N

$^{47}83^{000m}$N



43° 11' 15" 43° 11' 15"

76° 13' 07.5" JOINS PANEL 0087 76° 11' 15"

$^{4}02^{000m}$E $^{4}03^{000m}$E

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - - - 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: New York State Plane Central Zone (FIPS Zone 3102), Transverse Mercator projection
$^{49}89^{000m}$ N	1000-meter Universal Transverse Mercator grid values, zone 18
DX5510 X	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
November 4, 2016

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0079F

FIRM

FLOOD INSURANCE RATE MAP

ONONDAGA COUNTY, NEW YORK
(ALL JURISDICTIONS)

PANEL 79 OF 520
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLAY, TOWN OF	360573	0079	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

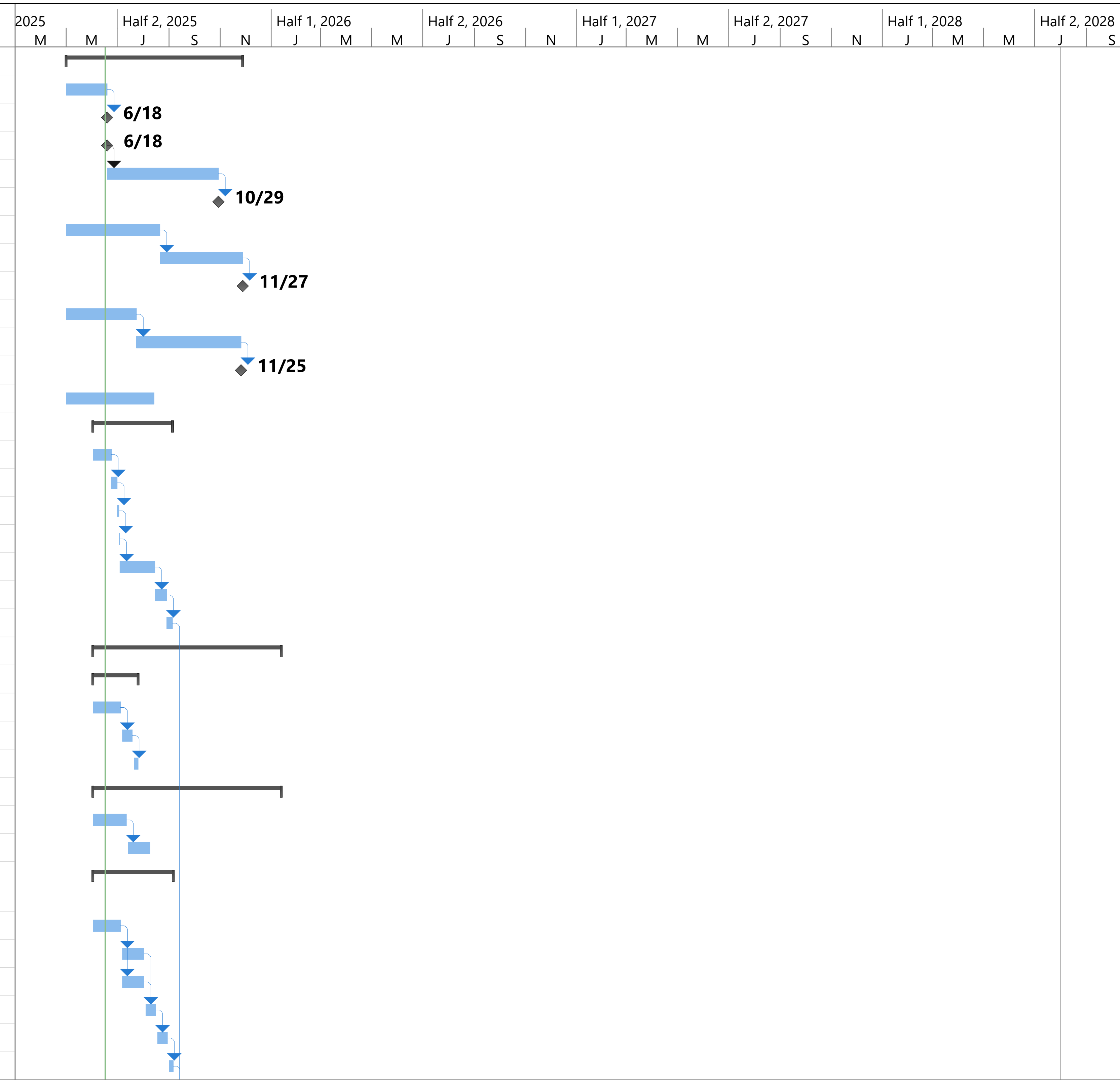
MAP NUMBER
36067C0079F

EFFECTIVE DATE
NOVEMBER 4, 2016

Federal Emergency Management Agency

Appendix D: Project Schedule

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**Permitting**	**151 days**	**Thu 5/1/25**	**Thu 11/27/25**	
2		SPDES Preparation	35 days	Thu 5/1/25	Wed 6/18/25	
3		SPDES Permit Application	0 days	Wed 6/18/25	Wed 6/18/25	2
4		SPDES Initial BODr Report	0 days	Wed 6/18/25	Wed 6/18/25	
5		SPDES Final	95 days	Thu 6/19/25	Wed 10/29/25	4
6		SPDES Final Submit	0 days	Wed 10/29/25	Wed 10/29/25	5
7		Air Permit Initial Submission	80 days	Thu 5/1/25	Wed 8/20/25	
8		Air Permit	71 days	Thu 8/21/25	Thu 11/27/25	7
9		Air Permit Final	0 days	Thu 11/27/25	Thu 11/27/25	8
10		Wetlands JD	60 days	Thu 5/1/25	Wed 7/23/25	
11		Wetlands Joint App	89 days	Thu 7/24/25	Tue 11/25/25	10
12		Wetland Final Application	0 days	Tue 11/25/25	Tue 11/25/25	11
13		Procurement	75 days	Thu 5/1/25	Wed 8/13/25	
14		**RFQ**	**69 days**	**Mon 6/2/25**	**Thu 9/4/25**	
15		Draft RFQ docs and forms	16 days	Mon 6/2/25	Mon 6/23/25	
16		OCDWEP review	5 days	Tue 6/24/25	Mon 6/30/25	15
17		Finalize RFQ	2 days	Tue 7/1/25	Wed 7/2/25	16
18		Issue RFQ	1 day	Thu 7/3/25	Thu 7/3/25	17
19		RFQ Response period	6 wks	Fri 7/4/25	Thu 8/14/25	18
20		RFQ response review	2 wks	Fri 8/15/25	Thu 8/28/25	19
21		Selection of PDB proposers	1 wk	Fri 8/29/25	Thu 9/4/25	20
22		**RFP**	**161 days**	**Mon 6/2/25**	**Mon 1/12/26**	
23		**Front End RFP Package**	**40 days**	**Mon 6/2/25**	**Fri 7/25/25**	
24		Front end package development	25 days	Mon 6/2/25	Fri 7/4/25	
25		Front end review	10 days	Mon 7/7/25	Fri 7/18/25	24
26		Finalize front end	5 days	Mon 7/21/25	Fri 7/25/25	25
27		**PDB Contract**	**161 days**	**Mon 6/2/25**	**Mon 1/12/26**	
28		PDB agreement development	30 days	Mon 6/2/25	Fri 7/11/25	
29		WLG/County review and edits	20 days	Mon 7/14/25	Fri 8/8/25	28
30		**Technical Design and Bridging Document**	**70 days**	**Mon 6/2/25**	**Fri 9/5/25**	
31		Finalize facility sizing and assumpt	25 days	Mon 6/2/25	Fri 7/4/25	
32		Draft of balance of plant design	20 days	Mon 7/7/25	Fri 8/1/25	31
33		Draft of process design	20 days	Mon 7/7/25	Fri 8/1/25	31
34		Full draft of technical documents	10 days	Mon 8/4/25	Fri 8/15/25	32,33
35		Full review	10 days	Mon 8/18/25	Fri 8/29/25	34
36		Finalize technical docs	5 days	Mon 9/1/25	Fri 9/5/25	35

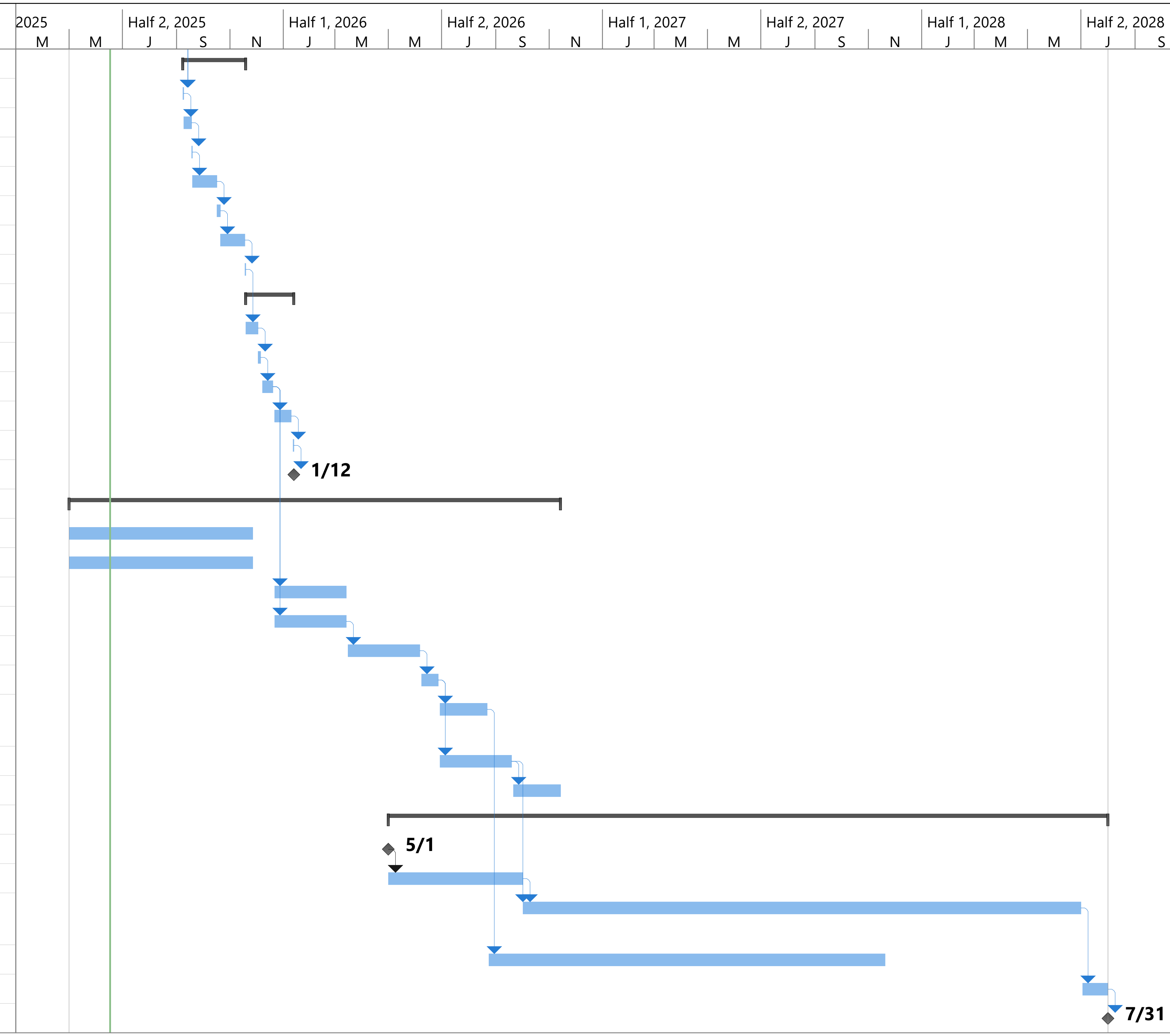


Project: 0616-2025 Schedule_S
Date: Tue 6/17/25

Task		Project Summary		Manual Task		Start-only		Deadline	
Split		Inactive Task		Duration-only		Finish-only		Progress	
Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
Summary		Inactive Summary		Manual Summary		External Milestone			

OCDWEP Industrial WWTP Schedule

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
37		**RFP Process and Bids Due**	**52 days**	**Mon 9/8/25**	**Tue 11/18/25**	
38		Issue RFP to proposers	1 day	Mon 9/8/25	Mon 9/8/25	36,21
39		Proposer initial assessments of RF	7 days	Tue 9/9/25	Wed 9/17/25	38
40		Site walk	1 day	Thu 9/18/25	Thu 9/18/25	39
41		Content development	4 wks	Fri 9/19/25	Thu 10/16/25	40
42		Confidential meetings	2 days	Fri 10/17/25	Mon 10/20/25	41
43		Final bid period	4 wks	Tue 10/21/25	Mon 11/17/25	42
44		Proposals due	1 day	Tue 11/18/25	Tue 11/18/25	43
45		**Contract Award Process**	**39 days**	**Wed 11/19/25**	**Mon 1/12/26**	
46		Proposal review period	2 wks	Wed 11/19/25	Tue 12/2/25	44
47		Interviews	3 days	Wed 12/3/25	Fri 12/5/25	46
48		Issuance of notice of award	2 wks	Mon 12/8/25	Fri 12/19/25	47
49		Contract negotiations	3 wks	Mon 12/22/25	Fri 1/9/26	48
50		Contract Award - Design only	1 day	Mon 1/12/26	Mon 1/12/26	49
51		DB Start	0 days	Mon 1/12/26	Mon 1/12/26	50
52		**Design**	**402 days**	**Thu 5/1/25**	**Fri 11/13/26**	
53		B&C Final BODr Report- handoff to DB	150 days	Thu 5/1/25	Wed 11/26/25	
54		EDR Site Enabling Package	150 days	Thu 5/1/25	Wed 11/26/25	
55		DB Precon - Early Works Design/IFC	60 days	Mon 12/22/25	Fri 3/13/26	48
56		DB BODr-30% Design Check In Point	60 days	Mon 12/22/25	Fri 3/13/26	48
57		DB 60% Design	60 days	Mon 3/16/26	Fri 6/5/26	56
58		60% Design Approval	15 days	Mon 6/8/26	Fri 6/26/26	57
59		Funding and PDB Final Contract Amendment	40 days	Mon 6/29/26	Fri 8/21/26	58
60		90% Design	60 days	Mon 6/29/26	Fri 9/18/26	58
61		DB IFC	40 days	Mon 9/21/26	Fri 11/13/26	60
62		**Construction**	**587 days**	**Fri 5/1/26**	**Mon 7/31/28**	
63		Mobilization	0 days	Fri 5/1/26	Fri 5/1/26	
64		Early Works Construction	110 days	Fri 5/1/26	Thu 10/1/26	63
65		DB Construction - Installation Commissioning	456 days	Fri 10/2/26	Fri 6/30/28	60,64
66		Equipment Procurement	325 days	Mon 8/24/26	Fri 11/19/27	59
67		Start-Up - Operational Comissioning	21 days	Mon 7/3/28	Mon 7/31/28	65
68		Micron Wastewater Fab 1 Begin	0 days	Mon 7/31/28	Mon 7/31/28	67



Project: 0616-2025 Schedule_S
Date: Tue 6/17/25

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

Appendix E: SPDES Permit

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT

Industrial Code:	**4952**	SPDES Number:	**NY-0030317**
Discharge Class (CL):	**05**	DEC Number:	**7-3124-00018/00001**
Toxic Class (TX):	**N**	Effective Date (EDP):	**07/01/2014**
Major Drainage Basin:	**07**	Expiration Date (ExDP):	**06/30/2019**
Sub Drainage Basin:	**03**	Modification Dates:(EDPM)	
Water Index Number:	**ONT-66-11**		
Compact Area:	**IJC**		

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et.seq.)(hereinafter referred to as "the Act").

PERMITTEE NAME AND ADDRESS

Name: **Onondaga County** Attention: **Commissioner, WEP**
Street: **650 Hiawatha Blvd. West**
City: **Syracuse** State: **NY** Zip Code: **13204-1194**

is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS

Name: **Oak Orchard Wastewater Treatment Plant**
Location (C,T,V): **Clay (T)** County: **Onondaga**
Facility Address: **4300 Oak Orchard Road**
City: **Clay** State: **NY** Zip Code: **13212**
NYTM -E: NYTM - N:
From Outfall No.: **001** at Latitude: **43** ° **12** ' **18.6** " & Longitude: **76** ° **12** ' **49.7** "
into receiving waters known as: **Oneida River** Class: **B**

and; (list other Outfalls, Receiving Waters & Water Classifications)

See stormwater outfalls list, page 2 of permit.

in accordance with: effluent limitations; monitoring and reporting requirements; other provisions and conditions set forth in this permit; and 6 NYCRR Part 750-1 and 750-2.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS

Mailing Name: **Onondaga County Department of Water Environment Protection**
Street: **650 Hiawatha Blvd**
City: **Syracuse** State: **NY** Zip Code: **13204-1194**
Responsible Official or Agent: **Head Operator** Phone: **(315) 652-5097**

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:

CO BWP - Permit Coordinator
RWE
RPA
EPA Region II – Michelle Josilo
NYSEFC
NYSDOH District Office
IJC

Chief Permit Permit Administrator: John J. Ferguson	
Address: Division of Environmental Permits 625 Broadway Albany, NY 12233-1750	
Signature: [signature]	Date: 6/9/14

STORMWATER OUTFALLS

The following outfalls discharge on-site stormwater only, from roofs and catch basins:

Outfall	Description	Latitude/Longitude	Receiving Water
002	Stormwater runoff only from catch basin, roof drains, grass covered swales.	43° 12' 12.9" N 76° 12' 42" W	Mud Creek to Oneida River
003	Stormwater runoff only from catch basin and paved roadway areas.	43° 12' 00" N 76° 12' 30.9" W	Drainage area of Oneida River
004	Stormwater runoff only from catch basins, roof drains, grassed areas and paved areas.	43° 11' 53.3" N 76° 12' 40.8" W	Mud Creek to Oneida River

PERMIT LIMITS, LEVELS AND MONITORING DEFINITIONS

OUTFALL	WASTEWATER TYPE	RECEIVING WATER	EFFECTIVE	EXPIRING
	This cell describes the type of wastewater authorized for discharge. Examples include process or sanitary wastewater, storm water, non-contact cooling water.	This cell lists classified waters of the state to which the listed outfall discharges.	The date this page starts in effect. (e.g. EDP or EDPM)	The date this page is no longer in effect. (e.g. ExDP)

PARAMETER	MINIMUM	MAXIMUM	UNITS	SAMPLE FREQ.	SAMPLE TYPE
e.g. pH, TRC, Temperature, D.O.	The minimum level that must be maintained at all instants in time.	The maximum level that may not be exceeded at any instant in time.	SU, °F, mg/l, etc.		

PARA-METER	EFFLUENT LIMIT	PRACTICAL QUANTITATION LIMIT (ML)	ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE
	Limit types are defined below in Note 1. The effluent limit is developed based on the more stringent of technology-based standards, required under the Clean Water Act, or New York State water quality standards. The limit has been derived based on existing assumptions and rules. These assumptions include receiving water hardness, pH and temperature; rates of this and other discharges to the receiving stream; etc. If assumptions or rules change the limit may, after due process and modification of this permit, change.	For the purposes of compliance assessment, the analytical method specified in the permit shall be used to monitor the amount of the pollutant in the outfall to this level, provided that the laboratory analyst has complied with the specified quality assurance/quality control procedures in the relevant method. Monitoring results that are lower than this level must be reported, but shall not be used to determine compliance with the calculated limit. This ML can be neither lowered nor raised without a modification of this permit.	Action Levels are monitoring requirements, as defined below in Note 2, that trigger additional monitoring and permit review when exceeded.	This can include units of flow, pH, mass, Temperature, concentration. Examples include µg/l, lbs/d, etc.	Examples include Daily, 3/week, weekly, 2/month, monthly, quarterly, 2/yr and yearly.	Examples include grab, 24 hour composite and 3 grab samples collected over a 6 hour period.

Note 1: DAILY DISCHARGE: The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for the purposes of sampling. For pollutants expressed in units of mass, the ‘daily discharge’ is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the ‘daily discharge’ is calculated as the average measurement of the pollutant over the day. DAILY MAX: The highest allowable daily discharge. DAILY MIN: The lowest allowable daily discharge. MONTHLY AVG (daily avg): The highest allowable average of daily discharges over a calendar month, calculated as the sum of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. RANGE: The minimum and maximum instantaneous measurements for the reporting period must remain between the two values shown. 7 DAY ARITHMETIC MEAN (7 day average): The highest allowable average of daily discharges over a calendar week. 12 MRA (twelve month rolling avg): The average of the most recent twelve month’s monthly averages. 30 DAY GEOMETRIC MEAN (30 d geo mean): The highest allowable geometric mean of daily discharges over a calendar month, calculated as the antilog of : the sum of the log of each of the daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. 7 DAY GEOMETRIC MEAN (7 d geo mean): The highest allowable geometric mean of daily discharges over a calendar week.

Note 2: ACTION LEVELS: Routine Action Level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If the additional monitoring requirement is triggered as noted below, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharging days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the third month following the month when the additional monitoring requirement was triggered. Results may be appended to the DMR or transmitted under separate cover to the same address. If levels higher than the Action Levels are confirmed, the permit may be reopened by the Department for consideration of revised Action Levels or effluent limits. The permittee is not authorized to discharge any of the listed parameters at levels which may cause or contribute to a violation of water quality standards. The additional monitoring requirement is triggered upon receipt by the permittee of any monitoring results in excess of the stated Action Level.

PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	June 16 to October 31	Oneida River	07/01/2014	06/30/2019

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
								Location		
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Inf.	Eff.	
Flow	Monthly average	10.0	mgd	-	-	Continuous	Recorder		X	
$CBOD_5$	Monthly average	25	mg/l	2085	lbs/d	2/week	24-hr. Comp.	X	X	(1)
$CBOD_5$	7 day average	40	mg/l	3336	lbs/d	2/week	24-hr. Comp.	X	X	
BOD_5	Monthly average	Monitor	mg/l	Monitor	lbs/d	1/month	24-hr. Comp.	X		
UOD	Daily maximum	Monitor	mg/l	4289	lbs/d	2/week	24-hr. Comp.	X	X	(2)
Solids, Suspended	Monthly average	30	mg/l	2500	lbs/d	2/week	24-hr. Comp.	X	X	(1)
Solids, Suspended	7 day average	45	mg/l	3750	lbs/d	2/week	24-hr. Comp.	X	X	
Solids, Settleable	Daily maximum	0.3	ml/l	-	-	3/day	Grab	X	X	
pH	Range	6.0 to 9.0	SU	-	-	3/day	Grab	X	X	
Temperature	Daily maximum	Monitor	Deg C	-	-	3/day	Grab	X	X	
Dissolved Oxygen	Daily Minimum	2.0	mg/l	-	-	2/week	Grab		X	
Nitrogen, Ammonia Total (as NH_3)	Monthly average	Monitor	mg/l	307	lbs/d	2/week	24-hr. Comp.		X	
Nitrogen, TKN (as N)	Daily maximum	Monitor	mg/l	-	-	2/week	24-hr. Comp.		X	
Phosphorus, Total (as P)	Monthly average	1.0	mg/l	-	-	2/week	24-hr. Comp.		X	
Mercury, Total	Daily maximum	50	ng/l	-	-	Quarterly	Grab		X	(4)
Effluent Disinfection required: [ ] All Year [X] Seasonal from May 15 to October 15										
Coliform, Fecal	30 day geometric mean	200	No./ 100 ml	-	-	2/week	Grab.		X	
Coliform, Fecal	7 day geometric mean	400	No./ 100 ml	-	-	2/week	Grab.		X	
Chlorine, Total Residual *(Interim – effective EDP to 11/1/2018)*	Daily maximum	0.35	mg/l	-	-	3/day	Grab		X	(5)
Chlorine, Total Residual *(Final – becomes effective 11/1/2018)*	Daily maximum	0.045	mg/l	-	-	3/day	Grab		X	(5)

FOOTNOTES: See page 6

PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL No.	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	November 1 to June 15	Oneida River	07/01/2014	06/30/2019

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
								Location		
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Inf.	Eff.	
Flow	Monthly average	10.0	mgd	-	-	Continuous	Recorder		X	
$CBOD_5$	Monthly average	25	mg/l	2085	lbs/d	2/week	24-hr. Comp.	X	X	(1)
$CBOD_5$	7 day average	40	mg/l	3336	lbs/d	2/week	24-hr. Comp.	X	X	
BOD_5	Monthly average	Monitor	mg/l	Monitor	lbs/d	1/month	24-hr. Comp.	X		
UOD	Daily maximum	-	mg/l	-	lbs/d	2/week	24-hr. Comp.	X	X	(2)
Solids, Suspended	Monthly average	30	mg/l	2500	lbs/d	2/week	24-hr. Comp.	X	X	(1)
Solids, Suspended	7 day average	45	mg/l	3750	lbs/d	2/week	24-hr. Comp.	X	X	
Solids, Settleable	Daily maximum	0.3	ml/l	-	-	3/day	Grab	X	X	
pH	Range	6.0 to 9.0	SU	-	-	3/day	Grab	X	X	
Temperature	Daily maximum	Monitor	Deg C	-	-	3/day	Grab	X	X	
Dissolved Oxygen	Daily Minimum	2.0	mg/l	-	-	2/week	Grab		X	
Nitrogen, Ammonia Total (as NH_3)	Monthly average	Monitor	mg/l	2,026	lbs/d	2/week	24-hr. Comp.		X	
Nitrogen, TKN (as N)	Daily maximum	Monitor	mg/l	-	-	2/week	24-hr. Comp.		X	
Phosphorus, Total (as P)	Monthly average	1.0	mg/l	-	-	2/week	24-hr. Comp.		X	
Mercury, Total	Daily maximum	50	ng/l	-	-	Quarterly	Grab		X	(4)
Effluent Disinfection required: [ ] All Year [X] Seasonal from May 15 to October 15										
Coliform, Fecal	30 day geometric mean	200	No./ 100 ml	-	-	2/week	Grab.		X	
Coliform, Fecal	7 day geometric mean	400	No./ 100 ml	-	-	2/week	Grab.		X	
Chlorine, Total Residual *(Interim – effective EDP to 11/1/2018)*	Daily maximum	0.35	mg/l	-	-	3/day	Grab		X	5
Chlorine, Total Residual *(Final – becomes effective 11/1/2018)*	Daily maximum	0.045	mg/l	-	-	3/day	Grab		X	5

FOOTNOTES: See page 6

PERMIT LIMITS, ACTION LEVELS AND MONITORING

OUTFALL No.	LEVELS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	All year unless otherwise noted	Oneida River	07/01/2014	06/30/2019

PARAMETER	EFFLUENT LIMIT		MONITORING ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FN
	Monthly Avg.	Daily Max					
Iron, Total Recoverable			Monitor	lbs/day	1/quarter	24 hr. Comp.	
Chloroform			1.3	lbs/day	1/quarter	24 hr. Comp.	(3)
Cadmium, Total Recoverable			0.4	lbs/day	1/quarter	24 hr. Comp.	
Chromium, Total Recoverable			1.9	lbs/day	1/quarter	24 hr. Comp.	
Copper, Total Recoverable			1.8	lbs/day	1/quarter	24 hr. Comp.	
Nickel, Total Recoverable			2.9	lbs/day	1/quarter	24 hr. Comp.	
Zinc, Total Recoverable			5.4	lbs/day	1/quarter	24 hr. Comp.	
Arsenic, Total Recoverable			Monitor	lbs/day	1/quarter	24 hr. Comp.	
Phenols, Total			Monitor	lbs/day	1/quarter	24 hr. Comp.	(3)

FOOTNOTES:

(1) Effluent shall not exceed __15__ % and __15__ % of influent concentration values for $CBOD_5$ & TSS respectively.
(2) Ultimate Oxygen Demand shall be computed as follows: UOD = 1.5 X $CBOD_5$ + 4.5 X TKN (Total Kjeldahl Nitrogen).
(3) The 24-hr. composites shall be collected as 3 grab samples at 8 hr. intervals. Three grab samples shall be collected and combined in laboratory prior to analysis.
(4) EPA Method 1631 is required for Mercury sampling.
(5) Monitoring of these parameters is only required during the period when disinfection is required.

WHOLE EFFLUENT TOXICITY (WET) TESTING REQUIREMENTS

OUTFALL No.	LEVELS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	All year unless otherwise noted	Oneida River	07/01/2014	06/30/2019

PARAMETER	EFFLUENT LIMIT		PQL	MONITORING ACTION LEVEL	UNITS	SAMPLE FREQUENCY	SAMPLE TYPE	FN
	Monthly Avg.	Daily Max.	Daily Max.					
WET - Acute Invertebrate				1.5	TUa	Quarterly	seefootnote	1
WET - Acute Vertebrate				1.5	TUa	Quarterly	seefootnote	1
WET - Chronic Invertebrate				9.0	TUc	Quarterly	seefootnote	1
WET - Chronic Vertebrate				9.0	TUc	Quarterly	seefootnote	1

Footnotes:

1. Whole Effluent Toxicity (WET) Testing:

Testing Requirements - WET testing shall consist of Chronic only testing. WET testing shall be performed in accordance with 40 CFR Part 136 and TOGS 1.3.2 unless prior written approval has been obtained from the Department. The test species shall be *Ceriodaphnia dubia* (water flea - invertebrate) and *Pimephales promelas* (fathead minnow - vertebrate). Receiving water collected upstream from the discharge should be used for dilution. The appropriate dilution series bracketing the IWC and including one exposure group of 100% effluent should be used to generate a definitive test endpoint, otherwise an immediate rerun of the test is required. WET testing shall be coordinated with the monitoring of chemical and physical parameters limited by this permit so that the resulting analyses are also representative of the sample used for WET testing. The ratio of critical receiving water flow to discharge flow (i.e. dilution ratio) is 5:1 for acute, and 9:1 for chronic. Discharges which are disinfected using chlorine should be dechlorinated prior to WET testing or samples shall be taken immediately prior to the chlorination system.

Monitoring Period - WET testing shall be performed at the specified sample frequency for the duration of the permit during calendar years ending in __1__ and __6__ beginning in January and lasting for a period of one full year.

Reporting - Toxicity Units shall be calculated and reported on the DMR as follows: TUa = (100)/(48 hr LC50) or (100)/(48 hr EC50) (note that Acute data is generated by both Acute and Chronic testing) and TUc = (100)/(NOEC) when Chronic testing has been performed or TUc = (TUa) x (10) when only Acute testing has been performed and is used to predict Chronic test results, where the 48 hr LC50 or 48 hr EC50 and NOEC are expressed in % effluent. This must be done for both species and using the Most Sensitive Endpoint (MSE) or the lowest NOEC and corresponding highest TUc. Report a TUa of 0.3 if there is no statistically significant toxicity in 100% effluent as compared to control.

The complete test report including all corresponding results, statistical analyses, reference toxicity data, daily average flow at the time of sampling and other appropriate supporting documentation, shall be submitted within 60 days following the end of each test period to the Toxicity Testing Unit. A summary page of the test results for the invertebrate and vertebrate species indicating TUa, 48 hr LC50 or 48 hr EC50 for Acute tests and/or TUc, NOEC, IC25, and most sensitive endpoints for Chronic tests, should also be included at the beginning of the test report.

WET Testing Action Level Exceedances - If an action level is exceeded then the Department may require the permittee to conduct additional WET testing including Acute and/or Chronic tests. Additionally, the permittee may be required to perform a Toxicity Reduction Evaluation (TRE) in accordance with Department guidance. If such additional testing or performance of a TRE is necessary, the permittee shall be notified in writing by the Regional Water Engineer. The written notification shall include the reason(s) why such testing or a TRE is required.

PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS

A. DEFINITIONS. Generally, terms used in this Section shall be defined as in the General Pretreatment Regulations (40 CFR Part 403). Specifically, the following definitions apply to terms used in this Section (PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS):

1. Categorical Industrial User (CIU) - an industrial user of the POTW that is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N;

2. Local Limits - General Prohibitions, specific prohibitions and specific limits as set forth in 40 CFR 403.5.

3. The Publicly Owned Treatment Works (the POTW) - as defined by 40 CFR 403.3(q) and that discharges in accordance with this permit.

4. Program Submission(s) - requests for approval or modification of the POTW Pretreatment Program submitted in accordance with 40 CFR 403.11 or 403.18 and approved by letter dated June 11, 1984.

5. Significant Industrial User (SIU) -

   a. CIUs;

   b. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater) to the POTW;

   c. Except as provided in 40 CFR 403.3(v)(3), any other industrial user that contributes a process wastestream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant;

   d. Any other industrial user that the permittee designates as having a reasonable potential for adversely affecting the POTW's operation or for violating a pretreatment standard or requirement.

6. Substances of Concern - Substances identified by the New York State Department of Environmental Conservation Industrial Chemical Survey as substances of concern.

B. IMPLEMENTATION. The permittee shall implement a POTW Pretreatment Program in accordance 40 CFR Part 403 and as set forth in the permittee's approved Program Submission(s). Modifications to this program shall be made in accordance with 40 CFR 403.18. Specific program requirements are as follows:

1. Industrial Survey. To maintain an updated inventory of industrial dischargers to the POTW the permittee shall:

   a. Identify, locate and list all industrial users who might be subject to the industrial pretreatment program from the pretreatment program submission and any other necessary, appropriate and available sources. This identification and location list will be updated, at a minimum, every five years. As part of this update the permittee shall collect a current and complete New York State Industrial Chemical Survey form (or equivalent) from each SIU.

   b. Identify the character and volume of pollutants contributed to the POTW by each industrial user identified in B.1.a above that is classified as a SIU.

   c. Identify, locate and list, from the pretreatment program submission and any other necessary, appropriate and available sources, all significant industrial users of the POTW.

2. Control Mechanisms. To provide adequate notice to and control of industrial users of the POTW the permittee shall:

   a. Inform by certified letter, hand delivery courier, overnight mail, or other means which will provide written acknowledgment of delivery, all industrial users identified in B.1.a. above of applicable pretreatment standards and requirements including the requirement to comply with the local sewer use law, regulation or

PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS (continued)

ordinance and any applicable requirements under section 204(b) and 405 of the Federal Clean Water Act and Subtitles C and D of the Resource Conservation and Recovery Act.

b. Control through permit or similar means the contribution to the POTW by each SIU to ensure compliance with applicable pretreatment standards and requirements. Permits shall contain limitations, sampling frequency and type, reporting and self-monitoring requirements as described below, requirements that limitations and conditions be complied with by established deadlines, an expiration date not later than five years from the date of permit issuance, a statement of applicable civil and criminal penalties and the requirement to comply with Local Limits and any other requirements in accordance with 40 CFR 403.8(f)(1).

3. Monitoring and Inspection. To provide adequate, ongoing characterization of non-domestic users of the POTW, the permittee shall:

a. Receive and analyze self-monitoring reports and other notices. The permittee shall require all SIUs to submit self-monitoring reports at least every six months unless the permittee collects all such information required for the report, including flow data.

b. The permittee shall adequately inspect each SIU at a minimum frequency of once per year.

c. The permittee shall collect and analyze samples from each SIU for all priority pollutants that can reasonably be expected to be detectable at levels greater than the levels found in domestic sewage at a minimum frequency of once per year.

d. Require, through permits, each SIU to collect at least one 24 hour, flow proportioned composite (where feasible) effluent sample every six months and analyze each of those samples for all priority pollutants that can reasonably be expected to be detectable in that discharge at levels greater than the levels found in domestic sewage. The permittee may perform the aforementioned monitoring in lieu of the SIU except that the permittee must also perform the compliance monitoring described in 3.c.

4. Enforcement. To assure adequate, equitable enforcement of the industrial pretreatment program the permittee shall:

a. Investigate instances of noncompliance with pretreatment standards and requirements, as indicated in self-monitoring reports and notices or indicated by analysis, inspection and surveillance activities. Sample taking and analysis and the collection of other information shall be performed with sufficient care to produce evidence admissible in enforcement proceedings or in judicial actions. Enforcement activities shall be conducted in accordance with the permittee's Enforcement Response Plan developed and approved in accordance with 40 CFR Part 403.

b. Enforce compliance with all national pretreatment standards and requirements in 40 CFR Parts 406 - 471.

c. Provide public notification of significant non-compliance as required by 40 CFR 403.8(f)(2)(viii).

d. Pursuant to 40 CFR 403.5(e), when either the Department or the USEPA determines any source contributes pollutants to the POTW in violation of Pretreatment Standards or Requirements the Department or the USEPA shall notify the permittee. Failure by the permittee to commence an appropriate investigation and subsequent enforcement action within 30 days of this notification may result in appropriate enforcement action against the source and permittee.

5. Record keeping. The permittee shall maintain and update, as necessary, records identifying the nature, character, and volume of pollutants contributed by SIUs. Records shall be maintained in accordance with 6 NYCRR Part 750-2.5(c).

6. Staffing. The permittee shall maintain minimum staffing positions committed to implementation of the Industrial Pretreatment Program in accordance with the approved pretreatment program.

PRETREATMENT PROGRAM IMPLEMENTATION REQUIREMENTS (continued)

C. SLUDGE DISPOSAL PLAN. The permittee shall notify NYSDEC, and USEPA as long as USEPA remains the approval authority, 60 days prior to any major proposed change in the sludge disposal plan. NYSDEC may require additional pretreatment measures or controls to prevent or abate an interference incident relating to sludge use or disposal.

D. REPORTING. The permittee shall provide to the offices listed on the Monitoring, Reporting and Recording page of this permit and to the Chief-Water Compliance Branch; USEPA Region II; 290 Broadway; New York, NY 10007; a periodic report that briefly describes the permittee's program activities over the previous year. This report shall be submitted to the above noted offices within 60 days of the end of the reporting period. The reporting period shall be ANNUAL with reporting period(s) ending on December 31.

The periodic report shall include:

1. Industrial Survey. Updated industrial survey information in accordance with 40 CFR 403.12(i)(1) (including any NYS Industrial Chemical Survey forms updated during the reporting period).

2. Implementation Status. Status of Program Implementation, to include:

   a. Any interference, upset or permit violations experienced at the POTW directly attributable to industrial users.

   b. Listing of significant industrial users issued permits.

   c. Listing of significant industrial users inspected and/or monitored during the previous reporting period and summary of results.

   d. Listing of significant industrial users notified of promulgated pretreatment standards or applicable local standards who are on compliance schedules. The listing should include for each facility the final date of compliance.

   e. Summary of POTW monitoring results not already submitted on Discharge Monitoring Reports and toxic loadings from SIU's organized by parameter.

   f. A summary of additions or deletions to the list of SIUs, with a brief explanation for each deletion.

3. Enforcement Status. Status of enforcement activities to include:

   a. Listing of significant industrial users in Significant Non-Compliance (as defined by 40 CFR 403.8(f)(2)(viii)) with federal or local pretreatment standards at end of the reporting period.

   b. Summary of enforcement activities taken against non-complying significant industrial users. The permittee shall provide a copy of the public notice of significant violators as specified in 40 CFR Part 403.8(f)(2)(viii).

MERCURY MINIMIZATION PROGRAM – High Priority POTWs

1. **General** - The permittee shall develop, implement, and maintain a Mercury Minimization Program (MMP). The MMP is required because the 50 ng/L permit limit exceeds the statewide water quality based effluent limit (WQBEL) of 0.70 nanograms/liter (ng/L) for Total Mercury. The goal of the MMP will be to reduce mercury effluent levels in pursuit of the WQBEL. Note – The mercury-related requirements in this permit conform to the mercury Multiple Discharge Variance specified in NYSDEC policy *DOW 1.3.10*.

2. **MMP Elements** - The MMP shall be documented in narrative form and shall include any necessary drawings or maps. Other related documents already prepared for the facility may be used as part of the MMP and may be incorporated by reference. As a minimum, the MMP shall include an on-going program consisting of: periodic monitoring designed to quantify and, over time, track the reduction of mercury; an acceptable control strategy for reducing mercury discharges via cost-effective measures, which may include more stringent control of tributary waste streams; and submission of periodic status reports.

A. Monitoring - The permittee shall conduct periodic monitoring designed to quantify and, over time, track the reduction of mercury. All permit-related wastewater and stormwater mercury compliance point (outfall) monitoring shall be performed using EPA Method 1631. Use of EPA Method 1669 during sample collection is recommended. Unless otherwise specified, all samples shall be grabs. Monitoring at influent and other locations tributary to compliance points may be performed using either EPA Methods 1631 or 245.7. Monitoring of raw materials, equipment, treatment residuals, and other non-wastewater/non-stormwater substances may be performed using other methods as appropriate. Monitoring shall be coordinated so that the results can be effectively compared between internal locations and final outfalls. Minimum required monitoring is as follows:

i. Sewage Treatment Plant Influent & Effluent, and Type II SSO Outfalls - Samples at each of these locations must be collected in accordance with the minimum frequency specified on the mercury permit limits page.

ii. Key Locations in the Collection System and Potential Significant Mercury Sources - The minimum monitoring frequency at these locations shall be semi-annual. Monitoring of properly treated dental facility discharges is not required.

iii. Hauled Wastes - Hauled wastes which may contain significant mercury levels must be periodically tested prior to acceptance to ensure compliance with pretreatment/local limits requirements and/or determine mercury load.

iv. Additional monitoring must be completed as may be required elsewhere in this permit or upon Department request.

B. Control Strategy - An acceptable control strategy is required for reducing mercury discharges via cost-effective measures, including but not limited to more stringent control of industrial users and hauled wastes. The control strategy will become enforceable under this permit and shall contain the following minimum elements:

i. Pretreatment/Local Limits - The permittee shall evaluate and revise current requirements in pursuit of the goal.

ii. Periodic Inspection - The permittee shall inspect users as necessary to support the MMP. Each dental facility shall be inspected at least once every five years to verify compliance with the wastewater treatment operation, maintenance, and notification elements of 6NYCRR Part 374.4. Other mercury sources shall also be inspected once every five years. Alternatively, the permittee may develop an outreach program which informs these users of their responsibilities once every five years and is supported by a subset of site inspections. Monitoring shall be performed as above.

iii. Systems with CSO & Type II SSO Outfalls - Priority shall be given to controlling mercury sources upstream of CSOs and Type II SSOs through mercury reduction activities and/or controlled-release discharge. Effective control is necessary to avoid the need for the Department to establish mercury permit limits at these outfalls.

iv. Equipment and Materials – Equipment and materials which may contain mercury shall be evaluated by the permittee and replaced with mercury-free alternatives where environmentally preferable.

C. Annual Status Report - An annual status report shall be submitted to the Regional Water Engineer and to the Bureau of Water Permits summarizing: (a) all MMP monitoring results for the previous year; (b) a list of known and potential mercury sources; (c) all action undertaken pursuant to the strategy during the previous year; (d) actions planned for the upcoming year; and, (e) progress toward the goal. The first annual status report is due one year after the permit is modified to include the MMP requirement and follow-up status reports are due annually thereafter. A file shall be maintained containing all MMP documentation, including the dental forms required by 6NYCRR Part 374.4, which shall be available for review by NYSDEC representatives. Copies shall be provided upon request.

3. **MMP Modification** - The MMP shall be modified whenever: (a) changes at the facility or within the collection system increase the potential for mercury discharges; (b) actual discharges exceed 50 ng/L; (c) a letter from the Department identifies inadequacies in the MMP; or, (d) pursuant to a permit modification.

STORM WATER POLLUTION PREVENTION PLAN FOR POTWs WITH STORMWATER OUTFALLS

1. General - The Department has determined that stormwater discharges from POTWs with design flows at or above 1 mgd shall be covered under the SPDES permit. If the permittee has already submitted a Notice of Intent to the Department for coverage under the General Storm Water permit, the permittee shall submit a Notice of Termination to the Department upon receipt of this final SPDES permit containing the requirement to develop a SWPPP.

The permittee is required to develop, maintain, and implement a Storm Water Pollutant Prevention Plan (SWPPP) to prevent releases of significant amounts of pollutants to the waters of the State through plant site runoff; spillage and leaks; sludge or waste disposal; and other stormwater discharges including, but not limited to, drainage from raw material storage.

The SWPPP shall be documented in narrative form and shall include the 13 minimum elements below and plot plans, drawings, or maps necessary to clearly delineate the direction of stormwater flow and identify the conveyance, such as ditch, swale, storm sewer or sheet flow, and receiving water body. Other documents already prepared for the facility such as a Safety Manual or a Spill Prevention, Control and Countermeasure (SPCC) plan may be used as part of the SWPPP and may be incorporated by reference. A copy of the current SWPPP shall be submitted to the Department as required in item (2.) below and a copy must be maintained at the facility and shall be available to authorized Department representatives upon request.

2. Compliance Deadlines - The initial completed SWPPP shall be submitted by EDP + 6 months to the Regional Water Engineer. The SWPPP shall be implemented within 6 months of submission, unless a different time frame is approved by the Department. The SWPPP shall be reviewed annually and shall be modified whenever: (a) changes at the facility materially increase the potential for releases of pollutants; (b) actual releases indicate the SWPPP is inadequate, or (c) a letter from the Department identifies inadequacies in the SWPPP. The permittee shall certify in writing, as an attachment to the December Discharge Monitoring Report (DMR), that the annual review has been completed. All SWPPP revisions (with the exception of minimum elements - see item (4.B.) below) must be submitted to the Regional Water Engineer within 30 days. Note that the permittee is not required to obtain Department approval of the SWPPP (or of any minimum elements) unless notified otherwise. Subsequent modifications to or renewal of this permit does not reset or revise these deadlines unless a new deadline is set explicitly by such permit modification or renewal.

3. Facility Review - The permittee shall review all facility components or systems (including but not limited to material storage areas; in-plant transfer, process, and material handling areas; loading and unloading operations; storm water, erosion, and sediment control measures; process emergency control systems; and sludge and waste disposal areas) where materials or pollutants are used, manufactured, stored or handled to evaluate the potential for the release of pollutants to the waters of the State. In performing such an evaluation, the permittee shall consider such factors as the probability of equipment failure or improper operation, cross-contamination of storm water by process materials, settlement of facility air emissions, the effects of natural phenomena such as freezing temperatures and precipitation, fires, and the facility's history of spills and leaks. The relative toxicity of the pollutant shall be considered in determining the significance of potential releases.

The review shall address all substances present at the facility that are identified in Tables 6-10 of SPDES application Form NY-2C (available at *http://www.dec.state.ny.us/website/dcs/permits/olpermits/form2c.pdf*) as well as those that are required to be monitored by the SPDES permit.

4. A. 13 Minimum elements - Whenever the potential for a release of pollutants to State waters is determined to be present, the permittee shall identify Best Management Practices (BMPs) that have been established to prevent or minimize such potential releases. Where BMPs are inadequate or absent, appropriate BMPs shall be established. In selecting appropriate BMPs, the permittee shall consider good industry practices and, where appropriate, structural measures such as secondary containment and erosion/sediment control devices and practices. USEPA guidance for development of minimum elements of the SWPPP and BMPs is available in the September 1992 manual *Storm Water Management for Industrial Activities,* EPA 832-R-92-006 (available on-line at http://nepis.epa.gov/pubtitleOW.htm). At a minimum, the plan shall include the following elements:

1. Pollution Prevention Team
2. Reporting of BMP Incidents
3. Risk Identification & Assessment
4. Employee Training
5. Inspections and Records
6. Security
7. Preventive Maintenance
8. Good Housekeeping
9. Materials/Waste Handling, Storage, & Compatibility
10. Spill Prevention & Response
11. Erosion & Sediment Control
12. Management of Runoff
13. Street Sweeping

STORM WATER POLLUTION PREVENTION PLAN FOR POTWs WITH STORMWATER OUTFALLS (continued)

Note that for some facilities, especially those with few employees, some of the above may not be applicable. It is acceptable in these cases to indicate "Not Applicable" for the portion(s) of the SWPPP that do not apply to your facility, along with an explanation, for instance if street sweeping did not apply because no streets exist at the facility.

B. Stormwater Pollution Prevention Plans (SWPPPs) Required for Discharges of Stormwater From Construction Activity to Surface Waters - As part of the erosion of and sediment control element, a SWPPP shall be developed prior to the initiation of any site disturbance of one acre or more of uncontaminated area. Uncontaminated area means soils or groundwater which are free of contamination by any toxic or non-conventional pollutants identified in Tables 6-10 of SPDES application Form NY-2C. Disturbance of any size contaminated area(s) and the resulting discharge of contaminated stormwater is not authorized by this permit unless the discharge is under State or Federal oversight as part of a remedial program or after review by the Regional Water Engineer; nor is such discharge authorized by any SPDES general permit for stormwater discharges. SWPPPs are not required for discharges of stormwater from construction activity to groundwaters.

The SWPPP shall conform to the *New York Standards and Specifications for Erosion and Sediment Control* and *New York State Stormwater Management Design Manual,* unless a variance has been obtained from the Regional Water Engineer, and to any local requirements. The permittee shall submit a copy of the SWPPP and any amendments thereto to the local governing body and any other authorized agency having jurisdiction or regulatory control over the construction activity at least 30 days prior to soil disturbance. The SWPPP shall also be submitted to the Regional Water Engineer if contamination, as defined above, is involved and the permittee must obtain a determination of any SPDES permit modifications and/or additional treatment which may be required prior to soil disturbance. Otherwise, the SWPPP shall be submitted to the Department only upon request. When a SWPPP is required, a properly completed *Notice of Intent* (NOI) form shall be submitted (available at *www.dec.state.ny.us/website/dow/toolbox/swforms.html*) prior to soil disturbance. Note that submission of a NOI is required for informational purposes; the permittee is not eligible for and will not obtain coverage under any SPDES general permit for stormwater discharges, nor are any additional permit fees incurred. SWPPPs must be developed and submitted for subsequent site disturbances in accordance with the above requirements. The permittee is responsible for ensuring that the provisions of each SWPPP is properly implemented.

DISCHARGE NOTIFICATION REQUIREMENTS

(a) Except as provided in (c) and (g) of these Discharge Notification Act requirements, the permittee shall install and maintain identification signs at all outfalls to surface waters listed in this permit. Such signs shall be installed before initiation of any discharge.

(b) Subsequent modifications to or renewal of this permit does not reset or revise the deadline set forth in (a) above, unless a new deadline is set explicitly by such permit modification or renewal.

(c) The Discharge Notification Requirements described herein do not apply to outfalls from which the discharge is composed exclusively of storm water, or discharges to ground water.

(d) The sign(s) shall be conspicuous, legible and in as close proximity to the point of discharge as is reasonably possible while ensuring the maximum visibility from the surface water and shore. The signs shall be installed in such a manner to pose minimal hazard to navigation, bathing or other water related activities. If the public has access to the water from the land in the vicinity of the outfall, an identical sign shall be posted to be visible from the direction approaching the surface water.

The signs shall have **minimum** dimensions of eighteen inches by twenty four inches (18" x 24") and shall have white letters on a green background and contain the following information:

N.Y.S. PERMITTED DISCHARGE POINT

SPDES PERMIT No.: NY__________

OUTFALL No. :____

For information about this permitted discharge contact:

Permittee Name: ____

Permittee Contact: ____

Permittee Phone: ( ) - ### - ####

OR:

NYSDEC Division of Water Regional Office Address :

NYSDEC Division of Water Regional Phone: ( ) - ### -####

(e) For each discharge required to have a sign in accordance with a), the permittee shall, concurrent with the installation of the sign, provide a repository of copies of the Discharge Monitoring Reports (DMRs), as required by the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of this permit. This repository shall be open to the public, at a minimum, during normal daytime business hours. The repository may be at the business office repository of the permittee or at an off-premises location of its choice (such location shall be the village, town, city or county clerk's office, the local library or other location as approved by the Department). In accordance with the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of your permit, each DMR shall be maintained on record for a period of five years.

(f) The permittee shall periodically inspect the outfall identification sign(s) in order to ensure they are maintained, are still visible, and contain information that is current and factually correct. Signs that are damaged or incorrect shall be replaced within 3 months of inspection.

DISCHARGE NOTIFICATION REQUIREMENTS (continued)

(g) All requirements of the Discharge Notification Act, including public repository requirements, are waived for any outfall meeting any of the following circumstances, provided Department notification is made in accordance with (h) below:

(i) such sign would be inconsistent with any other state or federal statute;

(ii) the Discharge Notification Requirements contained herein would require that such sign could only be located in an area that is damaged by ice or flooding due to a one-year storm or storms of less severity;

(iii) instances in which the outfall to the receiving water is located on private or government property which is restricted to the public through fencing, patrolling, or other control mechanisms. Property which is posted only, without additional control mechanisms, does not qualify for this provision;

(iv) instances where the outfall pipe or channel discharges to another outfall pipe or channel, before discharge to a receiving water; or

(v) instances in which the discharge from the outfall is located in the receiving water, two-hundred or more feet from the shoreline of the receiving water.

(h) If the permittee believes that any outfall which discharges wastewater from the permitted facility meets any of the waiver criteria listed in (g) above, notification (form enclosed) must be made to the Department's Bureau of Water Permits, Central Office, of such fact, and, provided there is no objection by the Department, a sign and DMR repository for the involved outfall(s) are not required. This notification must include the facility's name, address, telephone number, contact, permit number, outfall number(s), and reason why such outfall(s) is waived from the requirements of discharge notification. The Department may evaluate the applicability of a waiver at any time, and take appropriate measures to assure that the ECL and associated regulations are complied with.

SCHEDULE OF COMPLIANCE

a) The permittee shall comply with the following schedule:

Outfall(s)	Parameter(s) Affected	Interim Effluent Limit(s)	Compliance Action	Due Date
001	Chlorine, Total Residual	0.35 mg/l	Interim Permit Limit	Effective 07/01/2014 to 11/1/2018
001	Chlorine, Total Residual	-	Permittee must provide plans to the Department for achieving final permit limit	04/01/2015
001	Chlorine, Total Residual	-	Permittee must provide status report to the Department documenting progress toward achieving final permit limit.	01/01/2016 (see note (b) below)
001	Chlorine, Total Residual	0.045 mg/l (final)	Final Permit Limit	Effective 11/1/2018

The above compliance actions are one time requirements. The permittee shall comply with the above compliance actions to the Department's satisfaction once. When this permit is administratively renewed by NYSDEC letter entitled "SPDES NOTICE/RENEWAL APPLICATION/PERMIT," the permittee is not required to repeat the submission(s) noted above. The above due dates are independent from the effective date of the permit stated in the "SPDES NOTICE/RENEWAL APPLICATION/PERMIT" letter.

b) For any action where the compliance date is greater than 9 months past the previous compliance due date, the permittee shall submit interim progress reports to the Department every nine (9) months until the due date for these compliance items are met.

c) The permittee shall submit a written notice of compliance or non-compliance with each of the above schedule dates no later than 14 days following each elapsed date, unless conditions require more immediate notice as prescribed in 6 NYCRR Part 750-1.2(a) and 750-2. All such compliance or non-compliance notification shall be sent to the locations listed under the section of this permit entitled RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS. Each notice of non-compliance shall include the following information:

1. A short description of the non-compliance;
2. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirements without further delay and to limit environmental impact associated with the non-compliance;
3. A description or any factors which tend to explain or mitigate the non-compliance; and
4. An estimate of the date the permittee will comply with the elapsed schedule requirement and an assessment of the probability that the permittee will meet the next scheduled requirement on time.

d) The permittee shall submit copies of any document required by the above schedule of compliance to the NYSDEC Regional Water Engineer at the location listed under the section of this permit entitled RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS and to the Bureau of Water Permits, 625 Broadway, Albany, N.Y. 12233-3505, unless otherwise specified in this permit or in writing by the Department.

SPECIAL CONDITIONS: Schedule of Submittals

The permittee shall submit the following information to the Regional Water Engineer at the address listed on the Recording, Reporting and Monitoring page of this Permit, and to the Bureau of Water Permits, 625 Broadway, Albany NY 12233-3505:

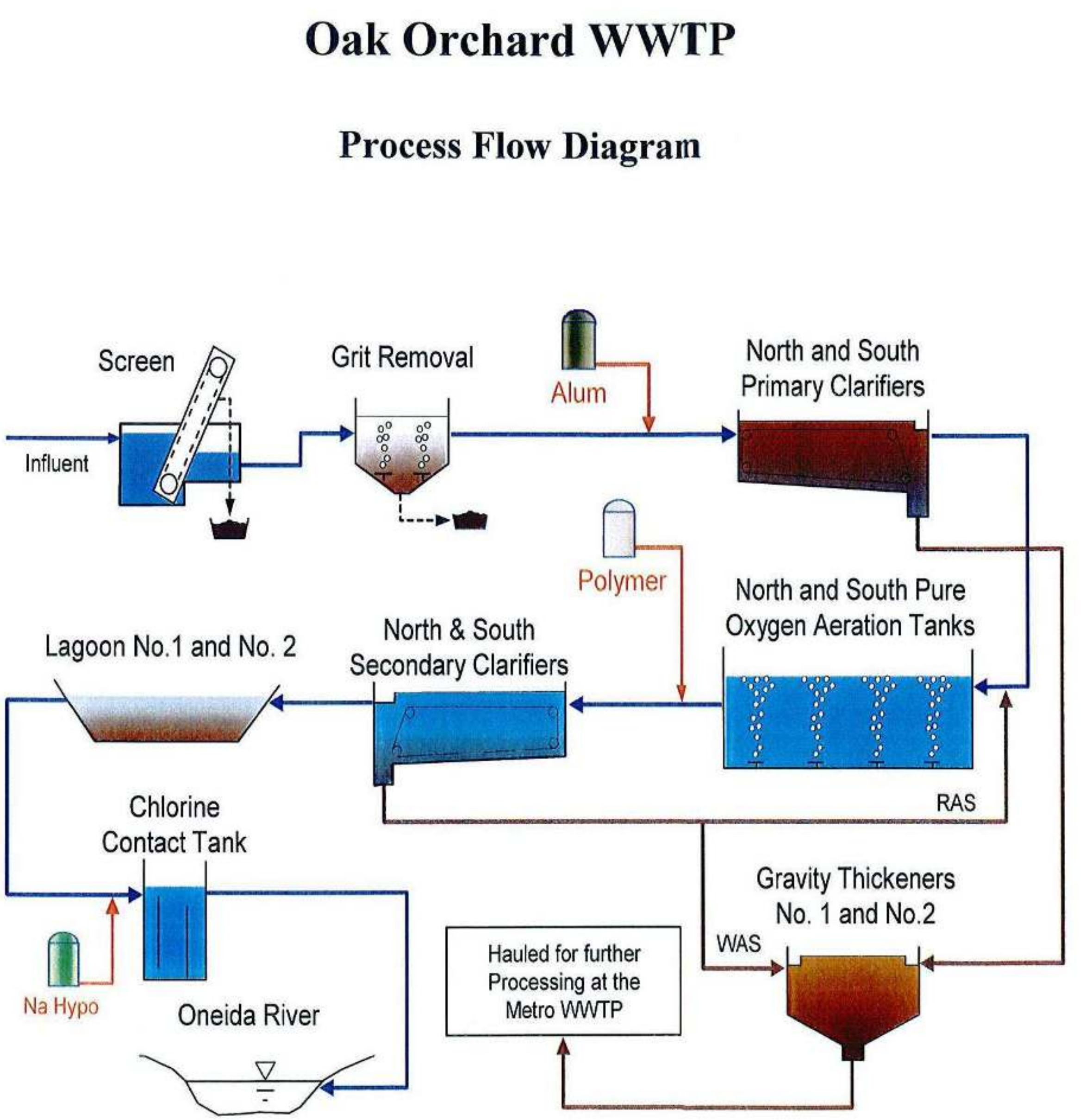
Outfall	Required Action	Due Date
001	Mercury Minimization Program: Submit annual status report by April 1st of each calendar year (for the previous year) with follow-up reports due annually thereafter.	Annually, by April 1st
	Whole Effluent Toxicity Testing: WET testing shall be performed at the specified sample frequency during calendar years ending in _1_ and _6_ beginning in January and lasting for a period of one full year.	Years ending in 1 and 6

Notes:

1. The permittee shall make every effort to comply with the above dates. Requests for extension, with justification, may be made to the Regional Water Engineer at the address listed above. Failure to submit either the information requested or a request for an extension by the dates listed above shall constitute noncompliance with this Permit.

MONITORING LOCATIONS

The permittee shall take samples and measurements, to comply with the monitoring requirements specified in this permit, at the location(s) specified below:



GENERAL REQUIREMENTS

A. The regulations in 6 NYCRR Part 750 are hereby incorporated by reference and the conditions are enforceable requirements under this permit. The permittee shall comply with all requirements set forth in this permit and with all the applicable requirements of 6 NYCRR Part 750 incorporated into this permit by reference, including but not limited to the regulations in paragraphs B through H as follows:.

B. General Conditions

1.	Duty to comply	6 NYCRR Part 750-2.1(e) & 2.4
2.	Duty to reapply	6 NYCRR Part 750-1.16(a)
3.	Need to halt or reduce activity not a defense	6 NYCRR Part 750-2.1(g)
4.	Duty to mitigate	6 NYCRR Part 750-2.7(f)
5.	Permit actions	6 NYCRR Part 750-1.1(c), 1.18, 1.20 & 2.1(h)
6.	Property rights	6 NYCRR Part 750-2.2(b)
7.	Duty to provide information	6 NYCRR Part 750-2.1(i)
8.	Inspection and entry	6 NYCRR Part 750-2.1(a) & 2.3

C. Operation and Maintenance

1.	Proper Operation & Maintenance	6 NYCRR Part 750-2.8
2.	Bypass	6 NYCRR Part 750-1.2(a)(17), 2.8(b) & 2.7
3.	Upset	6 NYCRR Part 750-1.2(a)(94) & 2.8(c)

D. Monitoring and Records

1.	Monitoring and records	6 NYCRR Part 750-2.5(a)(2), 2.5(c)(1), 2.5(c)(2), 2.5(d) & 2.5(a)(6)
2.	Signatory requirements	6 NYCRR Part 750-1.8 & 2.5(b)

E. Reporting Requirements

1.	Reporting requirements	6 NYCRR Part 750-2.5, 2.6, 2.7 & 1.17
2.	Anticipated noncompliance	6 NYCRR Part 750-2.7(a)
3.	Transfers	6 NYCRR Part 750-1.17
4.	Monitoring reports	6 NYCRR Part 750-2.5(e)
5.	Compliance schedules	6 NYCRR Part 750-1.14(d)
6.	24-hour reporting	6 NYCRR Part 750-2.7(c) & (d)
7.	Other noncompliance	6 NYCRR Part 750-2.7(e)
8.	Other information	6 NYCRR Part 750-2.1(f)
9.	Additional conditions applicable to a POTW	6 NYCRR Part 750-2.9
10.	Special reporting requirements for discharges that are not POTWs	6 NYCRR Part 750-2.6

F. Planned Changes

1. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

   a. The alteration or addition to the permitted facility may meet of the criteria for determining whether facility is a new source in 40 CFR §122.29(b); or
   b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, or to notification requirements under 40 CFR §122.42(a)(1); or
   c. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

   In addition to the Department, the permittee shall submit a copy of this notice to the United States Environmental Protection Agency at the following address: U.S. EPA Region 2, Clean Water Regulatory Branch, 290 Broadway, 24th Floor, New York, NY 10007-1866.

GENERAL REQUIREMENTS continued

G. Notification Requirement for POTWs

1. All POTWs shall provide adequate notice to the Department and the USEPA of the following:
   a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of CWA if it were directly discharging those pollutants; or
   b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
   c. For the purposes of this paragraph, adequate notice shall include information on:
      i. the quality and quantity of effluent introduced into the POTW, and
      ii. any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

POTWs shall submit a copy of this notice to the United States Environmental Protection Agency, at the following address: U.S. EPA Region 2, Clean Water Regulatory Branch, 290 Broadway, 24th Floor, New York, NY 10007-1866.

H. Sludge Management

The permittee shall comply with all applicable requirements of 6 NYCRR Part 360.

I. SPDES Permit Program Fee

The permittee shall pay to the Department an annual SPDES permit program fee within 30 days of the date of the first invoice, unless otherwise directed by the Department, and shall comply with all applicable requirements of ECL 72-0602 and 6 NYCRR Parts 480, 481 and 485. Note that if there is inconsistency between the fees specified in ECL 72-0602 and 6 NYCRR Part 485, the ECL 72-0602 fees govern.

J. Water Treatment Chemicals (WTCs)

New or increased use and discharge of a WTC requires prior Department review and authorization. At a minimum, the permittee must notify the Department in writing of its intent to change WTC use by submitting a completed *WTC Notification Form* for each proposed WTC. The Department will review that submittal and determine if a SPDES permit modification is necessary or whether WTC review and authorization may proceed outside of the formal permit administrative process. The majority of WTC authorizations do not require SPDES permit modification. In any event, use and discharge of a WTC shall not proceed without prior authorization from the Department. Examples of WTCs include biocides, coagulants, conditioners, corrosion inhibitors, defoamers, deposit control agents, flocculants, scale inhibitors, sequestrants, and settling aids.

1. WTC use shall not exceed the rate explicitly authorized by this permit or otherwise authorized in writing by the Department.
2. The permittee shall **maintain a logbook** of all WTC use, noting for each WTC the date, time, exact location, and amount of each dosage, and, the name of the individual applying or measuring the chemical. The logbook must also document that adequate process controls are in place to ensure that excessive levels of WTCs are not used.
3. The permittee shall **submit a completed *WTC Annual Report Form*** each year that they use and discharge WTCs. This form shall be attached to either the December DMR or the annual monitoring report required below.

The *WTC Notification Form* and *WTC Annual Report Form* are available from the Department's website at http://www.dec.ny.gov/permits/93245.html .

RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

A. The monitoring information required by this permit shall be summarized, signed and retained for a period of at least five years from the date of the sampling for subsequent inspection by the Department or its designated agent. **Also, monitoring information required by this permit shall be summarized and reported by submitting;**

[X] (if box is checked) completed and signed Discharge Monitoring Report (DMR) forms for each __1__ month reporting period to the locations specified below. Blank forms are available at the Department's Albany office listed below. The first reporting period begins on the effective date of this permit and the reports will be due no later than the 28th day of the month following the end of each reporting period.

[ ] (if box is checked) an annual report to the Regional Water Engineer at the address specified below. The annual report is due by February 1 each year and must summarize information for January to December of the previous year in a format acceptable to the Department.

[ ] (if box is checked) a monthly "Wastewater Facility Operation Report..." (form 92-15-7) to the:
[ ] Regional Water Engineer and/or [ ] County Health Department or Environmental Control Agency specified below

Send the **original** (top sheet) of each DMR page to:
Department of Environmental Conservation
Division of Water, Bureau of Water Compliance
625 Broadway, Albany, New York 12233-3506
Phone: (518) 402-8177

Send an **additional copy** of each DMR page to:
Onondaga Co. Dept. of Health
PO Box 1325
421 Montgomery Street
Syracuse, NY 13202

Send the **first copy** (second sheet) of each DMR page to:
Department of Environmental Conservation
Regional Water Engineer, Region 7
615 Erie Blvd West
Syracuse, New York 13204-2400
(315) 426-7500

B. Monitoring and analysis shall be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

C. More frequent monitoring of the discharge(s), monitoring point(s), or waters of the State than required by the permit, where analysis is performed by a certified laboratory or where such analysis is not required to be performed by a certified laboratory, shall be included in the calculations and recording of the data on the corresponding DMRs.

D. Calculations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

E. Unless otherwise specified, all information recorded on the DMRs shall be based upon measurements and sampling carried out during the most recently completed reporting period.

F. Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section 502 of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be directed to the New York State Department of Health, Environmental Laboratory Accreditation Program.

Appendix F: Projected WQBELs

Projected Water Quality Based Effluent Limits for Discharge to the Oneida River

Assumptions that may change results: cormix instream mixing; effluent flow rates; instream background concentrations; instream hardness, pH, temp; distribution between MTT & ITT (current values show equal distribution)

For carbonaceous and nitrogenous oxygen demanding pollutants, the Department uses a model which incorporates the Streeter-Phelps equation. The equation relates the decomposition of inorganic and organic materials along with oxygen reaeration rates to compute the downstream dissolved oxygen concentration for comparison to water quality standards. Boomi is calculating predicted WQBELs for these

Values below are based on the following dilution ratios, and assuming equal distribution between both treatment facilities
Fab 1 Chronic = 7.1x; Acute = 2.5x *based on MTT = 11 mgd, ITT = 8.25 mgd, 7Q10 = 183 cfs*

Not all parameters listed below will be limited in the SPDES Permit; only parameters that exhibit a reasonable potential to exceed instream standards (based on a projected discharge concentration) will be given a WQBEL.

Parameter	Fab1 + WEP 13 WQBEL ug/L unless noted	Fab2 + WEP 15 WQBEL ug/L unless noted	WQBEL Notes
pH	6.5 - 8.5	6.5 - 8.5	
Dissolved Oxygen	Boomi modeling - TBD		DO is typically limited through 'UOD' &/or 'CBOD & ammonia'. UOD would be modeled @ 7Q10 using streeter phelps.
Phosphorous	*1000*		*OOWWTP informed limit will be 1 mg/L monthly average. However, NY DEC Draft WQS being pursued is 75ug/L resulting in WQBEL of 0.495 mg/L, unsure if this will be finalized by permit issuance.*
Total Ammonia (ug/L NH3)	Boomi modeling - TBD		DO is typically limited through 'UOD' &/or 'CBOD & ammonia'. UOD would be modeled @ 7Q10 using streeter phelps.
Sulfite	1,420		
Nitrite (Expressed as N)	710		
Solids, Total Dissolved (TDS) mg/L	2,086		mg/L
1,4-Dioxane	127,800		
Perfluorooctane Sulfonic Acid (PFOS)	1,136		
Fluoride	21,473		
Hydrogen sulfide	14.2		
Arsenic, total	917		
Beryllium, acid-soluble form	7,810		
Cadmium, total	16.1		
Chromium, total (not including hex)	725		
Chromium (hexavalent), total	42.4		
Copper, total	50.4		
Lead, total	35.01		
Mercury, total	1.40		ng/L as 12 month rolling average - based on variance calculation from DEC
Nickel, total	509		
Silver, total	0.604		
Thallium, acid soluble form	56.80		
Zinc,total	431		
Cobalt, acid soluble form	35.5		
Boron, acid soluble form	71,000		
Iron, Total	1,221		
Vanadium, acid soluble	99.4		
Selenium, dissolved	32.7		
Cyanide, Total	36.92		
Benzene	115		
Clorobenzene	35.50		
Dichlorobenzene	35.50		
Methylene Chloride	2,300		
Toluene	710		
Benzidine	0.71		
Bis (2-ethylhexyl) Phthalate	4.26		
2,4-Dimethylphenol	11,500		
2,4-Dinitrophenol	4,600		
Hexachlorobenzene	3.45E-04		
Hexachlorobutadiene	0.115		
Hexachlororcyclopentadiene	3.195		
Hexachloroethane	6.900		
Pentachlorophenol	118		
applies to the sum of "Phenols, total unchlorinated"	57.5		
applies to the sum of "Phenols, total chlorinated".	11.5		
Aldrin & Dieldrin	0.0115		
Dieldrin	6.90E-06		
Chlordane	0.0002		
4,4'-DDD	0.0009		
4,4'-DDE	8.05E-06		
4,4'-DDT	0.000115		
Endosulfan	0.0639		
Endrin	0.0230		
Heptachlor	0.0023		
Heptachlor Epoxide	0.0035		
Polychlorinated biphenyls	1.15E-05		
Azinphosmethyl	0.0355		
Carbofuran	7.1		
dibenzofurans	3.57E-08		
Chlorine (total residual)	35.5		
Chlorobenzene	35.5		
Demeton (sum of)	0.7100		
Diazinon	0.5680		
alpha-hexachlorocyclohexane	0.0230		
beta-hexachlorocyclohexane	0.0805		
delta-hexachlorocyclohexane	0.0920		
epsilon-hexachlorocyclohexane	0.0920		
gamma-hexachlorocyclohexane	0.0920		
hydrazine	71.0000		
hydroquinone	15.6200		
Isodecyl diphenyl phosphate	12.1		
Isothiazolones, total	7.1		
Linear alkyl benzene sulfonates	284		
Malathion	0.7100		
Methoxychlor	0.2130		
Methylene bisthiocyanate	7.1		
Mirex	1.15E-05		
Nitrolotri acetic acid	35,500		
Octachlorostyrene	0.000069		
Parathion	0.1755		
Parathion and Methyl Parathion	0.0568		
Quaternary Ammonium Compounds	71.0		
Toxaphene	6.90E-05		
Trichlorobenzenes	35.5		
Trichloroethene	460		

Triphenyl Phosphate	28.4		
Anthracene	27.0		
Benz(a)anthracene	0.2130		
Benzo(a)pyrene	0.0138		
Chlorinated dibenzo-p-dioxins and Chlorinated dibenzofurans	6.90E-09		
2,2-Dibromo-3-nitrilopropionamide and Dibromoacetonitrile	142.0000		
Dichlorobenzenes	35.5000		
Ethylbenzene	120.7000		
Ethylene glycol	3,550,000		
Fluorene	3.8		
Isopropylbenzene	18.5		
Isothiazolones, total (isothiazolinones) (includes 5-chloro-2-methyl-4-isothiazolin 3-one & 2-ethyl-4-isothiazolin-3-one)	7.1		
2-Methylnaphthalene	11.3		
Naphthalene	92.3		
Phenanthrene	36		
Polychlorinated biphenyls	0.000012		
Pyrene	32.66		
Tetrachloroethene	11.50		
1,2,4-Trimethylbenzene	234		
1,2-Xylene1,3-Xylene 1,4-Xylene	462		
Temperature	+/- five Fahrenheit degrees or 86F		

Appendix G: Alternative Comparison Matrix

Onondaga County Micron IWTP Alternatives 1, 2, and 3 Screening											
Case	**Process**	**Flow Regime**	**Equalization and Diversion (EQ/DIV)**	**Chemical Treatment (Chem)**	**Clarification (Clar)**	**Biological Nutrient Removal (BNR)**	**Membrane Bioreactor (MBR)**	**Reverse Osmosis (RO)**	**Advantages**	**Disadvantages**	**Screening Comments**
1	**EQ/Div/Chem/Clar/BNR/MBR**	Main train forward flow (Q_f)at winter and summer peak flow of 8.5MGD and 6.8 MGD, respectively, plus up to 30 percent of Q_f for recycle treatment as needed or permitted by sodium and chloride TDS cycling.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 1.5 MG each for 8.5 MGD	Lime for pH adjustment to 9 plus for metals precipitation. Ferric Sulfate for limited coprecipitation/precipitation of ions as needed. PH adjustment for BNR.	Gravity chemical high solids clarification for physical removal of TSS.	Peroxide removal with Methanol. Bardenpho (Anoxic/Aerobic/Anoxic/Aerobic) biological activated sludge organics and full nutrient removal. Supplemental MgOH alkalinity and methanol (MeOH) addition for nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	NA	1) Provides low level chemical, biological nutrient and organics treatment that could accommodate brine recycle treatment. 2) Would accommodate other industrial organic and chemical dischargers. 3) Meets current estimated non-TDS discharge requirements.	1) Primary Chemical treatment results in additional Sodium and Chloride TDS. 2) Largest footprint given recycle flows. 3)Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 4) Won't meet TDS discharge requirements long term. 5) Requires supplemental COD or electron donor.	Ruled out because of space constraints, sodium and chloride levels, long term TDS compliance and limited potential for reuse by Micron.
2	**EQ/Div/Chem/Clar/BNR/MBR/RO/recycle**	Main train forward flow (Q_f)at winter and summer peak flow of 8.5MGD and 6.8 MGD, respectively, plus up to 30 percent of Q_f for recycle treatment as needed or permitted by sodium and chloride TDS cycling for discharge blending. 70 percent or more of Qf available for reuse by Micron.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 1.5 MG each for 8.5 MGD	Lime treatment pH adjustment to 9 plus for precipitation of metals. Ferric Sulfate addition for limited coprecipitation/precipitaton of ions as needed. Calcium chloride for sulfate removal. PH adustment for BNR	Gravity chemical high solids clarification for physical removal of TSS.	Peroxide removal with Methanol. Bardenpho (Anoxic/Aerobic/Anoxic/Aerobic)biological activated sludge organics and full nutrient removal. Supplemental MgOH alkalinity and methanol (MeOH) addition for nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	Low (70 percent) recovery reverse osmosis with concentrate recycle for sulfate and metals removal with recycle controlled by sodium and chloride cycling. Permeate reuse.	1) Provides low level chemical, biological nutrient, and organics treatment followed by RO treatment. 2) RO brine treatment removes sulfate and other constituents. 3) Provides reclaim water for Micron. 4) Would accommodate other industrial organic and chemical dischargers. 5) Meets current estimated non-TDS discharge requirements.	1) Primary Chemical treatment of both reject and influent results in higher Sodium and Chloride and TDS levels. 2) provides limited softening and silica removal. 3) Largest footprint given recycle flows. 4) Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 5) Won't meet TDS discharge requirements long term. 6) Requires supplemental COD or electron donor.	Ruled out because of space constraints, sodium and chloride levels, long- term TDS compliance,limited softening and silica removal capabilities, and complications of brine blowdown.
3	**EQ/Div/Chem/Clar/BNR/RO/norecycle**	Main train forward flow (Q_f)at winter and summer peak flow of 8.5MGD and 6.8 MGD, respectively with no recycle or RO concentrate treatment. 70 percent or more of Qf available for reuse by Micron.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 1.5 MG each for 8.5 MGD	Lime for pH adjustment to 9 plus for metals precipitation. Ferric Sulfate for limited coprecipitation/precipitation of ions as needed. pH adjustment for BNR.	Gravity chemical high solids clarification for physical removal of TSS.	Peroxide removal with Methanol. Bardenpho (Anoxic/Aerobic/Anoxic/Aerobic)biological activated sludge organics and full nutrient removal. Supplemental MgOH alkalinity and methanol (MeOH) addition for nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	Low (70 percent) recovery reverse osmosis with concentrate discharge and permeate reuse.	1) Provides low level chemical, biological nutrient, and organics treatment for Q_f. 2) Provides RO reclaim water for Micron. 3) Would accommodate other industrial organic and chemical dischargers. 4) Meets current estimated non-TDS discharge requirements.	1) Primary Chemical treatment results in additional Sodium and Chloride TDS. 2) One third smaller because of no recycle but still a large footprint. 3)Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 4) Won't meet TDS discharge requirements long term. 5) Requires supplemental COD or electron donor.	Ruled out because of space constraints, sodium and chloride levels, longe term TDS compliance, limited softening and silica removal capabilities.

Onondaga County Micron IWTP Alternatives 4, 5, and 6 Screening

Case	Process	Flow Regime	Equalization and Diversion (EQ/DIV)	Chemical Treatment (Chem)	Biological Nutrient Removal (BNR)	Membrane Bioreactor (MBR)	Weak Acid Cation (WAC) Exchange	Decarbonization (DeCarb) Stripping Tower	Reactive Silica Ion Exchange (SilX)	Reverse Osmosis (RO)	Brine Solids Clarifier (BrClar)	Pressure Multi-Media Filter (MedFilt)	Mechanical Vapor Recompression Evaporator (Evap)	Forced Circulation Crystallizer (Cryst)	Advantages	Disadvantages	Screening Comments
4	**EQ/Div/Chem/BNR/MBR**	Main train forward flow (Q_f)at winter and summer peak flow of 8.5MGD and 6.8 MGD, respectively.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 1.5 MG each for 8.5 MGD	PH adjustment for BNR. Ferric sulfate for limited coprecipitation/precipitation of ions as needed.	Peroxide removal with Methanol. Bardenpho (Anoxic/Aerobic/Anoxic/Aerobic)biological activated sludge organics and full nutrient removal. Supplemental MgOH alkalinity and methanol (MeOH) addition for nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	NA	NA	NA	NA	NA	NA	NA	NA	1)Provides limited chemical, low level biological nutrient and organics treatment that could accommodate brine recycle treatment. 2) Likely meets TDS discharge requirements until shift in TDS related to FAB 2. 3) Would accommodate other industrial organic and limited chemical dischargers. 4) Meets current estimated non-TDS discharge requirements.	1) Limited chemical treatment results in some sodium and chloride TDS. 2)Limited chemical treatment may not meet metals requirements. 3)Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 4) Noncompliant with TDS discharge requirements long-term. 5) Requires supplemental COD or electron donor.	Ruled out because of space constraints, supplemental COD requirements, not needed to meet estimated SPDES nitrogen limits, and without addons will not meet long term SPDES TDS and Micron reclaim water requirements.
5	**EQ/Div/Chem/BNR/MBR/WAC/DeCarb/RO/BrChem/BrClar/Med Filt**	Main train forward flow (Q_f)at winter and summer peak flow of 8.5MGD and 6.8 MGD, respectively. Up to 30 percent of Q_f from RO reject treated separately for discharge blending. 70 percent or more of Qf available for reuse by Micron.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 1.5 MG each for 8.5 MGD	PH adjustment for BNR. Ferric sulfate for limited coprecipitation/precipitation of ions as needed.	Peroxide removal with Methanol. Bardenpho (Anoxic/Aerobic/Anoxic/Aerobic)biological activated sludge organics and full nutrient removal. Supplemental MgOH alkalinity and methanol (MeOH) addition for nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	A weak acid cation exchange will be used to remove magnesium and calcium alkalinity to reduce the scaling tendencies in the RO. This will enable the RO to be operated at higher than the base 70 percent recovery. Weak hydrochloric (HCl) or perhaps sulfuric (H_2SO_4) will be used for regeneration of the WAC.	A decarbonization stripping tower will be provided to remove or strip carbon dioxide to further reduce scaling tendencies and corrosion. The pH will be adjusted with sulfuric acid to approximately 4-5 to enhance the stripper performance.	NA	Low (70 percent) recovery reverse osmosis with concentrate discharge to concentrate or brine chemical treatment and permeate reuse.	Gravity brine chemical solids clarifier for low solids density clarification for physical removal of TSS	A disc media filter will remove total suspended solids from clarifier effluent.	NA	NA	1) Provides limited chemical, low level biological nutrient and organics treatment that could accommodate brine recycle treatment. 2) Would accommodate other industrial organic and chemical dischargers. 3) Provides smaller foot print for chemical treatment with chemical and limtied TDS removal. 4) Provides reclaim water for Micron. 5) Hardness pretreatment for low recovery RO. 6) Meets current estimated non-TDS discharge requirements.	1) Limited chemical treatment results in some sodium and chloride TDS. 2)Limited chemical treatment may not meet metals requirements. 3) Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 4) Won't meet TDS discharge requirements long-term. 5) No silica RO pretreatment. 6) Requires supplemental COD or electron donor.	Ruled out because of space constraints, supplemental COD requirements, not needed to meet estimated SPDES nitrogen limits, requires more chemicals resulting in more chemical residuals, will not meet FAB 2 and beyond TDS limits and has a higher level of operational complexity.
6	**EQ/Div/Chem/BNR/MBR/WAC/DeCarb/SilX/RO/BrChem/BrClar/MedFilt/Evap/Cryst**	Main train forward flow (Q_f)at winter and summer peak flow of 8.5MGD and 6.8 MGD, respectively. Up to 30 percent of Q_f from RO reject treated separately with all liquid discharge available for reuse. 90 percent or more of Qf available for reuse by Micron.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 1.5 MG each for 8.5 MGD	PH adjustment for BNR. Ferric sulfate for limited coprecipitation/precipitation of ions as needed.	Peroxide removal with Methanol. Bardenpho (Anoxic/Aerobic/Anoxic/Aerobic)biological activated sludge organics and full nutrient removal. Supplemental MgOH alkalinity and methanol (MeOH) addition for nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	A weak acid cation exchange will be used to remove magnesium and calcium alkalinity to reduce the scaling tendencies in the RO. This will enable the RO to be operated at higher than the base 70 percent recovery. Weak hydrochloric (HCl) or perhaps sulfuric (H_2SO_4) will be used for regeneration of the WAC.	A decarbonization stripping tower will be provided to remove or strip carbon dioxide to further reduce scaling tendencies and corrosion. The pH will be adjusted with sulfuric acid to approximately 4-5 to enhance the stripper performance.	A silica strong base ion exchange system will be provided to remove reactive silica to enable the RO to be operated at higher than 70% recovery. Caustic Soda (NaOH) will be used for Si IX regeneration.	High (up to 90 percent)4 stage recovery reverse osmosis with concentrate discharge to concentrate or brine chemical treatment and permeate reuse. RO capacity targeted for maximum reuse and/or zero liquid discharge.	Gravity brine chemical solids clarifier for low solids density clarification for physical removal of TSS	A disc media filter will remove total suspended solids from clarifier effluent.	A mechnical vapor recompression thermal evaporator will further concentrate the brine from the media filter up to 23 percent total dissolved solids.	A forced circulation crystallizer will concentrate the evaporator total dissolved solids to 50 to 65 percent. Brine or TDS will be dewatered to 80 to 90 percent with a centrifuge.	1) Provides limited chemical, low level biological nutrient and organics treatment that could accommodate brine recycle treatment. 2) Meets all current estimated discharge requirements for FAB 1 through FAB 2. 3) Would accommodate other industrial organic and chemical dischargers. 4) Provides the smaller footprint for chemical treatment with chemical TDS removal for both brine treatment and other industry wastewater. 5) Provides the greatest amount of reclaim water for Micron operating as ZLD to near ZLD. 6) Provides hardness and silica pretreatment for high recovery RO.	1) Limited chemical treatment results in some sodium and chloride TDS. 2)Limited chemical treatment may not meet metals requirements. 3)Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 4) Not optimized for reclaim water needs and indescriminantly provides ZLD to near ZLD capabilities when those may not be needed. 5) Requires supplemental COD or electron donor.	Ruled out because of space constraints, supplemental COD requirements, not needed to meet estimated SPDES nitrogen limits, requires more chemicals resulting in more chemical residuals and has the highest level of operational complexity.

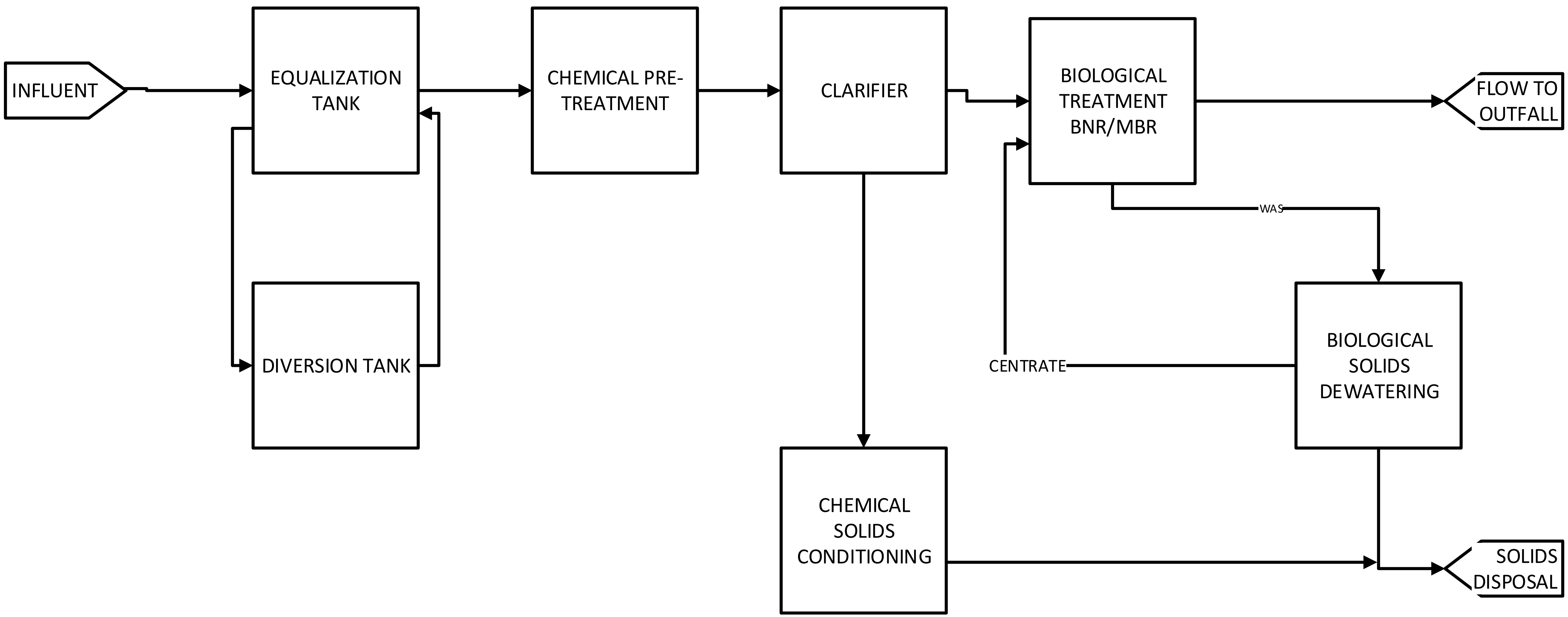
Onondaga County Micron IWTP Alternatives 7, 8, and 9 Screening

Case	Process	Flow Regime	Equalization and Diversion (EQ/DIV)	Chemical Treatment (Chem)	Biological Nutrient Removal (BNR) or Modified Ludzack Ettinger (MLE)	Membrane Bioreactor (MBR)	Ultraviolet Disinfection (UV)	Weak Acid Cation (WAC) Exchange	Strong Acid Cation (SAC) Exchange	Decarbonization (DeCarb) Stripping Tower	Reactive Silica Ion Exchange (SilX)	Reverse Osmosis (RO)	Brine Solids Clarifier (BrClar)	Pressure Multi-Media Filter (MedFilt)	Mechanical Vapor Recompression Evaporator (Evap)	Forced Circulation Crystallizer (Cryst)	Advantages	Disadvantages	Screening Comments
7	**EQ/Div/Chem/MLE/MBR**	Main train forward flow (Q_f)at winter and summer peak flow of 8.5MGD and 6.8 MGD, respectively.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 1.5 MG each for 8.5 MGD	PH adjustment for BNR. Ferric sulfate for limited coprecipitation/precipitation of ions as needed.	Peroxide removal with Methanol. Modified Ludzack Ettinger (Anoxic/Aerobic)biological activated sludge organics and nutrient removal. Supplemental MgOH alkalinity and methanol (MeOH) addition for up to 85% nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1)Provides limited chemical, and simpler biological nutrient and low level organics treatment that could accommodate brine recycle treatment. 2) Likely meets discharge requirements until shift in TDS related to FAB2. 3) Would accommodate other industrial organic and limited chemical dischargers. 4) Meets current estimated non-TDS discharge requirements.	1) Limited chemical treatment results in some sodium and chloride TDS. 2)Limited chemical treatment may not meet metals requirements. 3)Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 4) Noncompliant with TDS discharge requirements long-term. 5) Requires supplemental COD or electron donor.	Ruled out because of supplemental COD requirements, not needed to meet estimated SPDES nitrogen limits, and without addons will not meet long term SPDES TDS and Micron reclaim water requirements.
8	**EQ/Div/Chem/MLE/MBR/WAC/DeCarb/SilX/RO/BrChem/BrClar/MedFilt/Evap/Cryst**	Main train forward flow (Q_f)at winter and summer peak flow of 8.5MGD and 6.8 MGD, respectively. Up to 30 percent of Q_f from RO reject treated separately with all liquid discharge available for reuse. Targeted 70 percent or or less of Qf available for cooling water (4.8 MGD summer and 1.8 MGD winter) reuse by Micron.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 1.5 MG each for 8.5 MGD	PH adjustment for BNR. Ferric sulfate for limited coprecipitation/precipitation of ions as needed.	Peroxide removal with Methanol. Modified Ludzack Ettinger (Anoxic/Aerobic)biological activated sludge organics and nutrient removal. Supplemental MgOH alkalinity and methanol (MeOH) addition for up to 85% nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	NA	A weak acid cation exchange will be used to remove magnesium and calcium alkalinity to reduce the scaling tendencies in the RO. This will enable the RO to be operated at higher than the base 70 percent recovery. Weak hydrochloric (HCl) or perhaps sulfuric (H_2SO_4) will be used for regeneration of the WAC.	NA	A decarbonization stripping tower will be provided to remove or strip carbon dioxide to further reduce scaling tendencies and corrosion. The pH will be adjusted with sulfuric acid to approximately 4-5 to enhance the stripper performance.	A silica strong base ion exchange system will be provided to remove reactive silica to enable the RO to be operated at higher than 70% recovery. Caustic Soda (NaOH) will be used for Si IX regeneration.	High (up to 90 percent) 4 stage recovery reverse osmosis with concentrate discharge to concentrate or brine chemical treatment and permeate reuse. RO capacity targeted for cooling water reclamation of 4.8 MGD and 1.8 MGD respectively, for summer and winter.	Gravity brine chemical solids clarifier for low solids density clarification for physical removal of TSS	A disc media filter will remove total suspended solids from clarifier effluent.	A mechnical vapor recompression thermal evaporator will further concentrate the brine from the media filter up to 23 percent total dissolved solids.	A forced circulation crystallizer will concentrate the evaporator total dissolved solids to 50 to 65 percent. Brine or TDS will be dewatered to 80 to 90 percent with a centrifuge.	1)Provides limited chemical and biological nutrient (up to 85% TIN) and organics treatment that could accommodate brine recycle treatment. 2) Meets all current estimated discharge requirements through FAB 2. 3) Would accommodate other industrial organic and chemical dischargers. 4) Provides the smaller footprint for chemical treatment with chemical TDS removal for both brine treatment and other industry wastewater. 5) Provides the required reclaim water to meet Micron stated cooling water quantity and quality. 6) Provides hardness and silica pretreatment for high recovery RO.	1) Limited chemical treatment results in some sodium and chloride TDS. 2)Limited chemical treatment may not meet metals requirements. 3)Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 4) Requires supplemental COD or electron donor.	Ruled out because of space constraints, supplemental COD requirements, not needed to meet estimated SPDES nitrogen limits, requires more chemicals resulting in more chemical residuals and has the highest level of operational complexity.
9	**EQ/Div/Chem/BNR/MBR/WAC/DeCarb/SilX/RO/BrChem/BrClar/MedFilt/Evap/Cryst**	Main train forward flow (Q_f)at winter and summer peak flow of 8.5MGD and 6.8 MGD, respectively. Up to 30 percent of Q_f from RO reject treated separately with all liquid discharge available for reuse. Targeted 70 percent or or less of Qf available for cooling water (4.8 MGD summer and 1.8 MGD winter) reuse by Micron.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 1.5 MG each for 8.5 MGD	PH adjustment for BNR. Ferric sulfate for limited coprecipitation/precipitation of ions as needed.	Peroxide removal with Methanol. Bardenpho (Anoxic/Aerobic/Anoxic/Aerobic)biological activated sludge organics and full nutrient removal. Supplemental MgOH alkalinity and methanol (MeOH) addition for nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	NA	A weak acid cation exchange will be used to remove magnesium and calcium hardness to reduce the scaling tendencies in the RO. This will enable the RO to be operated at higher than the base 70 percent recovery. Weak hydrochloric (HCl) or perhaps sulfuric (H_2SO_4) will be used for regeneration of the WAC.	NA	A decarbonization stripping tower will be provided to remove or strip carbon dioxide to further reduce scaling tendencies and corrosion. The pH will be adjusted with sulfuric acid to approximately 4-5 to enhance the stripper performance.	A silica strong base ion exchange system will be provided to remove reactive silica to enable the RO to be operated at higher than 70% recovery. Caustic Soda (NaOH) will be used for Si IX regeneration.	High (up to 90 percent) 4 stage recovery reverse osmosis with concentrate discharge to concentrate or brine chemical treatment and permeate reuse. RO capacity targeted for cooling water reclamation of 4.8 MGD and 1.8 MGD respectively, for summer and winter.	Gravity brine chemical solids clarifier for low solids density clarification for physical removal of TSS	A disc media filter will remove total suspended solids from clarifier effluent.	A mechnical vapor recompression thermal evaporator will further concentrate the brine from the media filter up to 23 percent total dissolved solids.	A forced circulation crystallizer will concentrate the evaporator total dissolved solids to 50 to 65 percent. Brine or TDS will be dewatered to 80 to 90 percent with a centrifuge.	1)Provides limited chemical, and biological nutrient and organics treatment that could accommodate brine recycle treatment. 2) Meets all current estimated discharge requirements through NY4. 3) Would accommodate other industrial organic and chemical dischargers. 4) Provides the smaller foot print for chemical treatment with chemical TDS removal for both brine treatment and other industry wastewater. 5) Provides the required reclaim water to meet Micron stated cooling water quantity and quality. 6) Provides hardness and silica pretreatment for high recovery RO.	1) Limited chemical treatment results in some sodium and chloride TDS. 2)Limited chemical treatment may not meet metals requirements. 3)Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water.	Ruled out because of space constraints, supplemental COD requirements, not needed to meet estimated SPDES nitrogen limits, requires more chemicals resulting in more chemical residuals and has the highest level of operational complexity.

Onondaga County Micron IWTP Alternatives 10 and 11 Screening

Case	Process	Flow Regime	Equalization and Diversion (EQ/DIV)	Chemical Treatment (Chem)	Biological Nutrient Removal or Modified Ludzack Ettinger (MLE)	Membrane Bioreactor (MBR)	Ultraviolet Disinfection (UV)	Weak Acid Cation (WAC) Exchange	Strong Acid Cation (SAC) Exchange	Decarbonization (DeCarb) Stripping Tower	Reactive Silica Ion Exchange (SilX)	Reverse Osmosis (RO)	Brine Solids Clarifier (BrClar)	Pressure Multi-Media Filter (MedFilt)	Mechanical Vapor Recompression Evaporator (Evap)	Forced Circulation Crystallizer (Cryst)	Advantages	Disadvantages	Screening Comments
10	**EQ/Div/MLE/MBR/UV**	Main train forward flow (Q_f) at winter and summer peak flow of 8.25MGD and 6.8 MGD, respectively, for Fabrication 1.	Equalization and diversion provides up to 16 hours total storage. 8 hours for constant volume equalization and 8 hours for diversion at 3 MG each for up to 8.25 MGD	NA	Modified Ludzack Ettinger (Anoxic/Aerobic)biological activated sludge organics and nutrient removal (~80 percent Nitrogen removal). Supplemental MgOH alkalinity and methanol (MeOH) addition for up to 85% nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	Ultraviolet Disinfection for treatment of potential pathogenic organisms (e.g., coliforms and enterococci) on effluent discharge	NA	NA	NA	NA	NA	NA	NA	NA	NA	1)Provides biological nutrient and low level organics treatment that could accommodate brine recycle treatment. 2) Does not require supplemental COD or electron donor. 3) Requires pretreatment provisions for certain parameters. 4) Meets current estimated discharge requirements.	1) Provides complete ammmonia and partial nitrate nitrogen removal. 2)No chemcial treatment for potential discrete metals/water quality based effluent limits. 3)Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 4) Noncompliant with estimated TDS discharge requirements long-term.	Selected as base case starter treatment system that can be expanded and accomodates add on chemical and physical treatment for reclaim water for reuse and improved discharge water quality including TDS discharge compliance.
11	**EQ/Div/MLE/MBR/UV/SAC/DeCarb/RO/Evap/Cryst**	Additional main train forward flow (Q_f) for Fabrication 2 at winter and summer peak flow of 8.25MGD and 6.8 MGD, respectively, for a total of 16.5 and 13.6 MGD for winter and summer, respectively. Up to 11.5 MGD of MBR effluent treated through a 90 plus percent recovery RO with up to 10 percent of RO Reject sent for TDS removal. Resulting in 5 MGD of MBR effluent, 6 MGD of reclaim for Micron and 5.5 MGD of blending reclaim effluent.	Equalization and diversion provides up to 8 hours total storage. 4 hours for constant volume equalization and 4 hours for diversion at 3 MG each for up to 16.5 MGD	NA	Modified Ludzack Ettinger (Anoxic/Aerobic)biological activated sludge organics and nutrient removal (~80 percent Nitrogen removal). Supplemental MgOH alkalinity and methanol (MeOH) addition for up to 85% nitrogen removal. Micronutrient and phosphorus addition.	Internal immersed dead end hollow fiber membrane ultrafiltration for solids removal and residence time control coupled with the BNR reactor tanks.	Ultraviolet Disinfection for treatment of potential pathogenic organisms (e.g., coliforms and enterococci) and to reduce biofouling in reclaime water for cooling on effluent and reclaim water discharges.	NA	A strong acid cation exchange will be used to remove magnesium and calcium alkalnity and non alkalinity magnesium and calcium to reduce the scaling tendencies in the RO. This will enable the RO to be operated at higher than the base 70 percent recovery. Hydrochloric acid (HCl) will be used for regeneration of the SAC.	A decarbonization stripping tower will be provided to remove or strip carbon dioxide to further reduce scaling tendencies and corrosion. The pH will be adjusted with sulfuric acid to approximately 4-5 to enhance the stripper performance.	NA	High (90 plus percent) 5 stage recovery reverse osmosis with concentrate discharge to concentrate or brine thermal treatment and permeate reuse. RO capacity targeted for cooling water reclamation of up 6 MGD for summer and winter.	NA	NA	A mechnical vapor recompression thermal evaporator will further concentrate the brine from the media filter up to 23 percent total dissolved solids.	A forced circulation crystallizer will concentrate the evaporator total dissolved solids to 50 to 65 percent. Brine or TDS will be dewatered to 80 to 90 percent with a centrifuge.	1)Provides biological nutrient and low level organics treatment that could accommodate brine recycle treatment. 2) Does not require supplemental COD or electron donor. 3) Requires pretreatment provisions for certain parameters. 4) Meets current estimated discharge requirements at higher flows and mass of parameters. 5) Provides improved water quality for all water quality parameters and reclaim water from RO Treament.	1) Provides complete ammmonia and partial nitrate nitrogen removal. 2)No chemcial treatment for potential discrete metals/water quality based effluent limits. 3)Discharge would require additional treatment for Micron's Cooling Tower reclaim makup water. 4) Noncompliant with estimated TDS discharge requirements long-term.	Selected as upgrade treatment to base case starter treatment system for improved water quality discharge compliance and reclaim water for reuse by Micron or others.

ALTERNATIVE 1



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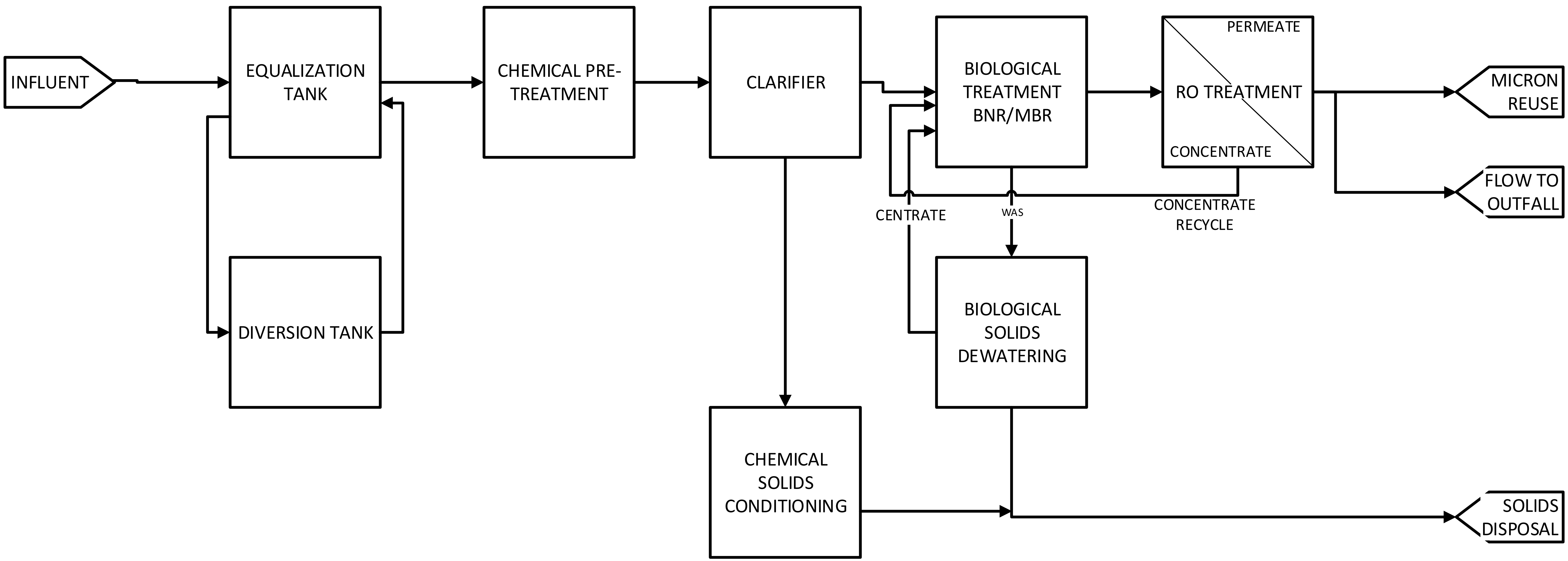

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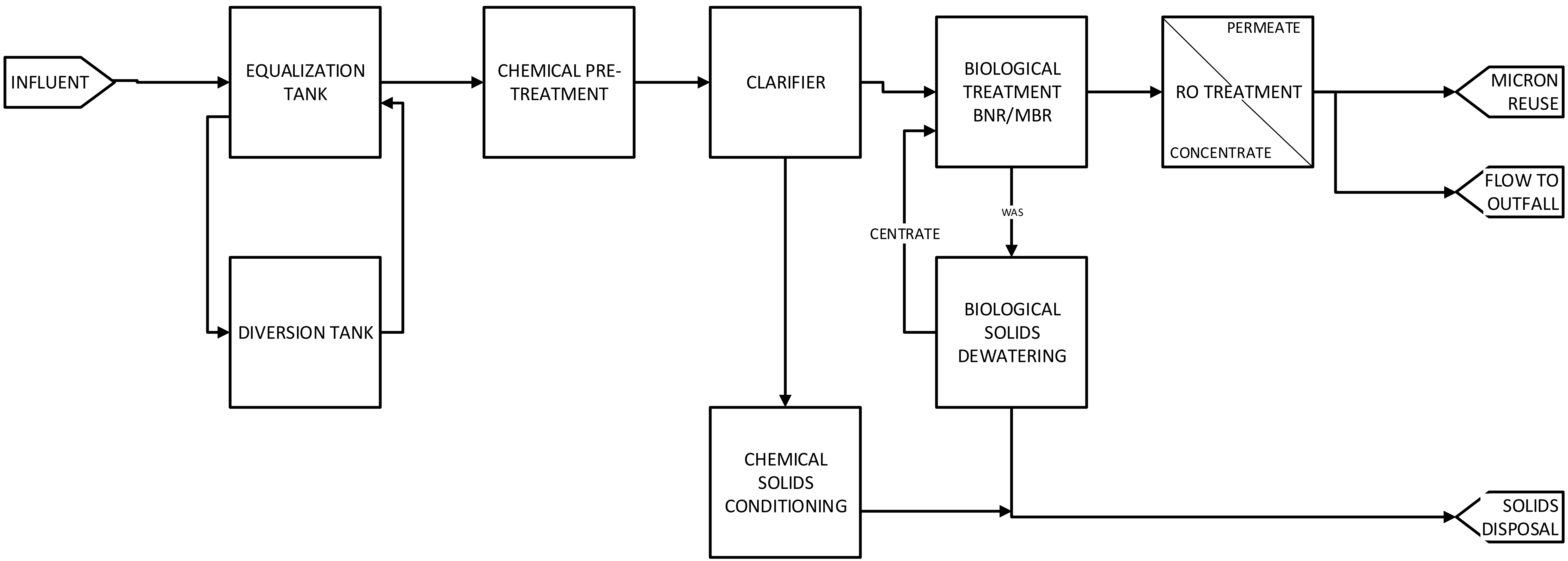

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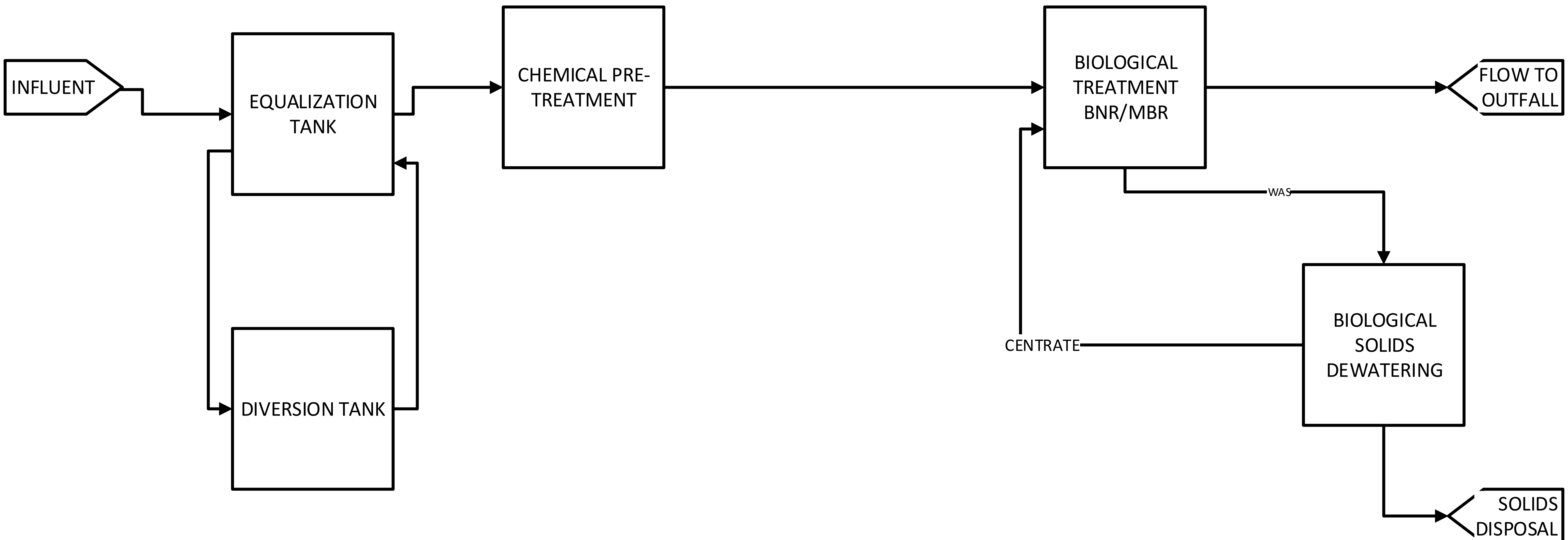

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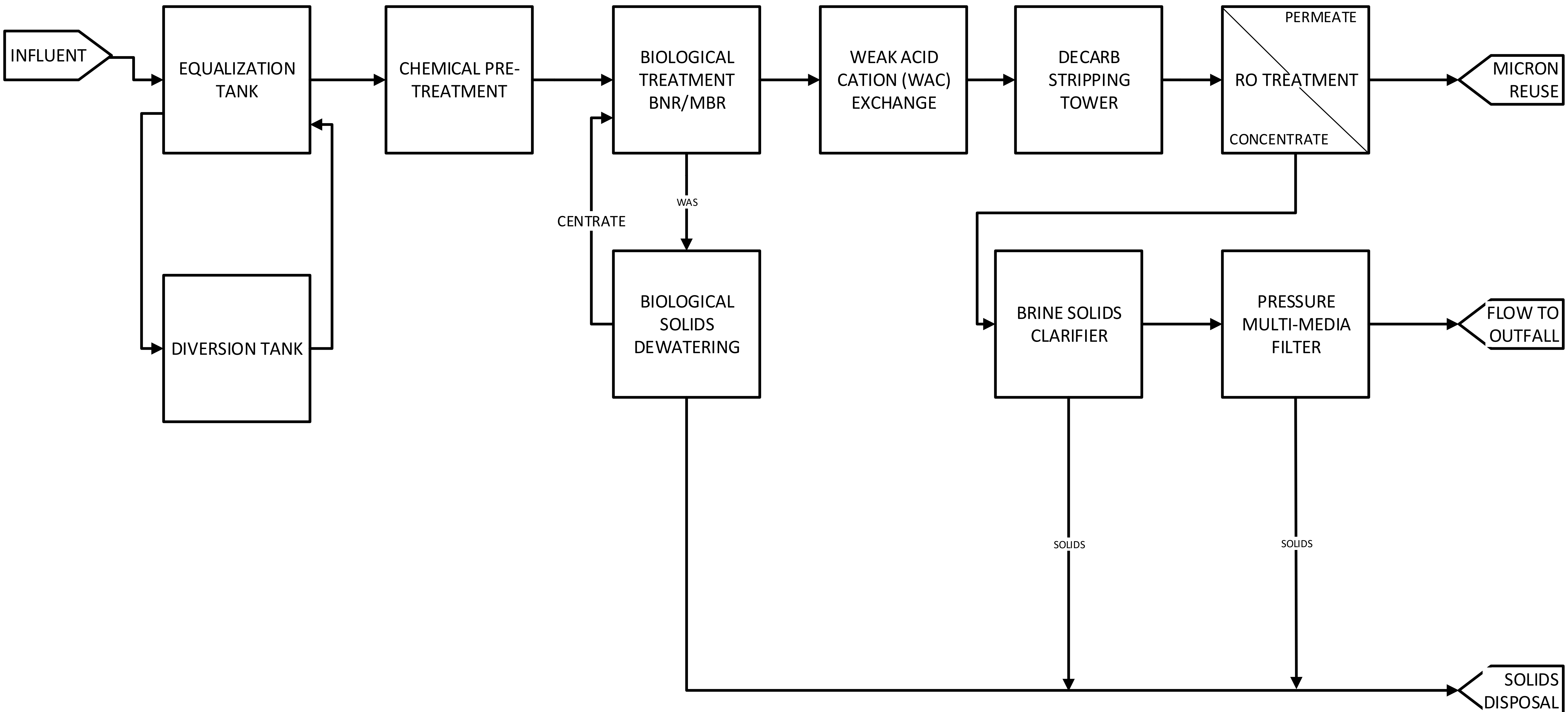

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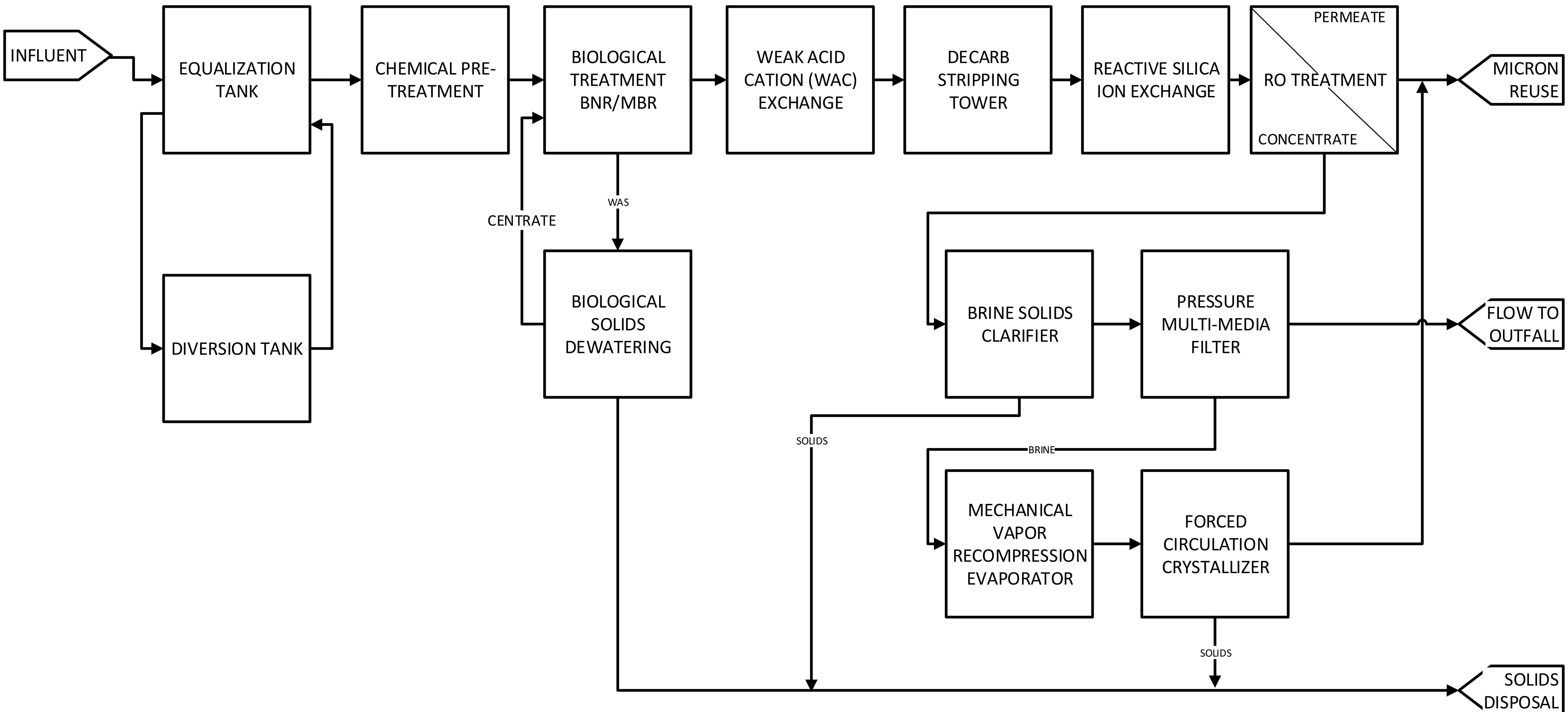

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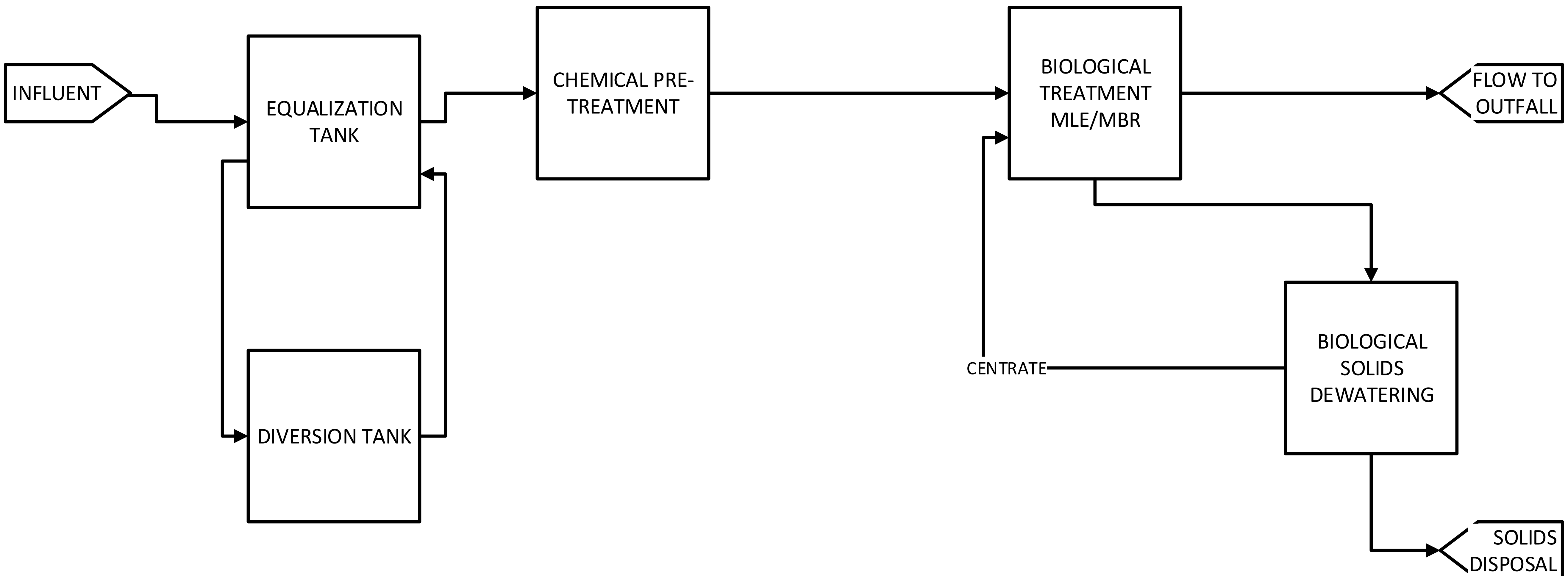
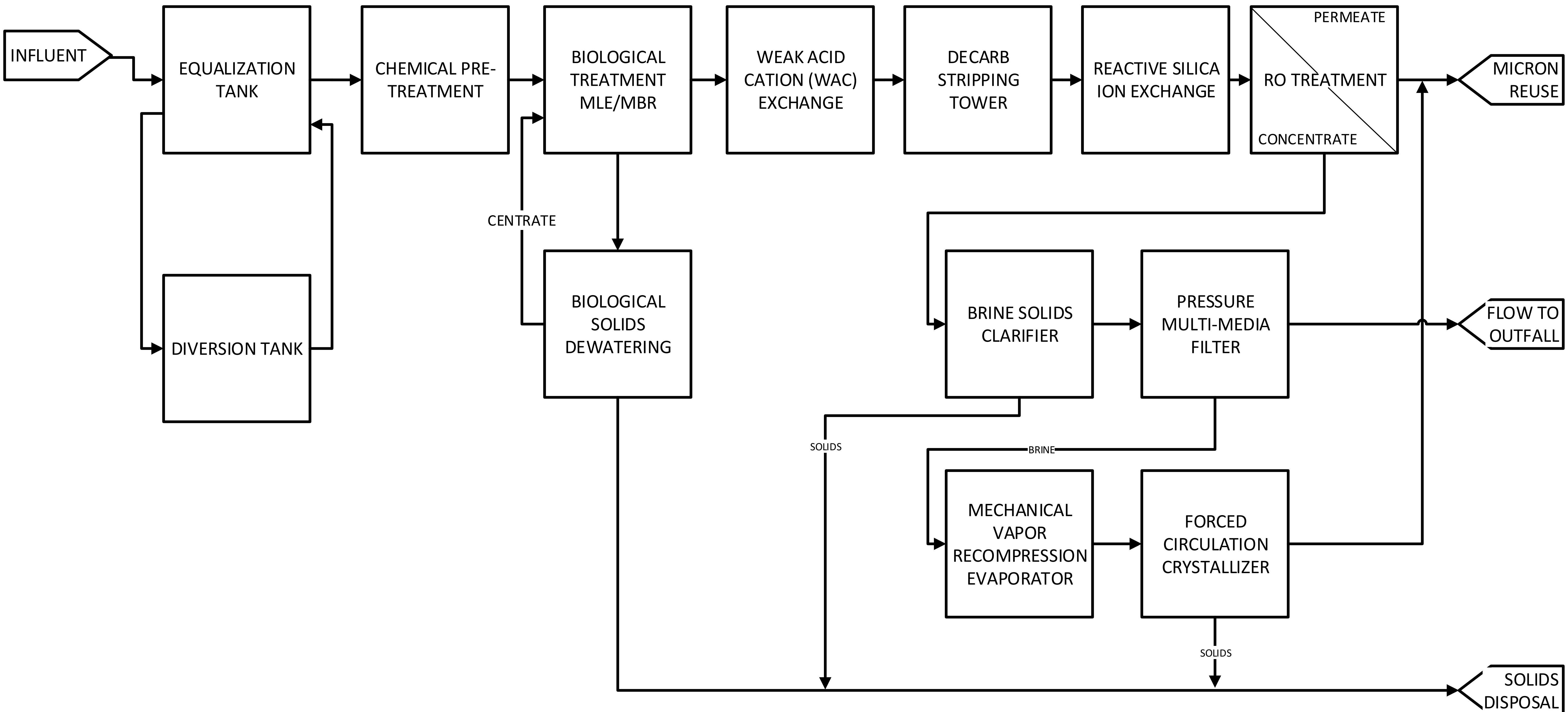
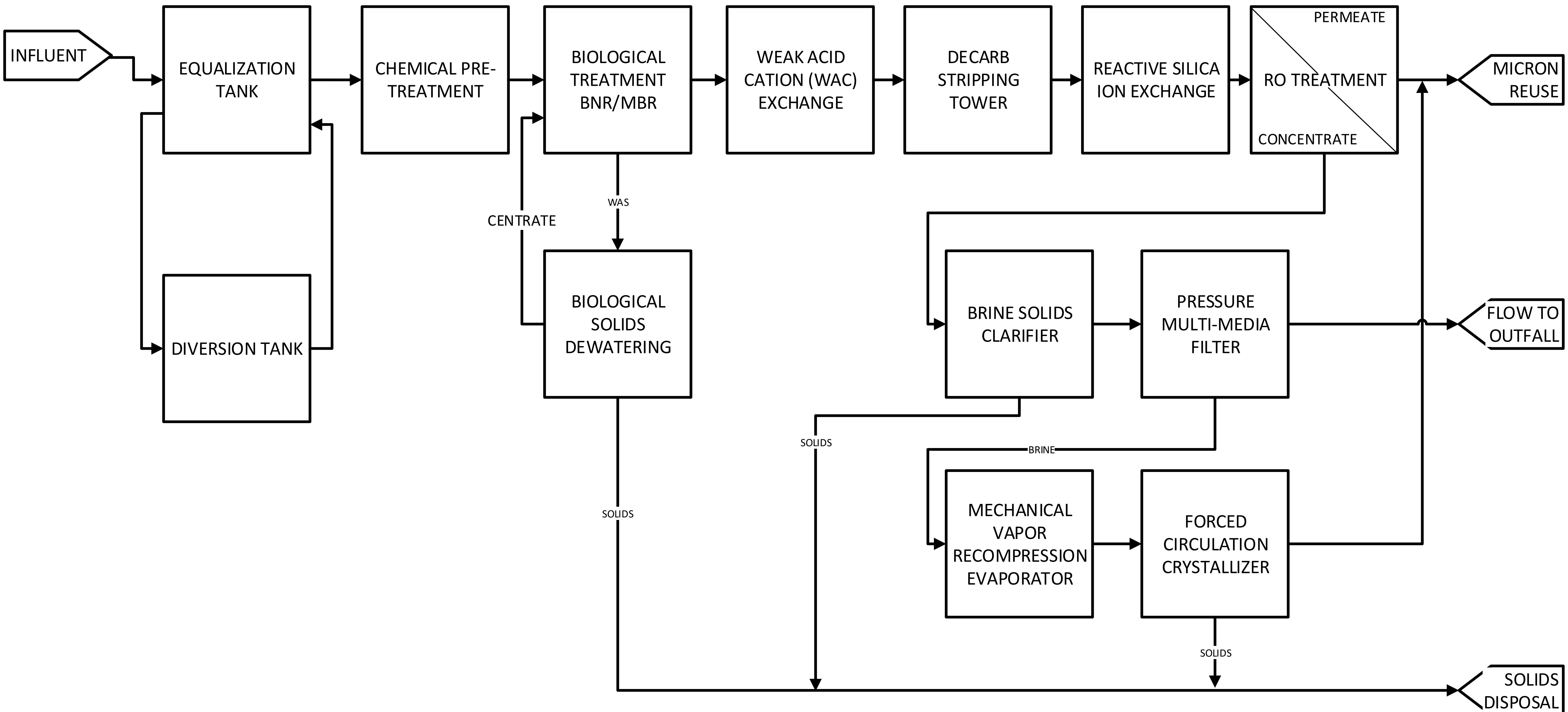


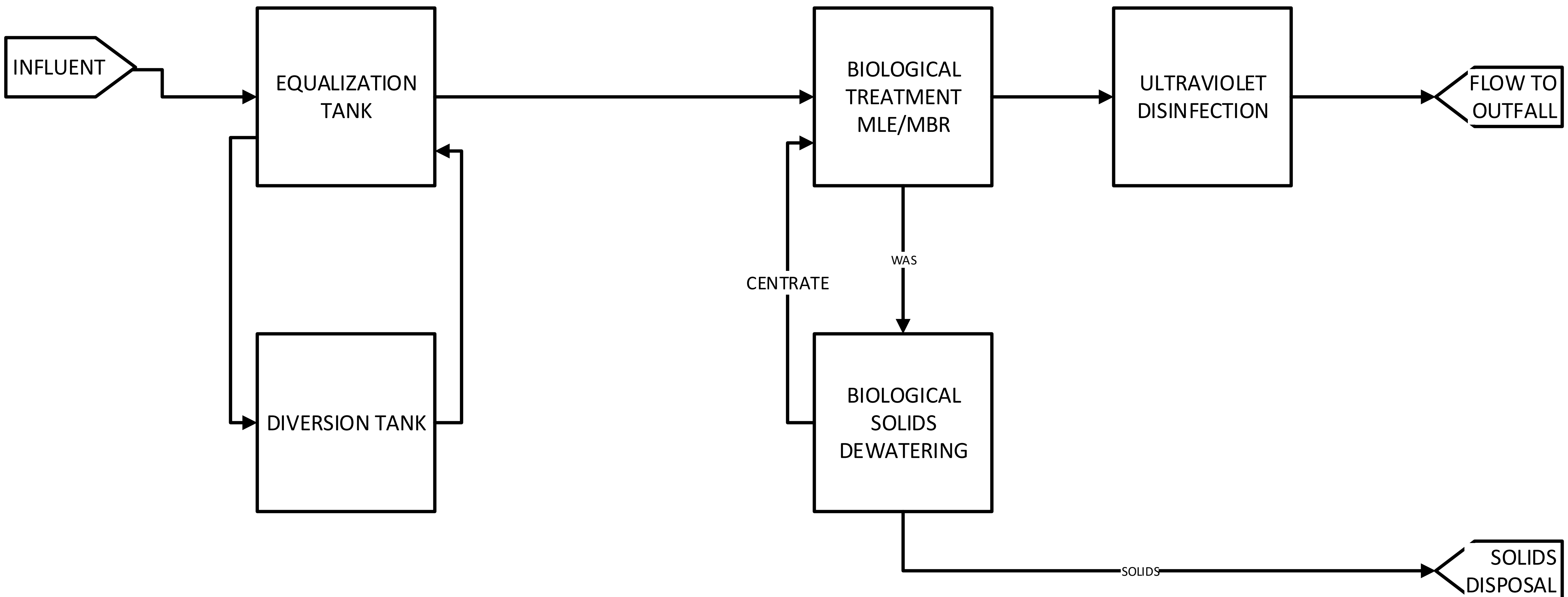
ALTERNATIVE 8



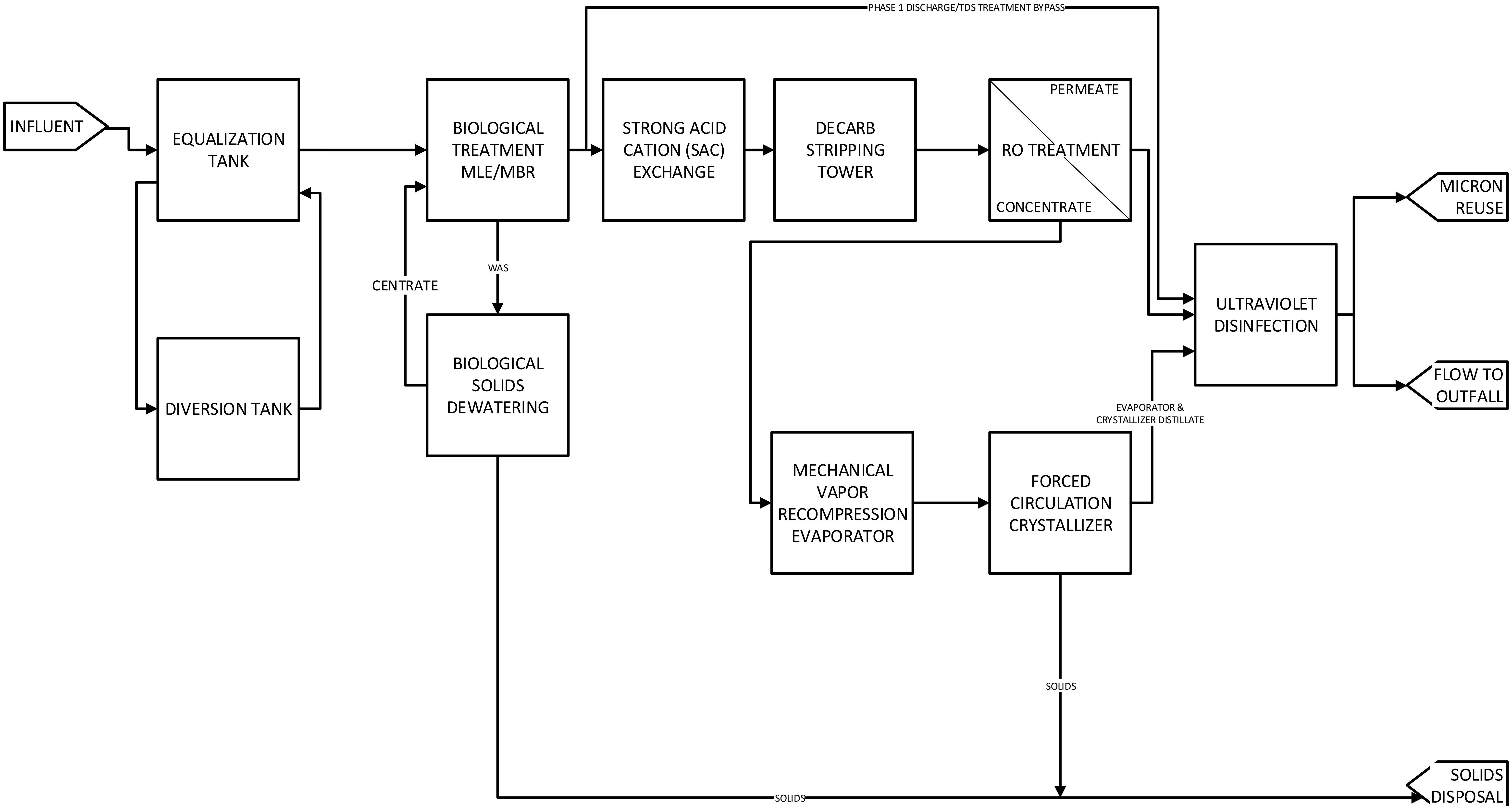
ALTERNATIVE 9



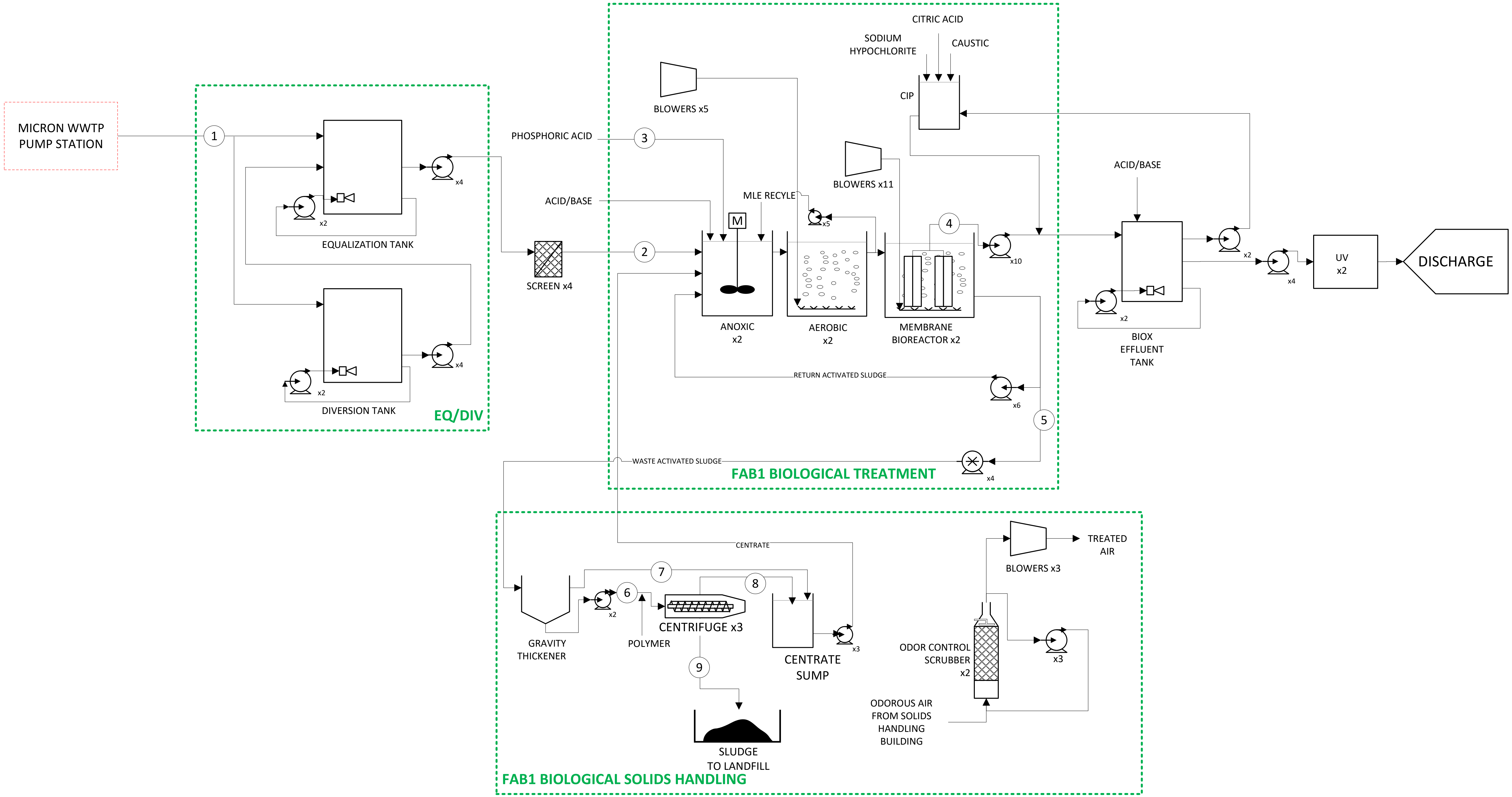
ALTERNATIVE 10



ALTERNATIVE 11



Appendix H: Alternative 10 Conceptual Design Package



PRELIMINARY NOT FOR CONSTRUCTION RECORDATION, CONVEYANCE, SALES, OR PERMIT ISSUANCE

NOTES:
1. NOT TO SCALE

REV	DATE	DESCRIPTION	DRAWN/ENG	CHECKED	APPROVED
0	01/16/2025	CONCEPT FOR DISCUSSION			
1	05/19/2025	REVISED FOR CONCEPT DEVELOPMENT			

Brown AND Caldwell

Onondaga County Water Redevelopment Corporation

Industrial Wastewater Treatment and Water Reclamation Facility (IWWTPWRF)
FIGURE H-1: CONCEPTUAL ALTERNATIVE 10 SIMPLIFIED PROCESS FLOW DIAGRAM

SHEET	REV
	1

Alternative 10: OCWEP IWWTP Fab1 Mass Balance, Winter Average Conditions										
Parameter	**Unit**	**EQ Influent**	**Biological Influent**	**75% Phosphoric acid**	**Biological Effluent**	**WAS**	**Thickened Sludge/ Centrifuge Feed**	**Sludge Thickener Decant**	**Bio Centrifuge Centrate**	**Bio Solids to Landfill**
Stream ID		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Flowrate (MGD)	MGD	8.25	8.34	4.00E-05	7.89	0.45	0.097	0.35	0.088	0.0093
Flowrate (gpm)		5,729	5,790	0.028	5,478	312	68	245	61	6.43
pH	s.u.	7.23	7.23		7.00	7.00	7.00	7.00	7.00	
Temperature	F	75	75		72					
Total Dissolved Solids (TDS)	mg/L	1,515	1,515		1,516	1,516	1,516	1,516	1,516	1,516
	lb/d	104,243	105,357		99,706	5,685	1,231	4,454	1,114	117
Total Suspended Solids (TSS)	mg/L	80	91		5.00	4,559	20,000	291	1,105	200,000
	lb/d	5,532	6,344		329	17,100	16,245	855	812	15,433
Soluble Chemical Oxygen Demand (COD)	mg/L	699	692		26	26	26	26	26	26
	lb/d	48,106	48,125		1,680	96	21	75	19	1.97
Alkalinity	mg/L as CaCO3	145	145		100	100	100	100	100	100
	lb/d	9,977	10,050		6,579	375	81	294	74	7.72
Nitrate	mg/L as N	49	49		45	45	45	45	45	45
	lb/d	3,371	3,403		2,939	168	36	131	33	3.45
Ammonia	mg/L as N	75	74		0.50	0.50	0.50	0.50	0.50	0.50
	lb/d	5,160	5,161		33	1.88	0.41	1.47	0.37	0.039
Total Nitrogen (TN)	mg/L as N	124	123		45	45	45	45	45	45
	lb/d	8,531	8,564		2,972	169	37	133	33	3.49
Sulfate (SO4 2-)	mg/L	635	635		635	635	635	635	635	635
	lb/d	43,700	44,167		41,785	2,382	516	1,867	467	49
Total Silica (TSi)	mg/L as SiO2	47	47		47	47	47	47	47	47
	lb/d	3,233	3,268		3,091	176	38	138	35	3.63
Calcium (Ca)	mg/L	87	87		87	87	87	87	87	87
	lb/d	5,974	6,038		5,713	326	71	255	64	6.70
Magnesium (Mg)	mg/L	17	17		17	17	17	17	17	17
	lb/d	1,137	1,149		1,087	62	13	49	12	1.28
Chloride (Cl-)	mg/L	150	150		150	150	150	150	150	150
	lb/d	10,303	10,413		9,852	562	122	440	110	12
Sodium (Na)	mg/L	194	194		194	194	194	194	194	194
	lb/d	13,359	13,501		12,773	728	158	571	143	15
Potassium (K)	mg/L	7.00	7.00		7.00	7.00	7.00	7.00	7.00	7.00
	lb/d	482	487		461	26	5.69	21	5.15	0.54
Fluoride (F)	mg/L	7.62	7.62		7.62	7.62	7.62	7.62	7.62	7.62
	lb/d	524	530		501	29	6.19	22	5.60	0.59
Total Organic Carbon (TOC)	mg/L	90	89		8.51	8.51	8.51	8.51	8.51	8.51
	lb/d	6,186	6,193		560	32	6.91	25	6.26	0.66
Aluminum	mg/L	0.72	0.72		0.72	0.72	0.72	0.72	0.72	0.72
	lb/d	50	50		48	2.71	0.59	2.12	0.53	0.056
Barium	mg/L	0.31	0.31		0.31	0.31	0.31	0.31	0.31	0.31
	lb/d	21	22		20	1.16	0.25	0.91	0.23	0.024
Copper	mg/L	0.33	0.33		0.33	0.33	0.33	0.33	0.33	0.33
	lb/d	23	23		22	1.24	0.27	0.97	0.24	0.026
Iron	mg/L	0.0080	0.0080		0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
	lb/d	0.55	0.56		0.53	0.030	0.0065	0.024	0.0059	6.17E-04
Zinc	mg/L	0.50	0.50		0.50	0.50	0.50	0.50	0.50	0.50
	lb/d	34	35		33	1.88	0.41	1.47	0.37	0.039
Phosphorus	mg/L	1.55	1.67	361,828	0.50	54	239	3.47	239	2,388
	lb/d	107	116	121	33	204	194	10	9.70	184

Alternative 10: OCWEP IWWTP Fab1 Mass Balance, Summer Average Conditions										
Parameter	**Unit**	**EQ Influent**	**Biological Influent**	**75% Phosphoric acid**	**Biological Effluent**	**WAS**	**Thickened Sludge/ Centrifuge Feed**	**Sludge Thickener Decant**	**Bio Centrifuge Centrate**	**Bio Solids to Landfill**
Stream ID		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Flowrate (MGD)	MGD	6.80	6.88	2.78E-05	6.43	0.45	0.089	0.36	0.081	0.0085
Flowrate (gpm)		4,724	4,780	0.019	4,467	312	62	250	56	5.89
pH	s.u.	7.00	7.00		7.00	7.00	7.00	7.00	7.00	
Temperature	F	86	86		89					
Total Dissolved Solids (TDS)	mg/L	1,826	1,826		1,826	1,826	1,826	1,826	1,826	1,826
	lb/d	103,561	104,792		97,967	6,852	1,360	5,492	1,231	129
Total Suspended Solids (TSS)	mg/L	98	110		5.00	4,178	20,000	261	1,105	200,000
	lb/d	5,578	6,323		268	15,679	14,895	784	745	14,150
Soluble Chemical Oxygen Demand (COD)	mg/L	848	838		2.88	2.88	2.88	2.88	2.88	2.88
	lb/d	48,106	48,108		154	11	2.14	8.65	1.94	0.20
Alkalinity	mg/L as CaCO3	145	144		100	100	100	100	100	100
	lb/d	8,226	8,293		5,365	375	74	301	67	7.08
Nitrate	mg/L as N	59	59		34	34	34	34	34	34
	lb/d	3,370	3,394		1,847	129	26	104	23	2.44
Ammonia	mg/L as N	75	74		0.50	0.50	0.50	0.50	0.50	0.50
	lb/d	4,255	4,255		27	1.88	0.37	1.50	0.34	0.035
Total Nitrogen (TN)	mg/L as N	134	133		35	35	35	35	35	35
	lb/d	7,625	7,649		1,874	131	26	105	24	2.47
Sulfate (SO4 2-)	mg/L	763	763		763	763	763	763	763	763
	lb/d	43,284	43,799		40,936	2,863	568	2,295	514	54
Total Silica (TSi)	mg/L as SiO2	57	57		57	57	57	57	57	57
	lb/d	3,243	3,281		3,067	214	43	172	39	4.04
Calcium (Ca)	mg/L	104	104		104	104	104	104	104	104
	lb/d	5,902	5,972		5,581	390	77	313	70	7.36
Magnesium (Mg)	mg/L	19	19		19	19	19	19	19	19
	lb/d	1,078	1,091		1,019	71	14	57	13	1.34
Chloride (Cl-)	mg/L	179	179		179	179	179	179	179	179
	lb/d	10,154	10,275		9,604	672	133	538	121	13
Sodium (Na)	mg/L	234	234		234	234	234	234	234	234
	lb/d	13,275	13,432		12,554	878	174	704	158	17
Potassium (K)	mg/L	7.00	7.00		7.00	7.00	7.00	7.00	7.00	7.00
	lb/d	397	402		376	26	5.21	21	4.72	0.50
Fluoride (F)	mg/L	9.19	9.19		9.19	9.19	9.19	9.19	9.19	9.19
	lb/d	521	528		493	34	6.84	28	6.19	0.65
Total Organic Carbon (TOC)	mg/L	109	107		0.96	0.96	0.96	0.96	0.96	0.96
	lb/d	6,164	6,164		51	3.60	0.71	2.88	0.65	0.068
Aluminum	mg/L	0.80	0.80		0.80	0.80	0.80	0.80	0.80	0.80
	lb/d	45	46		43	3.00	0.60	2.41	0.54	0.057
Barium	mg/L	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
	lb/d	23	23		21	1.50	0.30	1.20	0.27	0.028
Copper	mg/L	0.41	0.41		0.41	0.41	0.41	0.41	0.41	0.41
	lb/d	23	24		22	1.54	0.31	1.23	0.28	0.029
Iron	mg/L	0.0100	0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
	lb/d	0.57	0.57		0.54	0.038	0.0074	0.030	0.0067	7.08E-04
Zinc	mg/L	0.60	0.60		0.60	0.60	0.60	0.60	0.60	0.60
	lb/d	34	34		32	2.25	0.45	1.80	0.40	0.042
Phosphorus	mg/L	1.80	1.92	361,828	0.50	45	213	2.78	213	2,131
	lb/d	102	110	84	27	167	159	8.35	7.93	151

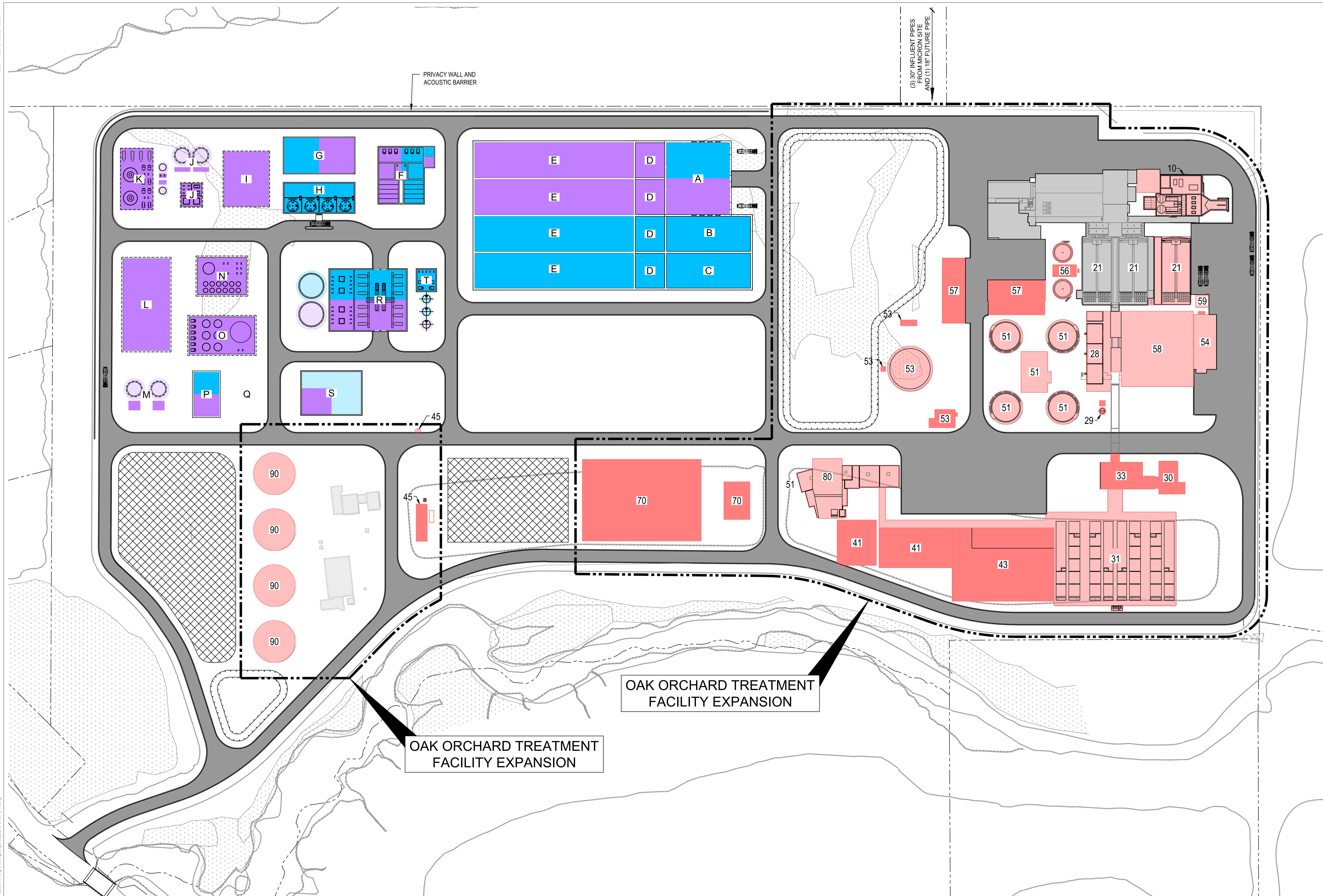
Alternative 10: OCWEP IWWTP Fab1 Mass Balance, Maximum Concentrations										
Parameter	**Unit**	**EQ Influent**	**Biological Influent**	**75% Phosphoric acid**	**Biological Effluent**	**WAS**	**Thickened Sludge/ Centrifuge Feed**	**Sludge Thickener Decant**	**Bio Centrifuge Centrate**	**Bio Solids to Landfill**
Stream ID		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Flowrate (MGD)	MGD	8.25	8.41	3.72E-05	8.07	0.34	0.18	0.16	0.16	0.017
Flowrate (gpm)		5,729	5,840	0.026	5,607	234	123	111	111	12
pH	s.u.	7.23	7.23		7.00	7.00	7.00	7.00	7.00	
Temperature	F	86	86		89					
Total Dissolved Solids (TDS)	mg/L	3,400	3,400		3,400	3,400	3,400	3,400	3,400	3,400
	lb/d	233,937	238,467		228,965	9,536	5,005	4,531	4,530	475
Total Suspended Solids (TSS)	mg/L	300	315		5.00	11,049	20,000	1,163	1,105	200,000
	lb/d	20,642	22,113		337	30,986	29,437	1,549	1,472	27,965
Soluble Chemical Oxygen Demand (COD)	mg/L	1,272	1,248		2.88	2.88	2.88	2.88	2.88	2.88
	lb/d	87,520	87,524		194	8.06	4.23	3.83	3.83	0.40
Alkalinity	mg/L as CaCO3	201	199		100	100	100	100	100	100
	lb/d	13,847	13,980		6,733	280	147	133	133	14
Nitrate	mg/L as N	89	88		21	21	21	21	21	21
	lb/d	6,132	6,160		1,424	59	31	28	28	2.96
Ammonia	mg/L as N	75	74		0.50	0.50	0.50	0.50	0.50	0.50
	lb/d	5,160	5,161		34	1.40	0.74	0.67	0.67	0.070
Total Nitrogen (TN)	mg/L as N	164	161		22	22	22	22	22	22
	lb/d	11,292	11,321		1,458	61	32	29	29	3.03
Sulfate (SO4 2-)	mg/L	763	763		763	763	763	763	763	763
	lb/d	52,498	53,515		51,375	2,140	1,123	1,017	1,016	107
Total Silica (TSi)	mg/L as SiO2	57	57		57	57	57	57	57	57
	lb/d	3,933	4,009		3,849	160	84	76	76	7.99
Calcium (Ca)	mg/L	104	104		104	104	104	104	104	104
	lb/d	7,158	7,296		7,005	292	153	139	139	15
Magnesium (Mg)	mg/L	19	19		19	19	19	19	19	19
	lb/d	1,307	1,333		1,279	53	28	25	25	2.66
Chloride (Cl-)	mg/L	179	179		179	179	179	179	179	179
	lb/d	12,316	12,555		12,053	502	263	239	238	25
Sodium (Na)	mg/L	234	234		234	234	234	234	234	234
	lb/d	16,100	16,412		15,756	656	344	312	312	33
Potassium (K)	mg/L	7.00	7.00		7.00	7.00	7.00	7.00	7.00	7.00
	lb/d	482	491		471	20	10	9.33	9.32	0.98
Fluoride (F)	mg/L	9.19	9.19		9.19	9.19	9.19	9.19	9.19	9.19
	lb/d	632	645		619	26	14	12	12	1.29
Total Organic Carbon (TOC)	mg/L	424	416		0.96	0.96	0.96	0.96	0.96	0.96
	lb/d	29,173	29,175		65	2.69	1.41	1.28	1.28	0.13
Aluminum	mg/L	0.80	0.80		0.80	0.80	0.80	0.80	0.80	0.80
	lb/d	55	56		54	2.24	1.18	1.07	1.07	0.11
Barium	mg/L	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40
	lb/d	28	28		27	1.12	0.59	0.53	0.53	0.056
Copper	mg/L	0.41	0.41		0.41	0.41	0.41	0.41	0.41	0.41
	lb/d	28	29		28	1.15	0.60	0.55	0.55	0.057
Iron	mg/L	0.0100	0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
	lb/d	0.69	0.70		0.67	0.028	0.015	0.013	0.013	0.0014
Zinc	mg/L	0.60	0.60		0.60	0.60	0.60	0.60	0.60	0.60
	lb/d	41	42		40	1.68	0.88	0.80	0.80	0.084
Phosphorus	mg/L	2.70	2.84	361,828	0.50	99	179	10	179	1,790
	lb/d	186	199	112	34	277	264	14	13	250

Brown AND Caldwell	Client	Micron Onondaga	Location	Syracuse, NY	Originator	Anukriti Shah	Revision	A	MAJOR EQUIPMENT LIST ALT 10
	Project	IWWTP & WRF	BC #	191915	Approved By	Tom Sandy	Issued Date	6/18/2025	DRAFT

		EQUIPMENT INFORMATION				PROCESS				MECHANICAL				ELECTRICAL & INSTRUMENTATION	
Item No.	REV	Equipment Category	Equipment Status	Equipment Name	Quantity	Capacity per Unit	Total Capacity	Units	Temperature	Type	Material of Construction	Physical Dimension	Equipment Installation	HP (Nameplate)	Notes
1	A	Tank	New	Equalization Tank	1	3,000,000	3,000,000	gal	AMB	--	Cast-In-Place Concrete	180 ft (L) x 75 ft (W) x 30 ft (H)	Outdoor	--	
2	A	Tank	New	Diversion Tank	1	3,000,000	3,000,000	gal	AMB	--	Cast-In-Place Concrete	180 ft (L) x 75 ft (W) x 30 ft (H)	Outdoor	--	
3	A	Mixer	New	EQ/Diversion Eductor System	2	1,300	2,600	gpm	AMB	--	--	--	Outdoor	--	
4	A	Pump	New	EQ/Diversion Eductor Pumps	4	1,300	5,200	gpm	AMB	Centrifugal	Cast Iron	--	Outdoor	30.0	
5	A	Pump	New	EQ/Diversion Feed Pumps	4	2,000	8,000	gpm	AMB	Centrifugal	Cast Iron	--	Outdoor	50.0	
6	A	Pump	New	Screen Feed Pumps	4	2,000	8,000	gpm	AMB	Centrifugal	Cast Iron		Outdoor	50.0	
7	A	Separation	New	Screens	4	2,000	8,000	gpm	AMB	--	Stainless steel	--	Outdoor	1.0	
8	A	Tank	New	Anoxic Tanks	2	1,050,000	2,100,000	gal	AMB	--	Cast-In-Place Concrete	63 ft (L) x 75 ft (W) x 30 ft (H)	Outdoor	--	
9	A	Mixer	New	Anoxic Tank Mixers	2	--	--	--	AMB	Vertical Hyperboloid	Stainless Steel	--	Outdoor	40.0	
10	A	Tank	New	Aerobic Tanks	2	5,700,000	11,400,000	gal	AMB	--	Cast-In-Place Concrete	340 ft (L) x 75 ft (W) x 30 ft (H)	Outdoor	--	
11	A	Aeration	New	Aeration Coarse Bubble Grid	2	13,500	27,000	scfm	AMB	Coarse Bubble	Stainless Steel	--	Outdoor	--	
12	A	Blower	New	Aerobic Blowers	5	13,500	67,500	scfm	AMB	Positive Displacement Blower	Cast Iron	--	Outdoor	350.0	
13	A	Pump	New	MLE Recycle Pumps	5	5,730	28,650	gpm	AMB	Centrifugal	Stainless Steel	--	Indoor	50.0	
14	A	Separation	New	MBR Cassette Tanks & Membranes	10	6080	60,800	gpm	AMB	--	Coated Carbon Steel	42 ft (L) x 10 ft (W) x 14 ft (H)	Indoor	--	
15	A	Blower	New	MBR Blowers	11	300	3,300	scfm	AMB	Positive Displacement Blower	Cast Iron	--	Indoor	40.0	
16	A	Pump	New	Recirculation (RAS&WAS) pumps	10	TBD	TBD	gpm	AMB	Low Shear Rotary Lobe Positive Displacement	Cast Iron		Outdoor	25.0	
17	A	Pump	New	Permeate/Feed Pulse Pumps	10	TBD	TBD	gpm	AMB	Centrifugal	Cast Iron		Outdoor	30.0	
18	A	Compressor	New	MBR Air Compressor	2	TBD	TBD	scfm	AMB				Outdoor	5.0	
19	A	Pump	New	CIP Tank Feed Pumps	2	25	50	hp	AMB	Centrifugal	Cast Iron			25.0	
20	A	Tank	New	Gravity Thickener	1	1,000,000	1,000,000	gal	AMB	--	Cast-In-Place Concrete	50 ft (D) x 17 ft (H)	Indoor	--	
21	A	Pump	New	Centrifuge Feed Pumps	2	607	1,214	gpm	AMB	Centrifugal	Cast Iron	--	Indoor	50.0	
22	A	Dewatering	New	Biological Centrifuges	3	607	1,821	gpm	AMB	Decanter Centrifuge	Coated Carbon Steel		Indoor	--	
23	A	Tank	New	Centrate Sump	1	7,500	7,500	gal	AMB	Sump	Concrete-in Place	10 ft (L) x 10ft (W) x 10ft (H)	Outdoor	--	

Brown AND Caldwell	Client	Micron Onondaga	Location	Syracuse, NY	Originator	Anukriti Shah	Revision	A	MAJOR EQUIPMENT LIST ALT 10
	Project	IWWTP & WRF	BC #	191915	Approved By	Tom Sandy	Issued Date	6/18/2025	DRAFT

		EQUIPMENT INFORMATION				PROCESS				MECHANICAL				ELECTRICAL & INSTRUMENTATION	
Item No.	REV	Equipment Category	Equipment Status	Equipment Name	Quantity	Capacity per Unit	Total Capacity	Units	Temperature	Type	Material of Construction	Physical Dimension	Equipment Installation	HP (Nameplate)	Notes
24	A	Pump	New	Centrate Sump Pumps	3	375	1,125	gpm	AMB	Centrifugal	Cast Iron		Outdoor	20.0	
25	A	Pump	New	Building Sump Pumps	2	375	750	gpm	AMB	Centrifugal	Cast Iron			20.0	
26	A	Conveyor	New	Hopper & Conveyor	3	375	1,125	gpm	AMB					15.0	
27	A	Tank	New	Biox Effluent Tank	1	343,800	343,800	gal	AMB	--	Cast-In-Place Concrete	34 ft (L) x 34 ft (W) x 30 ft (H)	Outdoor	--	
28	A	Mixer	New	Biox Effluent Tank Eductor System	1	240	240	gpm	AMB	--	--	--	Outdoor	--	
29	A	Pump	New	Biox Effluent Tank Eductor Pumps	2	240	480	gpm	AMB	Centrifugal	Cast Iron	--	Outdoor	7.5	
30	A	Disinfection	New	UV Disinfection Unit	2	5730	11,460	gpm	AMB	Centrifugal	Stainless steel	6 ft (L) x 5 ft (W) x 6 ft (H)	Outdoor	265.5	
31	A	Pump	New	Discharge Pumps	4	2000	8,000	gpm	AMB	Centrifugal	Cast Iron	--	Indoor	50.0	
32	A	Tank	New	Odor Control Scrubbers	2	31,360	94,080	scfm	AMB			17ft (D)	Outdoor	--	
33	A	Blower	New	Scrubber Blowers	3	31,360	94,080	scfm	AMB	Positive Displacement Blower	Cast Iron		Outdoor		
34	A	Pump	New	Recirculation Scrubber Pumps	3	TBD	TBD	gpm					Outdoor		
35	A	Tank	New	Phosphoric Acid Tank	1	7,400	7,400	gal	AMB	--	FRP Double Wall	11 ft (D) x 10 ft (H)	Indoor	--	
36	A	Tank	New	Sulfuric Acid Tank	1	7,400	7,400	gal	AMB	--	LDPE	11 ft (D) x 10 ft (H)	Indoor	--	
37	A	Tank	New	Sodium Hydroxide Tank	1	7,400	7,400	gal	AMB	--	HDPE	11 ft (D) x 10 ft (H)	Indoor	--	
38	A	Tank	New	Neat Polymer Tank	1	7,400	7,400	gal	AMB	--	FRP Double Wall	11 ft (D) x 10 ft (H)	Indoor	--	
39	A	Tank	New	Sodium Hypochlorite Tote	2	275	550	gal	AMB					--	
40	A	Tank	New	Citric Acid Tote	2	275	550	gal	AMB					--	
41	A	Pump	New	Phosphoric Acid Metering Pumps	4	0.02	0	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls	--	Indoor	1.0	
42	A	Pump	New	Sulfuric Acid Metering Pumps	5	1.63	8	gpm	AMB	Chemical Metering Pump	Stainless Steel	--	Outdoor	1.0	
43	A	Pump	New	Sodium Hydroxide Metering Pumps	5	0.10	1	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls	--	Indoor	5.0	
44	A	Pump	New	CIP Sodium Hypochlorite Pumps	2	0.10	0.2	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls	--	Indoor	1.0	
45	A	Pump	New	CIP Citric Acid Pumps	2	0.10	0.2	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls	--	Indoor	1.0	
46	A	Pump	New	CIP Caustic Pumps	2	0.10	0.2	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls		Indoor	1.0	
47	A	Pump	New	Biological Polymer Make Down System	3	0.08	0.2	gpm	AMB			--	Indoor	5.0	



AREA CODE	OAK ORCHARD TREATMENT FACILITY EXPANSION AREAS
10	HEADWORKS
21	PRIMARY CLARIFIERS
28	ODOR CONTROL
30	FINE SCREENING
31	BIOREACTORS
33	BLOWER BUILDING
41	REUSE FACILITY (RO BUILDING), TEMPORARY UF
43	MEMBRANE BUILDING
45	RECYCLED WATER PUMP STATION
51	DIGESTER COMPLEX
53	GAS STORAGE AND GAS FLARE
54	THICKENING/DEWATERING
56	PS GRAVITY THICKENING
57	HSW AND MS RECEIVING AND BLENDING
58	SOLIDS HAULING, DRYER BUILDING
70	NATIONAL GRID CONNECTION, NATIONAL GRID SUBSTATION
80	EXISTING ADMIN BUILDING, ADMIN BUILDING
90	BRIDGING PROJECT MBBR TANKS - FUTURE RECYCLED WATER STORAGE, BRIDGING MBBR BLOWER BUILDING

WHITE PINES INDUSTRIAL WASTEWATER TREATMENT FACILITY

LEGEND

(blue)	EQUIPMENT FOR TREATING FAB - 1 WASTEWATER
(purple)	EQUIPMENT FOR TREATING FAB - 2 EXPANSION WASTEWATER
(red)	OAK ORCHARD TREATMENT FACILITY EXPANSION
(grey)	PAVED ROAD
(grey)	EXISTING STRUCTURE
(hatch)	CONTRACTOR STAGING AREA
(line)	PRIVACY WALL ACOUSTIC BARRIER
(line)	LIMIT OF WORK BY OTHERS
(line)	FAB - 1 STRUCTURE OR AREA
(line)	FAB - 2 EXPANSION STRUCTURE OR AREA
A	INFLUENT SCREENING BUILDING
B	EQUALIZATION TANK
C	DIVERSION TANK
D	ANOXIC TANKS
E	AERATION TANKS
F	MEMBRANE FILTRATION BUILDING
G	BLOWER BUILDING
H	CHEMICAL BUILDING
I	EVAPORATION SYSTEM BUILDING
J	CONDENSATE / EFFLUENT STORAGE AREA
K	CRYSTALLIZER SYSTEM BUILDING
L	HIGH PH RO BUILDING
M	HIGH PH RO PERMEATE AND FEED TANKS
N	ION EXCHANGE BUILDING
O	DECARBONATION BUILDING
P	UV DISINFECTION BUILDING
Q	RECYCLED WATER PUMP STATION
R	DEWATERING BUILDING
S	MOTOR CONTROL BUILDING
T	ODOR CONTROL AREA

100 0 50 100 200
GRAPHIC SCALE (IN FEET)

GENERAL ARRANGEMENT SITE PLAN

Scale: 1" = 20'

OTHER INFORMATION

ORIGINAL DRAWING SIZE: ARCH D (24" X 36")

CLIENT / SUBCONSULTANT:

EDR
a better environment
Environmental Design & Research,
Landscape Architecture, Engineering & Environmental Services, P.C.
396 Main Street, Suite 15
Hyannis, MA 02601
P. 508.972.3960

PROJECT TITLE: **WHITE PINES INDUSTRIAL WWTP**

PROJECT LOCATION: **OAK ORCHARD ROAD**

CLIENT: **ONONDAGA COUNTY**

DRAWING TITLE: **GENERAL ARRANGEMENT SITE PLAN**

CONTRACT NO.

DRAWINGS ISSUED FOR / REVISIONS

NO.	DATE	ISSUED FOR / REVISION	BY	CHK	APP
1					
2					
3					
4					
5					
6					

EDR JOB#: **24370**
DATE: **05/25**
SCALE: **AS NOTED**
DRAWN BY: **JDF**
CHECKED BY: **JDF**
DRAWING NUMBER:
C-101

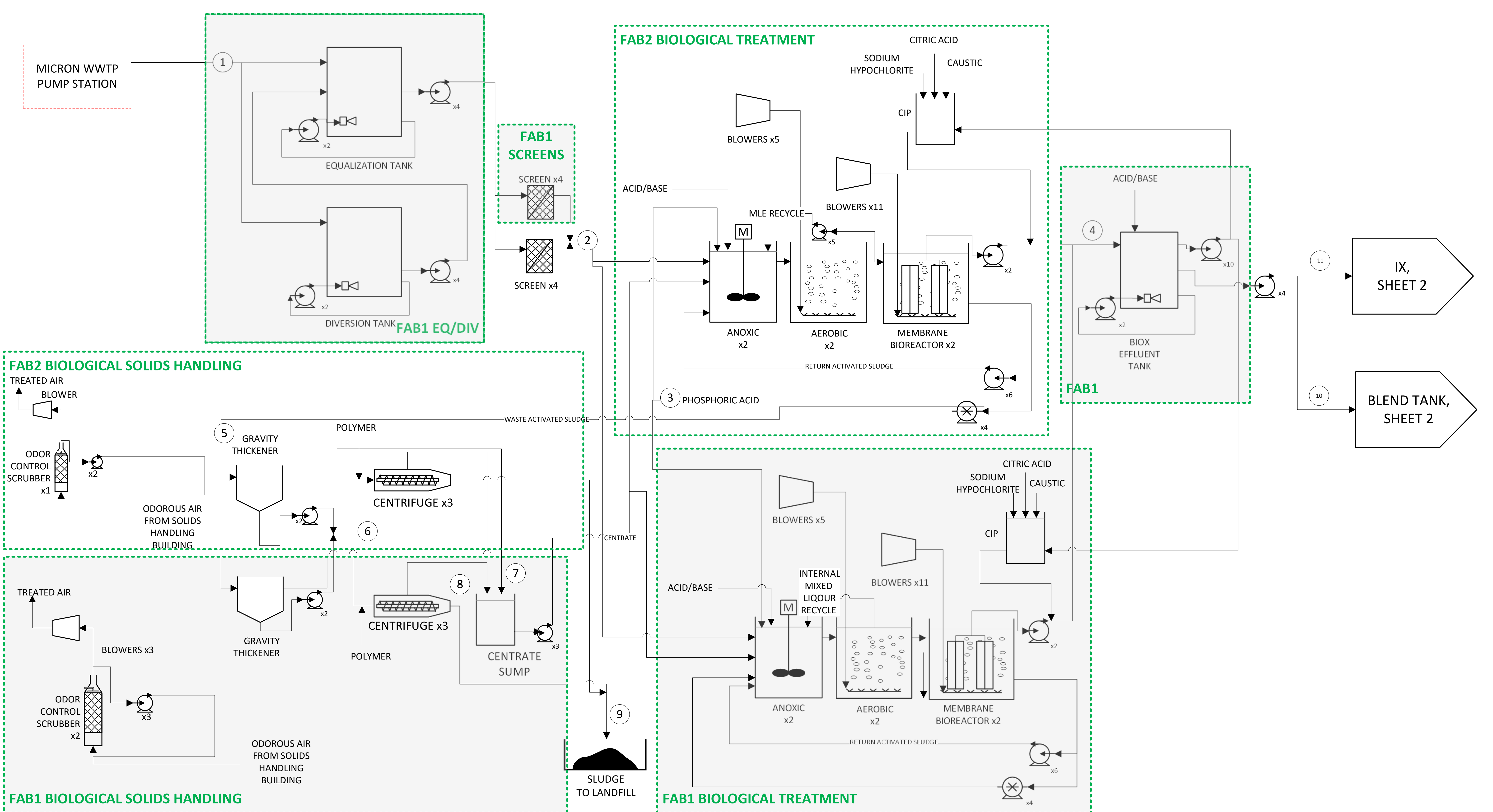
Appendix I: Energy Efficiency Best Practices

APPENDIX I
ENERGY EFFICIENCY BEST PRACTICES

Operation Process	Standard Practice	Typical Energy Efficiency Measures
Influent Pumping (Pump Station 1, 2 and 3)	On/Off Level Controls and EPAct Motors	VFD with control loop; premium efficiency motors
Primary Treatment	EPAct Motors, Timers on Sludge Draw-off	Premium efficiency motors; VFDs on sludge drawoff
Secondary Treatment	EPAct Motors	Premium efficiency motors
Fixed Film	EPAct Motors	Premium efficiency motors; flow control/VFDs on recycle
Mechanical Aeration	EPAct Motors	Premium efficiency motors; level control on effluent weir
Diffuser System	Coarse or Medium Bubble Aeration	Fine bubble diffusers; fine bubble diffusers with mixers
Aeration Blowers	Multi-Stage Centrifugal Blowers with EPAct Motors	Premium efficiency motors; inlet flow control
Aeration Blowers	Positive Displacement Blowers with EPAct Motors	Premium efficiency motors; VFDs
Dissolved Oxygen Control	Manual Handheld DO Monitoring with Manual Adjustment	VFD with dissolved oxygen control loop; start/stop blowers; control air output
WAS/RAS Pumps	Timed Operation and EPAct Motors	VFDs with control loop; premium efficiency motors
Tertiary Treatment	Flow Control Valves and EPAct Motors	VFDs with control loop; premium efficiency motors
Sludge Processing	EPAct Motors and case-by-case VFD designs	Premium efficiency motors
UV Disinfection	Medium Pressure UV Lamps	Low pressure high output lamp technology

Operation Process	Standard Practice	Typical Energy Efficiency Measures
Effluent Pumping	Flow Control Valves and EPAct Motors	VFDs with control loop; premium efficiency motors
Plant Water System	Constant Speed Pumps; System Wide Pressure	VFDs with pressure control; booster pumps at specific processes
Building Systems	Building Energy Code Compliant	Lighting, HVAC, etc. More efficient than Building Energy Code

Appendix J: Alternative 11 Conceptual Design Package



PRELIMINARY NOT FOR CONSTRUCTION RECORDATION, CONVEYANCE, SALES, OR PERMIT ISSUANCE

NOTES:
1. NOT TO SCALE

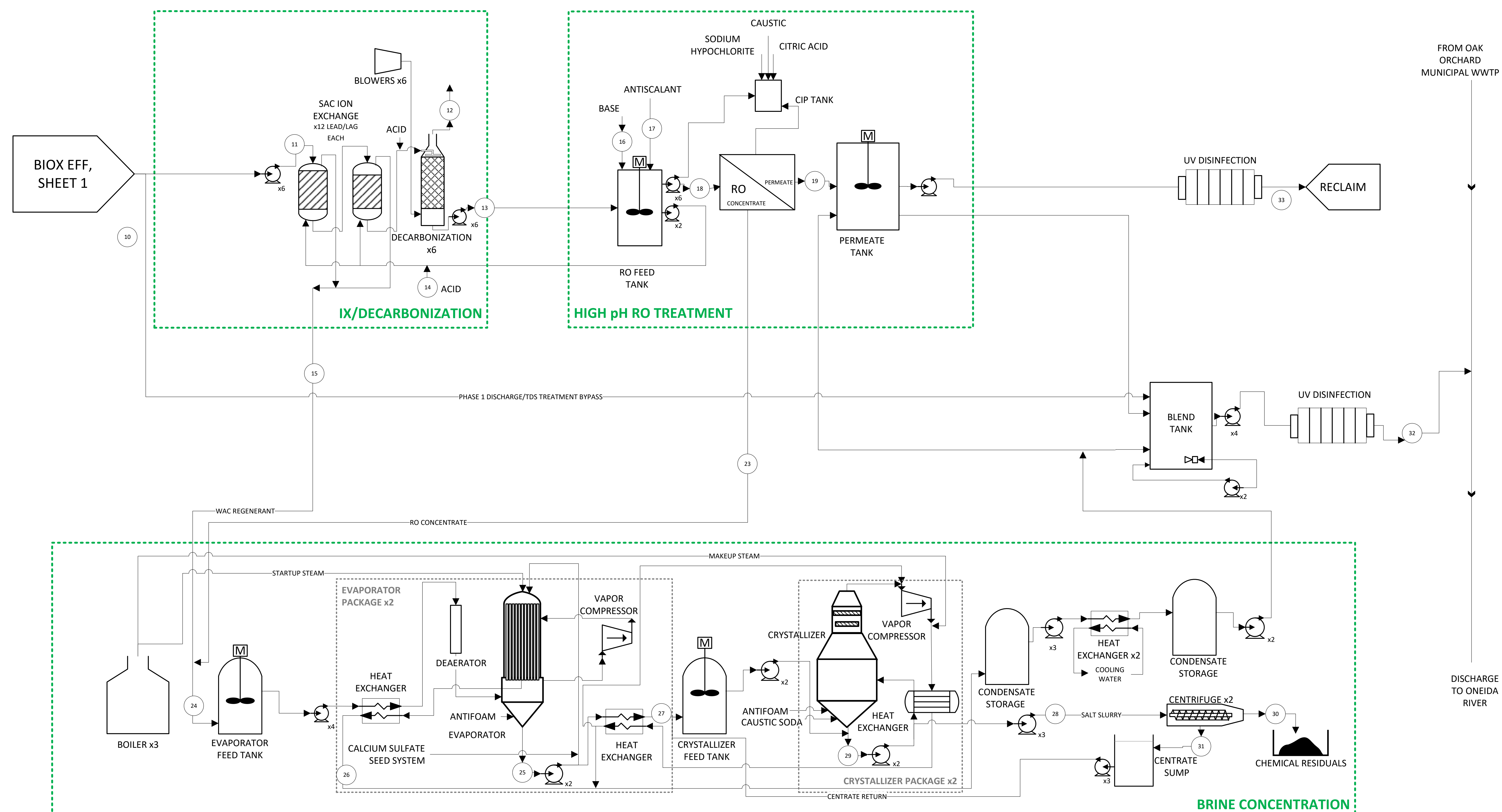
REV	DATE	DESCRIPTION	DRAWN/ENG	CHECKED	APPROVED
0	01/16/2025	CONCEPT FOR DISCUSSION			
1	05/19/2025	REVISED FOR CONCEPT DEVELOPMENT			

Brown AND Caldwell

Onondaga County Water Redevelopment Corporation

Industrial Wastewater Treatment and Water Reclamation Facility (IWWTPWRF)
FIGURE J-1: CONCEPTUAL ALTERNATIVE 11 SIMPLIFIED PROCESS FLOW DIAGRAM

SHEET 1 | **REV** 1



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REV	DATE	DESCRIPTION	DRAWN/ENG	CHECKED	APPROVED
0	01/16/2025	CONCEPT FOR DISCUSSION			
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Brown AND Caldwell

Onondaga County Water Redevelopment Corporation

Industrial Wastewater Treatment and Water Reclamation Facility (IWWTPWRF)
FIGURE J-1: CONCEPTUAL ALTERNATIVE 11 SIMPLIFIED PROCESS FLOW DIAGRAM

SHEET 2 | REV 1

Alternative 11: OCWEP IWWTP FAB2 Mass Balance, Winter Average Conditions																
Parameter	**Unit**	**EQ Influent**	**Biological Influent**	**75% Phosphoric acid**	**Biological Effluent**	**WAS**	**Thickened Sludge/ Centrifuge Feed**	**Sludge Thickener Decant**	**Bio Centrifuge Centrate**	**Bio Solids to Landfill**	**Biological Eff. Bypassed to Outfall**	**SAC IX Influent**	**Air Stripped from Decarbon**	**IX and Decarbonator Effluent**	**30% HCl for Regeneration**	**IX Regenerate Waste**
Stream ID		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Flowrate (MGD)	MGD	17	17	8.0033E-05	16	0.90	0.19	0.70	0.18	0.019	8.00	7.78		7.39	0.0086	0.40
Flowrate (gpm)		11,458	11,581	0.056	10,956	625	135	489	122	13	5,556	5,401		5,131	5.95	276
pH	s.u.	7.23	7.23		7.00	7.00	7.00	7.00	7.00		7.00	7.00		4.30		5.00
Temperature	F	75	75		72						72	72		72		72
Total Dissolved Solids (TDS)	mg/L	1,515	1,515		1,517	1,515	1,515	1,515	1,515	1,515	1,517	1,517		1,384	38,903	4,793
	lb/d	208,486	210,714	202	199,549	11,366	2,461	8,905	2,227	234	101,186	98,363		85,257	2,781	15,887
Total Suspended Solids (TSS)	mg/L	80	91		5.00	4,559	20,000	291	1,105	200,000	5.00	5.00		5.00		4.89
	lb/d	11,064	12,688		658	34,200	32,490	1,710	1,624	30,865	334	324		308		16
Soluble Chemical Oxygen Demand (COD)	mg/L	699	692		26	26	26	26	26	26	26	26		26		25
	lb/d	96,212	96,249		3,360	192	41	150	38	3.94	1,704	1,656		1,573		83
Alkalinity	mg/L as CaCO3	145	145		100	100	100	100	100	100	100	100		0.100		20
	lb/d	19,953	20,100		13,158	750	162	588	147	15	6,672	6,486	6,415	6.16		65
Nitrate	mg/L as N	49	49		45	45	45	45	45	45	45	45		45		44
	lb/d	6,741	6,807		5,878	335	73	263	66	6.89	2,981	2,898		2,753		145
Ammonia	mg/L as N	75	74		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50		0.49
	lb/d	10,321	10,321		66	3.75	0.81	2.94	0.74	0.077	33	32		31		1.62
Total Nitrogen (TN)	mg/L as N	124	123		45	45	45	45	45	45	45	45		45		44
	lb/d	17,062	17,128		5,944	339	73	266	66	6.97	3,014	2,930		2,783		146
Sulfate (SO4 2-)	mg/L	635	635		635	635	635	635	635	635	635	635		635		621
	lb/d	87,401	88,334		83,570	4,765	1,032	3,733	934	98	42,376	41,194		39,134		2,060
Total Silica (TSi)	mg/L as SiO2	47	47		47	47	47	47	47	47	47	47		47		46
	lb/d	6,466	6,535		6,183	353	76	276	69	7.25	3,135	3,048		2,895		152
Calcium (Ca)	mg/L	87	87		87	87	87	87	87	87	87	87		0.100		1,697
	lb/d	11,949	12,077		11,425	651	141	510	128	13	5,793	5,632		6.16		5,626
Magnesium (Mg)	mg/L	17	17		17	17	17	17	17	17	17	17		0.100		321
	lb/d	2,274	2,298		2,174	124	27	97	24	2.55	1,102	1,072		6.16		1,066
Chloride (Cl-)	mg/L	150	150		150	150	150	150	150	150	150	150		150	38,903	986
	lb/d	20,607	20,827		19,703	1,123	243	880	220	23	9,991	9,712		9,227	2,781	3,266
Sodium (Na)	mg/L	194	194		194	194	194	194	194	194	194	194		194		190
	lb/d	26,718	27,003		25,547	1,457	315	1,141	285	30	12,954	12,593		11,963		630
Potassium (K)	mg/L	7.00	7.00		7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00		7.00		6.85
	lb/d	963	974		921	53	11	41	10	1.08	467	454		431		23
Fluoride (F)	mg/L	7.62	7.62		7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62		7.62		7.46
	lb/d	1,049	1,060		1,003	57	12	45	11	1.18	509	494		470		25
Total Organic Carbon (TOC)	mg/L	90	89		8.51	8.51	8.51	8.51	8.51	8.51	8.51	8.51		8.51		8.33
	lb/d	12,373	12,385		1,120	64	14	50	13	1.31	568	552		524		28
Aluminum	mg/L	0.72	0.72		0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72		0.72		0.71
	lb/d	99	101		95	5.42	1.17	4.25	1.06	0.11	48	47		45		2.34
Barium	mg/L	0.31	0.31		0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31		0.100		4.20
	lb/d	43	43		41	2.32	0.50	1.82	0.46	0.048	21	20		6.16		14
Copper	mg/L	0.33	0.33		0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33		0.33		0.32
	lb/d	45	46		43	2.48	0.54	1.94	0.49	0.051	22	21		20		1.07
Iron	mg/L	0.0080	0.0080		0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080		0.0080		0.0078
	lb/d	1.10	1.11		1.05	0.060	0.013	0.047	0.012	0.0012	0.53	0.52		0.49		0.026
Zinc	mg/L	0.50	0.50		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50		0.49
	lb/d	69	70		66	3.75	0.81	2.94	0.74	0.077	33	32		31		1.62
Phosphorus	mg/L	1.55	1.67	361,828	0.50	54	239	3.47	239	2,388	0.50	0.50		0.50		0.49
	lb/d	213	233	242	66	408	388	20	19	368	33	32		31		1.62

	Alternative 11: OCWEP IWWTP FAB2 Mass Balance, Winter Average Conditions																	
Parameter	**50% Caustic Soda**	**Antiscalant**	**RO Influent**	**RO Permeate**	**93% Sulfuric Acid for pH**	**RO Permeate to Reclaim**	**RO Permeate to Outfall**	**RO Concentrate**	**Thermal Treatment Influent**	**Evaporator Brine**	**Evaporator Distillate**	**Crystallizer Feed**	**Crystallizer Salt Slurry to Centrifuge**	**Cooled Crystallizer Distillate**	**Dewatered Crystallized Salt Solids**	**Crystallizer Dewatering Centrate**	**To Outfall (Bio Eff & RO Perm >**	**To Reclaim (Distillate & RO Perm)**
Stream ID	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**
Flowrate (MGD)	0.0012	1.01E-05	7.39	6.83	4.8E-06	5.06	1.77	0.55	0.95	0.055	0.90	0.068	0.028	0.041	0.015	0.013	9.77	6.00
Flowrate (gpm)	0.81	0.0070	5,131	4,746	0.0033	3,516	1,231	385	661	38	623	47	19	28	10	9.02	671	47
pH			11	8.96		7.00	7.00	11	8.65									
Temperature			72	72		72		72	72					75				
Total Dissolved Solids (TDS)	478,804		1,459	40		41	41	18,958	13,042	225,000	14	202,324	500,000	34	850,000	106,088	1,249	37
	4,630		89,887	2,265	67	1,728	605	87,622	103,509	103,405	104	114,894	114,882	11	103,394	11,488	101,791	1,843
Total Suspended Solids (TSS)			5.00	0		0	0	67	41	0	0	0	0	0	0	0	4.09	0.0
			308	0		0	0	308	324	0	0	0	0	0	0	0	334	0.0
Soluble Chemical Oxygen Demand (COD)			26	0		0	0	340	209	3,601	0.22	5,508	13,602	0.93	13,602	13,602	21	0.039
			1,574	0		0	0	1,574	1,656	1,655	1.66	3,128	3,127	0.31	1,654	1,473	1,704	1.97
Alkalinity			30	3.52		3.52	3.52	358	217	217	217	332	819	0.056	819	819	83	35
	1,850		1,856	200		148	52	1,656	1,721	100	1,621	188	188	0.019	100	89	6,724	1,769
Nitrate			45	7.42		7.42	7.42	504	312	5,379	0.33	8,228	20,320	1.38	20,320	20,320	38	6.32
			2,753	423		314	110	2,330	2,475	2,472	2.47	4,673	4,672	0.47	2,472	2,200	3,090	316
Ammonia			0.50	0.058		0.058	0.058	5.96	3.67	63	0.0039	97	239	0.016	239	239	0.42	0.049
			31	3.29		2.44	0.85	28	29	29	0.029	55	55	0.0055	29	26	34	2.47
Total Nitrogen (TN)			45	7.48		7.48	7.48	510	315	5,443	0.33	8,325	20,560	1.40	20,560	20,560	38	6.37
			2,784	427		316	111	2,357	2,504	2,501	2.50	4,728	4,727	0.47	2,501	2,226	3,125	319
Sulfate (SO4 2-)			635	2.54		2.54	2.54	8,437	5,173	89,242	5.49	136,510	337,112	23	337,112	337,112	520	3.12
			39,140	145	67	107	38	38,995	41,055	41,014	41	77,520	77,512	7.75	41,006	36,506	42,414	156
Total Silica (TSi)			47	0.66		0.66	0.66	618	379	6,544	0.40	10,009	24,718	1.68	24,718	24,718	39	0.63
			2,896	38		28	9.81	2,858	3,010	3,007	3.01	5,684	5,683	0.57	3,007	2,677	3,145	32
Calcium (Ca)			0.100	0.000189		0.000189	0.000189	1.33	710	12,242	0.75	18,726	46,244	3.15	46,244	46,244	71	0.13
			6.16	0.011		0.0080	0.0028	6.15	5,632	5,626	5.63	10,634	10,633	1.06	5,625	5,008	5,793	6.70
Magnesium (Mg)			0.100	0.0003		0.0003	0.0003	1.33	135	2,330	0.14	3,563	8,800	0.60	8,800	8,800	14	0.026
			6.16	0.017		0.013	0.0044	6.15	1,072	1,071	1.07	2,024	2,023	0.20	1,070	953	1,102	1.29
Chloride (Cl-)			150	7.82		7.82	7.82	1,900	1,518	26,190	1.61	40,062	98,934	6.73	98,934	98,934	124	6.89
			9,228	446		330	116	8,782	12,049	12,037	12	22,750	22,748	2.28	12,034	10,714	10,107	345
Sodium (Na)	287,500		239	6.12		6.12	6.12	3,114	1,893	32,657	2.01	49,954	123,363	8.39	123,363	123,363	160	5.52
	2,780		14,743	349		259	91	14,394	15,024	15,009	15	28,368	28,365	2.84	15,006	13,359	13,044	276
Potassium (K)			7.00	0.18		0.18	0.18	91	56	965	0.059	1,476	3,644	0.25	3,644	3,644	5.76	0.16
			431	10		7.60	2.66	421	444	443	0.44	838	838	0.084	443	395	470	8.12
Fluoride (F)			7.62	0.15		0.15	0.15	100	61	1,056	0.065	1,615	3,988	0.27	3,988	3,988	6.27	0.14
			470	8.69		6.44	2.25	461	486	485	0.49	917	917	0.092	485	432	511	7.01
Total Organic Carbon (TOC)			8.51	0.73		0.73	0.73	105	64	1,110	0.068	1,698	4,194	0.29	4,194	4,194	7.10	0.62
			525	41		31	11	483	511	510	0.51	964	964	0.096	510	454	579	31
Aluminum			0.72	0.040		0.040	0.040	9.14	5.62	97	0.0060	148	366	0.025	366	366	0.60	0.035
			45	2.29		1.70	0.59	42	45	45	0.045	84	84	0.0084	45	40	49	1.75
Barium			0.100	0.0050		0.0050	0.0050	1.27	2.50	43	0.0026	66	163	0.011	163	163	0.25	0.0047
			6.16	0.29		0.21	0.074	5.88	20	20	0.020	37	37	0.0037	20	18	21	0.23
Copper			0.33	0.017		0.017	0.017	4.20	2.58	45	0.0027	68	168	0.011	168	168	0.27	0.014
			20	0.94		0.70	0.24	19	20	20	0.020	39	39	0.0039	20	18	22	0.72
Iron			0.0080	0.0004		0.0004	0.0004	0.10	0.063	1.08	6.64E-05	1.65	4.07	0.0002772	4.07	4.07	0.0066	0.0003493
			0.49	0.023		0.017	0.0059	0.47	0.50	0.50	0.000496	0.94	0.94	9.368E-05	0.50	0.44	0.54	0.017
Zinc			0.50	0.025		0.025	0.025	6.36	3.91	67	0.0041	103	255	0.017	255	255	0.41	0.022
			31	1.43		1.06	0.37	29	31	31	0.031	59	59	0.0059	31	28	34	1.09
Phosphorus			0.50	0.0070		0.0070	0.0070	6.58	4.04	70	0.0043	107	263	0.018	263	263	0.41	0.0067
			31	0.40		0.30	0.10	30	32	32	0.032	60	60	0.0060	32	28	33	0.33

Alternative 11: OCWEP IWWTP FAB2 Mass Balance, Summer Average Conditions																
Parameter	**Unit**	**EQ Influent**	**Biological Influent**	**75% Phosphoric acid**	**Biological Effluent**	**WAS**	**Thickened Sludge/ Centrifuge Feed**	**Sludge Thickener Decant**	**Bio Centrifuge Centrate**	**Bio Solids to Landfill**	**Biological Eff. Bypassed to Outfall**	**SAC IX Influent**	**Air Stripped from Decarbon**	**IX and Decarbonator Effluent**	**30% HCl for Regeneration**	**IX Regenerate Waste**
Stream ID		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Flowrate (MGD)	MGD	14	14	5.5547E-05	13	0.90	0.18	0.72	0.16	0.017	5.00	7.87		7.47	0.010	0.40
Flowrate (gpm)		9,447	9,560	0.039	8,935	625	124	501	112	12	3,472	5,462		5,189	7.14	280
pH	s.u.	7.00	7.00		7.00	7.00	7.00	7.00	7.00		7.00	7.00		4.30		5.00
Temperature	F	86	86		89						89	89		89		89
Total Dissolved Solids (TDS)	mg/L	1,826	1,826		1,827	1,826	1,826	1,826	1,826	1,826	1,827	1,827		1,690	38,903	5,313
	lb/d	207,122	209,583	165	196,047	13,700	2,719	10,981	2,461	258	76,189	119,859		105,312	3,337	17,884
Total Suspended Solids (TSS)	mg/L	98	110		5.00	4,178	20,000	261	1,105	200,000	5.00	5.00		5.00		4.87
	lb/d	11,156	12,646		537	31,358	29,790	1,568	1,489	28,300	209	328		312		16
Soluble Chemical Oxygen Demand (COD)	mg/L	848	838		2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88		2.88		2.80
	lb/d	96,212	96,216		308	22	4.28	17	3.88	0.41	120	189		179		9.43
Alkalinity	mg/L as CaCO3	145	144		100	100	100	100	100	100	100	100		0.100		19
	lb/d	16,451	16,586		10,730	750	149	602	135	14	4,170	6,560	6,488	6.23		66
Nitrate	mg/L as N	59	59		34	34	34	34	34	34	34	34		34		34
	lb/d	6,741	6,787		3,695	258	51	207	46	4.87	1,436	2,259		2,146		113
Ammonia	mg/L as N	75	74		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50		0.49
	lb/d	8,509	8,510		54	3.75	0.74	3.01	0.67	0.071	21	33		31		1.64
Total Nitrogen (TN)	mg/L as N	134	133		35	35	35	35	35	35	35	35		35		34
	lb/d	15,250	15,297		3,748	262	52	210	47	4.94	1,457	2,292		2,177		115
Sulfate (SO4 2-)	mg/L	763	763		763	763	763	763	763	763	763	763		763		744
	lb/d	86,568	87,597		81,871	5,726	1,136	4,590	1,029	108	31,817	50,054		47,551		2,503
Total Silica (TSi)	mg/L as SiO2	57	57		57	57	57	57	57	57	57	57		57		56
	lb/d	6,485	6,562		6,133	429	85	344	77	8.09	2,384	3,750		3,562		187
Calcium (Ca)	mg/L	104	104		104	104	104	104	104	104	104	104		0.100		2,026
	lb/d	11,803	11,943		11,163	781	155	626	140	15	4,338	6,825		6.23		6,818
Magnesium (Mg)	mg/L	19	19		19	19	19	19	19	19	19	19		0.100		368
	lb/d	2,156	2,181		2,039	143	28	114	26	2.69	792	1,246		6.23		1,240
Chloride (Cl-)	mg/L	179	179		179	179	179	179	179	179	179	179		179	38,903	1,166
	lb/d	20,309	20,550		19,207	1,343	267	1,077	241	25	7,464	11,743		11,156	3,337	3,925
Sodium (Na)	mg/L	234	234		234	234	234	234	234	234	234	234		234		228
	lb/d	26,549	26,865		25,109	1,756	349	1,408	315	33	9,758	15,351		14,583		768
Potassium (K)	mg/L	7.00	7.00		7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00		7.00		6.82
	lb/d	794	804		751	53	10	42	9.44	0.99	292	459		436		23
Fluoride (F)	mg/L	9.19	9.19		9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19		9.19		8.96
	lb/d	1,043	1,055		986	69	14	55	12	1.30	383	603		573		30
Total Organic Carbon (TOC)	mg/L	109	107		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96		0.96		0.93
	lb/d	12,327	12,329		103	7.19	1.43	5.76	1.29	0.14	40	63		60		3.14
Aluminum	mg/L	0.80	0.80		0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80		0.80		0.78
	lb/d	91	92		86	6.00	1.19	4.81	1.08	0.11	33	52		50		2.62
Barium	mg/L	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40		0.100		5.94
	lb/d	45	46		43	3.00	0.60	2.41	0.54	0.057	17	26		6.23		20
Copper	mg/L	0.41	0.41		0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41		0.41		0.40
	lb/d	47	47		44	3.08	0.61	2.47	0.55	0.058	17	27		26		1.34
Iron	mg/L	0.0100	0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100		0.0100		0.0097
	lb/d	1.13	1.15		1.07	0.075	0.015	0.060	0.013	0.0014	0.42	0.66		0.62		0.033
Zinc	mg/L	0.60	0.60		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60		0.60		0.58
	lb/d	68	69		64	4.50	0.89	3.61	0.81	0.085	25	39		37		1.97
Phosphorus	mg/L	1.80	1.92	361,828	0.50	45	213	2.78	213	2,131	0.50	0.50		0.50		0.49
	lb/d	204	220	168	54	334	317	17	16	301	21	33		31		1.64

	Alternative 11: OCWEP IWWTP FAB2 Mass Balance, Summer Average Conditions																	
Parameter	**50% Caustic Soda**	**Antiscalant**	**RO Influent**	**RO Permeate**	**93% Sulfuric Acid for pH**	**RO Permeate to Reclaim**	**RO Permeate to Outfall**	**RO Concentrate**	**Thermal Treatment Influent**	**Evaporator Brine**	**Evaporator Distillate**	**Crystallizer Feed**	**Crystallizer Salt Slurry to Centrifuge**	**Cooled Crystallizer Distillate**	**Dewatered Crystallized Salt Solids**	**Crystallizer Dewatering Centrate**	**To Outfall (Bio Eff & RO Perm >**	**To Reclaim (Distillate & RO Perm)**
Stream ID	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**
Flowrate (MGD)	0.0012	1.02E-05	7.47	6.91	4.85E-06	5.05	1.86	0.56	0.96	0.067	0.90	0.082	0.033	0.049	0.018	0.016	6.86	6.00
Flowrate (gpm)	0.81	0.0071	5,190	4,801	0.0034	3,509	1,291	389	670	46	623	57	23	34	12	11	682	57
pH			11	8.96		7.00	7.00	11	8.64									
Temperature			89	89		89		89	89					75				
Total Dissolved Solids (TDS)	478,804		1,764	48		49	49	22,925	15,553	225,000	17	202,324	500,000	34	850,000	106,088	1,345	44
	4,630		109,942	2,771	68	2,075	764	107,172	125,056	124,931	125	138,810	138,797	14	124,917	13,880	76,952	2,214
Total Suspended Solids (TSS)			5.00	0		0	0	67	41	0	0	0	0	0	0	0	3.64	0.0
			312	0		0	0	312	328	0	0	0	0	0	0	0	209	0.0
Soluble Chemical Oxygen Demand (COD)			2.88	0		0	0	38	23	339	0.025	519	1,282	0.087	1,282	1,282	2.10	0.0045
			179	0		0	0	179	189	188	0.19	356	356	0.036	188	168	120	0.22
Alkalinity			30	3.48		3.48	3.48	354	214	214	214	327	809	0.055	809	809	74	35
	1,850		1,856	200		146	54	1,656	1,721	119	1,603	225	225	0.022	119	106	4,224	1,749
Nitrate			34	5.72		5.72	5.72	389	240	3,471	0.26	5,310	13,112	0.89	13,112	13,112	27	4.87
			2,146	330		241	89	1,816	1,929	1,927	1.93	3,643	3,642	0.36	1,927	1,715	1,525	243
Ammonia			0.50	0.058		0.058	0.058	5.96	3.67	53	0.0039	81	200	0.014	200	200	0.38	0.049
			31	3.33		2.43	0.89	28	29	29	0.029	56	56	0.0056	29	26	22	2.47
Total Nitrogen (TN)			35	5.78		5.78	5.78	394	244	3,524	0.26	5,391	13,312	0.91	13,312	13,312	27	4.92
			2,177	333		244	90	1,844	1,959	1,957	1.96	3,698	3,698	0.37	1,956	1,742	1,546	246
Sulfate (SO4 2-)			763	3.05		3.05	3.05	10,136	6,204	89,754	6.66	137,292	339,044	23	339,044	339,044	557	3.76
			47,559	176	68	129	47	47,383	49,886	49,836	50	94,194	94,184	9.42	49,826	44,358	31,864	188
Total Silica (TSi)			57	0.81		0.81	0.81	752	461	6,664	0.49	10,193	25,173	1.71	25,173	25,173	42	0.77
			3,563	47		34	13	3,516	3,704	3,700	3.70	6,993	6,993	0.70	3,699	3,293	2,396	38
Calcium (Ca)			0.100	0.000189		0.000189	0.000189	1.33	849	12,279	0.91	18,782	46,383	3.16	46,383	46,383	76	0.16
			6.23	0.011		0.0080	0.0029	6.22	6,825	6,818	6.82	12,886	12,885	1.29	6,816	6,068	4,338	8.12
Magnesium (Mg)			0.100	0.0003		0.0003	0.0003	1.33	155	2,243	0.17	3,430	8,471	0.58	8,471	8,471	14	0.030
			6.23	0.017		0.013	0.0047	6.22	1,246	1,245	1.25	2,353	2,353	0.24	1,245	1,108	792	1.49
Chloride (Cl-)			179	9.35		9.35	9.35	2,271	1,809	26,165	1.94	40,023	98,838	6.73	98,838	98,838	133	8.22
			11,157	539		394	145	10,618	14,543	14,528	15	27,459	27,456	2.75	14,525	12,931	7,609	411
Sodium (Na)	287,500		279	7.13		7.13	7.13	3,626	2,204	31,882	2.37	48,768	120,432	8.19	120,432	120,432	172	6.43
	2,780		17,364	411		301	111	16,952	17,720	17,702	18	33,459	33,455	3.35	17,699	15,756	9,868	322
Potassium (K)			7.00	0.18		0.18	0.18	91	56	808	0.060	1,235	3,051	0.21	3,051	3,051	5.15	0.16
			436	10		7.58	2.79	426	449	448	0.45	848	848	0.085	448	399	295	8.12
Fluoride (F)			9.19	0.18		0.18	0.18	120	74	1,066	0.079	1,630	4,026	0.27	4,026	4,026	6.75	0.17
			573	11		7.75	2.85	562	592	592	0.59	1,119	1,118	0.11	592	527	386	8.45
Total Organic Carbon (TOC)			0.96	0.082		0.082	0.082	12	7.23	105	0.0078	160	395	0.027	395	395	0.72	0.070
			60	4.71		3.45	1.27	55	58	58	0.058	110	110	0.011	58	52	41	3.51
Aluminum			0.80	0.044		0.044	0.044	10	6.21	90	0.0067	137	339	0.023	339	339	0.60	0.039
			50	2.56		1.87	0.69	47	50	50	0.050	94	94	0.0094	50	44	34	1.93
Barium			0.100	0.0050		0.0050	0.0050	1.27	3.23	47	0.0035	71	176	0.012	176	176	0.29	0.0048
			6.23	0.29		0.21	0.078	5.94	26	26	0.026	49	49	0.0049	26	23	17	0.24
Copper			0.41	0.021		0.021	0.021	5.21	3.20	46	0.0034	71	175	0.012	175	175	0.30	0.018
			26	1.18		0.86	0.32	24	26	26	0.026	49	49	0.0049	26	23	17	0.89
Iron			0.0100	0.0005		0.0005	0.0005	0.13	0.078	1.13	8.38E-05	1.73	4.26	0.0002901	4.26	4.26	0.0074	0.000436
			0.62	0.029		0.021	0.0078	0.59	0.63	0.63	0.000627	1.18	1.18	0.0001184	0.63	0.56	0.42	0.022
Zinc			0.60	0.030		0.030	0.030	7.63	4.68	68	0.0050	104	256	0.017	256	256	0.45	0.026
			37	1.73		1.26	0.47	36	38	38	0.038	71	71	0.0071	38	33	25	1.31
Phosphorus			0.50	0.0070		0.0070	0.0070	6.58	4.03	58	0.0043	89	220	0.015	220	220	0.37	0.0067
			31	0.40		0.30	0.11	31	32	32	0.032	61	61	0.0061	32	29	21	0.33

Alternative 11: OCWEP IWWTP FAB2 Mass Balance, Maximum Concentration Conditions																
Parameter	**Unit**	**EQ Influent**	**Biological Influent**	**75% Phosphoric acid**	**Biological Effluent**	**WAS**	**Thickened Sludge/ Centrifuge Feed**	**Sludge Thickener Decant**	**Bio Centrifuge Centrate**	**Bio Solids to Landfill**	**Biological Eff. Bypassed to Outfall**	**SAC IX Influent**	**Air Stripped from Decarbon**	**IX and Decarbonator Effluent**	**30% HCl for Regeneration**	**IX Regenerate Waste**
Stream ID		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Flowrate (MGD)	MGD	17	17	7.4303E-05	16	0.67	0.35	0.32	0.32	0.034	3.95	12		12	0.016	0.63
Flowrate (gpm)		11,458	11,680	0.052	11,213	467	245	222	222	23	2,743	8,470		8,047	11	435
pH	s.u.	7.23	7.23		7.00	7.00	7.00	7.00	7.00		7.00	7.00		4.30		5.00
Temperature	F	86	86		89						89	89		89		89
Total Dissolved Solids (TDS)	mg/L	3,400	3,400		3,402	3,400	3,400	3,400	3,400	3,400	3,402	3,402		3,347	38,903	5,313
	lb/d	467,874	476,932	206	458,068	19,070	10,009	9,061	9,058	951	112,056	346,012		323,455	5,175	27,732
Total Suspended Solids (TSS)	mg/L	300	315		5.00	11,049	20,000	1,163	1,105	200,000	5.00	5.00		5.00		4.87
	lb/d	41,283	44,227		673	61,973	58,874	3,099	2,944	55,931	165	509		483		25
Soluble Chemical Oxygen Demand (COD)	mg/L	1,272	1,248		2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88		2.88		2.80
	lb/d	175,040	175,048		387	16	8.46	7.66	7.66	0.80	95	292		278		15
Alkalinity	mg/L as CaCO3	201	199		100	100	100	100	100	100	100	100		0.100		19
	lb/d	27,694	27,960		13,467	561	294	267	266	28	3,294	10,172	10,061	9.66		102
Nitrate	mg/L as N	89	88		21	21	21	21	21	21	21	21		21		21
	lb/d	12,264	12,320		2,849	119	62	56	56	5.92	697	2,152		2,044		108
Ammonia	mg/L as N	75	74		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		0.50		0.49
	lb/d	10,321	10,322		67	2.80	1.47	1.33	1.33	0.14	16	51		48		2.54
Total Nitrogen (TN)	mg/L as N	164	161		22	22	22	22	22	22	22	22		22		21
	lb/d	22,584	22,642		2,916	121	64	58	58	6.06	713	2,203		2,093		110
Sulfate (SO4 2-)	mg/L	763	763		763	763	763	763	763	763	763	763		763		744
	lb/d	104,996	107,029		102,750	4,280	2,246	2,034	2,033	213	25,136	77,615		73,734		3,881
Total Silica (TSi)	mg/L as SiO2	57	57		57	57	57	57	57	57	57	57		57		56
	lb/d	7,866	8,018		7,697	321	168	152	152	16	1,883	5,814		5,524		291
Calcium (Ca)	mg/L	104	104		104	104	104	104	104	104	104	104		0.100		2,026
	lb/d	14,316	14,593		14,009	583	306	277	277	29	3,427	10,582		9.66		10,573
Magnesium (Mg)	mg/L	19	19		19	19	19	19	19	19	19	19		0.100		368
	lb/d	2,615	2,665		2,559	107	56	51	51	5.31	626	1,933		9.66		1,923
Chloride (Cl-)	mg/L	179	179		179	179	179	179	179	179	179	179		179	38,903	1,166
	lb/d	24,632	25,109		24,105	1,004	527	477	477	50	5,897	18,208		17,298	5,175	6,085
Sodium (Na)	mg/L	234	234		234	234	234	234	234	234	234	234		234		228
	lb/d	32,201	32,824		31,512	1,312	689	624	623	65	7,709	23,803		22,613		1,190
Potassium (K)	mg/L	7.00	7.00		7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00		7.00		6.82
	lb/d	963	982		943	39	21	19	19	1.96	231	712		676		36
Fluoride (F)	mg/L	9.19	9.19		9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19		9.19		8.96
	lb/d	1,265	1,289		1,238	52	27	24	24	2.57	303	935		888		47
Total Organic Carbon (TOC)	mg/L	424	416		0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96		0.96		0.93
	lb/d	58,347	58,349		129	5.38	2.82	2.55	2.55	0.27	32	97		93		4.87
Aluminum	mg/L	0.80	0.80		0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80		0.80		0.78
	lb/d	110	112		108	4.49	2.35	2.13	2.13	0.22	26	81		77		4.07
Barium	mg/L	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40		0.100		5.94
	lb/d	55	56		54	2.24	1.18	1.07	1.07	0.11	13	41		9.66		31
Copper	mg/L	0.41	0.41		0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41		0.41		0.40
	lb/d	56	58		55	2.30	1.21	1.09	1.09	0.11	14	42		40		2.09
Iron	mg/L	0.0100	0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100		0.0100		0.0097
	lb/d	1.38	1.40		1.35	0.056	0.029	0.027	0.027	0.0028	0.33	1.02		0.97		0.051
Zinc	mg/L	0.60	0.60		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60		0.60		0.58
	lb/d	83	84		81	3.37	1.77	1.60	1.60	0.17	20	61		58		3.05
Phosphorus	mg/L	2.70	2.84	361,828	0.50	99	179	10	179	1,790	0.50	0.50		0.50		0.49
	lb/d	372	398	224	67	555	527	28	26	501	16	51		48		2.54

	Alternative 11: OCWEP IWWTP FAB2 Mass Balance, Maximum Concentration Conditions																	
Parameter	**50% Caustic Soda**	**Antiscalant**	**RO Influent**	**RO Permeate**	**93% Sulfuric Acid for pH**	**RO Permeate to Reclaim**	**RO Permeate to Outfall**	**RO Concentrate**	**Thermal Treatment Influent**	**Evaporator Brine**	**Evaporator Distillate**	**Crystallizer Feed**	**Crystallizer Salt Slurry to Centrifuge**	**Cooled Crystallizer Distillate**	**Dewatered Crystallized Salt Solids**	**Crystallizer Dewatering Centrate**	**To Outfall (Bio Eff & RO Perm >**	**To Reclaim (Distillate & RO Perm)**
Stream ID	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**
Flowrate (MGD)	0.0012	1.58E-05	12	11	7.52E-06	4.55	6.17	0.87	1.49	0.19	1.31	0.23	0.093	0.14	0.049	0.044	10	6.00
Flowrate (gpm)	0.81	0.011	8,047	7,444	0.0052	3,163	4,281	604	1,038	128	910	159	64	94	34	30	1,072	159
pH			11	8.96		7.00	7.00	11	8.64									
Temperature			89	89		89		89	89					75				
Total Dissolved Solids (TDS)	478,804		3,395	92		94	94	44,122	27,876	225,000	32	202,324	500,000	34	850,000	106,088	1,385	79
	4,630		328,086	8,268	105	3,557	4,816	319,818	347,549	347,202	348	385,776	385,737	39	347,163	38,574	116,872	3,943
Total Suspended Solids (TSS)			5.00	0		0	0	67	41	0	0	0	0	0	0	0	1.95	0.0
			483	0		0	0	483	509	0	0	0	0	0	0	0	165	0.0
Soluble Chemical Oxygen Demand (COD)			2.88	0		0	0	38	23	189	0.027	290	715	0.049	715	715	1.12	0.0069
			278	0		0	0	278	292	292	0.29	552	552	0.055	292	260	95	0.35
Alkalinity			19	2.25		2.25	2.25	229	141	141	141	216	533	0.036	533	533	40	33
	1,850		1,860	201		85	115	1,659	1,761	218	1,543	412	412	0.041	218	194	3,410	1,628
Nitrate			21	3.52		3.52	3.52	239	147	1,190	0.17	1,820	4,495	0.31	4,495	4,495	10	2.71
			2,045	314		134	181	1,730	1,838	1,836	1.84	3,470	3,470	0.35	1,836	1,634	878	136
Ammonia			0.50	0.058		0.058	0.058	5.96	3.67	30	0.0042	45	112	0.0076	112	112	0.23	0.045
			48	5.16		2.19	2.97	43	46	46	0.046	86	86	0.0086	46	41	19	2.25
Total Nitrogen (TN)			22	3.57		3.57	3.57	245	151	1,219	0.17	1,865	4,606	0.31	4,606	4,606	11	2.76
			2,093	319		136	184	1,773	1,884	1,882	1.88	3,557	3,556	0.36	1,881	1,675	897	138
Sulfate (SO4 2-)			763	3.05		3.05	3.05	10,136	6,204	50,075	7.08	76,597	189,158	13	189,158	189,158	300	4.15
			73,741	273	105	116	157	73,468	77,349	77,272	77	146,050	146,035	15	77,257	68,778	25,292	208
Total Silica (TSi)			57	0.81		0.81	0.81	752	461	3,718	0.53	5,687	14,044	0.96	14,044	14,044	23	0.75
			5,524	72		31	42	5,452	5,743	5,737	5.74	10,844	10,842	1.08	5,736	5,106	1,925	38
Calcium (Ca)			0.100	0.000189		0.000189	0.000189	1.33	849	6,851	0.97	10,479	25,879	1.76	25,879	25,879	41	0.25
			9.66	0.017		0.0072	0.0097	9.65	10,582	10,572	11	19,981	19,979	2.00	10,570	9,410	3,427	13
Magnesium (Mg)			0.100	0.0003		0.0003	0.0003	1.33	155	1,251	0.18	1,914	4,726	0.32	4,726	4,726	7.42	0.046
			9.66	0.027		0.011	0.015	9.64	1,933	1,931	1.93	3,649	3,649	0.36	1,930	1,719	626	2.31
Chloride (Cl-)			179	9.35		9.35	9.35	2,271	1,809	14,598	2.06	22,330	55,144	3.75	55,144	55,144	76	7.63
			17,300	836		355	481	16,464	22,549	22,526	23	42,577	42,573	4.26	22,522	20,050	6,378	382
Sodium (Na)	287,500		263	6.73		6.73	6.73	3,420	2,084	16,821	2.38	25,730	63,539	4.32	63,539	63,539	95	5.72
	2,780		25,393	601		255	346	24,792	25,982	25,956	26	49,059	49,054	4.91	25,951	23,103	8,055	286
Potassium (K)			7.00	0.18		0.18	0.18	91	56	451	0.064	689	1,702	0.12	1,702	1,702	2.84	0.15
			677	16		6.83	9.25	660	696	695	0.70	1,314	1,314	0.13	695	619	240	7.66
Fluoride (F)			9.19	0.18		0.18	0.18	120	74	595	0.084	910	2,246	0.15	2,246	2,246	3.70	0.16
			888	16		6.98	9.45	872	918	918	0.92	1,734	1,734	0.17	917	817	312	8.07
Total Organic Carbon (TOC)			0.96	0.082		0.082	0.082	12	7.23	58	0.0083	89	221	0.015	221	221	0.42	0.064
			93	7.31		3.10	4.20	85	90	90	0.090	170	170	0.017	90	80	36	3.21
Aluminum			0.80	0.044		0.044	0.044	10	6.21	50	0.0071	77	189	0.013	189	189	0.34	0.036
			77	3.98		1.69	2.29	73	77	77	0.077	146	146	0.015	77	69	29	1.78
Barium			0.100	0.0050		0.0050	0.0050	1.27	3.23	26	0.0037	40	98	0.0067	98	98	0.16	0.0048
			9.66	0.45		0.19	0.26	9.22	40	40	0.040	76	76	0.0076	40	36	13	0.24
Copper			0.41	0.021		0.021	0.021	5.21	3.20	26	0.0037	39	98	0.0066	98	98	0.17	0.017
			40	1.83		0.78	1.05	38	40	40	0.040	75	75	0.0075	40	35	15	0.83
Iron			0.0100	0.0005		0.0005	0.0005	0.13	0.078	0.63	8.9E-05	0.96	2.38	0.0001619	2.38	2.38	0.0042	0.0004026
			0.97	0.045		0.019	0.026	0.92	0.97	0.97	0.000973	1.84	1.84	0.0001837	0.97	0.86	0.36	0.020
Zinc			0.60	0.030		0.030	0.030	7.63	4.68	38	0.0053	58	143	0.0097	143	143	0.25	0.024
			58	2.68		1.14	1.54	55	58	58	0.058	110	110	0.011	58	52	21	1.21
Phosphorus			0.50	0.0070		0.0070	0.0070	6.58	4.03	33	0.0046	50	123	0.0084	123	123	0.20	0.0065
			48	0.63		0.27	0.36	48	50	50	0.050	95	95	0.0095	50	45	17	0.33

Brown AND Caldwell	Client	Micron Onondaga	Location	Syracuse, NY	Originator	Anukriti Shah	Revision	A	MAJOR EQUIPMENT LIST ALT 11
	Project	IWWTP & WRF	BC #	191915	Approved By	Tom Sandy	Issued Date	6/18/2025	DRAFT

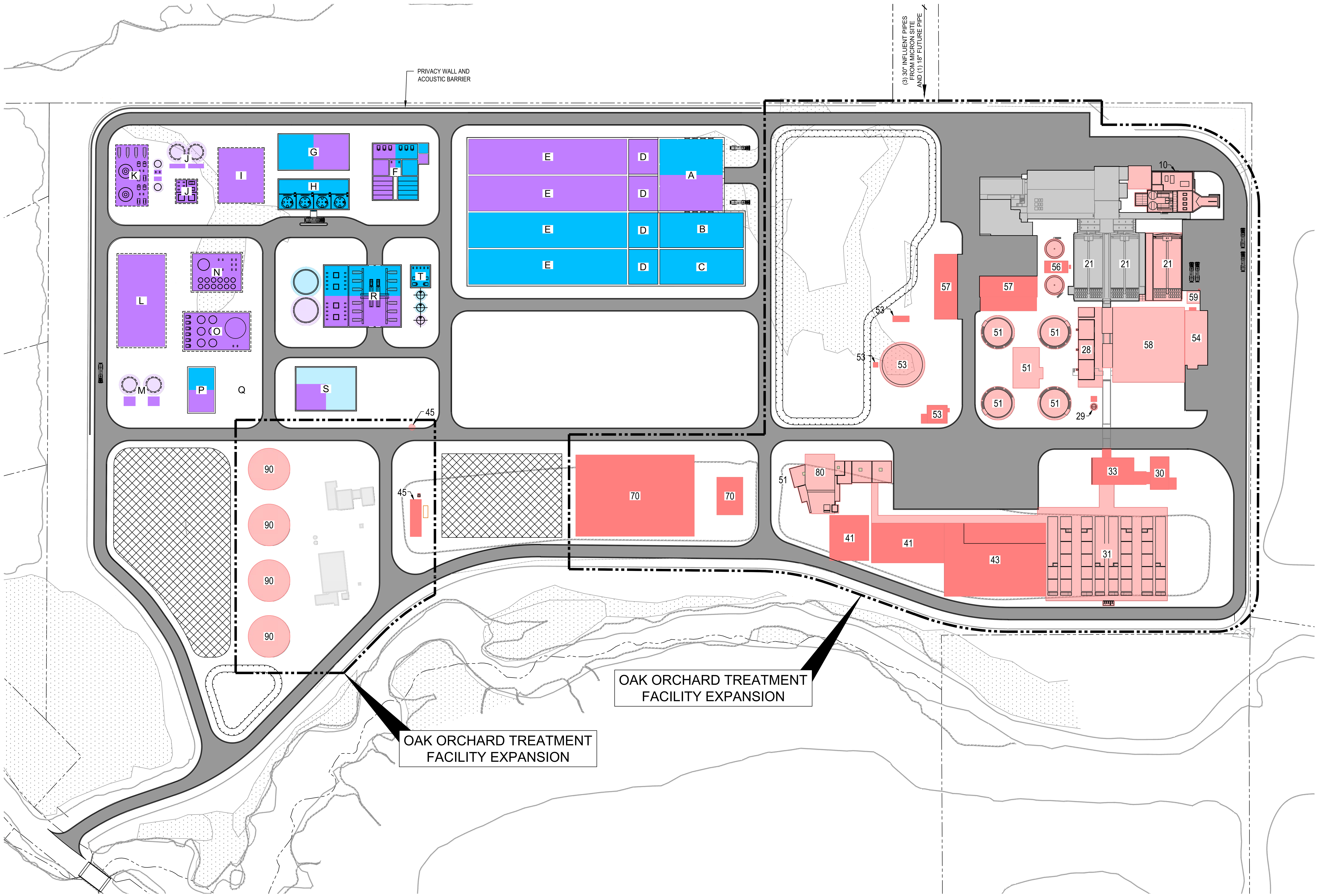
		EQUIPMENT INFORMATION				PROCESS				MECHANICAL				ELECTRICAL & INSTRUMENTATION	
Item No.	REV	Equipment Category	Equipment Status	Equipment Name	Quantity	Capacity	Total Capacity	Units	Temperature	Type	Material of Construction	Physical Dimension	Equipment Installation	HP (Nameplate)	Notes
1	A	Pump	New	EQ/Diversion Feed Pumps	4	2,000	8,000	gpm	AMB	Centrifugal	Cast Iron	--	Outdoor	50	
2	A	Pump	New	Screen Feed Pumps	4	2,000	8,000	gpm	AMB	Centrifugal	Cast Iron	--	Outdoor	50	
3	A	Separation	New	Screens	4	2,000	8,000	gpm	AMB	--	Stainless steel	--	Outdoor	1	
4	A	Tank	New	Anoxic Tanks	2	1,050,000	2,100,000	gal	AMB	--	Cast-In-Place Concrete	63 ft (L) x 75 ft (W) x 30 ft (H)	Outdoor	--	
5	A	Mixer	New	Anoxic Tank Mixers	2	--	--	--	AMB	Vertical Hyperboloid	Stainless Steel	--	Outdoor	40	
6	A	Tank	New	Aerobic Tanks	2	5,700,000	11,400,000	gal	AMB	--	Cast-In-Place Concrete	340 ft (L) x 75 ft (W) x 30 ft (H)	Outdoor	--	
7	A	Aeration	New	Aeration Coarse Bubble Grid	1	13,500	13,500	scfm	AMB	Coarse Bubble	Stainless Steel	--	Outdoor	--	
8	A	Blower	New	Aerobic Blowers	5	13,500	67,500	scfm	AMB	Positive Displacement Blower	Cast Iron	--	Outdoor	350	
9	A	Pump	New	MLE Recycle Pumps	5	5,730	28,650	gpm	AMB	Centrifugal	Stainless Steel	--	Indoor	50	
10	A	Separation	New	MBR Cassette Tanks & Membranes	10	6080	60,800	gpm	AMB	--	Coated Carbon Steel	42 ft (L) x 10 ft (W) x 14 ft (H)	Indoor	--	
11	A	Blower	New	MBR Blowers	11	300	3,300	gpm	AMB	Positive Displacement Blower	Cast Iron	--	Indoor	40	
12	A	Pump	New	Recirculation (RAS&WAS) pumps	10	TBD	TBD	gpm	AMB	Low Shear Rotary Lobe Positive Displacement	Cast Iron	Design capacities are to be confirmed once vendor information has been provided	Indoor	25	
13	A	Pump	New	Permeate/Feed Pulse Pumps	10	TBD	TBD	gpm	AMB	Centrifugal	Cast Iron	Design capacities are to be confirmed once vendor information has been provided	Outdoor	30	
14	A	Compressor	New	MBR Air Compressor	2	TBD	TBD	scfm	AMB	--	--	Design capacities are to be confirmed once vendor information has been provided	Outdoor	5	
15	A	Pump	New	CIP Tank Feed Pumps	1	375	375	gpm	AMB	Centrifugal	Cast Iron			25	
16	A	Tank	New	Gravity Thickener	1	1,000,000	1,000,000	gal	AMB	--	Cast-In-Place Concrete	50 ft (D) x 17 ft (H)	Indoor	--	
17	A	Pump	New	Centrifuge Feed Pumps	2	607	1,214	gpm	AMB	Progressive Cavity	Cast Iron		Indoor	50	
18	A	Dewatering	New	Biological Centrifuges	3	607	1,821	gpm	AMB	Decanter Centrifuge	Coated Carbon Steel		Indoor	--	
19	A	Tank	New	Centrate Sump	1	7500	7,500	gal	AMB	Sump	Concrete-in Place		Outdoor	--	
20	A	Pump	New	Centrate Sump Pumps	3	375	1,125	gpm	AMB	Centrifugal	Cast Iron		Outdoor	20	
21	A	Pump	New	Building Sump Pumps	2	375	750	gpm	AMB	Centrifugal	Cast Iron			20	
22	A	Conveyor	New	Hopper & Conveyor	3	375	1,125	gpm	AMB					15	
26	A	Disinfection	New	UV Disinfection Unit	2	5730	11,460	gpm	AMB	Various	Stainless steel	6 ft (L) x 5 ft (W) x 6 ft (H)	Outdoor	266	
27	A	Pump	New	Discharge Pumps	4	2000	8,000	gpm	AMB	Centrifugal	Cast Iron	--	Indoor	50	
28	A	Tank	New	Phosphoric Acid Tank	1	7400	7,400	gal	AMB	--	FRP Double Wall	11 ft (D) x 10 ft (H)	Indoor	--	
29	A	Tank	New	Sulfuric Acid Tank	1	7400	7,400	gal	AMB	--	LDPE	11 ft (D) x 10 ft (H)	Indoor	--	
30	A	Tank	New	Sodium Hydroxide Tank	1	7400	7,400	gal	AMB	--	HDPE	11 ft (D) x 10 ft (H)	Indoor	--	
31	A	Tank	New	Neat Polymer Tank	1	7400	7,400	gal	AMB	--	FRP Double Wall	11 ft (D) x 10 ft (H)	Indoor	--	
32	A	Tank	New	Citric Acid Tote	2	275	550	gal	AMB					--	
33		Tank	New	Sodium Hypochlorite Tote	2	275	550	gal	AMB					--	
34	A	Pump	New	Phosphoric Acid Metering Pumps	4	0.02	0.1	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls	--	Indoor	1	
35	A	Pump	New	Sulfuric Acid Metering Pumps	5	1.625	8	gpm	AMB	Chemical Metering Pump	Stainless Steel	--	Outdoor	1	
36	A	Pump	New	Sodium Hydroxide Metering Pumps	5	0.1	1	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls	--	Indoor	5	
37	A	Pump	New	CIP Hypo Pumps	2	0.1	0.2	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls	--	Indoor	1	

Brown and Caldwell	Client	Micron Onondaga	Location	Syracuse, NY	Originator	Anukriti Shah	Revision	A	MAJOR EQUIPMENT LIST ALT 11
	Project	IWWTP & WRF	BC #	191915	Approved By	Tom Sandy	Issued Date	6/18/2025	DRAFT

		EQUIPMENT INFORMATION				PROCESS				MECHANICAL				ELECTRICAL & INSTRUMENTATION	
Item No.	REV	Equipment Category	Equipment Status	Equipment Name	Quantity	Capacity	Total Capacity	Units	Temperature	Type	Material of Construction	Physical Dimension	Equipment Installation	HP (Nameplate)	Notes
38	A	Pump	New	CIP Citric Acid Pumps	2	0.1	0.2	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls	--	Indoor	1	
39	A	Pump	New	CIP Caustic Pumps	2	0.10	0.2	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls		Indoor	1.0	
40	A	Tank	New	Biological Polymer Make Down System	3	0.08	0.2	gpm	AMB	--	--	--	Indoor	5	
43	A	Pump	New	IX Feed Pumps	6	1731	10,386	gpm	AMB	Centrifugal	Cast Iron	--	Indoor	100	
44	A	Separation	New	SAC Ion Exchange Vessels	12	8,657	103,884	gpm	AMB	Ion Exchange	Coated Carbon Steel	10 ft (D) x 12 ft (H)	Indoor	--	
45	A	Tank	New	HCl (35%) Storage Tank	1	92,160	92,160	gal	AMB	--	HDPE	25 ft (D) x 25ft (H)	Indoor	--	
46	A	Pump	New	HCl Feed Pumps (IX regeneration)	2	40	80	gpm	AMB	Chemical Metering Pump	Chemical Metering Pump	--	Indoor	3	
47	A	Tank	New	HCl Wet Scrubber	1	TBD	TBD	gal	AMB	--	TBD	--	Outdoor	--	
48	A	Pump	New	SAC Backwash Pumps	2	618	1,237	gpm	AMB	Centrifugal	Cast Iron	--	Indoor	50	
49	A	Separation	New	Decarbonator	6	1,600	9,600	gpm	AMB	--	FRP	17 ft (D) x 24 ft (H)	Outdoor	--	
50	A	Blower	New	Decarbonator blowers	6	86,000	516,000	scfm	AMB	Positive Displacement Blower	Cast Iron	--	Outdoor	600	
51	A	Pump	New	RO Feed Tank Feed Pumps	6	1,800	10,800	gpm	AMB	Centrifugal	Cast Iron	--	Outdoor	40	
52	A	Tank	New	RO Feed Tank	1	173,140	173,140	gal	AMB	--	Cast-In-Place Concrete	30 ft (D) x 33 ft (H)	Outdoor	--	
53	A	Mixer	New	RO Feed Tank Mixer	1	618	618	gpm	AMB	Mechanical Mixer	Stainless Steel	--	Outdoor	15	
54	A	Pump	New	RO Feed Pumps	7	1,500	10,500	gpm	AMB	Centrifugal	Cast Iron	--	Indoor	50	
55	A	Separation	New	RO Package	1	8,225	8,225	gpm	AMB	Various	Various	--	Indoor	--	
56	A	Separation	New	RO Cartridge Filters	5	8,225	41,125	gpm	TBD	TBD	TBD	TBD	Indoor	--	Design capacities and details are to be confirmed once vendor information has been provided
57	A	Pump	New	RO High Pressure Feed Pumps	5	TBD	TBD	gpm	TBD	TBD	TBD	TBD	Indoor	100	Design capacities and details are to be confirmed once vendor information has been provided
58	A	Pump	New	RO Booster Pumps	5	1,800	9,000	gpm	TBD	TBD	TBD	TBD	Indoor	575	Design capacities and details are to be confirmed once vendor information has been provided
59	A	Tank	New	RO Flush Water Tank	1	TBD	TBD	gal	TBD	TBD	TBD	TBD	Indoor	--	Design capacities and details are to be confirmed once vendor information has been provided
60	A	Pump	New	RO Flush Pumps	2	TBD	TBD	gpm	TBD	TBD	TBD	TBD	Indoor	150	Design capacities and details are to be confirmed once vendor information has been provided
61	A	Tank	New	RO CIP Tank	1	2,000	2,000	gal	TBD	TBD	TBD	TBD	Indoor	--	Design capacities and details are to be confirmed once vendor information has been provided
62	A	Pump	New	RO CIP Pumps	2	TBD	TBD	gpm	TBD	TBD	TBD	TBD	Indoor	120	Design capacities and details are to be confirmed once vendor information has been provided
63	A	Tank	New	RO Neutralization Tank	1	2,000	2,000	gal	TBD	TBD	TBD	TBD	Indoor	--	Design capacities and details are to be confirmed once vendor information has been provided
64	A	Pump	New	RO CIP Waste Pumps	3	TBD	TBD	gpm	TBD	TBD	TBD	TBD	Indoor	100	Design capacities and details are to be confirmed once vendor information has been provided
65	A	Tank	New	Sodium Bisulfite Tote	1	275	275	gal	AMB	--	--	--	Indoor	--	
66	A	Tank	New	RO Permeate Tank	1	259,710	259,710	gal	AMB	--	Coated carbon steel	30 ft (D) x 49 ft (H)	Outdoor	--	
67	A	Mixer	New	RO Permeate Tank Mixers	1	12,986	12,986	gpm	AMB	--	--	--	Outdoor	30	
68	A	Tank	New	Blend Tank	1	389,565	389,565	gal	AMB	--	Cast-In-Place Concrete	45 ft (D) x 33 ft (H)	Outdoor	--	
69	A	Mixer	New	Blend Tank Eductor System	1	240	240	gpm	AMB	--	--	--	Outdoor	--	
70	A	Pump	New	Blend Tank Eductor Pumps	2	240	480	gpm	AMB	Centrifugal	Cast Iron	--	Outdoor	5	
71	A	Heat Element	New	Boiler, Natural Gas	3	7267	21,801	lb/hr	Elevated	--	Various	17.2' x 4.5' x 7.9' (H)	Indoor	210	

Brown AND Caldwell	Client	Micron Onondaga	Location	Syracuse, NY	Originator	Anukriti Shah	Revision	A	MAJOR EQUIPMENT LIST ALT 11
	Project	IWWTP & WRF	BC #	191915	Approved By	Tom Sandy	Issued Date	6/18/2025	DRAFT

		EQUIPMENT INFORMATION				PROCESS				MECHANICAL				ELECTRICAL & INSTRUMENTATION	
Item No.	REV	Equipment Category	Equipment Status	Equipment Name	Quantity	Capacity	Total Capacity	Units	Temperature	Type	Material of Construction	Physical Dimension	Equipment Installation	HP (Nameplate)	Notes
72	A	Tank	New	Evaporator Feed Tank	1	523,200	523,200	gal	AMB	--	Stainless Steel	30 ft (D) x 99 ft (H)	Indoor	--	
73	A	Mixer	New	Evaporator Feed Tank Mixer	1	60	60	hp	AMB	Mechanical Mixer	Stainless Steel	--	Indoor	60	
74	A	Pump	New	Evaporator Feed Pumps	4	363	1,453	gpm	AMB	Centrifugal	Stainless Steel	--	Indoor	20	
75	A	Separation	New	Evaporator	2	1,090	2,180	gpm	Elevated	Various	Various	--	Indoor	7248	
76	A	Heater	New	Feed Preheater	2	1,090	2,180	gpm	Elevated	Heat Exchanger	Titanium Grade 1	4500 ft^2	Indoor	TBD	Plate and frame Heat Exchanger
77	A	Dearator	New	Deaerator	2	1,090	2,180	gpm	Elevated		Stainless steel	43 ft (D)	Indoor	TBD	
78	A	Compressor	New	Evaporator Vapor Compressor & Motor	2	44,000	88,000	cfm	AMB	Centrifugal Fan	Stainless steel			1450	
79	A	Pump	New	Evaporator Recirculation Pump & Motor	2	4,900	9,800	gpm	AMB	Centrifugal	Stainless steel			125	
80	A	Pump	New	Evaporator Distillate Pump & Motor	3	600	1,800	gpm	AMB	Centrifugal	Stainless steel			25	
81	A	Tank	New	Evaporator Distillate Tank	1	3,000	3,000	gal	AMB		Stainless steel			--	
82	A	Pump	New	Antifoam Pumps & Motors	3	0.1	0.3	gpm	AMB	Chemical Metering Pump	Stainless steel			0.25	
83	A	Pump	New	Slug Antifoam Pump & Motor	1	0.1	0.1	gpm	AMB	Chemical Metering Pump	Stainless steel			0.25	
84	A	Pump	New	Caustic Pumps & Motors	3	0.1	0.3	gpm	AMB	Chemical Metering Pump	Stainless steel			0.25	
85	A	Tank	New	Crystallizer Feed Tank	1	75,840	75,840	gal	AMB	--	Stainless Steel	15 ft (D) x 54 ft (H)	Indoor	--	
86	A	Mixer	New	Crystallizer Feed Tank Mixer	1	60	60	hp	AMB	Mechanical Mixer	Stainless Steel	--	Indoor	TBD	
87	A	Pump	New	Crystallizer Feed Pump & Motor	3	50	150	gpm	AMB	Centrifugal	Stainless steel			10	
88	A	Tank	New	Crystallizer	2	158	316	gpm	AMB	--	Stainless Steel	14.25 ft (D) x 50ft (H)	Indoor	--	
89	A	Heater	New	Crystallizer Heater	1	TBD	TBD	TBD	Elevated					TBD	
90	A	Compressor	New	Crystallizer Vapor Compressor	2	1,000	2,000	HP	AMB	Centrifugal fans	Stainless Steel			2000	
91	A	Pump	New	Crystallizer Recirculation Pump & Motor	1	41,000	41,000	gpm	AMB		Stainless Steel			600	
92	A	Tank	New	Antifoam Tote	1	275	275	gal	AMB	--	--	--	Indoor	--	
93	A	Tank	New	Condensate Storage Tank	2	15,000	30,000	gal	AMB	--	Stainless Steel	12 ft (L) x 12 ft (W) x 12 ft (H)	Indoor	--	
94	A	Pump	New	Condensate Storage Tank Pumps	3	500	1,500	gpm	AMB	Centrifugal	Stainless Steel	--	Indoor	25	
95	A	Pump	New	Condensate Storage Tank Effluent Pumps	2	1,000	2,000	gpm	AMB	Centrifugal	Stainless Steel	--	Indoor	25	
96	A	Pump	New	Centrifuge Feed Pumps	3	64	192	gpm	AMB	Centrifugal	Stainless Steel			20	
97	A	Separation	New	Salt Centrifuges (Solid Bowl)	2	68	136	gpm	AMB	TBD	TBD	TBD		200	125HP Bowl Motor, 75 HP Scroll Motor
98	A	Tank	New	Centrate Sump	1	30	30	gpm	AMB	Sump	Cast-In-Place Concrete		Outdoor	--	
99	A	Pump	New	Centrate Sump Pumps	3	30	90	gpm	AMB	Centrifugal	Cast Iron		Outdoor	15	
100	A	Tank	New	Antiscalant Tote	1	275	275	gal	AMB	--	--	--	Indoor	--	
101	A	Pump	New	Antiscalant Metering Pump	2	0.1	0.2	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls		Indoor	0.5	
102	A	Pump	New	Sulfuric Acid Metering Pumps	2	0.1	0.2	gpm	AMB	Chemical Metering Pump	PVC/PVDF dosing head, EPDM/Viton FKM O-rings, ceramic check balls		Indoor	0.5	
103	A	Tank	New	Odor Control Scrubbers	1	31,360	94,080	scfm	AMB			17ft (D)	Outdoor	--	
104	A	Blower	New	Scrubber Blowers	1	31,360	31,360	scfm	AMB					TBD	
105	A	Pump	New	Recirculation Scrubber Pumps	3	TBD	TBD	gpm	AMB					TBD	

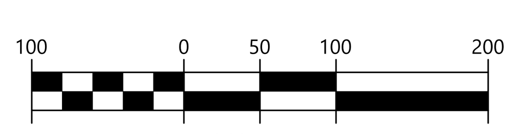


OAK ORCHARD TREATMENT FACILITY EXPANSION	
AREA CODE	AREAS
10	HEADWORKS
21	PRIMARY CLARIFIERS
28	ODOR CONTROL
30	FINE SCREENING
31	BIOREACTORS
33	BLOWER BUILDING
41	REUSE FACILITY (RO BUILDING), TEMPORARY UF
43	MEMBRANE BUILDING
45	RECYCLED WATER PUMP STATION
51	DIGESTER COMPLEX
53	GAS STORAGE AND GAS FLARE
54	THICKENING/DEWATERING
56	PS GRAVITY THICKENING
57	HSW AND MS RECEIVING AND BLENDING
58	SOLIDS HAULING, DRYER BUILDING
70	NATIONAL GRID CONNECTION, NATIONAL GRID SUBSTATION
80	EXISTING ADMIN BUILDING, ADMIN BUILDING
90	BRIDGING PROJECT MBBR TANKS - FUTURE RECYCLED WATER STORAGE, BRIDGING MBBR BLOWER BUILDING

WHITE PINES INDUSTRIAL WASTEWATER TREATMENT FACILITY

LEGEND

(blue)	EQUIPMENT FOR TREATING FAB - 1 WASTEWATER
(purple)	EQUIPMENT FOR TREATING FAB - 2 EXPANSION WASTEWATER
(red)	OAK ORCHARD TREATMENT FACILITY EXPANSION
(grey)	PAVED ROAD
(grey)	EXISTING STRUCTURE
(cross-hatch)	CONTRACTOR STAGING AREA
(grey line)	PRIVACY WALL ACOUSTIC BARRIER
(dash-dot line)	LIMIT OF WORK BY OTHERS
(solid line)	FAB - 1 STRUCTURE OR AREA
(dashed line)	FAB - 2 EXPANSION STRUCTURE OR AREA
A	INFLUENT SCREENING BUILDING
B	EQUALIZATION TANK
C	DIVERSION TANK
D	ANOXIC TANKS
E	AERATION TANKS
F	MEMBRANE FILTRATION BUILDING
G	BLOWER BUILDING
H	CHEMICAL BUILDING
I	EVAPORATION SYSTEM BUILDING
J	CONDENSATE / EFFLUENT STORAGE AREA
K	CRYSTALLIZER SYSTEM BUILDING
L	HIGH PH RO BUILDING
M	HIGH PH RO PERMEATE AND FEED TANKS
N	ION EXCHANGE BUILDING
O	DECARBONATION BUILDING
P	UV DISINFECTION BUILDING
Q	RECYCLED WATER PUMP STATION
R	DEWATERING BUILDING
S	MOTOR CONTROL BUILDING
T	ODOR CONTROL AREA



GENERAL ARRANGEMENT SITE PLAN

Scale: 1" = 20'

OTHER INFORMATION

ORIGINAL DRAWING SIZE: ARCH D (24" X 36")

The following is paraphrased from the New York Education Law, Article 145, Section 7209, and Chapter II, Section 79-1.4, and applies to this drawing: "It is a violation of this law for any person unless he is acting under the direction of a licensed professional engineer, licensed landscape architect or licensed land surveyor to alter an item in any way. If an item bearing the seal of an engineer, landscape architect or land surveyor is altered, the altering engineer, landscape architect or land surveyor shall affix to the item his seal and the notation "altered by" followed by his signature and the date of such alteration and a specific description of the alteration".

CLIENT / SUBCONSULTANT:

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a better environment
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Landscape Architecture, Engineering & Environmental Services, P.C.
396 Main Street, Suite 15
Hyannis, MA 02601
P. 508.972.3960

PROJECT TITLE: **WHITE PINES INDUSTRIAL WWTP**

PROJECT LOCATION: **OAK ORCHARD ROAD**

CLIENT: **ONONDAGA COUNTY**

DRAWING TITLE: **GENERAL ARRANGEMENT SITE PLAN**

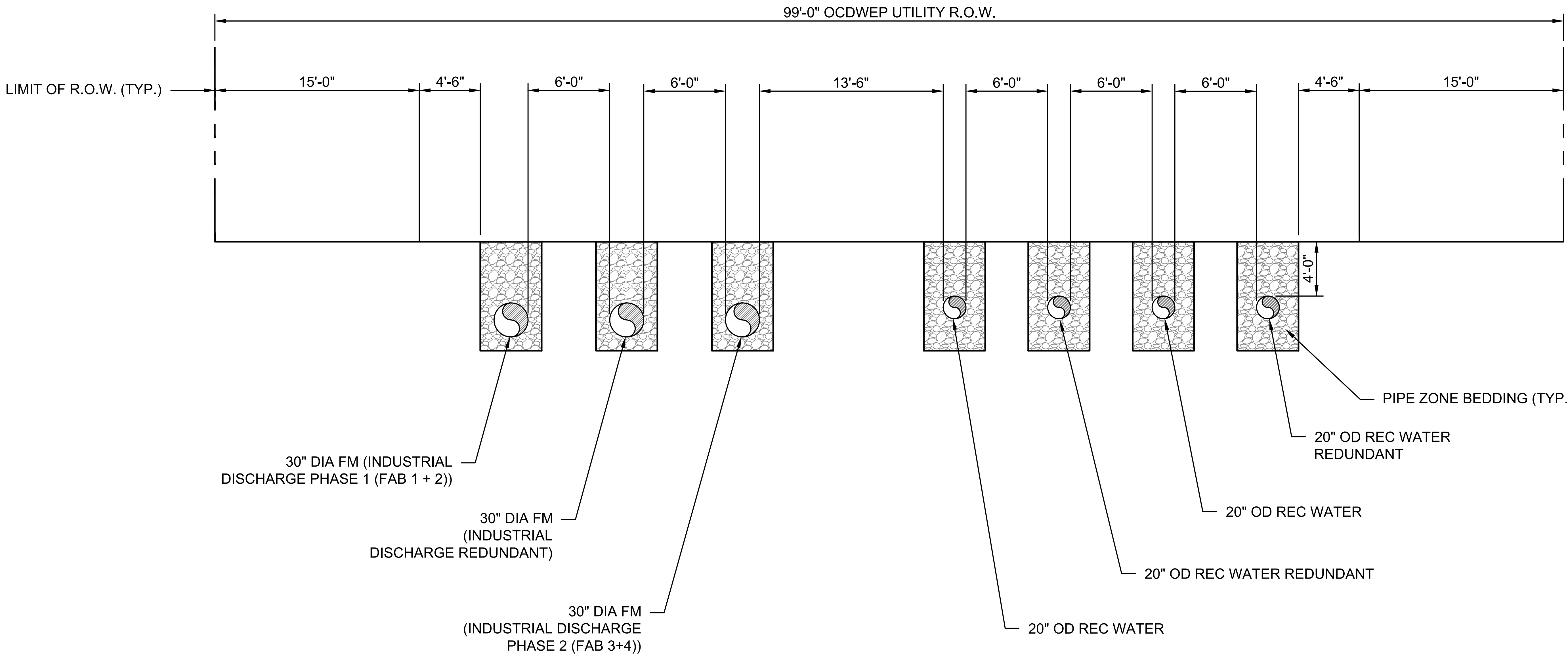
CONTRACT NO.:

DRAWINGS ISSUED FOR / REVISIONS

NO.	DATE	ISSUED FOR / REVISION	BY	CHK	APP
1					
2					
3					
4					
5					
6					

EDR JOB#: **24370**
DATE: **05/25**
SCALE: **AS NOTED**
DRAWN BY: **JDF**
CHECKED BY: **JDF**
DRAWING NUMBER:
C-101

Appendix K: Conveyance



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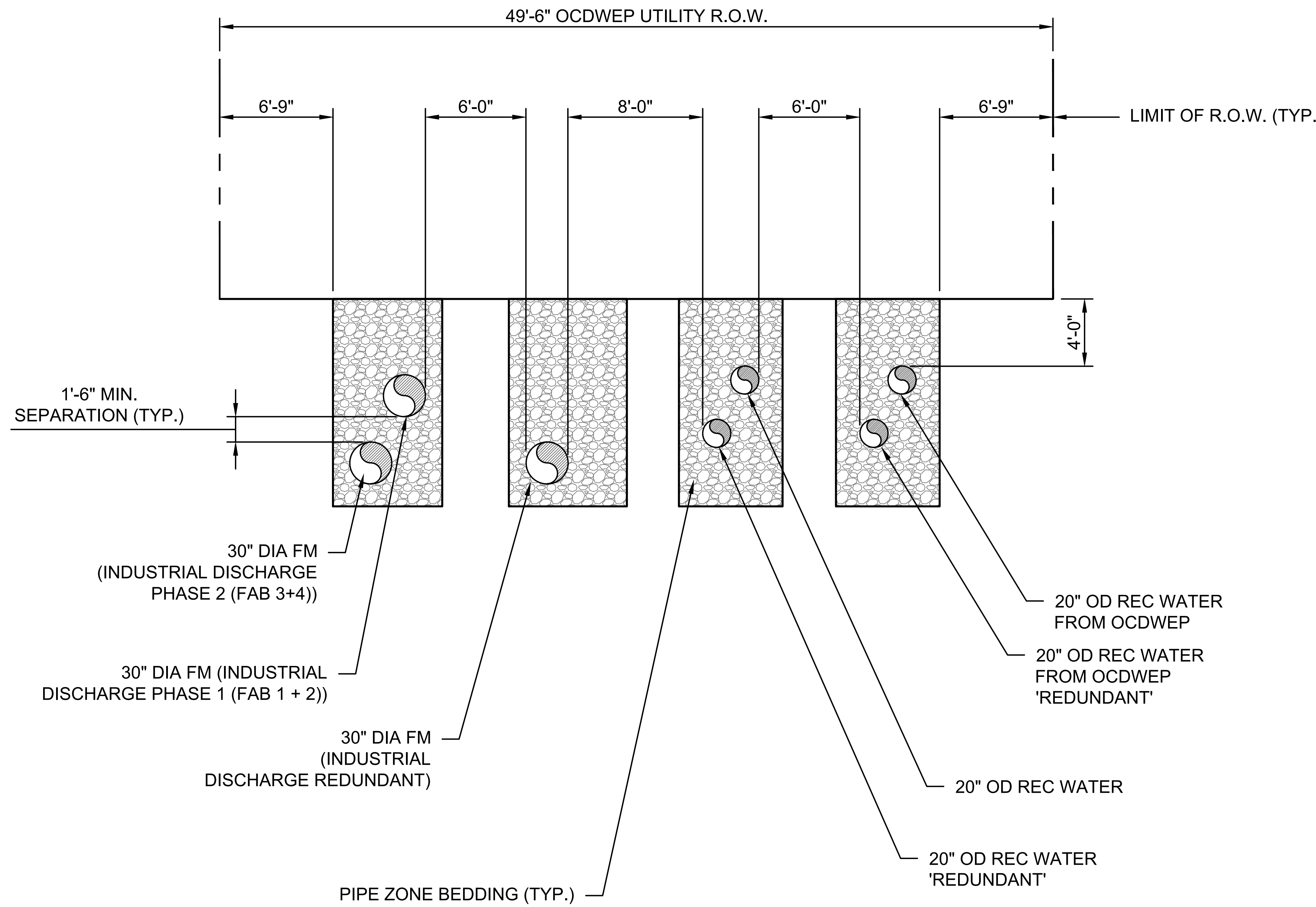
Landscape Architecture, Engineering & Environmental Services, D.P.C.
217 Montgomery Street, Suite 1100
Syracuse, New York 13202
P. 315.471.0688

PROJECT TITLE: **Industrial Conveyance Corridor**				EDR JOB#: **24370**
DRAWING TITLE: **99' OCDWEP UTILITY R.O.W.**				DRAWING NUMBER:
SCALE: **1/8" = 1'-0"**	DRAWN BY: **JJO**	CHECKED BY: **JDF**	DATE: **06/25**	**SECTION A**



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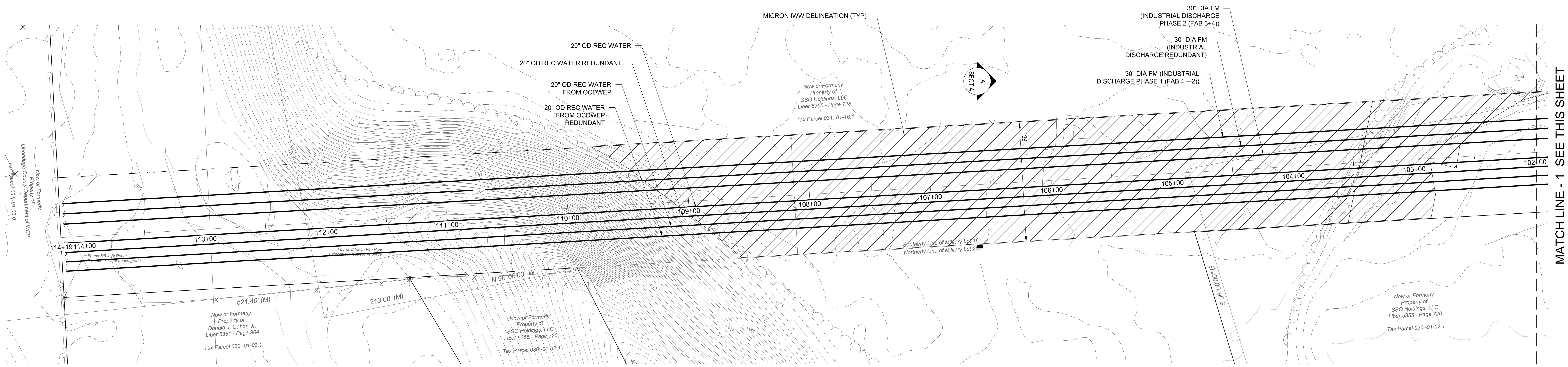
Landscape Architecture, Engineering & Environmental Services, D.P.C.
217 Montgomery Street, Suite 1100
Syracuse, New York 13202
P. 315.471.0688

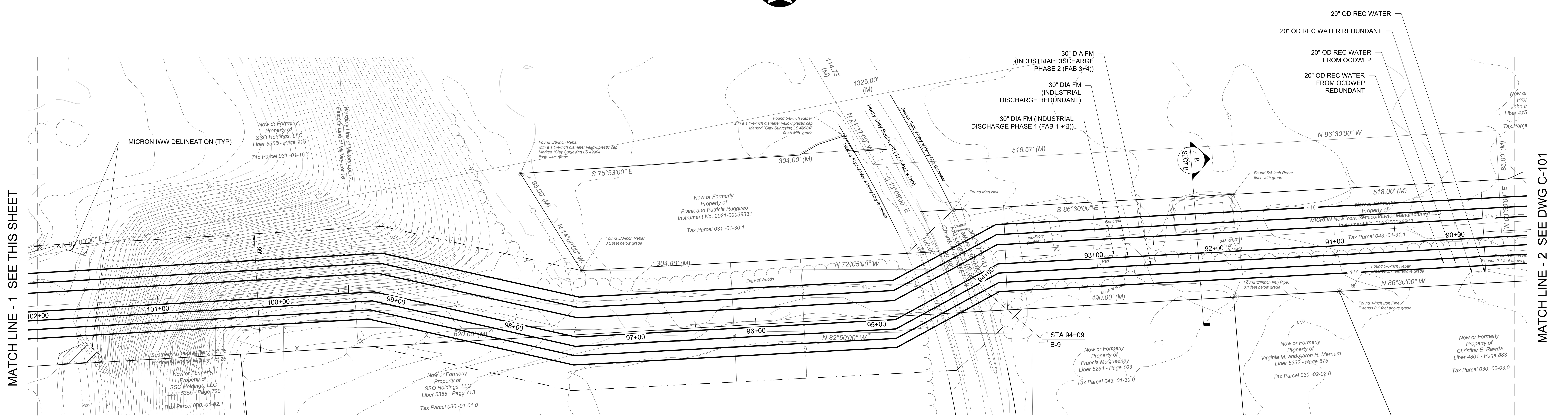
PROJECT TITLE: **Industrial Conveyance Corridor**			
DRAWING TITLE: **49.5' OCDWEP UTILITY R.O.W.**			
SCALE: **1/8" = 1'-0"**	DRAWN BY: **JJO**	CHECKED BY: **JDF**	DATE: **06/25**

EDR JOB#: **24370**

DRAWING NUMBER: **SECTION B**



PLAN 1
SCALE: 1" = 40'



PLAN 2
SCALE: 1" = 40'

40 20 0 20 40 80
GRAPHIC SCALE (IN FEET)

CLIENT / SUBCONSULTANT:

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396 Main Street, Suite 15
Hyannis, MA 02601
P. 508.972.3960

PROJECT TITLE: **Industrial Conveyance Corridor**

PROJECT LOCATION: **TOWN OF CLAY, ONONDAGA COUNTY, NY**

CLIENT: **ONONDAGA COUNTY Department of Water Protection Environment**

DRAWING TITLE: **Conveyance Plan**

CONTRACT NO.

DRAWINGS ISSUED FOR / REVISIONS

NO.	DATE	ISSUED FOR / REVISION	BY	CHK	APP
1					
2					
3					
4					
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6					

EDR JOB#: **24730**
DATE: **6/2025**
SCALE: **1" = 40'**
DRAWN BY: **JJO**
CHECKED BY: **JDF**
DRAWING NUMBER:
C-100

ORIGINAL DRAWING SIZE: ARCH D (24" X 36")

PLAN 3
SCALE: 1" = 40'

PLAN 4
SCALE: 1" = 40'

40 20 0 20 40 80
GRAPHIC SCALE (IN FEET)

CLIENT / SUBCONSULTANT:

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396 Main Street, Suite 15
Hyannis, MA 02601
P. 508.972.3960

PROJECT TITLE: **Industrial Conveyance Corridor**

PROJECT LOCATION: TOWN OF CLAY, ONONDAGA COUNTY, NY

CLIENT: Onondaga County Department of Water Protection Environment

DRAWING TITLE: Conveyance Plan

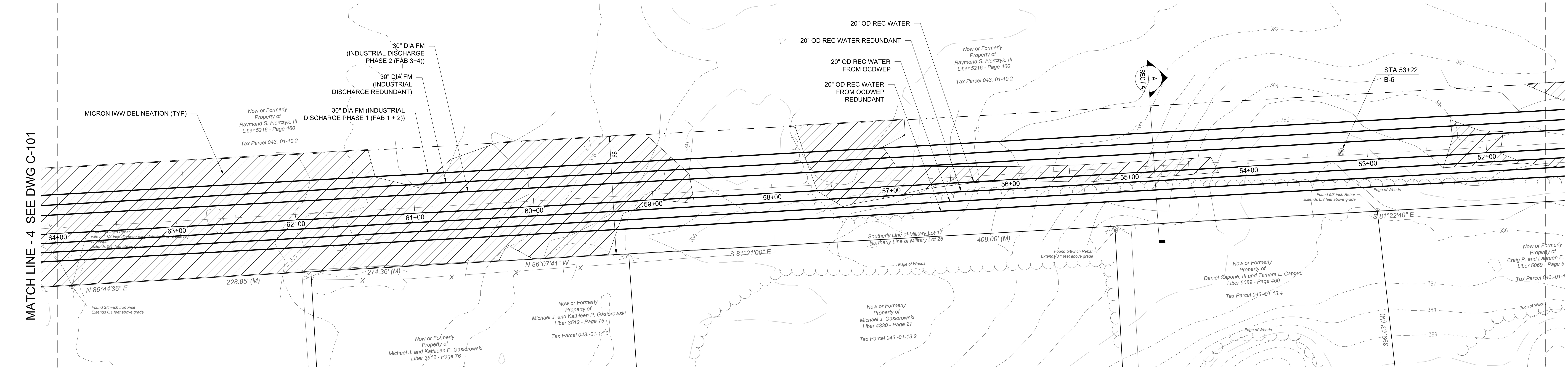
CONTRACT NO.:

DRAWINGS ISSUED FOR / REVISIONS

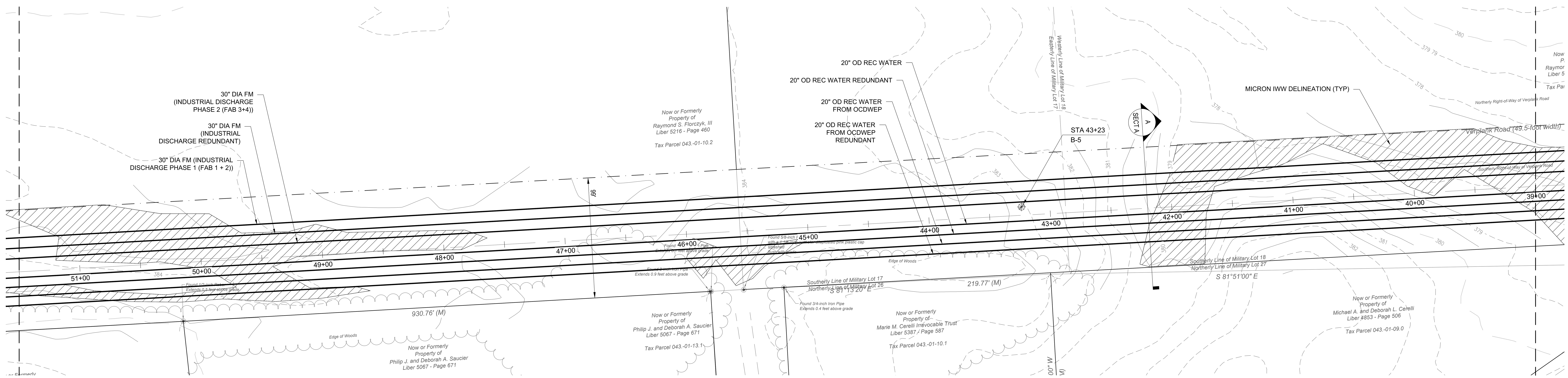
NO.	DATE	ISSUED FOR / REVISION	BY	CHK	APP
1					
2					
3					
4					
5					
6					

EDR JOB#: 24730
DATE: 6/2025
SCALE: 1" = 40'
DRAWN BY: JJO
CHECKED BY: JDF
DRAWING NUMBER:

C-101



PLAN 5
SCALE: 1" = 40'



PLAN 6
SCALE: 1" = 40'

40 20 0 20 40 80
GRAPHIC SCALE (IN FEET)

CLIENT / SUBCONSULTANT:

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Landscape Architecture, Engineering & Environmental Services, P.C.
396 Main Street, Suite 15
Hyannis, MA 02601
P. 508.972.3960

PROJECT TITLE: **Industrial Conveyance Corridor**

PROJECT LOCATION: TOWN OF CLAY, ONONDAGA COUNTY, NY

CLIENT: Onondaga County Department of Water Protection Environment

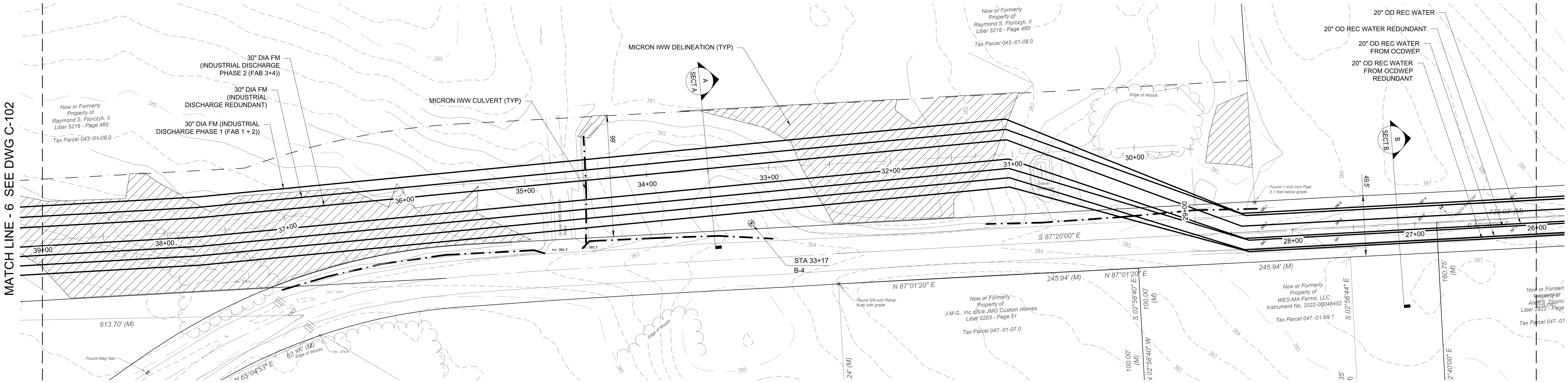
DRAWING TITLE: Conveyance Plan

CONTRACT NO.

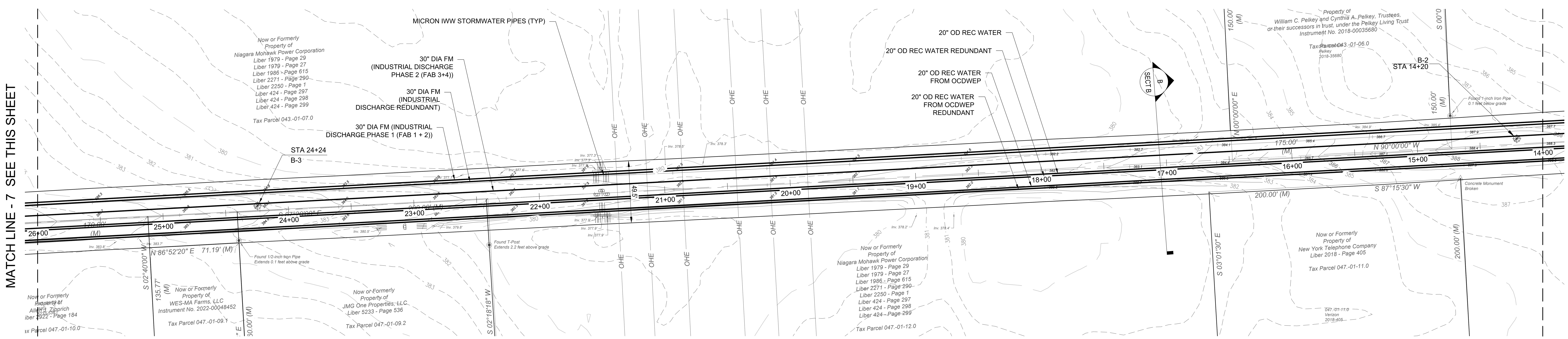
DRAWINGS ISSUED FOR / REVISIONS

NO.	DATE	ISSUED FOR / REVISION	BY	CHK	APP
1					
2					
3					
4					
5					
6					

EDR JOB#: 24730
DATE: 6/2025
SCALE: 1" = 40'
DRAWN BY: JJO
CHECKED BY: JDF
DRAWING NUMBER:
C-102



PLAN 7
SCALE: 1" = 40'



PLAN 8
SCALE: 1" = 40'

GRAPHIC SCALE (IN FEET): 40 20 0 20 40 80

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Landscape Architecture, Engineering & Environmental Services, P.C.
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Hyannis, MA 02601
P. 508.972.3960

PROJECT TITLE: **Industrial Conveyance Corridor**

PROJECT LOCATION: TOWN OF CLAY, ONONDAGA COUNTY, NY

CLIENT: Onondaga County Department of Water Protection Environment

DRAWING TITLE: Conveyance Plan

CONTRACT NO.:

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2					
3					
4					
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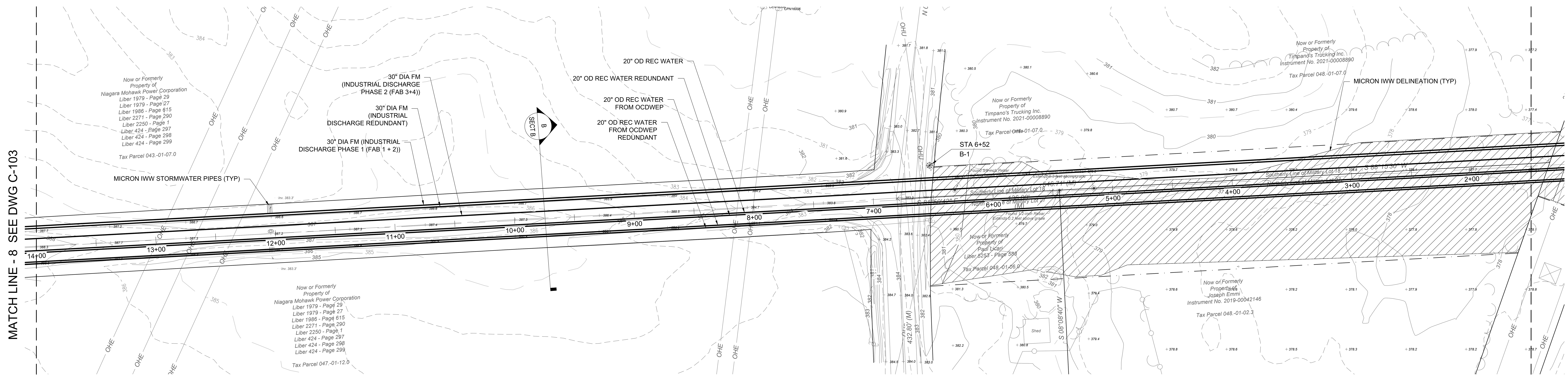
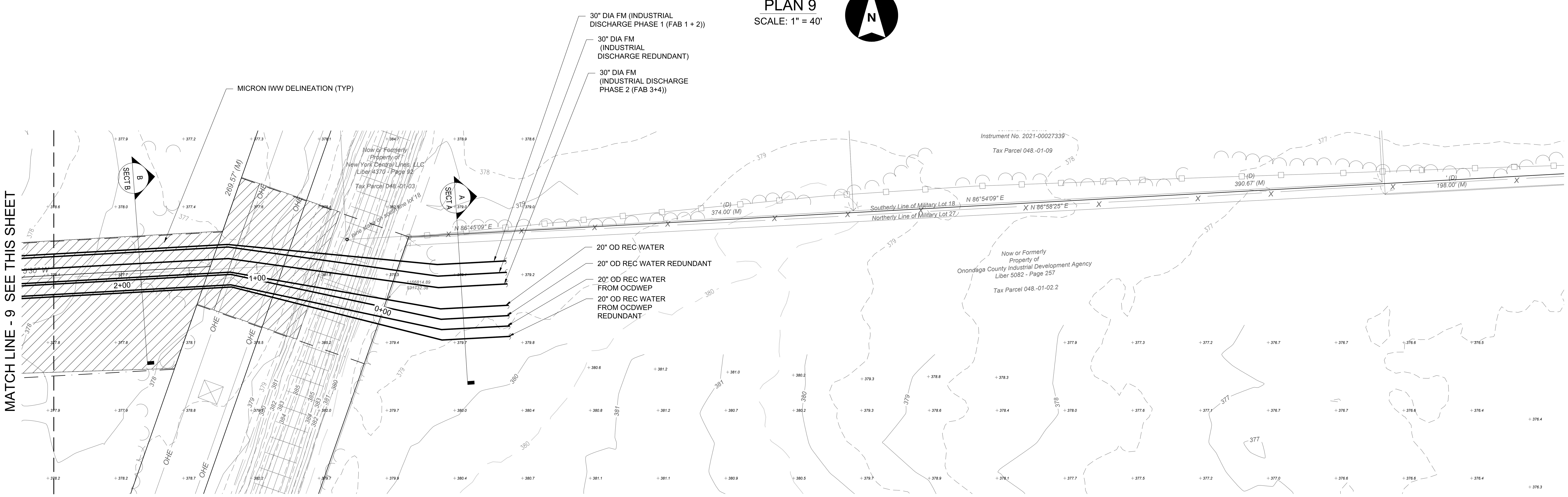
6					

EDR JOB#: 24730
DATE: 6/2025
SCALE: 1" = 40'
DRAWN BY: JJO
CHECKED BY: JDF
DRAWING NUMBER:

C-103



PLAN 9
SCALE: 1" = 40'



PLAN 10
SCALE: 1" = 40'

40 20 0 20 40 80
GRAPHIC SCALE (IN FEET)

CLIENT / SUBCONSULTANT:

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396 Main Street, Suite 15
Hyannis, MA 02601
P. 508.972.3960

PROJECT TITLE: **Industrial Conveyance Corridor**

PROJECT LOCATION: **TOWN OF CLAY, ONONDAGA COUNTY, NY**

CLIENT: **Onondaga County Department of Water Protection Environment**

DRAWING TITLE: **Conveyance Plan**

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3					
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6					

EDR JOB#: **24730**
DATE: **6/2025**
SCALE: **1" = 40'**
DRAWN BY: **JJO**
CHECKED BY: **JDF**
DRAWING NUMBER:
C-104

ORIGINAL DRAWING SIZE: ARCH D (24" X 36")