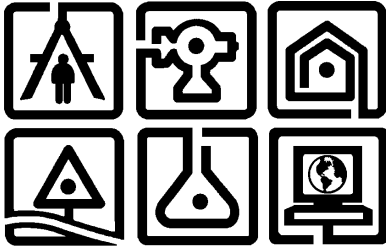


June 1, 2022
Revised July 19, 2022



Climate Leadership and Community Protection Act Analysis

Shelter Enterprises Inc.
Cohoes, NY Facility

Prepared for:

SHELTER ENTERPRISES INC.
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**CLIMATE LEADERSHIP AND COMMUNITY PROTECTION ACT (CLCPA)
ANALYSIS - SHELTER ENTERPRISES INC.
8 SARATOGA STREET, COHOES, NEW YORK**

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1.0 PROJECT/FACILITY BACKGROUND

C.T. Male Associates Engineering, Surveying, Architecture, Landscape Architecture & Geology, D.P.C. (C.T. Male) has prepared the attached CLPCA Analysis as part of a project which includes an application for a New York State Department of Environmental Conservation (NYSDEC) Air State Facility Permit for the Shelter Enterprises Inc. facility located at 8 Saratoga Street in the City of Cohoes, Albany County, New York (see Figure 1). Shelter Enterprises Inc. is a manufacturer of Expanded Polystyrene (EPS) building material products for residential, commercial, and civil markets. No new construction or change to historic operations is planned at this time.

The facility operations utilize natural gas within an exempt boiler and an air pollution control device (a Regenerative Thermal Oxidizer) which controls pentane emissions from site operations. These combustion operations generate greenhouse gases (GHGs) that are subject to the requirements of the NYSDEC's Climate Leadership and Community Protection Act (CLCPA).

Under CLCPA, when issuing air quality permits in New York, all state agencies are required to consider "whether such decisions are consistent with, or will interfere with, the attainment of the statewide GHG emission limits established in Article 75 of the environmental conservation law." With the submittal of a new Air State Facility (ASF) permit application for the Shelter Enterprises Inc. site operations, the applicant is required to include a CLCPA analysis as it relates to the project's impact on statewide GHG levels.

New York's CLCPA was signed into law on July 18, 2019 and includes requirements to reduce economy-wide GHG emissions in New York State by 40% below 1990 levels of carbon dioxide equivalent [CO_{2e}] by 2030, and no less than 85% below 1990 levels by 2050, as shown in Table 1.1 below.

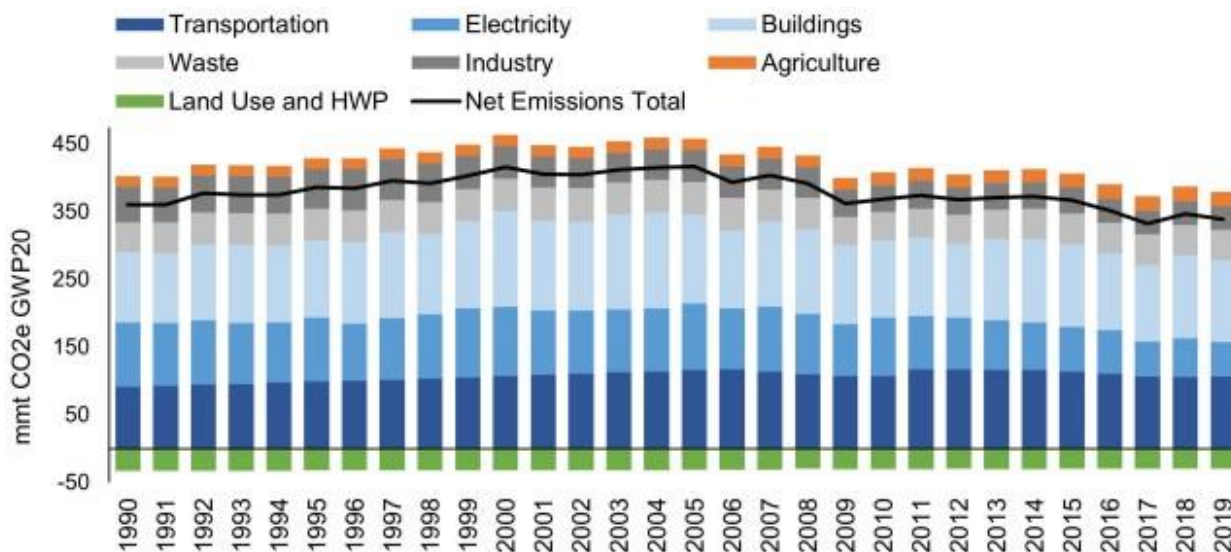
Table 1.1 - Statewide GHG Emission Limits

Year	Statewide GHG Emission Limit (Million Metric Tons of CO ₂ e) ¹
1990	409.78
2030	245.87 (40% Reduction of 1990 level)
2050	61.47 (85% Reduction of 1990 level)

¹ – As listed in 6 NYCRR Part 496.4, Statewide Greenhouse Gas Emission Limits.

The Shelter Enterprises Inc. facility is accounted for under the “Industrial Processes and Product Use” sector within the statewide GHG inventory. In New York, industrial process emissions are a relatively small portion of the overall statewide emissions and have seen an overall reduction over the past 30 years according to the “Industrial Processes and Product Use: 2021 NYS Greenhouse Gas Emissions Report (Sectoral Report #2)” obtained from the NYSDEC website. Table 1.2 below was excerpted from the “Summary Report 2021 NYS Statewide GHG Emissions Report” obtained from the NYSDEC website to demonstrate that the industrial sector is a small piece of the overall, statewide GHG impact.

Table 1.2 - NYS Statewide Greenhouse Gas Emissions by Economic Sector, 1990-2019



Note: mmt = million metric tons

The CLCPA analysis submitted by Shelter Enterprises includes considerations for the facility’s existing and potential operations, and was conducted in accordance with NYSDEC’s Draft Division of Air Resources (DAR) Policy Climate Leadership and Community Protection Act and Air Permit Applications (DAR-21).

2.0 PROJECT/FACILITY DESCRIPTION

Shelter Enterprises Inc. is a manufacturer of Expanded Polystyrene building material products for residential, commercial, and civil markets. The facility's previous Air State Facility Permit (4-0103-00057/00002) expired on June 22, 2021 and the applicant is applying to reinstate a State Facility Permit to continue operations as previously permitted. No changes to existing operations are being sought as part of the application process.

Manufacturing activities include expansion, aging and molding activities at the facility. The Pre-expander equipment was replaced in January 2016 and the Block Molding Machine was replaced in 2018 as part of efforts to improve capture efficiency and replace aging equipment. Emissions from the facility's EPS manufacturing operations are calculated based on the bead usage at the facility and pentane content of the products used. Pentane is contained within the raw material (beads) and is the only Volatile Organic Compound (VOC) that is emitted from production. The EPS process uses pentane as a blowing agent and does not incorporate the use of Chlorofluorocarbons/Hydrochlorofluorocarbons (CFCs/HCFCs). Process related emissions do not contain GHG or Hazardous Air Pollutants (HAP).

Facility operations also include an exempt 6 Million British Thermal Units per hour (MMBTU/hr) natural gas-fired boiler for heating purposes and a 2 MMBTU/hr natural gas-fired regenerative thermal oxidizer (RTO) to control VOC emissions. GHG and HAP are emitted from the facility as a result of natural gas combustion activities.

3.0 CLCPA ANALYSIS

The direct and upstream indirect GHG emissions from Shelter Enterprises analyzed under this CLCPA analysis includes emissions of carbon dioxide (CO₂), methane (CH₄) and Nitrous Oxide (N₂O) and CO_{2e} as no other GHG have been identified to be generated by facility operations.

DAR-21 requires calculations describing the project's direct GHG emissions on a potential to emit (PTE) and actual emissions basis. Actual emissions are provided for the facility corresponding to 2021 data (1 shift per day / 5 days per week). PTE emissions will be estimated for the facility at full production capacity (3 shifts per day / 7 days per week).

3.1 Carbon Dioxide Equivalent Greenhouse Gas Emissions

GHG emissions estimated in this analysis demonstrate the actual and projected emissions (in units of CO_{2e}). These calculations were performed using 20-year global warming potentials (GWPs) found in 6 NYCRR Part 496.5 - Statewide Greenhouse Gas Emission Limits.

Each individual GHG has a different GWP that has been developed in order to be able to compare different GHGs on a common reporting basis (CO_{2e}). Each estimated quantity of GHG was multiplied by its GWP factor that accounts for the lifetime of each chemical over a period of 20 years. For the Shelter Enterprises facility, GHG emissions consist of CO₂, Methane and Nitrous Oxide and are a result of combustion activities and indirect upstream sources.

Expected GHGs from facility operations and their 20-year GWPs are included in Table 3.1.

Table 3.1 - Global Warming Potentials

Greenhouse Gas	Chemical Formula	20-Year GWP ¹
Carbon Dioxide	CO ₂	1
Methane	CH ₄	84
Nitrous oxide	N ₂ O	264

¹ - 20-year GWPs from 6 NYCRR Part 496.5 Statewide Greenhouse Gas Emission Limits

3.2 Facility Sources and Direct Greenhouse Gas Emissions

Shelter Enterprises Inc.'s direct GHG emissions sources evaluated as part of the CLCPA include the following:

- **Boilers:** The existing onsite natural gas-fired boiler provides heat and steam to the facility.
- **Emergency Generators:** None present at facility.
- **Manufacturing Processes:** The EPS manufacturing activities do not use any Perfluorinated Compounds (PFCs) as a blowing agent and does not generate PFCs.
- **Regenerative Thermal Oxidizer (RTO):** The RTO requires natural gas external combustion during certain periods (i.e., when the amount of pentane alone within the exhaust stream cannot sustain combustion).

Direct GHG emission calculations include estimates from sources listed above on an annual (based on 2021 GHG emissions data generated from combustion operations related to the boiler and RTO) and Potential to Emit basis. No changes are planned to existing operations (which represent baseline conditions). Maximum potential emissions would involve running 3 shifts per day / 7 days per week as compared to the current single operating shift per day.

Direct GHG emissions were calculated using emission factors from the U.S. Environmental Protection Agency's (EPA's) AP-42 Compilation of Air Emission Factors document (Chapter 1.4 for Natural Gas, July 1998 Version). Tables 3.2 and 3.3 provide additional details for the GHG emission estimates as part of the CLCPA analysis.

Table 3.2 - Direct GHG Emission Source Information

Fuel Type	Source Type	Emission Estimate Details
Natural Gas	<ul style="list-style-type: none"> ▪ Boilers ▪ RTO 	<p>Total amount of pipeline-grade natural gas delivered and combusted at the site is tracked through monthly utility bills.</p> <p>For the PTE estimate, facility operations occurring 24 hours per day is assumed.</p>
Diesel Fuel	Not Applicable	Not Applicable
Other Fuels or Gases	Not Applicable	Not Applicable

Table 3.3 - Direct GHG Emissions from Natural Gas Combustion

	Emis. Factor lb/MMBTU ^a	Annual Basis (Based on 2021 Usage)			Potential to Emit (Based on Max. Firing Rate for 8,760 hours)		
		MMBTU	lb/yr ^b	ton/yr	lb/hr ^c	lb/yr	ton/yr
CO ₂	117.65	18,413	2,166,235	1,083	941.18	8,244,706	4,122
CH ₄	0.00225	18,413	41.52	0.021	0.0180	158.02	0.079
N ₂ O	0.00216	18,413	39.71	0.020	0.0173	151.15	0.076
Total Combined CO _{2e} ^d		1,090.1 ton/yr Actual			4,148.9 ton/yr PTE		

^a - Emission factors from AP-42 Based on Natural Gas Combustion (Uncontrolled)

^b - Based on 2021 consumption of natural gas = 184,130 Therms (18,413 MMBTU)

^c - Based on maximum combined heat input capacity for boiler and RTO of 8.0 MMBTU/hr

^d - Total CO_{2e} = sum of (lb/yr * GWP) for each contaminant

3.3 Indirect Upstream Greenhouse Gas Emissions

DAR-21 requires that the CLCPA analysis requires estimates of upstream out-of-state GHG emissions attributable to the project resulting from the extraction, transmission, and use of fossil fuels or electricity imported into the state.

Natural gas is delivered to the site via National Grid pipeline. No diesel fuel is utilized for stationary combustion sources at the facility. Emission factors to be used for the upstream natural gas were taken from the NYSDEC's Summary Report: 2021 NYS Statewide GHG Emissions Report, Appendix A, Table A1, 2019 Emission Factors for Use by State Agencies and Applicants as included in Table 3.4.

Table 3.4 - Emission Rates for Upstream Out-of-State Sources - Natural Gas

	Emission Rate	Annual Basis (Based on 2021 Usage)			Potential to Emit Basis (Based on Max. Firing Rate for 8,760 hours)			
	g/MMBTU	MMBTU	lb/yr	ton/yr	MMBTU/hr	hr/yr	lb/yr	ton/yr
CO ₂	12,131	18,413	492,442	246.2	8.0	8,760	1,874,239	937.1
CH ₄	357	18,413	14,492	7.25	8.0	8,760	55,157	27.58
N ₂ O	0.14	18,413	5.68	0.0028	8.0	8,760	21.63	0.011
Total CO _{2e} ¹	42,147	18,413	1,710,903	855.5	8.0	8,760	6,511,709	3,256

¹ - Total CO_{2e} conversion uses GWP20 according to 6 NYCRR Part 496

This site receives electricity from National Grid; therefore it is our understanding that upstream emissions from purchased electricity are not required for this CLCPA

analysis. Additionally, there are currently no contractual agreements for renewable energy from National Grid.

3.4 Indirect Downstream Greenhouse Gas Emissions

DAR-21 requires calculations describing any foreseeable downstream and indirect emissions attributable to the project. Downstream emissions include emissions of GHGs resulting from the transportation and use of the facility's products; however, these emissions do not typically include emissions from the shipment or use of consumer goods. As such, downstream emissions are not applicable to this project and will not be estimated under this CLCPA analysis.

3.5 Projected Greenhouse Gas and Carbon Dioxide Equivalent Emissions

Projected future GHG and CO_{2e} emissions for 2030 and 2050 are required to be evaluated as part of the CLCPA analysis. Emission estimates as described in the previous subsections of this analysis will be projected out based on continuing operation at the current production level. No quantifiable changes in GHG emissions are projected at this time as no changes to the current operations are contemplated. In the future based on New York State's emission goals, it is anticipated that emissions from electricity would decrease over time as part of National Grid's efforts toward attaining net zero carbon by 2050. Significant increases in natural gas consumption are not contemplated at this time, and only the use of natural gas in the boiler and RTO systems is projected in the future. Summaries of annual and potential GHG emissions including upstream and downstream considerations are discussed in Sections 3.2 - 3.4.

3.6 Projected Co-Pollutant Emissions

The Shelter Enterprises facility is located adjacent to a Potential Environmental Justice Area (PEJA) as identified by the DEC Office of Environmental Justice. As such, the facility is required to calculate co-pollutant emissions from each GHG source (co-pollutants are defined as HAPs that are emitted by GHG sources). HAP Emission estimates have been projected based on continuing operation of natural gas combustion in the boiler and RTO systems at the current production level. No quantifiable changes in HAP emissions from combustion are projected at this time as no changes to the current operations are contemplated. The facility's use of the boiler is integral to

continued operations in order to produce necessary heat and steam. The continued use of the RTO is required to minimize air pollution due to VOC emissions from the production processes and operation of the facility without use of the control device would not be allowed under the NYSDEC's Air Regulations. Shelter Enterprises will attempt to operate each of these combustion sources with maximum efficiency in order to minimize GHG and HAP emissions as well as operational expenses. Periodic testing of the RTO will be used to determine if the pentane destruction efficiency of the unit is acceptable, and such operational checks as well as periodic maintenance activities associated with the RTO and boiler systems will continue to be utilized to provide Good Combustion Practices (GCP) as detailed in Section 3.7. Further measures to minimize the emissions of GHG or HAP beyond the use of GCP are not contemplated at this time. Emission factors for combustion sources were taken from EPA's AP-42 Compilation of Air Emission Factors document (Chapter 1.4 for Natural Gas, July 1998 Version).

Table 3.5 - Combustion HAP Emission Summary

Hazardous Air Pollutant	Emission Factors		Potential to Emit		Annual (2021)	
	lb/10 ⁶ scf	lb/MMBTU	lb/hr	lb/yr	lb/yr	ton/yr
2-Methylnaphthalene	2.40E-05	2.35E-08	1.88E-07	0.0016	0.00043	2.17E-07
3-Methylcholanthrene	1.80E-06	1.76E-09	1.41E-08	0.00012	0.000032	1.62E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.57E-08	1.25E-07	0.0011	0.00029	1.44E-07
Acenaphthene	1.80E-06	1.76E-09	1.41E-08	0.00012	0.000032	1.62E-08
Acenaphthylene	1.80E-06	1.76E-09	1.41E-08	0.00012	0.000032	1.62E-08
Anthracene	2.40E-06	2.35E-09	1.88E-08	0.00016	0.000043	2.17E-08
Benz(a)anthracene	1.80E-06	1.76E-09	1.41E-08	0.00012	0.000032	1.62E-08
Benzene	2.10E-03	2.06E-06	1.65E-05	0.14	0.038	1.90E-05
Benzo(a)pyrene	1.20E-06	1.18E-09	9.41E-09	0.00008	0.000022	1.08E-08
Benzo(b)fluoranthene	1.80E-06	1.76E-09	1.41E-08	0.00012	0.000032	1.62E-08
Benzo(g,h,i)perylene	1.20E-06	1.18E-09	9.41E-09	0.00008	0.000022	1.08E-08
Benzo(k)fluoranthene	1.80E-06	1.76E-09	1.41E-08	0.00012	0.000032	1.62E-08
Chrysene	1.80E-06	1.76E-09	1.41E-08	0.00012	0.000032	1.62E-08
Dibenzo(a,h)anthracene	1.20E-06	1.18E-09	9.41E-09	0.00008	0.000022	1.08E-08
Dichlorobenzene	1.20E-03	1.18E-06	9.41E-06	0.082	0.022	1.08E-05

Hazardous Air Pollutant	Emission Factors		Potential to Emit		Annual (2021)	
	lb/10 ⁶ scf	lb/MMBTU	lb/hr	lb/yr	lb/yr	ton/yr
Fluoranthene	3.00E-06	2.94E-09	2.35E-08	0.00021	0.000054	2.71E-08
Fluorene	2.80E-06	2.75E-09	2.2E-08	0.00019	0.000051	2.53E-08
Formaldehyde	7.50E-02	7.35E-05	0.000588	5.15	1.35	6.77E-04
Hexane	1.80E+00	0.001765	0.014118	123.7	32.49	1.62E-02
Indeno(1,2,3-cd)pyrene	1.80E-06	1.76E-09	1.41E-08	0.00012	0.000032	1.62E-08
Naphthalene	6.10E-04	5.98E-07	4.78E-06	0.042	0.011	5.51E-06
Phenanathrene	1.70E-05	1.67E-08	1.33E-07	0.0012	0.00031	1.53E-07
Pyrene	5.00E-06	4.9E-09	3.92E-08	0.00034	0.000090	4.51E-08
Toluene	3.40E-03	3.33E-06	2.67E-05	0.23	0.061	3.07E-05
Arsenic	2.00E-04	1.96E-07	1.57E-06	0.014	0.0036	1.81E-06
Beryllium	1.20E-05	1.18E-08	9.41E-08	0.00082	0.00022	1.08E-07
Cadmium	1.10E-03	1.08E-06	8.63E-06	0.076	0.020	9.93E-06
Chromium	1.40E-03	1.37E-06	1.1E-05	0.096	0.025	1.26E-05
Cobalt	8.40E-05	8.24E-08	6.59E-07	0.0058	0.0015	7.58E-07
Manganese	3.80E-04	3.73E-07	2.98E-06	0.026	0.0069	3.43E-06
Mercury	2.60E-04	2.55E-07	2.04E-06	0.018	0.0047	2.35E-06
Nickel	2.10E-03	2.06E-06	1.65E-05	0.14	0.038	1.90E-05
Selenium	2.40E-05	2.35E-08	1.88E-07	0.0016	0.00043	2.17E-07
Sum of Listed HAP (from AP-42)			1.48E-02	129.71	34.08	0.017

3.7 Alternatives & Mitigations

As stated in DAR-21, if the CLCPA analysis demonstrates that the facility's CO_{2e}, including any known upstream or downstream emissions attributable to the project, will increase, then an explanation and justification for any potential alternative or mitigation measures must be included.

No increase in CO_{2e} emissions are planned at this time as no change to baseline emissions or operations are presently contemplated.

Existing Source and Site-Specific Controls

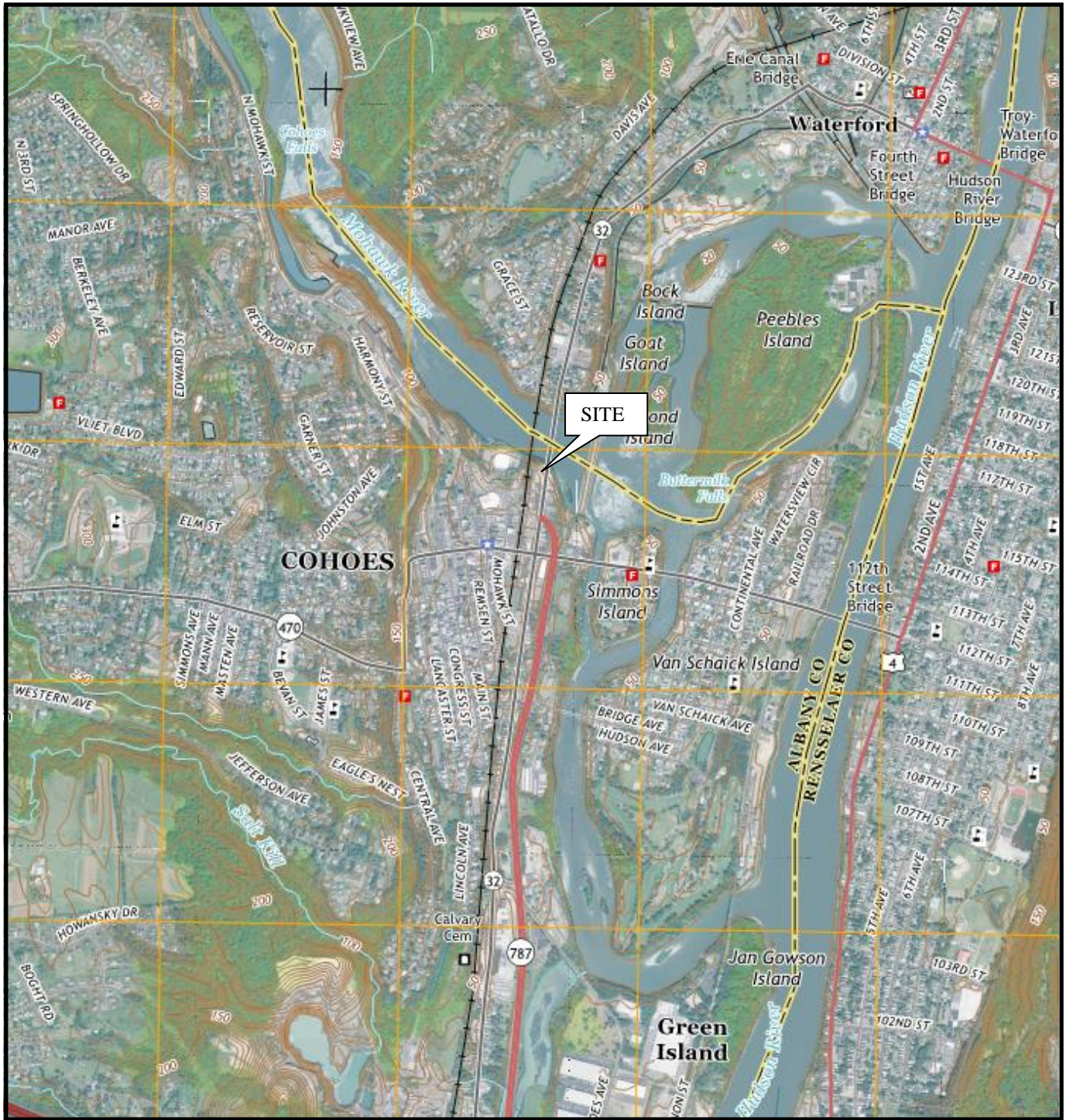
- Boiler Operations: Shelter Enterprises implements good combustion practices, energy efficiency measures, and good operating and maintenance practices for mitigating GHG emissions from the boiler system. Good operating and maintenance practices may include items such as reduced air leakage and boiler insulation, tuning, optimization, instrumentation, and digital control systems.
- RTO Operations: The RTO is tuned and maintained according to the manufacturer specifications. In order to ensure proper performance, Shelter Enterprises is required to periodically test the destruction efficiency of the RTO as a condition within its State Facility Permit.

4.0 ACRONYMS AND ABBREVIATIONS

AP-42	USEPA's AP-42: Compilation of Air Emission Factors
ASF	Air State Facility
CFC	Chlorofluorocarbon
CH ₄	Methane
CLCPA	Climate Leadership and Community Protection Act
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
DAR	Division of Air Resources
EPA	U.S. Environmental Protection Agency
EPS	Expanded Polystyrene
g/MMBtu	Gram(s) per Million British thermal unit
GCP	Good Combustion Practices
GHG	Greenhouse Gas
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HCFC	Hydrochlorofluorocarbons
MMBTU	Million British thermal unit
mmt CO _{2e}	Million Metric Ton(s) of Carbon Dioxide Equivalent
N ₂ O	Nitrous Oxide
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
PEJA	Potential Environmental Justice Area

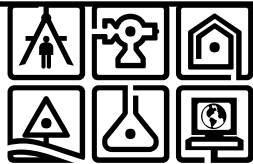
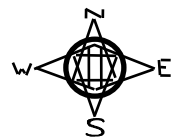
PFC	Perfluorinated Compound
PTE	Potential to Emit
RTO	Regenerative Thermal Oxidizer
VOC	Volatile Organic Compound

Figure 1
Site Location Map



MAP REFERENCE

United States Geological Survey
 7.5 Minute Series Topographic Maps
 Quadrangle: Troy North, N.Y. (2016)



CIVIL ENGINEERING
 ENVIRONMENTAL SERVICES
 SURVEY SERVICES
 LAND SERVICES
 ARCHITECTURE
 ENERGY & BUILDING SYSTEMS
 SERVICES
 ELECTRICAL ENGINEERING

FIGURE 1 SITE LOCATION MAP
SHELTER ENTERPRISES INC. FACILITY

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CITY OF COHOES

ALBANY COUNTY, NY

SCALE: ±1" = 2,000'

DRAFTER: J.FARRON

PROJECT No. 13.3449