Oak Orchard Wastewater Treatment Plant Climate Leadership and Community Protection Act Analysis

Prepared for

Onondaga County Department of Water Environment Protection (OCDWEP)

Clay, New York

November 7, 2025

Brown AND Caldwell

5795 Widewaters Parkway, Suite 2A
Syracuse, NY 13214
T: 315-345-1440

Table of Contents

List of Tables

List of Abbreviations

ASF	Air State Facility
CH_4	methane
CJWG	Climate Justice Working Group
CLCPA	Climate Leadership and Community Protection Act
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DAC	disadvantaged community
DEC	Department of Environmental Conservation
ECL	Environmental Conservation Law
GHG	greenhouse gas
GWP	global warming potential
IPCC	Intergovernmental Panel on Climate Change
ITT	industrial treatment train
MBR	membrane bioreactor
MGD	million gallons per day
MTT	municipal treatment train
N_2O	nitrous oxide
OCDWEP	Onondaga County Department of Water Environment Protection
OOWWTP	Oak Orchard Wastewater Treatment Plant
PTE	potential to emit
RO	reverse osmosis
SPDES	State Pollutant Discharge Elimination System
TDS	total dissolved solids
UPA	Uniform Procedures Act
WRF	water reclamation facility

Section 1

Introduction

Chapter 106 of the Laws of 2019, the Climate Leadership and Community Protection Act (CLCPA) added Article 75 to New York's Environmental Conservation Law (ECL). Section 0107 of Article 75 established greenhouse gas (GHG) emissions limits for New York to be met in 2030 and 2050. Section 0109 of Article 75 also requires the Department of Environmental Conservation (DEC) to establish rules ensuring compliance with these emissions limits.

Section 7(2) of the CLCPA requires that, in considering and issuing permits, licenses, and other administrative approvals and decisions, state agencies must consider whether such decisions are inconsistent with, or will interfere with, the attainment of the ECL Article 75 statewide GHG emissions limits. Section 7(3) of the CLCPA requires these decisions also not "disproportionately burden" disadvantaged communities (DACs).

The DEC established 6 NYCRR Part 496 to define the ECL Article 75 statewide GHG emissions limits for 2030 and 2050. In addition, DAR-21 (The Climate Leadership and Community Protection Act and Air Permit Applications) and DEP 24-1 (Permitting and Disadvantaged Communities under the Climate Leadership and Community Protection Act) were established to provide the procedures under which the DEC would evaluate projects. The applicability of these policies to the proposed project is discussed in Section 1.2 below.

1.1 Project Description

The proposed project includes two components at the Oak Orchard Wastewater Treatment Plant (OOWWTP or Facility), located at 4300 Oak Orchard Rd, Clay, NY, owned and operated by the Onondaga County Department of Water Environment Protection (OCDWEP): 1) expansion and upgrade of the existing OOWWTP and 2) construction of a new industrial WWTP.

Under the first component of the Project, the OCDWEP proposes to upgrade and expand the OOWWTP's municipal wastewater treatment train (MTT) to provide the following:

- Accommodate projected service area growth
- Replace aging equipment, creating a more operator-friendly and energy-efficient facility
- Provide regional solids processing
- Generate recycled water for industrial users

Under the second component of the Project, OCDWEP is proposing to construct and operate an industrial wastewater treatment train (the ITT) to be co-located at the OOWWTP site to accept industrial process wastewater from a proposed Micron Technology, Inc. (Micron) facility, and potentially other future industrial users as appropriate. Micron is planning to construct a semiconductor manufacturing campus in the Town of Clay, New York, at the White Pine Commerce Park (5171 Route 31, Clay, NY).

The Micron campus will include a total of four fabrication facilities (FABs): FAB1, FAB2, FAB3, and FAB4, to be built in two phases over an approximate 15-year period (2026 – 2041). FAB1 and FAB2 are planned to be constructed in Phase 1, while FAB3 and FAB4 will be constructed in Phase 2. FABs 1 through 4 are expected to be fully constructed and operational by Q2 2028, Q4 2030, Q4 2035, and Q3 2041, respectively.

The following CLCPA Section 7(2) analysis has been prepared for both components of the project (the OOWWTP project site). The analysis is consistent with the DEC's guidance documents including DAR-21, DEP 24-1, and CP-49 (Climate Change and DEC Action).

1.1.1 Municipal WWTP

OCDWEP's wastewater infrastructure and capacity improvements will occur in two phases. Expansions and improvements at the OOWWTP will be coordinated with construction of the ITT and will be constructed between 2027 and 2033.

OCDWEP submitted an application for State Pollutant Discharge Elimination System (SPDES) permit modification in June 2025, wetland permit application and 401 Water Quality Certification in September 2025, and an Air Facility Registration in October 2025 in advance of OCDWEP's scheduled construction of the Phase 1 MTT work to commence in 2027.

Prior to commencing the design process, OCDWEP and its consultant (Carollo Engineers) executed a design selection process to select the treatment methods that would be employed by the MTT expansion. While the Facility currently hauls solids generated by the plant to the Metropolitan Syracuse WWTP (Metro) for off-site processing, the proposed MTT expansion will include the addition of an on-site biosolids processing facility so that biosolids would no longer need to be hauled to the Metro WWTP for processing. In addition, the new biosolids facility would provide capacity to process solids generated at the nearby Onondaga County owned Brewerton WWTP and to potentially accept high-strength waste from local grease traps or other similar liquid organic waste in the region. In addition to processing OOWWTP's own biosolids, the proposed biosolids facility will have the capacity to process a portion of solids from the Metro WWTP in the event that facility were to require temporary solids diversion.

1.1.2 Industrial WWTP

The proposed ITT will be co-located with the MTT at the OOWWTP site. The ITT will be designed to accommodate 8.25 million gallons per day (MGD) for each of the four FABs to be constructed on the Micron campus. Phase I will accommodate FABs 1 and 2 and be designed to treat 16.5 MGD.

Once FAB 2 is online at the Micron Campus (second quarter of 2030), additional treatment capacity will be needed. The increased flow requires additional treatment to remove total dissolved solids (TDS) to meet permit limits.

Additional treatment at the ITT will be provided in the form of a water reclamation facility (WRF). The WRF will use a strong acid cation ion exchange to remove calcium and magnesium and reduce scaling potential ahead of reverse osmosis (RO). RO will concentrate the TDS in an RO brine (waste stream) and RO permeate (clean water product) will be disinfected and returned to the Micron plant or will be blended with other water from the plant prior to eventually being discharged at the outfall to Oneida River.

The RO brine will be treated using an evaporator followed by a crystallizer to further concentrate the TDS, generating a salt slurry. The salt slurry will be further dewatered using centrifuges before being disposed of off-site. Condensate from the evaporation and crystallization processes will be collected and reused and/or discharged to the Oneida River.

1.2 CLCPA Applicability

As described above, the DEC created two policies which describe procedures for the DEC to ensure that, pursuant to CLCPA Sections 7(2) and 7(3), the issuance of permits for proposed projects are not inconsistent with and will not interfere with the attainment of statewide GHG emissions limits and will not disproportionately burden DACs. These policies are DAR-21 and DEP 24-1 and the following describes their applicability to the Project.

DAR-21. This policy applies to the following air permit actions:

- New Title V and Air State Facility (ASF) permits
- Modifications to Title V and ASF permits
- Renewals of Title V and ASF permits
- Air Facility Registrations where the NYSDEC determines an analysis is necessary
- Any application where NYSDEC feels an analysis is necessary

Since the Proposed Project is applying for an Air Facility Registration, the fourth bullet above indicates that a CLCPA would apply to this project if the NYSDEC determines an analysis is necessary. The DEC has determined that a CLCPA analysis of the Project should be completed.

DEP 24-1. The requirements of this policy apply to projects located in or likely to impact a DAC. The Climate Justice Working Group (CJWG) finalized the definition of DACs on March 27, 2023. Areas defined as DACs are reviewed and updated periodically and are available to view in graphical format online (https://climate.ny.gov/Resources/Disadvantaged-Communities-Criteria). Using the online interface, the Project area was identified as census tract 36067011300. This tract is not identified as a DAC and is located significantly more than one-half mile from the nearest DAC.

Based on the distance between the Project and any DACs, the proposed action is not a covered project under DEP 24-1 and is not likely to affect a disadvantaged community.

Section 2

Alternatives

This section describes treatment alternatives analyzed during the planning phase for the MTT and ITT and the rationale for alternatives selection.

2.1 MTT Alternatives

The OOWWTP is an existing wastewater treatment plant and growth in the service area is exhausting the remaining treatment capacity of the existing OOWWTP. Additional growth requires improvements to the facility. This project will upgrade and expand the existing OOWWTP to provide capacity for future flows as well as sanitary flows from the Micron facility and possible flows from future development anticipated in the vicinity of the OOWWTP. Alternatives to the plant expansion are described below.

All treatment alternatives will result in solids production. Since the predominant source of GHG emissions at the OOWWTP will be due to how solids are handled, the alternatives discussion will focus on solids treatment process alternatives. Regardless of where or how solids are digested or decomposed, they will result in GHG emissions. The OOWWTP currently hauls its solids to the Metro WWTP for processing. Solids undergo anaerobic digestion at the Metro plant, gas produced from digestion is combusted to produce electricity, and GHG emissions from solids handling and combustion of digester gas occur at the Metro plant.

2.1.1 No Project Alternative

Under the No-Project alternative, capacity of the existing OOWWTP would not be increased and the plant would continue to haul sludge produced at the facility to Metro. Sludge production and transportation is expected to continue to increase due to area growth; therefore, hauling related emissions would increase.

The existing OOWWTP does not have the capacity to treat the projected future flows from its service area. Accepting the projected future influent flows at the existing OOWWTP facility would result in the plant's treatment capacity being exceeded, which in turn would result in SPDES permit noncompliance and negative impacts to receiving water quality.

Given that the existing OOWWTP does not have the capacity to provide adequate treatment for the service area's future needs, and that Metro is operating near its capacity for sludge handling and cannot accept additional hauled sludge, a No Project Alternative is not feasible.

2.1.2 Expand OOWWTP Capacity Without Digestion Capabilities

The existing OOWWTP's annual average flows are 5.34 MGD . The MTT Project will expand the plant's capacity to 10.98 MGD on an annual average basis and 14.26 MGD on a maximum monthly basis (see Table 2-1 for a summary of flow capacity information). Construction of the currently proposed facility upgrades for liquids treatment is expected to be completed in 2031.

Table 2-1. OOWWTP Flows		
Year	Projected Annual Average Flow (MGD)	Projected Monthly Average Flow (MGD)
Current	5.34	10
2035	8.16	14.26
2045	10.00	14.26
2031 (Project Capacity)	10.98	14.26

The OOWWTP currently hauls an average of 9 truckloads of solids per day to Metro. By 2045, it is anticipated that the OOWWTP could generate up to 34 truckloads of solids per day that would need to be trucked to Metro. Metro is currently near capacity for solids processing and will not be able to accommodate the projected increased solids produced from an expanded MTT plant or be able to accept additional solids from other regional plants. Therefore, an expansion of solids handling capabilities at Metro is required.

Similar to the processes proposed at the MTT, Metro uses an anaerobic digestion process to produce Class B biosolids and captures digester gas produced for beneficial reuse by burning biogas to make electricity. Since the Metro WWTP uses the same digestion process proposed for the OOWWTP expansion and beneficially combusts gas produced by the process (as proposed for gas produced by the OOWWTP), GHG emissions from handling of solids produced by the OOWWTP will be the same regardless of the location of where such handling occurs. However, expanded solids handling at the OOWWTP will reduce future GHG emissions from solids hauling that would be emitted within the DAC where Metro is located by up to 3,285 short tons CO_2e per year (see Table B-8 in Appendix B). While not quantified, there will be emissions of other criteria and hazardous air pollutants (HAP) that will be released from fuel combustion in haul trucks that also will not be emitted with the same DAC.

In addition, solids from the OOWWTP would no longer be hauled to the Metro WWTP for processing, resulting in reduced truck trips through the DAC. By also accepting solids from nearby Brewerton WWTP, the same is true with respect to reduced hauling to Metro WWTP and reduced impact on DAC.

Since this option results in increased GHG emissions within a DAC (and does not prioritize the reduction of GHG emissions in the DAC near the Metro WWTP), it would not align with NYSDEC's DEP 24-1.

2.1.3 Expand OOWWTP Capacity and Manage Sludge On-Site (Aerobic Digestion)

Aerobic digestion is typically suitable for smaller wastewater treatment plants (i.e., less than 5 MGD) per the Water Environment Federation's Manual of Practice 8 (Design of Water Resource Recovery Facilities) and requires aeration to maintain oxygen required to support microbial activity required for digestion. At the scale proposed for the MTT expansion, the energy required to aerate the sludge would become economically infeasible. Additionally, the additional energy would likely result in combustion of fossil fuel resulting in GHG emissions.

Due to the capacity of the proposed MTT expansion (14.26 MGD max month), the energy demand and associated cost for aeration make aerobic digestion technically and economically infeasible for the scale of the MTT expansion. In addition, GHG emissions estimates are similar to GHG emissions from an anaerobic treatment alternative. (See Table B-6 in Appendix B for the GHG emissions estimate for this alternative.)

2.1.4 Expand OOWWTP Capacity and Manage Sludge On-Site (Anaerobic Digestion)

In contrast to aerobic digestion, anaerobic digestion does not require the use of blowers to provide aeration for treatment and therefore uses less energy. Anaerobic digestion results in the production of digester gas which predominantly consists of methane and carbon dioxide (two GHGs). However, the gas produced can be used by equipment at the facility to offset fossil fuel usage. In contrast, gas produced via aerobic digestion mainly consists of CO_2 which is released to the atmosphere.

The anaerobic digesters proposed at the MTT are anticipated to produce an annual average of 180 standard cubic feet per minute (scfm) of biogas. This is enough to provide approximately 65% of the fuel needs for the gas-fired boilers at the plant, reducing the use of natural gas and reducing ongoing operational costs for the OOWWTP. Maximum hourly digester gas production rates are expected to approach 305 scfm and may occasionally exceed the capacity of the boilers to use the gas produced. As a result, a flare will be provided to safely dispose of excess gas which cannot be beneficially used. Flaring will not be a regular or routine part of plant operation and is used as a safety device only. In addition, while flaring results in CO_2 emissions, it eliminates nearly 100% of any methane in the digester gas, which has a global warming potential (GWP) 84 times greater than that of CO_2. In addition to the flare, safety vents (pressure relief valves) will be provided on top of each digester to act as a fail-safe in the event pressure set-points within the digester are exceeded and the flare is offline for maintenance and not able to dispose of the excess gas. In addition, venting will take place when digesters are removed from service for grit removal or inspection which is anticipated to occur approximately every 5 to 10 years.

Metro currently uses anaerobic digestion to produce Class B biosolids which have historically been land applied to local farms. The MTT upgrade will make it possible for the OOWWTP to produce Class A biosolids, potentially allowing for a broader range of solids disposal or reuse options.

As stated previously, in addition to handling biosolids produced at the OOWWTP, the anaerobic digesters have been sized to accept solids produced at the nearby Brewerton WWTP.

Due to aerobic digestion's greater electrical demand, anaerobic digestion's beneficial use of digester gas and production of biosolids with more potential uses, as well as the anaerobic digestion plant being considered more energy-efficient and operator-friendly, the anaerobic digestion treatment alternative was selected as the preferred alternative.

The following benefits are associated with the proposed MTT expansion:

1. Provides expansion of the regional wastewater and biosolids management capacity, enabling both residential and industrial growth in the region.
2. While the solids managed by the MTT will result in increased GHG emissions at the OOWWTP, there will be a reduction in GHG emissions at Metro where the biosolids would otherwise be managed.
3. Eliminate routine hauling of biosolids from the OOWWTP and from the Brewerton WWTP to Metro, thereby reducing truck trips through a DAC and reducing GHG emissions associated with hauling.
4. The energy demand for anaerobic digestion is less than that for aerobic digestion.
5. The biogas generated will be used in onsite boilers, replacing approximately 65% of the natural gas that would otherwise be needed and resulting in a reduction in combustion of natural gas and the energy required to produce and transport the natural gas to the facility.

2.2 ITT Alternatives

The ITT portion of this project will provide treatment of industrial process wastewater to meet discharge limits.

2.2.1 No Project

The proposed ITT will provide treatment of process industrial wastewater proposed to be discharged from the Micron facility as well as other potential future industrial facilities. Since the ITT is necessary to provide adequate wastewater treatment to the proposed industrial facilities planned in the area, a No-Project alternative is not feasible.

2.2.2 Treatment Alternatives

The influent characteristics of the wastewater, combined with discharge limits in the receiving water, limited the treatment options and drove the selection of biological treatment and separation technologies. Regardless of the treatment and separation technology selected, GHG emissions will be generated during aeration of the wastewater and the magnitude of GHG emissions will be dependent on the properties (i.e., biological and chemical oxygen demand) of the influent wastewater. Therefore, each treatment technology will generate similar quantities of GHG emissions based on the organics and chemicals present in the wastewater and treatment selection is not discussed.

The treatment process selected for design is the result of an analysis of nine potential treatment strategies. Alternative treatment processes were considered infeasible for reasons such as inability to comply with assumed total dissolved solids (TDS) limits and lack of organics treatment capabilities.

The selected solids/liquid separation technology, membrane bioreactors (MBR), are more efficient and require less space than alternative technologies (e.g., conventional clarifiers). In addition, use of conventional clarifiers would require a separate micro/ultrafiltration membrane step prior to a tertiary RO treatment. Finally, MBRs will more easily facilitate plant upgrades that are expected to be necessary to meet future industrial wastewater flows and loads and associated regulatory requirements.

A falling film evaporator and a mechanical vapor recompression crystallizer were selected for treatment of the brine stream from the RO process for the following reasons:

- Small footprint. The site location is not able to accommodate the area that would be required for evaporation ponds.
- A brine concentrating evaporator followed by a crystallizer is more energy efficient than sending the RO brine directly to crystallizers.
- The brine concentrating evaporator and crystallizer are established technologies and have been demonstrated to be effective in other semiconductor applications at this scale.
- The evaporator and crystallizers are available through multiple suppliers.

Section 3

Emissions Estimates

The following describes the approach for the GHG emissions estimates for the proposed Project and included in this analysis. Tables summarizing GHG emissions from the Project are provided in Appendix A and calculation tables are provided in Appendix B.

Direct GHG Emissions. The direct GHG emissions from the proposed Project are associated with CO_2, CH_4, and N_2O emissions from combustion of natural gas and digester gas as well as emissions from wastewater processing. Emission factors from 40 CFR Part 98 were used to estimate emissions resulting from combustion for each individual GHG pollutant

GHG emissions from wastewater treatment were estimated following the Intergovernmental Panel on Climate Change (IPCC) methodology outlined in its 2019 Refinement of its 2006 Guidelines for National Greenhouse Gas Inventories (IPCC 2019). The following assumptions were used in the analysis:

- Estimates of influent characteristics (biochemical oxygen demand and total Kjeldahl nitrogen) and of methane production were based on process modeling for each scenario (aerobic and anaerobic wastewater treatment).
- Emission factors for secondary treatment processes were adopted from Tables 6.2, 6.3, and 6.8A in IPCC 2019.
- For anaerobic digestion, emission factors were adopted from Table 4.1 of IPCC 2006.
- Emissions estimates include an assumption that 5 percent of the digester gas produced would be vented as fugitive emissions (page 4.4 of IPCC 2006).

GHG emissions from the industrial wastewater treatment plant (ITT) were estimated following the Intergovernmental Panel on Climate Change (IPCC) methodology outlined in its 2019 Refinement of its 2006 Guidelines for National Greenhouse Gas Inventories (IPCC 2019). The following assumptions were used in the analysis:

- Activated sludge process modeling was used to evaluate the fraction of chemical oxygen demand converted to biomass and the fraction that was emitted as CO_2.
- Final emission values were calculated as an average of six months of summer conditions and six months of winter conditions.
- N_2O emissions from the secondary treatment processes were adopted from Table 6.8A of IPCC 2019 (for centralized aerobic treatment plants).

Calculated emissions were then converted to CO_2e values using GWPs over a 20-year timeframe (GWP20) provided in 6 NYCRR 496.5. (The CO_2e of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are 1, 84, and 264, respectively.)

Potential to emit (PTE) emissions estimates assumed that all equipment would run 8,760 hours per year (i.e., 24 hours per day, 365 days per year). Actual emissions were based on assumed actual operating times for each piece of equipment on an annual basis.

Upstream Out-of-State GHG Emissions. Upstream out-of-state emissions from combustion of fossil fuels were calculated using the emission factors provided in Appendix A of the 2024 New York State Statewide GHG Emissions Report, an annual publication developed by NYSDEC. In accordance with the requirements of DAR-21, emissions were considered on a PTE and actual emissions basis and have been provided in CO_2e.

Downstream and Indirect GHG Emissions. Downstream emissions are GHG emissions resulting from the transmission and use of products such as renewable natural gas (RNG) or fossil fuels. Since digester gas produced by the Project will be used onsite, emissions from digester gas combustion have been included as direct emissions from the Project and there are no downstream emissions associated with its use. Indirect emissions are emissions that result from the Project but which occur elsewhere or at sources owned or controlled by another entity. GHG emissions increases due to handling of biosolids at another treatment plant, removal of solar cells to accommodate the ITT portion of the Project, as well as the reduction in GHG emissions due to reduced hauling of biosolids for offsite processing are considered indirect GHG emissions for the Project.

As part of the Project's Air Facility Registration application (for the Anaerobic digestion alternative), preliminary dispersion modeling results predicted that concentrations of air toxics at the facility's property line would be below New York State's Annual Guideline Concentration and Short-Term Guideline Concentration thresholds (tables from the registration application are provided in Appendix D for reference). This indicates that the Project is not expected to adversely impact DACs located farther from the site.

GHG Emissions from Project. As shown in Table A-8 in Appendix A, this project will result in an increase in GHG emissions. However, this increase remains below the EPA's major source threshold for GHG emissions. Importantly, the incremental emissions should be considered in the context of the substantial social and economic benefits the project will deliver to the community. These benefits include job creation, economic growth, improved infrastructure, and enhanced public services. When weighed against the relatively modest increase in GHG emissions, the overall positive impact of the project on community well-being and regional development supports its advancement under the CLCPA.

Section 4

Mitigation

While the Project is not anticipated to interfere with, or be inconsistent with, the attainment of statewide GHG emission limits, the following sections discuss mitigation measures proposed by the Project.

4.1 MTT Mitigation Measures

The MTT facility has been designed to reduce and mitigate GHG emissions. The MTT will recover methane through anaerobic digestion which will be used to fuel the boilers required to heat the digesters, thereby reducing the use of natural gas.

The following design considerations associated with the MTT will reduce GHG emissions associated with the Project and mitigate current impacts to DAQ:

- By processing biosolids on-site at the OOWWTP, truck traffic through DACs near the Metro WWTP will be reduced. Under the proposed plan to handle solids at the MTT, not only will trucks from the OOWWTP no longer travel through the DAC near the Metro WWTP, but trucks hauling solids from the Brewerton WWTP will also no longer travel through the DAC near the Metro plant. (See figure in Appendix C)
- Rather than venting or flaring digester gas generated through biosolids processing, the Project will capture and utilize digester gas in on-site boilers. This not only reduces GHG emissions from flaring of the gas but also reduces the use of natural gas that would otherwise be used in the boilers. Table 4-1 provides a comparison of GHG emissions resulting from different methods of biogas handling and includes the GHG emissions reduction from reduced natural gas combustion in the boilers. The table summarizes the GHG emissions from direct venting, flaring, and on-site combustion from the entire quantity of biogas produced for comparative purposes.

Table 4-1. GHG Emissions Comparison of Digester Gas Management Options

Method of Digester Gas Management	Average Annual DG Production (scfm)	Heat Content DG (Btu/scf)	Heat Content DG (MMBtu/year)	CO_2 (ton/yr)	CH_4 (ton/yr)	N_2O (ton/yr)	CO_2e (ton/yr)
Direct Venting	180	600	56,765	N/A[a]	1,155	N/A	97,061
Flaring				3,258[a]	0.2	0.04	3,285
Used on-site in place of natural gas[b]				-678	-17	0.02	-2,081

a. *Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO_2 in digester gas as well as CO_2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.*

b. *Emissions reduction is based on the difference between emissions from digester gas combustion and natural gas combustion and includes direct as well as upstream out-of-state emissions from natural gas combustion.*

- The following MTT design considerations increase efficiency, resulting in fewer GHG emissions being generated:

   - Use of more efficient high speed turbo blowers to reduce energy consumption in the secondary treatment (liquid) process.
   - Advanced aeration controls to optimize the efficiency of aeration in the secondary treatment process.

4.2 ITT Mitigation Measures

The following adjustments made during preliminary design of the ITT portion of the Project reduce potential GHG emissions associated with the proposed Project by approximately 9,300 short tons CO_2e per year:

- The facility includes a secondary electrical feed which eliminated the necessity of a large (estimated 6,868 BHP) combustion-driven emergency engine. Eliminating this engine reduces the use of natural gas and reduces GHG emissions by up to 2,493 short tons of carbon dioxide equivalent (CO_2e) each year, including 1,409 of direct emissions and up to 1,084 of upstream, out-of-state emissions by (using 20-year global warming potential (GWP) values). If the engine were diesel-fired, the GHG emissions savings would be 2,604 short tons CO_2e per year including 1,981 direct and 623 upstream out-of-state emissions.
- The initial ITT scope specified two natural gas-fired boilers sized at 12 MMBtu/hr each. Design refinement has reduced this to two duty boilers sized at 5.5 MMBtu/hr each with a third 5.5 MMBtu/hr boiler acting as a standby boiler. Based on 8,760 hour-per-year operation, reducing the boiler requirements reduces GHG emissions by 6,813 short tons CO_2e per year including 3,851 short tons direct emissions and 2,962 short tons of upstream, out-of-state emissions. In addition, while PTE emissions estimates assume the third boiler would operate 8,760 hours per year, it is anticipated to only operate when one of the duty boilers is out of operation.
- The existing solar array at the site is owned by a third party and sits on land owned by Onondaga County and leased to the third-party owner. The panels are approximately 10 years into a 20-year life span and are rated for 2.5 MW production (assuming energy production were achieved 24 hours per day). Records indicate that the facility has historically generated approximately 2,500 MWh per year. Using eGrid values, this equates to indirect GHG emissions of approximately 300 tons CO_2e per year over the remaining life of the solar panels (estimated at 10 years). This estimate conservatively assumes that the generating capacity does not decline over the remaining life of the solar cells. However, the array is currently not operational and removal of the solar panels allows the ITT to be located closer to the Micron facility than alternative treatment locations evaluated. Locating the ITT closer to the Micron facility reduces energy required to pump Micron's waste process water to a treatment facility located further from the OOWWTP location. In addition, it allows Micron to potentially reclaim water recovered from the ITT treatment process in the future. Onondaga County is attempting to purchase the existing panels from the current owner and sell them to another party who would use the panels to generate energy at another location. Since OCDWEP and Onondaga County do not own the panels, they cannot commit to re-use of these panels at this time.
- The following design elements will increase plant efficiency, thereby reducing potential GHG emissions:
   - Specification of premium efficiency motors and variable frequency drives to reduce energy consumption.
   - Control technology to optimize processes:
      - Blower controls based on dissolved oxygen content (such that blowers are utilized as necessary rather than all of the time).

    - Membrane cleaning schedules based on operational data (rather than based on set schedules) so that membrane cleaning occurs when necessary.
  - Use of membranes reduces total suspended solids passing into the ultraviolet (UV) disinfection step which allows for increased UV transmissivity (the ease at which UV light can pass through the water). As UV transmissivity improves, more UV light would be able to reach the disinfection target. Monitoring / control of UV light cycling and intensity allows the UV sensor to reduce the lamps' output accordingly, thereby decreasing power consumption.

4.3 Additional Mitigation

OCDWEP proposes to provide a Mitigation Workplan within 24 months of the submission of this CLCPA analysis. The Mitigation Workplan would provide detailed and specific mitigation measures that may include the following:

- Installing electric vehicle (EV) chargers at OOWWTP or elsewhere in Onondaga County or other County facilities.
- Supporting, via contractual agreements with the County, turnkey solar panel projects managed by third parties at OOWWTP or elsewhere in Onondaga County.
- Installing smaller solar panel arrays or wind turbines within available "free" space at the OOWWTP once the final design of the ITT and MTT facilities are determined (and remaining space is better defined).
- Additional measures to be determined

Section 5

Conclusion

The working capacity of the OOWWTP and the sludge handling capabilities of Metro (where OOWWTP's solids are currently processed) are approaching maximum capacity. The MTT portion of the Project will upgrade and expand the OOWWTP to provide the vital infrastructure needed to maintain the health of the Oneida River receiving waters and treat wastewater associated with future growth in the area. The ITT portion of the Project will provide treatment for industrial wastewater from the proposed Micron semiconductor development adjacent to the OOWWTP, as well as other potential future industries as appropriate. The Micron Campus is anticipated to provide unprecedented economic opportunity for Onondaga County, the Upstate New York region, and New York State as a whole.

Handling biosolids on-site reduces truck traffic, including truck traffic through the DAC area around Metro. In addition, the Project will provide solids handling for the Brewerton WWTP, reducing the trucking distance for solids from the Brewerton WWTP, which are also currently hauled to Metro, further reducing emissions through the DAC near Metro.

In addition, GHG emissions associated with the project have been reduced where feasible, through design refinement. Where gas-fired equipment is necessary, GHGs will be reduced through use of digester gas produced by the MTT, selection of highly efficient combustion equipment, and OCDWEP's commitment to, and track record of, performing regular maintenance.

Due to the relatively small quantity of GHG emissions associated with the proposed Project DEC's issuance of the requested Air Facility Registration and SPDES permit will not be inconsistent with, and will not interfere with, New York's attainment of the ECL Article 75 statewide GHG emission limits.

Appendix A: Emissions Tables

- Facility-wide GHG Emissions Summary – PTE
- Facility-wide GHG Emissions Summary – Actual Emissions at ITT Startup
- Facility-wide GHG Emissions Summary – Actual Emissions in 2030
- Facility-wide GHG Emissions Summary – Actual Emissions in 2050 (No Digestion)
- Facility-wide GHG Emissions Summary – Actual Emissions in 2050 (Aerobic Digestion)
- Facility-wide GHG Emissions Summary – Actual Emissions in 2050 (Anaerobic Digestion)
- Facility-wide GHG Emissions Summary – Digestion Alternatives Comparison
- Facility-wide GHG Emissions Summary – Estimated Emissions Increases
- Facility Wide Criteria Pollutant Emissions Summary

Table A-1 Facility Wide GHG Emissions Summary - PTE Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)				
Emissions Category	Pollutant	All Digester Gas Flared Alternative - Potential Emissions (ton/yr)		
		ITT Wastewater Treatment	MTT Wastewater Treatment	Total Potential
Direct Emissions	CO_2	36,346	46,885	83,230
	CH_4	4E-01	84	85
	N_2O	43	10	54
	CO_2e, 20-Year GWP	47,789	56,728	104,518
Upstream, Out-of-State Emissions	CO_2	3,914	4,526	8,440
	CH_4	105	122	227
	N_2O	4E-02	5E-02	9E-02
	CO_2e, 20-Year GWP	12,755	10,464	23,219
Indirect Emissions	Truck Trips for Hauling Sludge	--	-12	-12
	Removal of Solar Panels	303	--	303
	Total Indirect CO2e, 20-Year GWP	303	-12	290
Total Emissions	CO2e, 20-Year GWP	60,847	67,180	128,027

NOTES:
1. All digester gas produced onsite is flared. Natural gas is used to fuel boilers. This provides worst-case emissions.
2. There are no downstream emissions.
3. Truck trips includes miles traveled for transporting sludge from OOWWTP and Brewerton WWTP to Metro WWTP (there are no truck trips for the ITT).
4. GHG emissions from removal of solar panels is to accommodate ITT, therefore there are no emissions associated with the MTT.
5. Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO_2 in digester gas as well as CO_2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.
6. Emission factors for Upstream Out-of-State emissions were taken from Table A1 of the Appendix of "2024 NYS Statewide GHG Emissions Report."

Table A-2 Facility Wide GHG Emissions Summary - Estimated Actual Emissions at ITT Startup Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)				
Emissions Category	Pollutant	Estimated Actual Emissions (ton/yr)		
		ITT Wastewater Treatment	MTT Wastewater Treatment	Total Actual Emissions
Direct Emissions	CO_2	13,416	705	14,121
	CH_4	9E-02	15	15
	N_2O	22	6	28
	CO_2e, 20-Year GWP	19,128	3,566	22,694
Upstream, Out-of-State Emissions	CO_2	1,117	167	1,284
	CH_4	30	4	34
	N_2O	1E-02	2E-03	1E-02
	CO_2e, 20-Year GWP	3,639	543	4,183
Indirect Emissions	Truck Trips for Hauling Sludge	--	128	128
	Removal of Solar Panels	303	--	303
	Solids Handling at Metro	--	1,267	1,267
	CO2e, 20-Year GWP	303	1,395	1,698
Total Emissions	CO2e, 20-Year GWP	23,071	5,505	28,575

NOTES:

1. Digesters will not be constructed until after 2030; therefore, there is no digester gas use or flaring at the MTT at the time of ITT startup.
2. Sludge continues to be hauled to the Metro plant for digestion. Emissions from the Metro plant are estimated based on a ratio of WWTR flows.
2. There are no downstream emissions.
3. Boilers at the ITT are not required until 2030.
4. Truck trips includes miles traveled for transporting sludge from OOWWTP and Brewerton WWTP to Metro WWTP (there are no truck trips for the ITT).
5. GHG emissions from removal of solar panels is to accommodate ITT, therefore there are no emissions for solar panel removal associated with the MTT.
6. Emission factors for Upstream Out-of-State emissions were taken from Table A1 of the Appendix of "2024 NYS Statewide GHG Emissions Report"

Table A-3 Facility Wide GHG Emissions Summary - Estimated Actual Emissions in 2030 Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)				
Emissions Category	Pollutant	Estimated Actual Emissions (ton/yr)		
		ITT Wastewater Treatment	MTT Wastewater Treatment	Total Actual Emissions
Direct Emissions	CO_2	23,937	705	24,642
	CH_4	1E-01	18	18
	N_2O	43	7	51
	CO_2e, 20-Year GWP	35,354	4,149	39,503
Upstream, Out-of-State Emissions	CO_2	1,549	167	1,715
	CH_4	42	4	46
	N_2O	2E-02	2E-03	2E-02
	CO_2e, 20-Year GWP	5,047	543	5,590
Indirect Emissions	Truck Trips for Hauling Sludge	--	304	304
	Removal of Solar Panels	303	--	303
	Solids Handling at Metro	--	2,304	2,304
	CO2e, 20-Year GWP	303	2,608	2,910
Total Emissions	CO2e, 20-Year GWP	40,704	7,300	48,004

NOTES:

1. MTT emissions are for the interim configuration (tertiary moving-bed biofilm reactor) to allow the facility to meet operating and performance criteria with higher projected influent flows and loads while plant upgrades are being constructed.
2. Construction of digesters will not have been completed, therefore sludge would continue to be hauled to Metro and there is no digester gas production at the MTT (and therefore no flaring). Emissions from the Metro plant are estimated based on a ratio of WWTR flows.
2. There are no downstream emissions.
3. Truck trips include miles traveled for transporting sludge from OOWWTP and Brewerton WWTP to Metro WWTP (there are no truck trips for the ITT).
4. GHG emissions from removal of solar panels is to accommodate ITT, therefore there are no emissions for solar panel removal associated with the MTT.
5. Emission factors for Upstream Out-of-State emissions were taken from Table A1 of the Appendix of "2024 NYS Statewide GHG Emissions Report"

Table A-4 Facility Wide GHG Emissions Summary - Estimated Actual Emissions in 2050 (No Digestion) Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)				
Emissions Category	Pollutant	Estimated Actual Emissions (ton/yr)		
		ITT Wastewater Treatment	MTT Wastewater Treatment	Total Actual Emissions
Direct Emissions	CO_2	30,868	1,131	31,999
	CH_4	3E-01	83	83
	N_2O	43	10	53
	CO_2e, 20-Year GWP	42,300	10,789	53,089
Upstream, Out-of-State Emissions	CO_2	3,188	267	3,455
	CH_4	86	7	93
	N_2O	4E-02	3E-03	4E-02
	CO_2e, 20-Year GWP	10,389	872	11,260
Indirect Emissions	Truck Trips for Hauling Sludge	--	387	387
	Removal of Solar Panels	-	--	-
	Solids Handling at Metro	--	3,285	3,285
	CO2e, 20-Year GWP	-	3,672	3,672
Total Emissions	CO2e, 20-Year GWP	52,689	15,332	68,021

NOTES:
1. There are no downstream emissions.
2. Indirect emissions from truck trips accounts for sludge handling continuing to being performed at the Metro WWTP.
3. Solar panels are assumed to have reached the end of their life.
4. Emission factors for Upstream Out-of-State emissions were taken from Table A1 of the Appendix of "2024 NYS Statewide GHG Emissions Report"

Table A-5 Facility Wide GHG Emissions Summary - Estimated Actual Emissions in 2050 (Aerobic Digestion) Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)				
Emissions Category	Pollutant	Estimated Actual Emissions (ton/yr)		
		ITT Wastewater Treatment	MTT Wastewater Treatment	Total Actual Emissions
Direct Emissions	CO_2	30,868	1,131	31,999
	CH_4	3E-01	83	83
	N_2O	43	10	53
	CO_2e, 20-Year GWP	42,300	10,789	53,089
Upstream, Out-of-State Emissions	CO_2	3,188	267	3,455
	CH_4	86	7	93
	N_2O	4E-02	3E-03	4E-02
	CO_2e, 20-Year GWP	10,389	872	11,260
Indirect Emissions	Truck Trips for Hauling Sludge	--	-12	-12
	Removal of Solar Panels	-	--	-
	CO2e, 20-Year GWP	-	-12	-12
Total Emissions	CO2e, 20-Year GWP	52,689	11,648	64,337

NOTES:
1. There are no downstream emissions.
2. Indirect emissions from truck trips accounts for sludge handling being performed onsite and reduced hauling distance for solids from Brewerton WWTP (there are no truck trips for the ITT).
3. Solar panels are assumed to have reached the end of their life.
4. Emission factors for Upstream Out-of-State emissions were taken from Table A1 of the Appendix of "2024 NYS Statewide GHG Emissions Report"

Table A-6 Facility Wide GHG Emissions Summary - Estimated Actual Emissions in 2050 (Anaerobic Digestion) Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)				
Emissions Category	Pollutant	Estimated Actual Emissions (ton/yr)		
		ITT Wastewater Treatment	MTT Wastewater Treatment	Total Actual Emissions
Direct Emissions	CO_2	30,868	4,412	35,280
	CH_4	3E-01	83	83
	N_2O	43	10	53
	CO_2e, 20-Year GWP	42,300	14,097	56,397
Upstream, Out-of-State Emissions	CO_2	3,188	273	3,461
	CH_4	86	7	93
	N_2O	4E-02	3E-03	4E-02
	CO_2e, 20-Year GWP	10,389	889	11,278
Indirect Emissions	Truck Trips for Hauling Sludge	--	-12	-12
	Removal of Solar Panels	-	--	-
	CO2e, 20-Year GWP	-	-12	-12
Total Emissions	CO2e, 20-Year GWP	52,689	14,973	67,662

NOTES:
1. Assumes all digester gas produced onsite is beneficially used or flared.
2. There are no downstream emissions.
3. There are no upstream, out-of-state emissions associated with digester gas (including flaring of digester gas).
4. Indirect emissions from truck trips accounts for sludge handling being performed onsite and reduced hauling distance for solids from Brewerton WWTP (there are no truck trips for the ITT).
5. Solar panels are assumed to have reached the end of their life.
6. Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO_2 in digester gas as well as CO_2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.
7. Emission factors for Upstream Out-of-State emissions were taken from Table A1 of the Appendix of "2024 NYS Statewide GHG Emissions Report"

Table A-7 Facility Wide GHG Emissions Summary - Digestion Alternatives Comparison Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)				
Emissions Category	Pollutant	Estimated Actual Emissions(ton/yr)		
		Digestion at Metro	Aerobic Digestion	Anaerobic Digestion
Direct Emissions	CO_2	31,999	31,999	35,280
	CH_4	83	83	83
	N_2O	53	53	53
	CO_2e, 20-Year GWP	53,089	53,089	56,397
Upstream, Out-of-State Emissions	CO_2	3,455	3,455	3,461
	CH_4	93	93	93
	N_2O	4E-02	4E-02	4E-02
	CO_2e, 20-Year GWP	11,260	11,260	11,278
Indirect Emissions	Truck Trips for Hauling Sludge	387	-12	-12
	Removal of Solar Panels	-	-	-
	Solids Handling at Metro	3,285	--	--
	CO2e, 20-Year GWP	3,672	-12	-12
Total Emissions	CO2e, 20-Year GWP	68,021	64,337	67,662

NOTES:

1. There are no downstream emissions.
2. There are no upstream, out-of-state emissions associated with digester gas (including flaring of digester gas).
3. Indirect emissions from truck trips accounts for sludge handling being performed onsite and reduced hauling distance for solids from Brewerton WWTP (there are no truck trips for the ITT).
4. Solar panels are assumed to have reached the end of their life in 2035.
5. Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO_2 in digester gas as well as CO_2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.
6. Solids handling will occur at the OOWWTP under the Aerobic and Anaerobic Digestion alternatives.
7. Emission factors for Upstream Out-of-State emissions were taken from Table A1 of the Appendix of "2024 NYS Statewide GHG Emissions Report"

Table A-8 Facility Wide GHG Emissions Summary - Estimated Emissions Increases Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)											
Emissions Category	Pollutant	Estimated Actual Emissions (ton/yr)									
		ITT Wastewater Treatment			MTT Wastewater Treatment with Anaerobic Digestion			Total			Total Actual Emissions Increase
		Current	2030	2050	Current	2030	2050	Current	2030	2050	
Direct Emissions	CO_2	-	23,937	30,868	705	705	4,412	705	24,642	35,280	34,575
	CH_4	-	1E-01	3E-01	15	18	83	15	18	83	68
	N_2O	-	43	43	6	7	10	6	51	53	47
	CO_2e, 20-Year GWP	-	35,354	42,300	3,566	4,149	14,097	3,566	39,503	56,397	52,831
Upstream, Out-of-State Emissions	CO_2	-	1,549	3,188	167	167	273	167	1,715	3,461	3,294
	CH_4	-	42	86	4	4	7	4	46	93	88
	N_2O	-	2E-02	4E-02	2E-03	2E-03	3E-03	2E-03	2E-02	4E-02	4E-02
	CO_2e, 20-Year GWP	-	5,047	10,389	543	543	889	543	5,590	11,278	10,735
Indirect Emissions	Truck Trips for Hauling Sludge	--	--	--	128	304	-12	128	304	-12	-317
	Removal of Solar Panels	-	303	-	--	--	--	-	303	-	303
	Solids Handling at Metro	--	--	--	1,267	2,304	-	1,267	2,304	-	-2,304
	CO2e, 20-Year GWP	-	303	-	1,395	2,608	-12	1,395	2,910	-12	-2,317
Total Emissions	CO2e, 20-Year GWP	-	40,704	52,689	5,505	7,300	14,973	5,505	48,004	67,662	61,248

NOTES:
1. There are no downstream emissions.
2. There are no upstream, out-of-state emissions associated with digester gas (including flaring of digester gas).
3. Indirect emissions from truck trips accounts for sludge handling being performed onsite and reduced hauling distance for solids from Brewerton WWTP (there are no truck trips for the ITT).
4. Solar panels are assumed to have reached the end of their life in 2035.
5. Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO_2 in digester gas as well as CO_2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.
6. No change in upstream MTT emissions from current to 2030 because increase in natural gas use is expected to be insignificant.
7. Indirect emissions increase from current to 2030 for the MTT are due to increased wastewater generation (and increased solids handling required).
8. The total actual emissions increase at the MTT in 2050 is largely due to the assumption that CO_2 emissions from digester gas combustion are not biogenic.
9. Emission factors for Upstream out-of-state emissions were taken from Table A1 of the Appendix of "2024 NYS Statewide GHG Emissions Report"

Table A-9 Facility Wide Criteria Pollutant Emissions Summary Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)				
Pollutant	Criteria Emissions (ton/yr)	Permitting and Modeling Thresholds		
	Project Total Potential to Emit	State Facility Permit Threshold (tpy)	Major Source Threshold (tpy)	Significant Project Threshold (tpy)
NO_x	25	50	100	40
CO	27	50	100	100
PM_{10} / $PM_{2.5}$	3	50	100	25
SO_2[3]	3	50	100	40
VOC	4	25	50	-
HAPs[4]	2	10/25	10/25	-

Appendix B: Calculation Tables

- GHG Emissions from Combustion Equipment - PTE
- GHG Emissions from Combustion Equipment When DG is Beneficially Used
- Facility-Wide GHG Emissions - Actual Emissions at ITT Startup
- Facility-Wide GHG Emissions - Actual Emissions in 2030
- Facility-Wide GHG Emissions - Actual Emissions in 2050 (OOWWTP with No Digestion)
- Facility-Wide GHG Emissions - Actual Emissions in 2050 (Aerobic Treatment)
- Facility-Wide GHG Emissions - Actual Emissions in 2050 (Anaerobic Treatment
- Expected GHG Emissions at Metro WWTP if Project Not Built
- GHG Emissions from Removal of Solar Panels to Accommodate the ITT
- GHG Emissions Reduction from Reduced Truck Trips
- GHG Emissions Comparison - Digester Gas Management Options
- GHG Emissions Reduction from Elimination of Emergency Engine

Table B-1
GHG Emissions from Combustion Equipment - PTE
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Plant	ITT				MTT											Total (Both Plants)
Equipment	**Duty Boiler**	**Duty Boiler**	**Back up Boiler**	**HVAC Equipment**	**Duty Boiler #1**		**Duty Boiler #2**		**Back up Boiler**		**Flare**		**Sludge Dryer**		**HVAC Equipment**	
Max Heat Input	5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	20.5 MMBtu/hr	5 MMBtu/hr		5 MMBtu/hr		5 MMBtu/hr		305 scfm		10. MMBtu/hr		12.28 MMBtu/hr	
Fuel	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	
Potential Emissions (ton/yr) – Direct GHG Emissions – **PTE Hours**	8,760	8,760	8,760	8,760	8,760		8,760		8,760		8,760		8,760		8,760	
Max Potential Fuel Consumption (MMBtu/yr)	48,180	48,180	48,180	179,580	43,800		43,800		43,800		625	96,185	87,600		107,590	
CO_2	2,818	2,818	2,818	10,503	2,562	2,514	2,562	2,514	2,562	2,514	37	5,521	5,124	5,028	6,293	
CH_4	5E-02	5E-02	5E-02	2E-01	5E-02	2E-01	5E-02	2E-01	5E-02	2E-01	7E-04	3E-01	1E-01	3E-01	1E-01	
N_2O	5E-03	5E-03	5E-03	2E-02	5E-03	3E-02	5E-03	3E-02	5E-03	3E-02	7E-05	6E-02	1E-02	6E-02	1E-02	
CO_2e 20-yr GWP	2,824	2,824	2,824	10,525	2,567	2,535	2,567	2,535	2,567	2,535	37	5,566	5,134	5,069	6,306	
Total Direct CO_2e 20-yr GWP	18,997				24,744											43,741
Upstream Out of State GHG Emissions – **CO_2**	666	666	666	2,484	606	-	606	-	606	-	9	-	1,212	-	1,488	
CH_4	18	18	18	67	16	-	16	-	16	-	2E-01	-	33	-	40	
N_2O	7E-03	7E-03	7E-03	3E-02	7E-03	-	7E-03	-	7E-03	-	1E-04	-	1E-02	-	2E-02	
CO_2e 20-yr GWP	2,172	2,172	2,172	8,095	1,974	-	1,974	-	1,974	-	28	-	3,949	-	4,850	
Total Upstream Out of State CO_2e 20-yr GWP	14,611				14,750											29,361
Project Total CO_2e 20-yr GWP	33,607				39,494											73,102

NOTES:
1. Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO_2 in digester gas as well as CO_2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.
2. Flare emissions assume the estimated maximum hourly digester gas production rate occurs the entire year.
3. Global Warming Potential 20 (GWP 20) values from 6 NYCRR Part 496.5
4. USEPA's "Emission Factors for Greenhouse Gas Inventories," January 15, 2025

Table B-2
GHG Emissions from Combustion Equipment When DG is Beneficially Used
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Plant		ITT				MTT											Total (Both Plants)
Equipment		Duty Boiler	Duty Boiler	Back up Boiler	HVAC Equipment	Duty Boiler #1		Duty Boiler #2		Back up Boiler		Flare		Sludge Dryer		HVAC Equipment	
Max Heat Input		5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	20.5 MMBtu/hr	5 MMBtu/hr		5 MMBtu/hr		5 MMBtu/hr		305 scfm		10 MMBtu/hr		12.28 MMBtu/hr	
Fuel		Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	
Potential Emissions (ton/yr) — Direct GHG Emissions	PTE Hours	8,760	8,760	8,760	8,760	8,760		8,760		8,760		8,760		8,760		8,760	
	Max Potential Fuel Consumption (MMBtu/yr)	48,180	48,180	48,180	179,580	0	43,800	10,652	33,148	43,800	-	625	19,237	87,600	-	107,590	
	CO_2	2,818	2,818	2,818	10,503	-	2,514	623	1,903	2,562	-	37	1,104	5,124	-	6,293	
	CH_4	5E-02	5E-02	5E-02	2E-01	-	2E-01	1E-02	1E-01	5E-02	-	7E-04	7E-02	1E-01	-	1E-01	
	N_2O	5E-03	5E-03	5E-03	2E-02	-	3E-02	1E-03	2E-02	5E-03	-	7E-05	1E-02	1E-02	-	1E-02	
	CO_2e 20-yr GWP	2,824	2,824	2,824	10,525	-	2,535	624	1,918	2,567	-	37	1,113	5,134	-	6,306	
	Total Direct CO_2e 20-yr GWP	18,997				20,234											39,231
Potential Emissions (ton/yr) — Upstream Out of State GHG Emissions	CO_2	666	666	666	2,484	-	-	147	-	606	-	9	-	1,212	-	1,488	
	CH_4	18	18	18	67	-	-	4	-	16	-	2E-01	-	33	-	40	
	N_2O	7E-03	7E-03	7E-03	3E-02	-	-	2E-03	-	7E-03	-	1E-04	-	1E-02	-	2E-02	
	CO_2e 20-yr GWP	2,172	2,172	2,172	8,095	-	-	480	-	1,974	-	28	-	3,949	-	4,850	
	Total Upstream Out of State CO_2e 20-yr GWP	14,611				11,282											25,892
Project Total CO_2e 20-yr GWP		33,607				31,516											65,123

NOTES:

1. Flare emissions assume the estimated maximum hourly digester gas production rate occurs the entire year. Assumes 80% of digester gas produced is beneficially used.
2. Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO_2 in digester gas as well as CO_2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.
3. Global Warming Potential 20 (GWP 20) values from 6 NYCRR Part 496.5
4. USEPA's "Emission Factors for Greenhouse Gas Inventories," January 15, 2025

Table B-3 Facility-Wide Direct GHG Emissions - Estimated Actual Emissions at ITT Startup Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)										
Plant			**ITT**					**MTT**		**Total (Both Plants)**
Equipment			**ITT Process Emissions**	**Duty Boiler**	**Duty Boiler**	**Back up Boiler**	**HVAC Equipment**	**MTT Process**	**Existing Natural Gas Combustion**	
Max Heat Input			N/A	5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	15.8 MMBtu/hr	N/A		
Fuel			N/A	Natural Gas	Natural Gas	Natural Gas	Natural Gas	N/A	Natural Gas	
Actual Emissions (ton/yr)	**Direct GHG Emissions**	**Expected Actual Hours**	8,760	-	-	-	5,110	8,760	8,760	
		Actual Expected Fuel Consumption (MMBtu/yr)	N/A	-	-	-	80,738	N/A	12,054	
		CO_2	8,694	-	-	-	4,722	N/A	705	
		CH_4	0E+00	-	-	-	9E-02	15	1E-02	
		N_2O	22	-	-	-	9E-03	6	1E-03	
		Direct CO_2e 20-yr GWP	14,396	-	-	-	4,732	2,860	706	
		Total Direct CO_2e 20-yr GWP	19,128					3,566		22,694
	Upstream Out of State GHG Emissions	**CO_2**	N/A	-	-	-	1,117	N/A	167	
		CH_4	N/A	-	-	-	30	N/A	4	
		N_2O	N/A	-	-	-	1E-02	N/A	2E-03	
		CO_2e 20-yr GWP	N/A	-	-	-	3,639	N/A	543	
		Total Upstream Out of State CO_2e 20-yr GWP	3,639					543		4,183
	Project Total CO_2e 20-yr GWP		22,768					4,109		26,877

NOTES:

1. ITT is Industrial Treatment Train, MTT is Municipal Treatment Train. There is no direct fuel consumption associated with treatment (fuel consumption is accounted for under the boilers).
2. ITT Startup is in 2028 and will only be treating industrial wastewater from Fab 1. Since no tertiary treatment is included at this stage, there are no boilers required.
3. MTT emissions are based on current plant operations with emissions from natural gas combustion based on current billing data.
4. The heat input values listed for HVAC represent the maximum capacity requirements of the HVAC system; however, this level of energy will rarely be required.
5. N/A = Not Applicable

Table B-4

Facility-Wide Direct GHG Emissions - Estimated Actual Emissions in 2030

Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Plant		ITT					MTT			Total (Both Plants)
Equipment		ITT Process Emissions	Duty Boiler	Duty Boiler	Back up Boiler	HVAC Equipment	MTT Process	Gas Combustion		
Max Heat Input		N/A	5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	20.5 MMBtu/hr	N/A			
Fuel		N/A	Natural Gas	Natural Gas	Natural Gas	Natural Gas	N/A	Natural Gas	Digester Gas	
Actual Emissions (ton/yr) – Direct GHG Emissions	Expected Actual Hours	8,760	2,880	2,880	500	5,110	8,760	8,760	-	
	Actual Expected Fuel Consumption (MMBtu/yr)	N/A	2,400	2,400	2,400	104,755	N/A	12,054	-	
	CO_2	17,388	140	140	140	6,127	N/A	705	-	
	CH_4	0E+00	3E-03	3E-03	3E-03	1E-01	2E+01	1E-02	-	
	N_2O	43	3E-04	3E-04	3E-04	1E-02	7	1E-03	-	
	Direct CO_2e 20-yr GWP	28,793	141	141	141	6,140	3,443	706	-	
	Total Direct CO_2e 20-yr GWP	35,354					4,149			39,503
Actual Emissions (ton/yr) – Upstream Out of State GHG Emissions	CO_2	N/A	33	33	33	1,449	N/A	167	0E+00	
	CH_4	N/A	1	1	1	39	N/A	4	0E+00	
	N_2O	N/A	4E-04	4E-04	4E-04	0.02	N/A	2E-03	0E+00	
	CO_2e 20-yr GWP	N/A	108	108	108	4,722	N/A	543	0E+00	
	Total Upstream Out of State CO_2e 20-yr GWP	5,047					543			5,590
Actual Emissions (ton/yr)	Project Total CO_2e 20-yr GWP	40,401					4,692			45,093

NOTES:

1. ITT is Industrial Treatment Train, MTT is Municipal Treatment Train. There is no direct fuel consumption associated with treatment (fuel consumption is accounted for under the boilers).
2. Digesters at the MTT will not be online by 2030, therefore there is no digester gas produced (and no flaring of digester gas). GHG emissions estimate is for existing plant plus any changes implemented through maintenance and operations tasks (CO_2 emissions from wastewater treatment are biogenicand are excluded). Emissions from natural gas combustion are based on historic billing data.
3. Current projections show that Fab 1 and Fab 2 will be in operation in 2030 and tertiary treatment will be included at the ITT (therefore the need for boilers will commence).
4. ITT boilers will need to operate at their design capacity during cold startup of the crystallizers (one 24-hour event per month for each of two crystallizers). Once the crystallizers have gone through the startup process, the continuous steam demand is reduced to approximately 10% of boiler capacity. Due to the large swings in boiler load, emissions are based on anticipated fuel consumption rather than on operating hours.
5. The heat input values listed represent the maximum capacity required of the HVAC system; however, only rarely will this level of energy be required.
6. GHG emissions from the flares assumes that 20% of annual average production rate of digester gas produced is flared.
7. N/A = Not Applicable

Table B-5

Facility-Wide Direct GHG Emissions - Estimated Actual Emissions in 2050 (OOWWTP Expansion with no Digestion)
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

		Plant	ITT						MTT		Total (Both Plants)
		Equipment	ITT Process Emissions	Duty Boiler	Duty Boiler	Duty Boiler	Back up Boiler	HVAC Equipment	MTT Process	Natural Gas Combustion	
		Max Heat Input	N/A	5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	41 MMBtu/hr	N/A		
		Fuel	N/A	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	N/A	Natural Gas	
Actual Emissions (ton/yr)	Direct GHG Emissions	Expected Actual Hours	8,760	2,880	2,880	2,880	500	5,182	8,760	3,868	
		Actual Expected Fuel Consumption (MMBtu/yr)	N/A	4,500	4,500	4,500	4,500	212,462	N/A	19,338	
		CO_2	17,388	263	263	263	263	12,427	-	1,131	
		CH_4	0E+00	5E-03	5E-03	5E-03	5E-03	2E-01	8E+01	2E-02	
		N_2O	43	5E-04	5E-04	5E-04	5E-04	2E-02	10	2E-03	
		Direct CO_2e 20-yr GWP	28,793	264	264	264	264	12,452	9,655	1,133	
		Total Direct CO_2e 20-yr GWP	42,300						10,789		53,089
	Upstream Out of State GHG Emissions	CO_2	N/A	62	62	62	62	2,939	N/A	267	
		CH_4	N/A	2	2	2	2	79	N/A	7	
		N_2O	N/A	7E-04	7E-04	7E-04	7E-04	3E-02	N/A	3E-03	
		CO_2e 20-yr GWP	N/A	203	203	203	203	9,577	N/A	872	
		Total Upstream Out of State CO_2e 20-yr GWP	10,389						872		11,260
	Indirect Emissions (CO2e20-yr GWP)								3,672		
	Project Total CO_2e 20-yr GWP		52,689						15,332		68,021

NOTES:

1. ITT is Industrial Treatment Train, MTT is Municipal Treatment Train. There is no direct fuel consumption associated with treatment (fuel consumption is accounted for under the boilers).
2. Current projections show that all four Fabs will be online in 2050 and that three duty boilers will be required. The conceptual HVAC design was not completed for the scenario with all four fabs online; therefore, it was assumed that the ITT HVAC demand for all four fabs is double that of Fabs 1 and 2.
3. The boilers will need to operate at their design capacity during cold startup of the crystallizers (one 24-hour event per month for each of four crystallizers). Once the crystallizers have gone through the startup process, the continuous steam demand is reduced to approximately 10% of boiler capacity. Due to the large swings in boiler load, emissions are based on anticipated fuel consumption rather than on operating hours.
4. The heat input values listed represent the maximum capacity required of the HVAC system; however, only rarely will this level of energy be required.
5. Indirect emissions account for combustion of digester gas at the Metro WWTP resulting from anaerobic digestion of solids that would otherwise be handled at the OOWWTP (solids from OOWWTP as well as the Brewerton WWTP). In addition, it includes indirect emissions due to hauling solids from Brewerton WWTP and OOWWTP to the Metro WWTP.
6. N/A = Not Applicable

Table B-6 Facility-Wide Direct GHG Emissions - Estimated Actual Emissions in 2050 (Aerobic Treatment) Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)										
Plant		**ITT**						**MTT**		**Total (Both Plants)**
Equipment		**ITT Process Emissions**	**Duty Boiler**	**Duty Boiler**	**Duty Boiler**	**Back up Boiler**	**HVAC Equipment**	**MTT Process**	**Natural Gas Combustion**	
Max Heat Input		N/A	5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	41 MMBtu/hr	N/A		
Fuel		N/A	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	N/A	Natural Gas	
Actual Emissions (ton/yr) – Direct GHG Emissions	**Expected Actual Hours**	8,760	2,880	2,880	2,880	500	5,182	8,760	3,868	
	Actual Expected Fuel Consumption (MMBtu/yr)	N/A	4,500	4,500	4,500	4,500	212,462	N/A	19,338	
	CO_2	17,388	263	263	263	263	12,427	-	1,131	
	CH_4	0E+00	5E-03	5E-03	5E-03	5E-03	2E-01	8E+01	2E-02	
	N_2O	43	5E-04	5E-04	5E-04	5E-04	2E-02	10	2E-03	
	Direct CO_2e 20-yr GWP	28,793	264	264	264	264	12,452	9,655	1,133	
	Total Direct CO_2e 20-yr GWP	42,300						10,789		53,089
Actual Emissions (ton/yr) – Upstream Out of State GHG Emissions	**CO_2**	N/A	62	62	62	62	2,939	N/A	267	
	CH_4	N/A	2	2	2	2	79	N/A	7	
	N_2O	N/A	7E-04	7E-04	7E-04	7E-04	3E-02	N/A	3E-03	
	CO_2e 20-yr GWP	N/A	203	203	203	203	9,577	N/A	872	
	Total Upstream Out of State CO_2e 20-yr GWP	10,389						872		11,260
Project Total CO_2e 20-yr GWP		52,689						11,661		64,349

NOTES:

1. ITT is Industrial Treatment Train, MTT is Municipal Treatment Train. There is no direct fuel consumption associated with treatment (fuel consumption is accounted for under the boilers).
2. Current projections show that all four Fabs will be online in 2050 and that three duty boilers will be required. The conceptual HVAC design was not completed for the scenario with all four fabs online; therefore, it was assumed that the ITT HVAC demand for all four fabs is double that of Fabs 1 and 2.
3. The boilers will need to operate at their design capacity during cold startup of the crystallizers (one 24-hour event per month for each of four crystallizers). Once the crystallizers have gone through the startup process, the continuous steam demand is reduced to approximately 10% of boiler capacity. Due to the large swings in boiler load, emissions are based on anticipated fuel consumption rather than on operating hours.
4. The heat input values listed represent the maximum capacity required of the HVAC system; however, only rarely will this level of energy be required.
5. Since there are no digesters under the aerobic digestion option, no digester gas is produced, and a flare is not required.

Table B-7
Facility-Wide Direct GHG Emissions - Estimated Actual Emissions in 2050 (Anaerobic Treatment)
Preferred Alternative
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Plant		ITT						MTT										Total (Both Plants)
Equipment		ITT Process Emissions	Duty Boiler	Duty Boiler	Duty Boiler	Back up Boiler	HVAC Equipment	MTT Process	Duty Boiler #1		Duty Boiler #2		Back up Boiler		Flare		HVAC Equipment	
Max Heat Input		N/A	5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	5.5 MMBtu/hr	41 MMBtu/hr	N/A	5 MMBtu/hr		5 MMBtu/hr		5 MMBtu/hr		180 scfm		12.282 MMBtu/hr	
Fuel		N/A	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	N/A	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	Digester Gas	Natural Gas	
Actual Emissions (ton/yr) – Direct GHG Emissions	Expected Actual Hours	8,760	2,880	2,880	2,880	500	5,182	8,760	-	6,000	2,918	3,082	726	-	8,760	1,752	72	
	Actual Expected Fuel Consumption (MMBtu/yr)	N/A	4,500	4,500	4,500	4,500	212,462	N/A	-	30,000	14,588	15,412	3,629	-	625	11,353	884	
	CO_2	17,388	263	263	263	263	12,427	-	-	1,722	853	885	212	-	37	652	52	
	CH_4	0E+00	5E-03	5E-03	5E-03	5E-03	2E-01	83	-	1E-01	2E-02	5E-02	4E-03	-	7E-04	4E-02	1E-03	
	N_2O	43	5E-04	5E-04	5E-04	5E-04	2E-02	10	-	2E-02	2E-03	1E-02	4E-04	-	7E-05	8E-03	1E-04	
	Direct CO_2e 20-yr GWP	28,793	264	264	264	264	12,452	9,655	-	1,736	855	892	213	-	37	657	52	
	Total Direct CO_2e 20-yr GWP	42,300						14,097										56,397
Actual Emissions (ton/yr) – Upstream Out of State GHG Emissions	CO_2	N/A	62	62	62	62	2,939	N/A	-	-	202	-	50	-	9	-	12	
	CH_4	N/A	2	2	2	2	79	N/A	-	-	5	-	1	-	2E-01	-	3E-01	
	N_2O	N/A	7E-04	7E-04	7E-04	7E-04	0.03	N/A	-	-	2E-03	-	6E-04	-	1E-04	-	1E-04	
	CO_2e 20-yr GWP	N/A	203	203	203	203	9,577	N/A	-	-	658	-	164	-	28	-	40	
	Total Upstream Out of State CO_2e 20-yr GWP	10,389						889										11,278
Project Total CO_2e 20-yr GWP		52,689						14,986										67,675

NOTES:

1. ITT is Industrial Treatment Train, MTT is Municipal Treatment Train. There is no direct fuel consumption associated with treatment (fuel consumption is accounted for under the boilers).
2. Current projections show that all four Fabs will be online in 2050 and that three duty boilers will be required. The conceptual HVAC design was not completed for the scenario with all four fabs online; therefore, it was assumed that the ITT HVAC demand for all four fabs is double that of Fabs 1 and 2.
3. The boilers will need to operate at their design capacity during cold startup of the crystallizers (one 24-hour event per month for each of four crystallizers). Once the crystallizers have gone through the startup process, the continuous steam demand is reduced to approximately 10% of boiler capacity. Due to the large swings in boiler load, emissions are based on anticipated fuel consumption rather than on operating hours.
4. The heat input values for HVAC equipment represent the maximum capacity required of the HVAC system. This level of energy will only rarely be required, but emissions estimates are conservatively based on this value.
5. GHG emissions from the flares uses the annual average production rate of digester gas and assume that 20% of gas produced is flared.
6. Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO_2 in digester gas as well as CO_2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.

Table B-8 Expected GHG Emissions at Metro WWTP if Project Not Built							
	Average Annual DG Production (scfm)	Heat Content DG (Btu/scf)	MMBtu/year	CO_2 (ton/yr)[1]	CH_4 (ton/yr)	N_2O (ton/yr)	CO_2e (ton/yr)
Digester Gas Combustion	180	600	56,765	3,258	2E-01	4E-02	3,285

NOTES:

1. This table estimates GHG emissions from combustion of digester gas expected to be generated via anaerobic digestion at Metro without the Project digestion at the OOWWTP.
2. Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO_2 in digester gas as well as CO_2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.

hour =	60	min
year =	8,760	hr
ton =	2,000	lb
kg =	2.20462	lb
kg =	1,000	g

GHG Emission Factors, Stationary Combustion[a]			
Pollutant	Units	Digester Gas Combustion	Natural Gas Combustion
CO_2	kg/mmbtu	52.07	53.06
CH_4	g/mmbtu	3.2	1.0
N_2O	g/mmbtu	0.60	0.10

a. USEPA's "Emission Factors for Greenhouse Gas Inventories," January 15, 2025

Table B-9 GHG Emissions from Removal of Solar Panels to Accommodate the ITT					
Case	MWh/year	CO_2 (ton/yr)	CH_4 (ton/yr)	N_2O (ton/yr)	CO_2e (ton/yr)
Estimated Actual Emissions	2,500	301	0.01	1.25E-03	303

GHG emission factors from electricity consumption for NYUP eGRID region:[1]

CO_2:	241	lb/MWh
CH_4:	0.011	lb/MWh
N_2O:	0.001	lb/MWh

Historic energy generation reported online (2,500 MWh per year)[2]

NOTES:

1. Table 6 of EPA's "Emission Factors for Greenhouse Gas Inventories" dated 1/15/2025 (total output)
2. Energy generation from solar panels: https://www.gridinfo.com/plant/onondaga-county-oak-orchard-wwtp/60098

Table B-10 GHG Emissions Reduction from Reduced Truck Trips									
Route[1]	Average # Trucks Required	Current Distance Traveled (mi/day)	Proposed Distance Traveled (mi/day)	Trip Reduction (mi/day)	Trip Reduction (mi/year)	CO_2 (ton/year)	CH_4 (ton/year)	N_2O (ton/year)	CO_2e (ton/year)
OOWWTP to Metro (Current)	9	230.4	0	230	84,096	93	3E-03	9E-04	93
OOWWTP to Metro (2030)	26	665.6	0	666	242,944	268	9E-03	3E-03	269
OOWWTP to Metro (2050)	34	870.4	0	870	317,696	350	1E-02	4E-03	352
Brewerton to Metro (Current and Future (2030/2050))	3	87.0	0	87	31,755	35	1E-03	4E-04	35
Brewerton to OOWWTP	3	87.0	30.6	56	20,586	23	8E-04	2E-04	23

GHG emissions for truck trips from OOWWTP and Brewerton to Metro at current flows:	128
GHG emissions for truck trips from OOWWTP and Brewerton to Metro at 2030 flows:	304
GHG emissions for truck trips from OOWWTP and Brewerton to Metro at 2050 flows:	387
GHG emissions reduction due to truck trips in 2050:[3]	364

Data:

12.8	miles	Distance from MTT to Metropolitan Syracuse WWTP (Per Section 3.1.13 of the IWWTP BDR)
5.1	miles	Brewerton WWTP to MTT
14.5	miles	Brewerton WWTP to Metro
0.0332	g CH4/vehicle-mile[2]	
0.0100	g N2O/vehicle-mile[2]	
999	g CO2/mile[3]	

NOTES:

1. Metro = Metropolitan Syracuse WWTP at 650 Hiawatha Blvd, W. Syracuse, NY. Brewerton = Brewerton WWTP
2. Table 3 of EPA's "Emission Factors for Greenhouse Gas Inventories" dated 1/15/2025 (Heavy Duty Trucks for 2021)
3. Emissions reductions due to truck trips from OOWWTP to Metro for solids hauling being eliminated and from reduced haul distance from Brewerton to OOWWTP (rather than Brewerton to Metro)
4. GHG Emission factors for Heavy Duty Trucks (2025), U.S. Dept of Transportation: https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and

Table B-11 GHG Emissions Comparison - Digester Gas Management Options							
Method of Disposal of Digester Gas	Average Annual DG Production (scfm)	Heat Content DG (Btu/scf)	MMBtu/year	CO_2 (ton/yr)	CH_4 (ton/yr)	N_2O (ton/yr)	CO_2e (ton/yr)
Venting	180	600	56,765	NA	1,155	N/A	97,061
Flaring[1]				3,258	2E-01	4E-02	3,285
Reduced NG Use[2]				-678	-17	2E-02	-2,081

NOTES:

1. Despite CO_2 in digester gas and from combustion of digester gas being considered biogenic (Sections 1.2 and 1.3 of the EPA Center for Corporate Climate Leadership's Greenhouse Gas Inventory Guidance for Direct Emissions from Stationary Combustion Sources (12/2023) indicate that CO2 in digester gas as well as CO2 from combustion of digester gas are biogenic), GHG emissions estimates conservatively include CO_2 emissions from combustion of digester gas.
2. Use of digester gas in boilers (and possibly in a future dryer) reduces the quantity of natural gas combusted. Emissions reduction is the difference in GHG emissions from combustion of natural gas use and combustion of digester gas and includes direct emissions as well as upstream out-of-state emissions from natural gas combustion.

CH_4 portion:	60%	
MW CH_4:	16.043	lb/lbmol
Pressure:	1	atm
Temperature:	80	F
	539.67	R
R:	0.7302	ft3-atm/lbmol-R

ton/yr vented = ft^3/min x 1/R x P x 1/T x MW x 60 min/hr x 8,760 hr/yr x ton/2,000 lb

hour =	60	min
year =	8,760	hr
ton =	2,000	lb
kg =	2.20462	lb
kg =	1,000	g

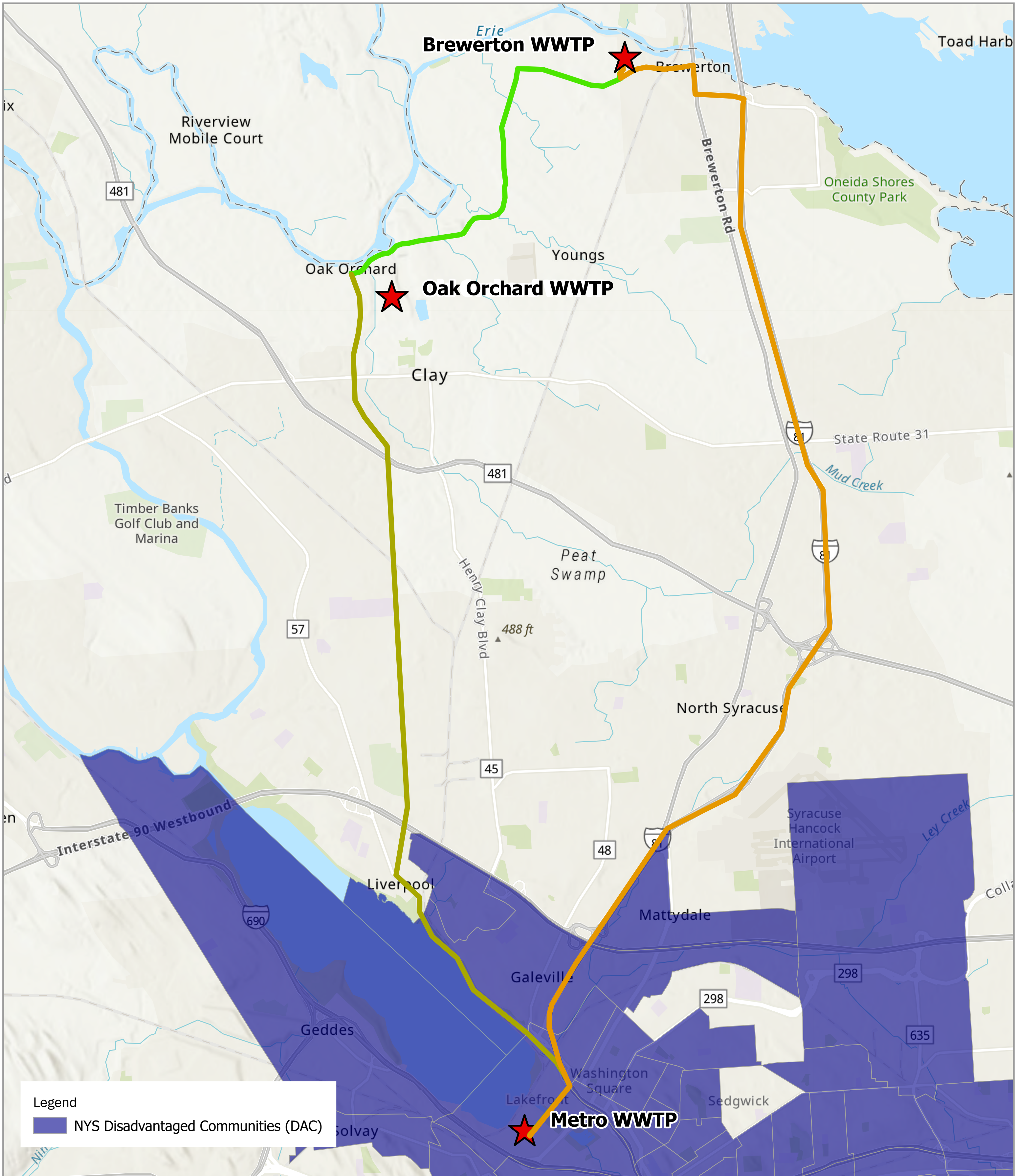
GHG Emission Factors, Stationary Combustion[a]			
Pollutant	Units	Digester Gas Combustion	Natural Gas Combustion
CO_2	kg/mmbtu	52.07	53.06
CH_4	g/mmbtu	3.2	1.0
N_2O	g/mmbtu	0.60	0.10

a. USEPA's "Emission Factors for Greenhouse Gas Inventories," January 15, 2025

Table B-12 GHG Emissions Reduction from Elimination of Emergency Engine									
Emergency Engine	**Fuel**	**Power Rating (HP)**	**Brake Specific Fuel Consumption (Btu/hp-hr)**	**Hours per year**	**Potential Energy Consumption**	**CO_2 (ton/year)**	**CH_4 (ton/year)**	**N_2O (ton/year)**	**CO_2e (ton/year)**
Direct Emissions	Natural Gas	6,868	7,000	500	24,038 MMBtu/yr	1,406	0.03	0.003	1,409
Upstream Out-of-State Emissions						333	8.93	0.004	1,084
Total Emissions						1,738	8.96	0.006	2,492
Direct Emissions	Diesel	6,868	7,000	500	175,073 gal/yr	1,970	0.08	0.015	1,981
Upstream Out-of-State Emissions						361	3.10	0.007	623
Total Emissions						2,332	3.18	0.022	2,605

NOTES:
1. The emergency generator calculations using the AP-42 factors assume a brake specific fuel consumption (BSFC) value of 7,000 Btu/hp-hr per AP-42, table 3.4-1 for dual fuel engines (95% natural gas and 5% diesel fuel). 4,500 kWe was converted to kW mechanical based on an 87.8% efficiency and kW was converted to HP using a conversion factor of 1.34 HP per kW.
2. Emergency generator emissions are based on 500 hour per year of operation per the U.S. EPA memo titled Calculating Potential to Emit (PTE) for Emergency Generators, dated September 6, 1995.

Appendix C: Sludge Haul Routes



Brown AND Caldwell

OOWWTP CLCPA Analysis

Date: 10/22/2025

Spatial Reference:
Name: WGS 1984 Web Mercator Auxiliary Sphere

N

0 1 2 4 6 Km

Sludge Haul Routes

Appendix D: Air Toxics Tables

Table D-1
Potential Emissions - Hazardous and Toxic Air Pollutant - Flare
Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

Fuel	Dual-fired: Natural Gas & Digester Gas	Operating Parameters	DG - Max Hour	DG - Annual Average	NG	Maximum Predicted Hourly Unit Impacts	Maximum Predicted Annual Unit Impacts	
Natural Gas Higher Heating Value (Btu/scf)	1,020	Operating Hours (hr/yr)	8,760	8,760	8,760	(ug/m3)/ (lb/hr):	(ug/m3)/ (lb/hr):	
Digester Gas Higher Heating Value (Btu/scf)	600	Flow rate (scfm)	305	180	1	22.42	1.00	
		Gas flow (mmscf/hr)	0.018	0.011	0.0001			

Hazardous Air Pollutant Emissions Calculations										Guidance Concentrations		Complies with SGC/AGC ?
Pollutant	CAS	Natural Gas		Digester Gas		Emissions				SGC	AGC	
		Emission Factor Reference	Emission Factor	Emission Factor Reference	Emission Factor	DG - Max hour Emissions	NG Combustion	Max 1-hour impact	Max Annual Impact			
			lb/MMscf		lb/MMscf	lb/hr	lb/hr	ug/m^3	ug/m^3	ug/m^3	ug/m^3	
PAH	1-15-1	AP-42 Table 1.4-3 Rev. July 1998		SJVAPCD Sewage Gas-Fired External Combustion (WWTP), Flare	1.80E-03	3.29E-05		7.39E-04	3.30E-05			
Formaldehyde	50-00-0		7.50E-02		7.01E-01	1.28E-02	5.25E-06	2.88E-01	1.29E-02	30	6.0E-02	YES
Benzo(a)pyrene	50-32-8		1.20E-06				8.40E-11	1.88E-09	8.43E-11		1.0E-03	YES
Dibenzo(a,h)-anthracene	53-70-3		1.20E-06				8.40E-11	1.88E-09	8.43E-11		1.0E-03	YES
3-Methyl-cholanthrene	56-49-5		1.80E-06				1.26E-10	2.83E-09	1.26E-10		1.0E-01	YES
Benz(a)-anthracene	56-55-3		1.80E-06				1.26E-10	2.83E-09	1.26E-10		1.0E-01	YES
Benzene	71-43-2		2.10E-03		9.54E-02	1.75E-03	1.47E-07	3.91E-02	1.75E-03	2.7E+01	1.3E-01	YES
Acetaldehyde	75-07-0				2.58E-02	4.72E-04		1.06E-02	4.74E-04	4.7E+02	4.5E-01	YES
Methylene Chloride	75-09-2				1.00E-04	1.83E-06		4.10E-05	1.84E-06	1.4E+04	4.6E+01	YES
1,1,2 Trichloroethane	79-00-5				1.00E-04	1.83E-06		4.10E-05	1.84E-06		1.4E+00	YES
Trichloroethylene	79-01-6				3.00E-04	5.49E-06		1.23E-04	5.51E-06	2.0E+01	2.1E-01	YES
Acenaphthene	83-32-9		1.80E-06				1.26E-10	2.83E-09	1.26E-10		1.0E-01	YES
Phenanthrene	85-01-8		1.70E-05				1.19E-09	2.67E-08	1.19E-09		1.0E-01	YES
Fluorene	86-73-7		2.80E-06				1.96E-10	4.39E-09	1.97E-10		1.0E-01	YES
Naphthalene	91-20-3		6.10E-04		6.60E-03	1.21E-04	4.27E-08	2.71E-03	1.21E-04	7.9E+03	3.0E+00	YES
2-Methyl-naphthalene	91-57-6		2.40E-05				1.68E-09	3.77E-08	1.69E-09		7.1E+00	YES
Ethylbenzene	100-41-4				8.67E-01	1.59E-02		3.56E-01	1.59E-02		1.0E+03	YES
Dichlorobenzene	106-46-7				1.80E-03	3.29E-05		7.39E-04	3.30E-05		9.1E-02	YES
Acrolein	107-02-8				6.00E-03	1.10E-04		2.46E-03	1.10E-04	2.6E+00	3.5E-01	YES
Ethylene Dichloride	107-06-2				1.40E-03	2.56E-05		5.74E-04	2.57E-05		3.8E-02	YES
Toluene	108-88-3		3.40E-03		3.48E-02	6.37E-04	2.38E-07	1.43E-02	6.39E-04	3.7E+04	5.0E+03	YES
Chlorobenzene	108-90-7				2.00E-04	3.66E-06		8.21E-05	3.67E-06		6.0E+01	YES
Hexane	110-54-3		1.80E+00		1.74E-02	3.18E-04	1.26E-04	7.14E-03	3.19E-04		7.0E+02	YES
Propylene	115-07-1				1.46E+00	2.67E-02		5.99E-01	2.68E-02		3.0E+03	YES
Anthracene	120-12-7		2.40E-06				1.68E-10	3.77E-09	1.69E-10		1.0E-01	YES
Perchloroethylene	127-18-4				5.00E-04	9.15E-06		2.05E-04	9.18E-06	3.0E+02	3.8E+00	YES
Pyrene	129-00-0		5.00E-06				3.50E-10	7.85E-09	3.51E-10		1.0E-01	YES
Benzo(g,h,i)-perylene	191-24-2		1.20E-06				8.40E-11	1.88E-09	8.43E-11		1.0E-01	YES
Indeno (1,2,3-cd) pyrene	193-39-5		1.80E-06				1.26E-10	2.83E-09	1.26E-10		1.0E-02	YES
Acenaphthylene	203-96-8		1.80E-06				1.26E-10	2.83E-09	1.26E-10		1.0E-01	YES

Hazardous Air Pollutant Emissions Calculations										Guidance Concentrations		Complies with SGC/AGC ?
		Natural Gas		Digester Gas		Emissions						
Pollutant	CAS	Emission Factor Reference	Emission Factor	Emission Factor Reference	Emission Factor	DG - Max hour Emissions	NG Combustion	Max 1-hour impact	Max Annual Impact	SGC	AGC	
			lb/MMscf		lb/MMscf	lb/hr	lb/hr	ug/m^3	ug/m^3	ug/m^3	ug/m^3	
Benzo(b)-fluoranthene	205-99-2	AP-42 Table 1.4-3 Rev. July 1998	1.80E-06	SJVAPCD Sewage Gas-Fired External Combustion (WWTP), Flare (Except for H2S)			1.26E-10	2.83E-09	1.26E-10		1.0E-02	YES
Fluoranthene	206-44-0		3.00E-06				2.10E-10	4.71E-09	2.11E-10		1.0E-01	YES
Benzo(k)-fluoranthene	207-08-9		1.80E-06				1.26E-10	2.83E-09	1.26E-10		1.0E-01	YES
Chrysene	218-01-9		1.80E-06				1.26E-10	2.83E-09	1.26E-10		1.0E-01	YES
Xylenes	1330-20-7				2.19E-02	4.01E-04		8.99E-03	4.02E-04		1.0E-01	YES
Lead	7439-92-1	AP-42 Table 1.4-2 Rev. July 1998	5.00E-04				3.50E-08	7.85E-07	3.51E-08		3.8E-02	YES
Manganese	7439-96-5	AP-42 Table 1.4-4 Rev. July 1998	3.80E-04				2.66E-08	5.96E-07	2.67E-08		5.0E-02	YES
Mercury	7439-97-6		2.60E-04				1.82E-08	4.08E-07	1.83E-08	6.0E-01	3.0E-01	YES
Nickel	7440-02-0		2.10E-03				1.47E-07	3.30E-06	1.47E-07	2.0E-01	4.2E-03	YES
Arsenic	7440-38-2		2.00E-04				1.40E-08	3.14E-07	1.40E-08		2.3E-04	YES
Beryllium	7440-41-7		1.20E-05				8.40E-10	1.88E-08	8.43E-10		4.2E-04	YES
Cadmium	7440-43-9		1.10E-03				7.70E-08	1.73E-06	7.72E-08		2.4E-04	YES
Chromium	7440-47-3		1.40E-03				9.80E-08	2.20E-06	9.83E-08		4.5E+01	YES
Cobalt	7440-48-4		8.40E-05				5.88E-09	1.32E-07	5.90E-09		1.0E-03	YES
Hydrogen Chloride	7647-01-0	AP-42 Table 1.4-3 Rev. July 1998			6.46E-01	1.18E-02		2.65E-01	1.19E-02	2.1E+03	2.0E+01	YES
Ammonia	7664-41-7							0.00E+00	0.00E+00	2.4E+03	5.0E+02	YES
Selenium	7782-49-2	AP-42 Table 1.4-4 Rev. July 1998	2.40E-05				1.68E-09	3.77E-08	1.69E-09		2.0E+01	YES
Hydrogen Sulfide	7783-06-4	AP-42 Table 1.4-3 Rev. July 1998			5.31E+00	9.71E-02		2.18E+00	9.74E-02		2.0E+00	YES
Dichlorobenzene	25321-22-6		1.20E-03				8.40E-08	1.88E-06	8.43E-08		1.0E-01	YES
7,12-Dimethyl-benz(a)-anthracene	POM		1.60E-05				1.12E-09	2.51E-08	1.12E-09		1.0E-01	YES
				Annual emissions (tpy):		**0.74**	**5.79E-04**					

NOTES:

1. Even though the pilot (natural gas) will not be fired concurrent with digester gas (DG), the emissions calculations above are based in both DG and natural gas combusted 8,760 hour/year.
2. Natural gas Higher Heating Value is 1020 Btu/scf per AP-42 Table 1.4-1.
3. Digester gas Higher Heating Value is 600 Btu/scf per SDAPCD Emission Factors for Digester Gas.
4. Hydrogen sulfide (H_2S) emissions from digester gas are calculated based in the maximum DG H_2S content (3,000 parts per million) and 98% oxidation to SO_2 (i.e., 2% emitted as H_2S)
4. The maximum unit impact was based on a unit emission rate of 1 pound per hour. The facility-wide impact was calculated by summing the product of the calculated emission rate by either the predicted hourly or annual unit impact.

Table D-2

ITT 212 Compliance Evaluation

Oak Orchard Wastewater Treatment Plant (Industrial and Municipal Treatment Trains)

CAS No.	MICRON Compound number	Compound	Predicted Compound Air Emissions Summary for Each WWTP Unit Operation (lb/d)											
			EQ	Combined Screens	AS - Anoxic	AS-Diffused (Aeration)	Membrane (MBR and BIOX)		Decarbonization Units[7]	Facility-Wide 24-Hour Impact	Facility-Wide Annual Impact	SGC	AGC	COMPLIES WITH SGC/AGC?
			lb/hr	lb/hr	lb/hr	lb/hr	lb/hr		lb/hr	(ug/m^3)	(ug/m^3)	(ug/m^3)	(ug/m^3)	
		Hourly Maximum Predicted Unit Impacts (ug/m3)/(lb/hr):	**173.77**	**929.98**	**191.54**	**118.52**	**968.08**		**302.74**					
		Annual Maximum Predicted Unit Impacts (ug/m3)/(lb/hr):	**5.08**	**44.61**	**4.80**	**4.56**	**45.72**		**3.29**					
75-59-0	1	TMAH-micron	3.9E-11	-	-	-	-			6.8E-09	2.0E-10		0.10	YES
67-63-0	2	Isopropyl Alcohol	2.3E-01	9.2E-04	1.9E-02	9.5E-02	7.9E-03		-	6.4E+01	2.1E+00	7,000	98,000	YES
56-40-6	3	Glycine-micron	1.4E-05	3.4E-08	1.7E-07	4.3E-08	1.0E-09		-	2.5E-03	7.5E-05		0.10	YES
56539-66-3	4	3-methoxy,3methyl,1-Butanol-micron	7.1E-04	2.1E-06	1.7E-05	1.2E-05	5.5E-07		-	1.3E-01	3.8E-03		0.10	YES
25322-68-3	5	Polyethylene glycol-micron	1.4E-11	-	-	-	-	-	-		7.1E-11		0.10	YES
182211-02-5	6	Methyloxirane polymer with oxirane	This is a polymer. Emissions are expected to be negligible											
288-88-0	7	1,2,4-Triazole-micron	2.3E-03	6.6E-06	3.6E-05	1.4E-05	4.0E-07		-	4.2E-01	1.2E-02		0.10	YES
141-43-5	8	Ethanolamine(Mono-)	1.3E-06	2.9E-09	1.1E-07	4.0E-07	3.5E-08		-	3.2E-04	1.0E-05	1,500	18	YES
929-06-6	9	2-(2-Aminoethoxy)ethanol-micron	5.9E-09	1.6E-11	9.7E-10	6.2E-09	5.7E-10		-	2.5E-06	8.9E-08		0.10	YES
617-48-1	10	DL-Malic acid-micron	-	-	-	-	-	-	-					NA
6915-15-7	11	Malic acid-micron	-	-	-	-	-	-	-					NA
64-19-7	12	Acetic Acid	2.1E-05	6.1E-08	4.1E-07	2.1E-07	7.8E-09		-	3.9E-03	1.1E-04	3,700	60	YES
110-16-7	13	Maleic Acid	-	-	-	-	-	-	-					NA
150-77-6	14	N,N,N,N-Tetraethylethyleneamine-micron	5.6E-07	1.9E-09	3.9E-07	3.6E-06	3.5E-07		-	9.4E-04	3.7E-05		0.10	YES
9004-62-0	15	CELLULOSE, 2-HYDROXYETHYL ETHER	This is a solid. Emissions are expected to be negligible.											
107-21-1	16	Ethylene Glycol	7.6E-07	1.7E-09	7.0E-08	2.8E-07	2.4E-08		-	2.0E-04	6.7E-06	1,000	400	YES
25704-18-1	17	Benzenesulfonic acid, 4-ethenyl-, sodium salt, homopolymer	This is a solid. Emissions are expected to be negligible.											
77-92-9	18	Citric acid - micron	-	-	-	-	-	-	-					NA
2592-95-2	19	1-Hydroxybenzotriazole-micron	1.0E-06	2.8E-09	7.0E-07	6.1E-06	5.9E-07		-	1.6E-03	6.4E-05		0.10	YES
9003-11-6		Oxirane, methyl - micron	-	-	-	-	-	-	-					NA
26353-67-3	20	2-Naphthalenesulfonic acid, polymer with formaldehyde	This is a polymer. Emissions are expected to be negligible.											
55866-85-8	21	Poly(oxy-1,2-ethanediyl), .alpha.-sulfo-.omega.-(2-propen-1-yloxy)-, ammonium salt (1:1)	Based on a Gelest SDS, this material is >98% solids and therefore emissions are expected to be negligible.											
2594-38-3	22	Polyanionic Electrolyte	As an anionic electrolyte, emissions are expected to be negligible.											
25751-21-7	23	2-propenoic acid, 2-methyl - micron	-	-	-	-	-	-	-					NA
3458-72-8	24	Triammonium citrate - micron	-	-	-	-	-	-	-					NA
9002-89-5	25	Polyvinyl alcohol - micron	-	-	-	-	-	-	-					NA
71888-87-4	26	Cellulose, 2-hydroxyethyl ether, reaction products with glyoxal	This is a solid. Emissions are expected to be negligible.											
594-61-6	27	2-Hydroxy-2-methylpropionic acid - micron	1.6E-05	4.3E-08	1.1E-05	9.6E-05	9.2E-06		-	2.5E-02	1.0E-03		0.10	YES
67-56-1	28	Methanol	8.3E-05	2.0E-07	3.8E-07	3.5E-08	3.4E-10		-	1.5E-02	4.4E-04	33,000	4,000	YES
124-38-9		Carbon dioxide	-	-	51.35	3918.61			144		18,588		21,000	YES
10024-97-2		Nitrous oxide	-	-	0.19	9.67			-		45.01		210	YES

NOTES:

1.The list of compounds is a summary of the expected organic chemical constituents in the proposed discharge as provided by Micron. For Part 212, compounds with emission less than 100 pounds per year do not need to be included in the compliance evaluation. Accordingly, emissions were calculated for compounds with predicted annual loading greater than 100 pounds per year. Certain metals are expected to be present in the influent wastewater. However, based on the nature of the process, emissions of metals are expected to be negligible.

2. Compound fate modeling was conducted using Toxchem (Hydromantis 2021) to estimate air emissions for the new Onondaga County Industrial wastewater treatment plant (IWWTP) in support of project permitting work. The ITT details including unit operation characteristics, influent flowrates and loading conditions, and operating conditions were derived from the Brown & Caldwell (BC) concept design report (BC 2025). The Micron facility's projected compound discharge loads were applied to establish influent compound concentrations. Compound properties were obtained from the Toxchem compound properties database, U.S. EPA EpiSuite, U.S. EPA WATER9, and online compound databases including the U.S. NIH PubChem and the European Chemical Agency (ECHA) websites. Note, the emissions calculations that are include above are intended to inform facility classification for permitting purposes.

3. Dashes in the indicate that Toxchem does not predict emissions of this compound. A Part 212 evaluation will be included in the Air Registration Application.

4. The maximum predicted unit impact was based on a unit emission rate of 1 pound per hour. The facility-wide impact was calculated by summing the product of predicted unit impact for each source and the predicted emission rate (via Toxchem) for that source.

5. The MBR and Biox are both located inside the membrane building. The combined emission rates were together modeled as a volume source.

6. Public access will be restricted to the facility and he facility and therefore no receptors were placed inside the property boundary.

7. Since only three units will run at any single time, values were taken as the result of a group of the three decarbonization units which resulted in the highest individual concentrations.