Sterling Environmental Engineering, P.C.

March 29, 2019

Ms. Kate Kornak
Deputy Regional Permit Administrator
Division of Environmental Permits, Region 4
NYS Department of Environmental Conservation
1130 North Westcott Road
Schenectady, New York 12306-2014

Subject: Rensselaer Engineered Fuels Solid Waste Processing Facility
36 Riverside Avenue, Rensselaer, NY
DEC #4-3814-00006
Response to Notice of Incomplete Application
STERLING File #2018-09

Dear Ms. Kornak,

In response to the subject Notice of Incomplete Application dated February 28, 2019, we provide the following responses:

1. An application for a State Air Facility Registration under 6 NYCRR 201-4 is attached along with required supporting documentation to authorize the air emissions from two pollution control devices (i.e., baghouse and biofilter).

2. The facility is located within the NYS Coastal Area, but a Consistency Review by NYSDOS is not required because the project is not a State or Federal lead project and does not involve any Federal permitting.

3. The facility is not within a mapped Potential Environmental Justice Area in the City of Rensselaer. The closest identified Potential Environmental Justice Area is on the east side of Route 9J. The project has been the subject of multiple local public meetings, hearings, and notices, including State Environmental Quality Review (SEQR) resulting in a Negative Declaration. According to CP-29, DEC Division of Environmental Permits is responsible for conducting a preliminary screen to assess if potential adverse environmental impacts are likely to affect a Potential Environmental Justice Area. The remainder of CP-29, including enhanced public participation, is only required if the preliminary screen identifies a Potential Environmental Justice Area is within an affected area by the project. The SEQR Negative Declaration supports that there are no potential adverse environmental impacts to surrounding areas from the facility.

4. A detailed noise assessment was prepared for the Site Plan submitted to the City. This noise assessment is included in the submitted Part 360 Application on pages 11-15 of the Engineering Report.

24 Wade Road ♦ Latham, New York 12110 ♦ Tel: 518-456-4900 ♦ Fax: 518-456-3532
E-mail: sterling@sterlingenvironmental.com ♦ Website: www.sterlingenvironmental.com

5. A completed application is attached for industrial discharge of generated leachate to the Rensselaer County Sewer District. As indicated in the submitted Engineering Report, an onsite holding tank will be available for offsite disposal at a permitted treatment facility if a sewer connection is not feasible. The facility will use municipal water through a metered connection at an estimated usage of 6,275 gallons per day.

6. The identified plans referenced in Appendix F: Facility Design Plan, have been corrected. Drawings D100 "Site Plot Plan" and D106 "Office Building Plan, View, Sections" are not applicable and were removed. The facility Site Plan is included in Engineering Report Appendix A – Site Plan Drawings. Drawing D106 was removed because there are no plans to construct a separate disconnected office building. The titles for Drawings D214 and D217 were corrected and are attached.

7. The State Environmental Quality Review Act comments are related to a statement in the Long EAF, which has been superseded by the full Application. At the time the Long EAF was prepared, the Applicant proposed to treat water through the existing BASF onsite treatment system. Following discussions with BASF and a meeting with NYSDEC Environmental Remediation staff on December 18, 2018, use of onsite treatment system was determined not to be feasible.

In addition to this response, we concur that a meeting may be beneficial to ensure NYSDEC has all necessary documentation to deem the application complete and request that the meeting occur as soon as possible in April 2019.

Please provide suggested meeting dates that work for the NYSDEC.

Very truly yours,

STERLING ENVIRONMENTAL ENGINEERING, P.C.

Mark P. Millspaugh, P.E.
President
mark.millspaugh@sterlingenvironmental.com

MPM/bc
Email/First Class Mail
Attachments

cc: Dennis Soriano, Rensselaer Resource Recovery, LLC

ATTACHMENT 1

AIR FACILITY REGISTRATION APPLICATION

Sterling Environmental Engineering, P.C.

APPLICATION FOR
AIR FACILITY REGISTRATION

FOR

RENSSELAER ENGINEERED FUELS
MECHANICAL BIOLOGICAL TREATMENT FACILITY
RENSSELAER, NY

Prepared For:

Rensselaer Resource Recovery, LLC
80 Red Schoolhouse Road, Suite 101
Chestnut Ridge, New York 10977

Prepared By:

Sterling Environmental Engineering, P.C.
24 Wade Road
Latham, New York 12110

March 28, 2019

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APPLICATION FOR
AIR FACILITY REGISTRATION

FOR

RENSSELAER ENGINEERED FUELS
MECHANICAL BIOLOGICAL TREATMENT FACILITY
RENSSELAER, NY

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1.0 INTRODUCTION

This narrative and attached supporting documentation provides a complete application for an Air Facility Registration under 6 NYCRR 201-4. Rensselaer Engineered Fuels, LLC (REF) is proposing to construct and operate a Municipal Solid Waste (MSW) Processing Facility (hereinafter the "Facility") with an annual throughput up to 150,000 tons of received MSW. Authorization to construct and operate the facility is the subject of a separate Solid Waste Management Facility Permit application to the New York State Department of Environmental Conservation (NYSDEC) pursuant to 6 NYCRR Part 360. As described in this narrative, all operations occur indoors under negative pressure to prevent fugitive emissions. During operation, the facility has the potential to emit particulate matter (PM10 and PM2.5) from mechanical processes and has the potential to emit odors (primarily ammonia and hydrogen sulfide) from the bio-oxidation process. The facility ventilation system exhausts to the atmosphere at two emission points subject to air pollution control devices. Exhaust air from mechanical processes is controlled through a baghouse, and exhaust air from the bio-oxidation process is controlled through biofilters. Calculated potential emissions with no control devices or operation restrictions (e.g., operating hour restrictions) are below the thresholds in 6 NYCRR 201-4.1(a) and 201-4.5(a) making the facility subject to air facility registration requirements (see the discussion of Particulate Matter (PM) in Narrative Section 8.0).

Table 1 provides a checklist of the application contents.

Table 1
6 NYCRR Part 201-4.3 Air Facility Registration Checklist

Regulatory Requirement	Description	Location
6 NYCRR 201-4.3	**Air Facility Registration Application Content**	
6 NYCRR 201-4.3(a)	Application for Air Facility Registration	Attachment 1
6 NYCRR 201-4.3(a)(1)	Identifying information, including owner name and address, facility name and address.	Attachment 1
6 NYCRR 201-4.3(a)(2)	Facility Location Map	Figures 1 and 2
6 NYCRR 201-4.3(a)(3)	Detailed description of the operations carried out at the facility including emission sources, processes, and products.	Narrative Section 2.0, Attachments 1-4
6 NYCRR 201-4.3(a)(4)	Listing of SIC or NAICS corresponding to the primary operations carried out at the facility.	Attachment 1
6 NYCRR 201-4.3(a)(5)	List of all regulated air pollutants and persistent, bioaccumulative, and toxic compounds emitted from the facility.	Attachment 1
6 NYCRR 201-4.3(a)(6)	List of all emission sources at the facility, except those that are exempt or trivial.	Narrative Section 2.0
6 NYCRR 201-4.3(a)(7)	List of applicable New York State requirements.	Attachment 1
6 NYCRR 201-4.3(a)(8)	List of applicable Federal requirements.	Attachment 1

2.0 DESCRIPTION OF PROJECT

The proposed Facility location is on Tax Parcel 154.00-5-2.132, 36 Riverside Avenue, Rensselaer, NY (Figure 1), owned by BASF Wyandotte Corp (State Superfund Site ID 442027). The Facility is designed to process MSW using a high efficiency mechanical biological treatment (MBT) technology to produce a marketable solid recovered fuel (SRF). When applied to MSW, the high efficiency MBT process:

- Substantially reduces the weight and moisture content of the resulting specification fuel product;
- Allows for additional recycling beyond initial source separation;
- Relieves demand on landfills and eases the associated environmental impacts;
- Provides a high-quality manufactured SRF that adheres to specific requirements and BTU values, effectively serving as an alternative to coal for use in cement manufacturing thereby reducing the emissions of greenhouse gases; and
- Involves no land disposal or incineration.

There is no processing of hazardous waste or incineration or combustion of MSW involved in the MBT process. The waste stream to be processed at the Facility will consist of MSW collected from residential dwellings and commercial businesses. Certain items such as hazardous waste, infectious medical waste, used oil, appliances, and construction debris will not be accepted. The Facility will be constructed and operated in accordance with a Part 360 permit with strict prohibitions on receiving non-MSW wastes. All MBT activities will be conducted indoors – from the reception of waste to the loading and shipment of the final SRF.

3.0 6 NYCRR PART 201-4.3(A) APPLICATION FOR AIR FACILITY REGISTRATION

A completed NYSDEC Air Facility Registration Form is provided as Attachment 1. Required elements of the application are included as additional attachments as indicated in Table 1.

4.0 6 NYCRR PART 201-4.3(A)(1) IDENTIFYING INFORMATION

Identifying information for the facility and facility owner is provided in the completed Air Facility Registration Form (Attachment 1).

5.0 6 NYCRR PART 201-4.3(A)(2) FACILITY LOCATION MAP

The facility will be located at Tax Parcel 154.00-5-2.132, 36 Riverside Avenue, Rensselaer, Rensselaer County, New York. Figure 1 displays the site location on a USGS 7.5-minute quadrangle map. Figure 2 displays the site vicinity on aerial imagery.

6.0 6 NYCRR PART 201-4.3(A)(3) DETAILED DESCRIPTION OF THE OPERATIONS

The facility uses high efficiency MBT technology to process MSW into a marketable SRF that meets specific end-use requirements. The facility consists of the following processes that are shown on the Facility Site Plan Sheet 3 provided as Attachment 2 and the Material Flow Diagram provided as Attachment 3.

The facility is totally enclosed with a slab concrete floor. The building includes the reception and pretreatment area, biological treatment (biodrying) area, commercial and industrial (C&I) waste reception area, mechanical treatment (refining) area, and SRF loading area. Descriptions of each area and associated processes are as follows:

1. Reception and Pretreatment Area – Household generated MSW is delivered by licensed haulers using standard hauling trucks that will not require modifications. Delivered MSW is received through quick opening doors into aerated reception pits. The approach ramps to the reception pits are slightly pitched into the Facility to ensure that any water from the trucks is collected in the reception pit. Air is continuously drawn into the building and a slight negative pressure is maintained in the enclosed Facility to avoid odor dispersion to surrounding areas. Monitoring of delivery and reception is performed remotely from a control room; at no time are Facility personnel in the reception area.

   No combustion or incineration of any kind is involved in this process. Leachate from the reception area is collected in dedicated piping and tanks for discharge to the City of Rensselaer sanitary sewer system.

   Following reception, MSW goes through an initial screening process where a large rotary drum tears open trash bags prior to screening the MSW for material segregation. The received MSW is moved from the reception pit to the rotary drum with a remotely controlled overhead bridge crane with a grab. Large piecs of waste referred to as “over-screen” are mechanically separated from the MSW and generally consist of biologically inert material not suitable for biological treatment (e.g., plastic, paper, and cardboard). This over-screen material is set aside for reintroduction to the process during the refining stage and is typically between 7 and 15% of the input. The remaining fraction, consisting primarily of biologically active organic waste is referred to as “under-screen” material. This under-screen fraction goes directly to the biological treatment area. An air circulation system is used to ensure rapid composting, as air circulation quickly starts the aerobic composting fermentation process.

2. Biological Treatment Area (Biodrying) – The under-screen material is placed in windrows on a prefabricated concrete floor containing slots through which processed air is introduced. This controlled combination of fresh and recirculated warm air from within the Facility ensures a consistent breakdown of the under-screen, reduces its moisture, and leaves a dry, paper-like product. Again, there is no combustion or incineration in this process. Windrows are virtually divided into zones for tracking and controlling the continuous biological treatment process (i.e., there are no physical dividing walls between windrows of differing age).

   The fans operating each biological treatment zone are variable control, which regulates the flow of air based on temperature as monitored by temperature probes that provide continuous feedback to the electronic control system. This system monitors temperature data and manages the airflow rate, air source (i.e., fresh or warmed), and the flow direction to achieve rapid oxidation.

Monitoring of biological treatment is performed remotely from the control room; at no time are Facility personnel in the biological treatment area.

3. Commercial and Industrial (C&I) Waste Reception Area – Adjacent to the biological treatment area is the C&I Reception Area for reception and staging of biologically inert C&I waste (e.g., carpet pellets, fluff, and roller paper waste). Collection trucks will enter the C&I Reception Area through a quick opening door and place waste directly on the concrete slab floor. C&I waste will be moved onto a conveyor belt with a wheel loader for transport directly to the Mechanical Treatment Area for refinement, skipping the biological treatment stage of the process.

4. Mechanical Treatment Area (Refinement) – Following biological treatment, the effectively dry product is moved to the mechanical treatment area for refinement. The large over-screen fraction (e.g., plastic, paper, and cardboard) is reintroduced to the process along with C&I waste. Using rotary screens, air separators, and magnetic infrared technology, three material streams are produced: Ferrous and non-ferrous metals for recycling; inerts such as PVC for disposal, and the remainder for final SRF production. The product is shredded into smaller pieces (1-3 cm), creating the engineered SRF that can augment or replace traditional fuels, such as coal and petroleum coke.

5. Solid Recovered Fuel (SRF) Loading Area – Following mechanical treatment, the processed MSW is now a manufactured marketable product referred to as SRF. The SRF loading area is enclosed entirely within the Facility and is designed to accommodate two 100 cubic yards (CY) walking floor trailers. The finished product is top loaded into trailers through a gravity chute with a conveyor from the mechanical treatment area. A hydraulic pump capable of attaching to the walking floor trailers is available so the floor can move to allow the SRF to be spread throughout the trailer. All loaded trucks are tarp-covered prior to leaving the loading area.

Emission sources associated with the process operations include the following:

Process	Emission
1. MSW Unloading Area	Particulates
2. MSW Pretreatment Drum Screener	Particulates
3. Biological Treatment Area	Odor
4. Refinement Primary Shredder	Particulates
5. Refinement Drum Screener	Particulates
6. Refinement Magnetic Belt	Particulates
7. Refinement Drum Separator	Particulates
8. Refinement Granulator	Particulates
9. Refinement Eddy Current Separator	Particulates

To control process emissions, the following air pollution control devices will be used:

Biofilter – The negative pressure environment within the Facility requires treatment of inside air to capture nuisance odors prior to outside exhaust. This occurs through a series of biofilters that consist of a parallel-piped tank made of prefabricated aluminum modular elements. Inside the tank, there is a PVC

watertight liner that forms a containment basin with a modular grid and filtering bed. Underneath the filtering bed and supporting grid is a plenum through which air is blown for treatment. The air passes through the filter bed and is released in the atmosphere. Odors are absorbed and metabolized by microbial colonies that populate the biofilter bed. The modular grid is made up of polypropylene tiles and columns that are 500 mm (19.7 inch) high with bearing capacity of 1,000 kg/m^2 (205 psf).

The biofilter is completed by a moistening system for the filtering material. The system is made of a network of sprinkler nozzles positioned above the biofilter media. Moistening of the biofilter with the sprinkler nozzles can be operated manually or automatically using control software tied to sensors in the biofilter that measure the humidity of the bed. The bottom of each biofilter is slightly sloped to convey the percolate through the draining pipes for collection and discharge to the sanitary sewer system. The biofilter will be designed, installed, operated, and maintained to achieve a minimum 99% collection efficiency.

Baghouse – The Facility has potential to generate dust during mechanical processing operations. To mitigate particulate dust emissions, interior air from areas excluding the Biological Treatment Area will be passed through a particulate control baghouse prior to exhaust to the atmosphere. The proposed baghouse will be a Moldow MX filter designed to achieve a PM-2.5 collection efficiency of 95%.

7.0 6 NYCRR PART 201-4.3(A)(4) LISTING OF SIC OR NAICS CODES

Applicable SIC and NAICS codes are included in the Air Facility Registration Application (Attachment 1) and listed below:

- SIC: 4953 – Refuse Systems
- NAICS: 562219 – Other Non-Hazardous Waste Transfer and Disposal

8.0 6 NYCRR PART 201-4.3(A)(5) LIST OF EMITTED REGULATED POLLUTANTS

Equivalent facilities currently operate in Europe and a facility has initiated operation on March 5, 2019 in West Virginia. Based on actual operating facilities, emitted pollutants include particulate matter (CAS No. 0NY075-00-0), ammonia (CAS No. 7664-41-7), and hydrogen sulfide (CAS No. 7783-06-4). Only particulate matter is a regulated criteria pollutant. No Hazardous Air Pollutants or Persistent, Bioaccumulative, or Toxic Compounds will be released as part of normal facility operations.

Facility emissions were calculated using the following Emission Factors from test data of comparable operating facilities:

Emission	Emission Factor (mg/m^3)	Emission Factor (lb/ft^3)
Particulate Matter	40	2.50×10^{-6}
Ammonia	17	1.06×10^{-6}
Hydrogen Sulfide	10	6.24×10^{-7}

Emissions were calculated as Potential to Emit (PTE) and estimated actual rates based on the following methodology and assumptions.

Potential to Emit:

- All facility operations were assumed to be operational 24 hours per day, 365 days per year.
- All facility emissions were assumed to be released to the atmosphere with no mitigation by pollution control devices.

Estimated Actual:

- Facility operating hours for mechanical processes (particulate emissions only) were limited to the proposed operating schedule of 9 hours per weekday and 7 hours on Saturday, excluding holidays. This equates to 302 working days per year and 2,614 operating hours.
- Facility operations for the biological treatment process remained at 24 hours per day, 365 days per year.
- Emission collection efficiencies of 95% were applied for particulate control by the baghouse and 99% were applied for odor control by the biofilter.

Calculated emissions for potential to emit and estimated actual are both less than 50% of the major facility threshold of 100 tons per year for particulate matter. Emission calculation summaries are provided in Attachment 4 and summarized in the following table:

Emission	Potential to Emit (ton/yr)	Actual (ton/yr)
Particulate Matter	29.0	0.43
Ammonia	13.3	0.13
Hydrogen Sulfide	7.8	0.08
Carbon Dioxide Equivalents	2,919	2,919

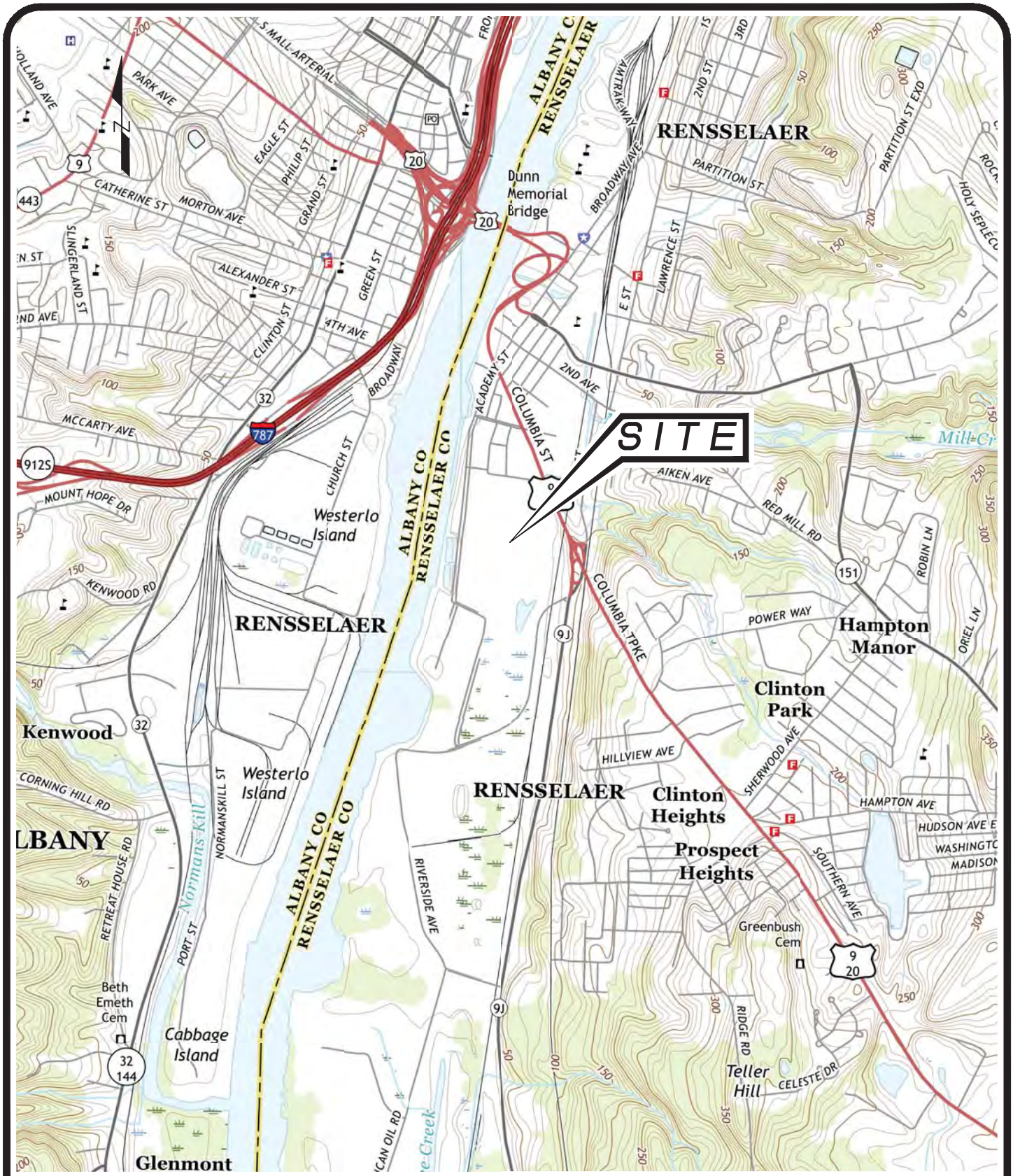
Particulate Matter is a Criteria Contaminant under the National Ambient Air Quality Standards (NAAQS) of the Clean Air Act in the United States of America.

While Ammonia is not currently a regulated pollutant under the Clean Air Act, Ammonia is regarded as a precursor to PM2.5 formation and eventually may be regulated similar to criteria pollutants.

Hydrogen sulfide is included in Section 112(r) of the Clean Air Act and is subject to the accidental release provision. Also, hydrogen sulfide is considered a pollutant for which there should be restricted emissions under the Prevention of Significant Deterioration (PSD) requirements. Hydrogen sulfide is capable of oxidizing in the atmosphere to sulfur dioxide, which is a Criteria Contaminant. Therefore, industrial operations that emit hydrogen sulfide above a Significant Emissions Rate (SER) are sometimes limited to a hydrogen sulfide emission rate below 10 tons per year. The calculated potential to emit for hydrogen sulfide is less than 10 tons per year.

The production of carbon dioxide equivalents in greenhouse gases is estimated to be approximately 2,919 tons per year. Since this is much less than 100,000 tons per year first proposed by the USEPA in the June 3, 2010 “Tailoring Rule,” the proposed facility is considered a minor source of greenhouse gases.

FIGURES



MAP REFERENCE: USGS ALBANY, TROY–SOUTH, DELMAR, AND EAST GREENBUSH 7.5 MINUTE QUADRANGLES, 2016

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24 Wade Road ♦ Latham, New York 12110

SITE LOCATION MAP

36 RIVERSIDE AVENUE

RENSSELAER ENGINEERED FUELS

CITY OF RENSSELAER RENSSELAER CO., NEW YORK

PROJ. No.: 2018–09	DATE: 10/22/18	SCALE: 1" = 2,000'	DWG. NO. 2018–09002	FIGURE 1

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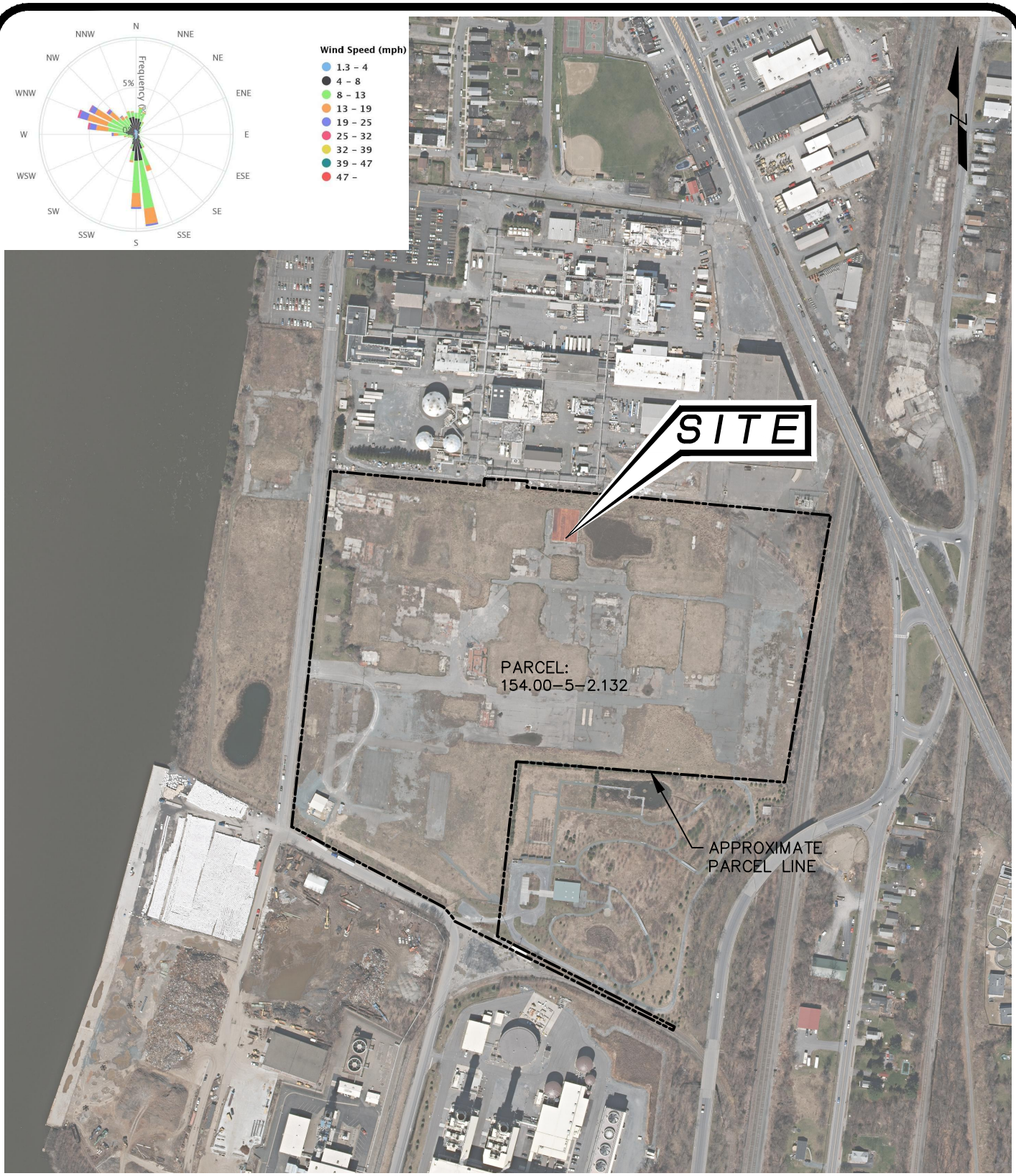

MAP REFERENCE: DISCOVER GIS DATA NY ORTHOIMAGERY, 2017.
WIND ROSE SOURCE: WWW.CLIMATE.GOV, DATA FROM ALBANY AIRPORT, MARCH 1, 2016 TO MARCH 29, 2019

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SITE VICINITY MAP
36 RIVERSIDE AVENUE
RENSSELAER ENGINEERED FUELS

CITY OF RENSSELAER RENSSELAER CO., NEW YORK

PROJ. No.: 2018–09	DATE: 03/29/19	SCALE: 1" = 400'	DWG. NO. 2018–09004	FIGURE 2

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ATTACHMENT 1

AIR FACILITY REGISTRATION FORM

New York State Department of Environmental Conservation
Air Facility Registration Application Instructions

Stationary sources meeting the applicability requirements of 6 NYCRR Subpart 201-4 are required to register with the Department prior to their construction or operation. Please contact the appropriate DEC regional office if you are unsure how to complete any portion of the attached application. A list of DEC regional offices and their contact information is available on the Department's website: http://www.dec.ny.gov/about/76070.html

DEC ID: Enter the 10 digit DEC ID of the facility. **If this application is for a new facility, leave this box blank.**

Application Type: Check the box that corresponds to the type of registration being applied for. If the facility has not been previously issued an air facility registration or other air pollution control permit, check new facility. If the application is for a modification or any other change to an existing registered facility, check notification of changes. If the application is for the renewal of an existing registration that is nearing its expiration date, check renewal. **Renewal applications for air facility registrations must be submitted to the department 60 days before the registration expiration date.**

Facility Information:

Name: Enter the name of the facility (e.g. XYZ Manufacturing, Inc.).

Facility Address: Enter the physical address of the facility (e.g. 27 Acme Rd. or Building 3, XYZ Industrial Park). Also list the city, county and township in which the facility is located. For instances where a facility is located in multiple jurisdictions (i.e. across town or county lines) list all jurisdictions. **If the application is for a new facility, attach a map with the physical location of the facility clearly marked.**

Principal Reference Point: Enter the North and East New York Transverse Mercator (NYTM) coordinates that correspond to the facility's address provided above in kilometers to the nearest three decimal places. NYTM coordinates can be obtained from https://orthos.dhses.ny.gov/. In the lower right-hand corner, change the display from Lat/Long to UTM. The tools icon contains a search function which can pinpoint a given address. Note that the provided coordinates are in meters. To obtain kilometers, divide each coordinate by 1000 and enter the result in the appropriate box.

Facility Owner:

Taxpayer ID: Enter the business taxpayer ID number. **Do not enter personal social security numbers.**

Name: Enter the full name of the individual or firm that owns or operates the facility for which this application is being prepared. For individuals, list the owner's full name (last, first, middle initial). For facilities with multiple owners, where no legal business partnership exists, provide the name of each individual owner. For corporations, include the full name of the corporation and the division or subdivision name (if applicable). **Note: the facility owner is legally responsible for the facility's operations and compliance with all applicable regulations, and must be registered with the New York State Department of State.**

Street Address: Enter the mailing address of the facility owner. For facilities with multiple owners, enter the mailing address of each individual owner, if different. Include the country if foreign owned and the appropriate ZIP/mail code.

Facility Contact: List the full name (last, first, middle initial), street address, e-mail address, telephone number, and fax number of the facility owner's representative. **Note:** The facility contact is responsible for answering any air permit inquiries regarding this facility, and will serve as the point of contact between the Department and the facility.

Facility Description:

Number of Emission Points: Enter the number of emission points located at the facility. An emission point is defined in Subpart 200.1 as any conduit, chimney, duct, vent, flue, stack, or opening of any kind through which air contaminants are emitted to the outdoor atmosphere. Do not include any emission points which vent emissions exclusively from exempt and trivial activities as defined in Subpart 201-3.

Standard Industrial Classification (SIC) Code(s): Enter the primary SIC code(s) that apply to the facility with the principal SIC code listed first. SIC codes may be obtained from the United States Department of Labor.

North American Industry Classification System (NAICS) Code(s): Enter the primary NAICS code(s) that apply to the facility with the principal NAICS code listed first. NAICS codes may be obtained from the United States Census Bureau.

Description: Provide a detailed description of the facility in terms of its primary function or business activity. Include a description and listing of all emission sources and their associated emission points that are not exempt or trivial as described in Subpart 201-3. The facility description should include the principal industrial or manufacturing processes including the item(s) being manufactured (if applicable), process equipment details (e.g. type, size, fuel used), and any other information supporting the SIC and NAICS code(s) listed above. Continuation sheets may be used if necessary.

Applicable Federal and New York State Regulations: List the rule citations of all applicable federal and New York State regulations as they pertain to this facility. The rule citation should be listed at the Subpart level (i.e. 201-4, 40 CFR 60 Subpart Dc).

Auto Body Shops: Provide the total quantity of coatings (e.g. paint, primer etc.) and solvents used on a gallons per month basis. If the facility described in the registration is not an auto body shop, leave this box blank.

Facility Emissions Summary: For all facilities **other than auto body shops**, provide emissions estimates for criteria pollutants *(CO, $PM_{10/2.5}$, SO_2, NOx, VOC, lead, Total HAP, and CO2 equivalents)*, individual hazardous air pollutants (HAPs, see Subpart 200.1) and High Toxicity Air Contaminants (HTACs, see Subparts 201-9 and 212-2.3). Do not include emissions of HTACs from combustion installations or emission sources that are listed as exempt or trivial in Subpart 201-3. **Attach all calculations used to determine the emissions information reported in this section.**

Cap by Rule: Check this box if the potential to emit for this contaminant is to be capped by rule pursuant to Subpart 201-4.5. Capping by rule is a regulatory provision that allows a facility to limit their actual emissions (as described in 6 NYCRR Subpart 201-4.5) in order to avoid applicability to certain regulations. A facility owner or operator choosing to cap-by-rule is agreeing to comply with the requirements of Subpart 201-4.5 with respect to the processes or emission sources being operated at the facility. If the cap by rule box is checked, indicate which regulations are to be avoided by the cap in the facility description box above.

Actual: For each listed compound that is to be capped by rule as described above, calculate the facility's Actual Emissions in pounds per year. Actual Emissions are defined in Subpart 201-2 as the emissions resulting from normal daily operations, verifiable by operating records or other compliance monitoring activities, averaged over the past two years or some other more representative time interval. Enter the total actual emissions from all non-exempt, exempt, and trivial emission sources located at the facility for each contaminant listed in the appropriate box.

PTE: For each listed compound that is **not** capped by rule as described above, calculate the facility's potential to emit (PTE) in pounds per year. Potential to Emit is defined in Subpart 200.1 as the maximum capacity of an air contamination source to emit any regulated air pollutant under its physical and operational design. Accordingly, the PTE of the facility should be calculated assuming each emission source operates for a total of 8760 hours per year. Enter the total PTE of each contaminant from all non-exempt, exempt, and trivial emission sources located at the facility in the appropriate box. If the calculated PTE for any listed contaminant exceeds the major facility thresholds described in 6 NYCRR Part 201-2.1(b)(21) the facility must cap by rule (as described above) for that contaminant in order to remain eligible for registration.

Note: The USEPA has developed the *Compilation of Air Pollutant Emission Factors* (AP-42). This document is useful for calculating the actual and potential emissions required by this section using emission factors. A link to the online version is provided on the Department's website: http://www.dec.ny.gov/chemical/4754.html

Certification: Enter the name, official title, signature, and date of signature of the responsible official accountable for the compliance of this facility with all applicable regulations. The responsible official is defined as a president, vice president, secretary, treasurer, general partner, proprietor, principle executive officer, ranking elected official, or any other person who performs policy or decision making functions and is authorized to legally bind the corporation, partnership, sole proprietorship, or government entity which operates the facility. Certification is required by a representative of the firm or applicant demonstrating the truth, accuracy, and completeness of the information contained in this application. **The responsible official should be aware that significant penalties could result from submitting false information, including the possibility of fines and imprisonment.**

Completed registration applications should be sent to the appropriate DEC Regional Office to the attention of the Regional Air Pollution Control Engineer. A list of DEC regional offices and their contact information is available on the Department's website at: http://www.dec.ny.gov/about/76070.html

New York State Department of Environmental Conservation
Air Facility Registration Application

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID	Application Type	Sheet 1 of 2
- -	☒ New Facility ☐ Notification of Changes ☐ Renewal	

Facility Information

Name Rensselaer Engineered Fuels			
Facility Address 36 Riverside Avenue (Tax Parcel 154.00-5-2.132)			
City Rensselaer	County Rensselaer	Township	Zip 12144
Principal Reference Point	NYTM N (KM) 1384027	NYTM E (KM) 694550	

Facility Owner (Individual/Firm)

Taxpayer ID: 8 2 5 0 5 0 3 5 3

Name Rensselaer Resource Recovery, LLC			
Street Address 80 Red Schoolhouse Road, Suite 101			
City Chestnut Ridge	State/Province NY	Country USA	Zip 10977

Facility Contact

Name Dennis Soriano			
Street Address 80 Red Schoolhouse Road, Suite 101			
City Chestnut Ridge	State/Province NY	Country USA	Zip 10977
E-mail dsoriano@biohitech.com	Phone (845) 559-9333	Fax	

Facility Description

Number of Emission Points: 2 ☐ Continuation Sheet(s)

SIC Code(s)	4953		NAICS Code(s)	562219		

Rensselaer Engineered Fuels, LLC is proposing to construct and operate a Municipal Solid Waste (MSW) Processing Facility with an annual throughput up to 150,000 tons of received MSW. The Facility is designed to process MSW using a high efficiency mechanical biological treatment (MBT) technology to produce a marketable solid recovered fuel (SRF) as an alternative to coal. All operations occur indoors under negative pressure to prevent fugitive emissions of particulates and odors. During operation, the Facility has the potential to emit particulate matter (PM10 and PM2.5) from mechanical processes and has the potential to emit odors (primarily ammonia and hydrogen sulfide) from the bio-oxidation process. The Facility ventilation system exhausts to the atmosphere at two emission points subject to air pollution control devices. Exhaust air from mechanical processes is controlled through a baghouse, and exhaust air from the bio-oxidation process is controlled through biofilters. Calculated potential emissions with no control devices or operation restrictions (e.g., operating hour restrictions) are below the thresholds in 6 NYCRR 201-4.1(a) and 201-4.5(a) making the facility subject to air facility registration requirements.

Applicable Federal and New York State Regulations at the Subpart Level

☐ Continuation Sheet(s)

200	201-4	201-5	211-1	211-2
212				

New York State Department of Environmental Conservation
Air Facility Registration Application

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID
- -

Auto Body Shops

gallons of coatings/month: NA	gallons of solvents/month: NA

Facility Emissions Summary

Criteria Pollutants

CAS Number	Contaminant Name	Cap by Rule	Actual (lbs/yr)	PTE (lbs/yr)
000630-08-0	Carbon Monoxide	☐		
0NY998-00-0	Total Volatile Organic Compounds (VOC)	☐		
0NY210-00-0	Oxides of Nitrogen	☐		
0NY075-00-0	Total Particulate Matter (PM-10 and PM-2.5)	☐	865	57,948
007446-09-5	Sulfur Dioxide	☐		
0NY100-00-0	Total Hazardous Air Pollutants (HAP)	☐		
007439-92-1	Lead	☐		
0NY750-00-0	Carbon Dioxide Equivalents	☐	2,919 ton/yr	2,919 ton/yr

Individual Hazardous Air Pollutants

☐ Continuation Sheet(s)

CAS Number	Contaminant Name	Cap by Rule	Actual (lbs/yr)	PTE (lbs/yr)
		☐		
		☐		
		☐		
		☐		
		☐		

High Toxicity Air Contaminants

☐ Continuation Sheet(s)

CAS Number	Contaminant Name		Actual (lbs/yr)	

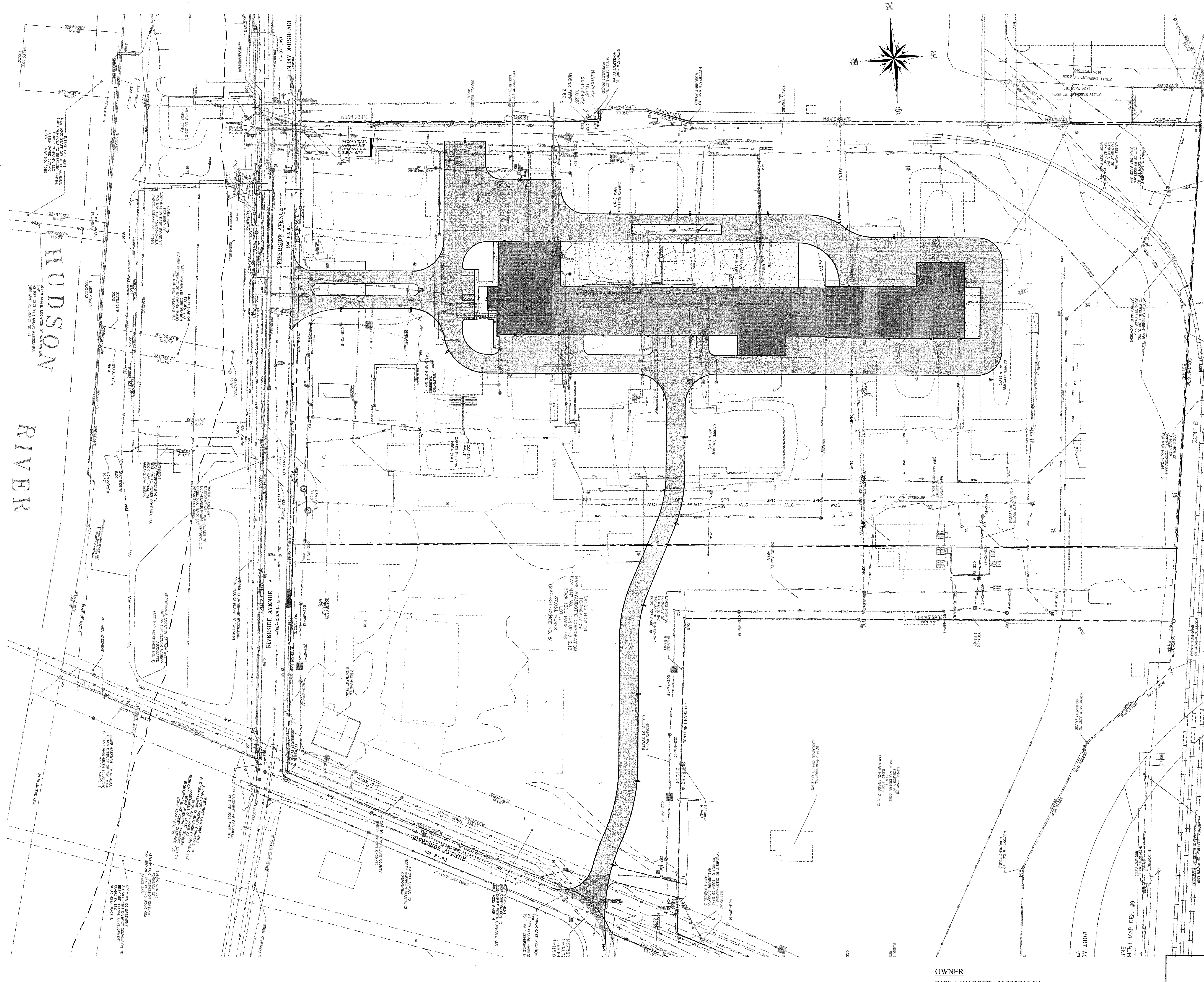
Certification

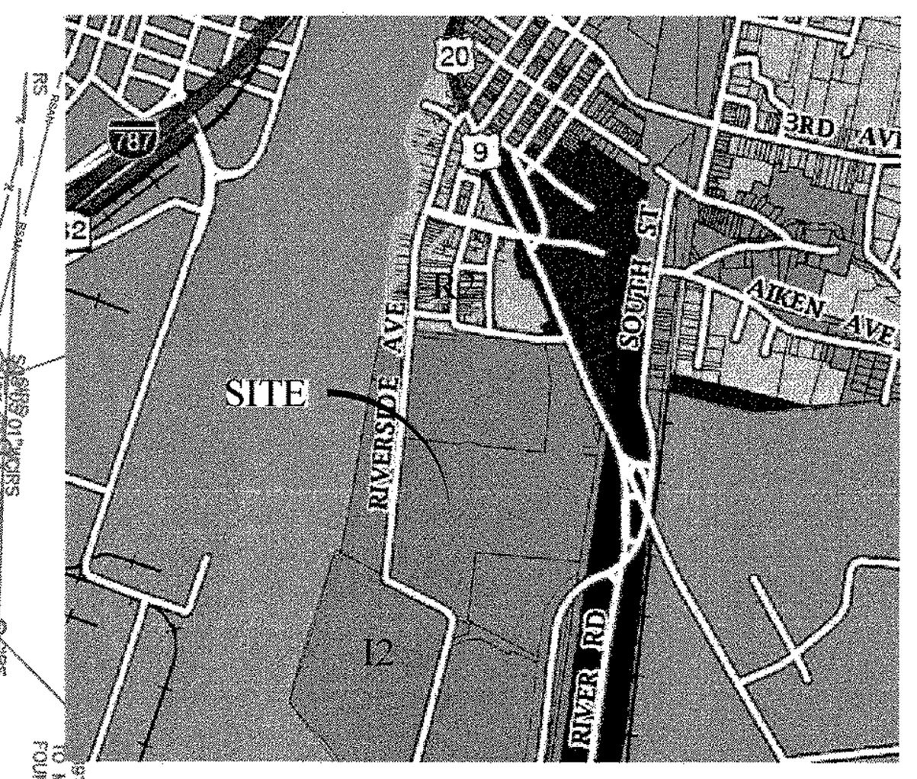
I certify the truth, accuracy, and completeness of the information contained in this application.

Responsible Official DENNIS SORIANO	Title Dir. of Bus. Develop.
Signature Dennis Soriano	Date 3/28/19

ATTACHMENT 2

FACILITY SITE PLAN





ZONING MAP
N.T.S.

DEMOLITION NOTES:

1. ALL DEMOLITION MATERIALS SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH THE REQUIREMENTS OF ALL REGULATORY AGENCIES, INCLUDING: CITY OF RENSSELAER, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION AND ALL OTHER AGENCIES.
2. ALL DEMOLITION MATERIALS SHALL BE DISPOSED OF AT AN APPROVED AND PERMITTED FACILITY.
3. CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL REQUIRED PERMITS.
4. CONTRACTOR IS RESPONSIBLE TO CONTACT AND COORDINATE ALL WORK WITH UTILITY COMPANIES.
5. CONTRACTOR IS RESPONSIBLE TO MINIMIZE THE AMOUNT OF DUST AND NOISE POLLUTION GENERATED DURING DEMOLITION OPERATIONS.
6. IF HAZARDOUS WASTE IS ENCOUNTERED DURING DEMOLITION WORK, THE CONTRACTOR SHALL CONTACT THE REGULATORY AGENCIES AND COMPLY WITH THE JURISDICTIONAL REQUIREMENTS. HAZARDOUS WASTE MUST BE REMOVED BY A PERMITTED HAZARDOUS WASTE CONTRACTOR TO A PERMITTED HAZARDOUS WASTE SITE. (SEE SITE HISTORICAL USE NOTIFICATION NOTE–THIS SHEET)
7. DEMOLITION SHALL INCLUDE, BUT IS NOT LIMITED TO, REMOVAL OF: FOUNDATION WALLS, FLOOR SLABS, SURFACE PAVEMENTS, WALLS, ROOFS AND ALL OTHER STRUCTURES NOT SCHEDULED TO REMAIN.
8. ALL DEPRESSIONS IN THE GROUND SURFACE RESULTING FROM DEMOLITION WORK SHALL BE BACKFILLED WITH CLEAN, GRANULAR FILL MATERIALS MEETING NEW YORK STATE DEPARTMENT OF TRANSPORTATION TYPE 4 SPECIFICATIONS. FILL SHALL BE COMPACTED TO MINIMUM 90% MODIFIED PROCTOR DENSITY AND PLACED IN 12" LIFTS MAXIMUM.

Site Utilities Note

IT IS OUR UNDERSTANDING THAT UTILITIES SHOWN HEREON HAVE BEEN ABANDONED. IT IS THE CONTRACTORS RESPONSIBILITY TO CONFIRM WITH THE RESPECTIVE UTILITY OWNERS THAT THE EXISTING UTILITIES HAVE BEEN IN FACT ABANDONED.

Site Historical Use Notification

THE CONTRACTOR IS INFORMED THAT THE SITE WAS PREVIOUSLY USED AS THE BASF MANUFACTURING PLANT AND THERE WAS WASTE DISPOSAL CONDUCTED AT THE SITE DURING THAT HISTORICAL SITE USAGE. THE FORMER BASF MANUFACTURING PLANT PORTIONS OF THE SITE HAVE BEEN CLOSED IN ACCORDANCE WITH THE REQUIREMENTS OF THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC). IN ADDITION, ENGINEERING REPORTS AND DRAWINGS COMPILED DURING THE SITE CLOSURE INVESTIGATIONS ARE AVAILABLE AND THE SITE CONTRACTOR SHALL BECOME FAMILIAR WITH THOSE DOCUMENTS PRIOR TO CONDUCTING ANY SITE WORK AT THE PROJECT SITE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW AND BECOME FAMILIAR WITH THE DATA PREVIOUSLY GENERATED. THE CONTRACTOR SHALL REVIEW AND BECOME FAMILIAR WITH THE REQUIREMENTS SPECIFICALLY IDENTIFIED IN THE SITE MANAGEMENT PLAN (SMP) AND THE EXCAVATION WORK PLAN (EWP) THAT HAVE SPECIFIC NOTIFICATION, TESTING AND OPERATION REQUIREMENTS.
THE SITE MANAGEMENT PLAN (SMP) AND THE EXCAVATION WORK PLAN (EWP) HAVE BEEN PREPARED BY REMEDIAL ENGINEERING, PC , ENVIRONMENTAL ENGINEERS AND ROUX ASSOCIATES, INC. AND ARE DATED MAY 7, 2014.

SURVEY NOTES:

1. EXISTING INFORMATION SHOWN HEREON WAS TAKEN FROM THE MAP REFERENCE AND DOES NOT CONSTITUTE AN ACTUAL FIELD SURVEY CONDUCTED BY ADVANCE ENGINEERING & SURVEYING, PLLC.
2. TAX MAP DESIGNATION: 154.00 – 5 – 2.132.

MAP REFERENCE:

TOPOGRAPHIC AND BOUNDARY SURVEY, BASF WYANDOTTE, CORPORATION, 36 RIVERSIDE AVENUE, CITY OF RENSSELAER, RENSSELAER COUNTY, NEW YORK, DATED APRIL 25, 2018, AS PREPARED BY WILLIAM M. CURRAN, PROFESSIONAL LAND SURVEYOR.

SITE STATISTICS

	EXISTING	% COV.	PROPOSED	% COV.
PROJECT AREA	489,030 S.F.		UNCHANGED	
LOT WIDTH	677.92'		UNCHANGED	
PAVED AREA	318,829 S.F.	65.2	185,754 S.F.	38.0
GREEN SPACE	31,909 S.F.	6.5	230,862 S.F.	47.2
BUILDING AREA	138,292 S.F.	28.3	72,414 S.F.	14.8
TOTAL	489,030 S.F.	100.0	489,030 S.F.	100.0

PARKING ANALYSIS:

PROPOSED MANUFACTURING OPERATIONS:

PARKING REQUIRED: 1 SPACE PER EMPLOYEE
16 EMPLOYEES = 16 SPACES

PARKING PROVIDED: 16 SPACES
(INCLUDES 1 ACCESSIBLE SPACE)

OWNER

BASF WYANDOTTE CORPORATION
110 PARK AVENUE
FLORHAM PARK, NJ 07932

APPLICANT

RENSSELAER RESOURCE RECOVERY, LLC
80 RED SCHOOL HOUSE ROAD, SUITE 101
CHESTNUT RIDGE, NY 10977

Dig Safely. New York Call811 before you dig

CITY OF RENSSELAER
APPROVAL

FOR SITE PLAN APPROVAL ONLY - NOT FOR CONSTRUCTION

NO.	REVISION	BY	APPD.	DATE
1)	ISSUED FOR REVIEW	R.D.D.	N.C.	05-07-18
2)	REVISED PER CITY, PLANNING COMMISSION, GPI AND CLIENT COMMENTS	R.D.D.	N.C.	08-09-18

HART ENGINEERING
1969 FERNDALE ROAD
CASTLETON, NY 12033
Phone: (518) 479-4014
Fax: (518) 477-6371

Law of the State of New York, for under the direction of a Licensed Professional Engineer, to alter this It is a violation of the Education any person, unless he is acting document in any way.

08.09.18
NICHOLAS COSTA, P.E.

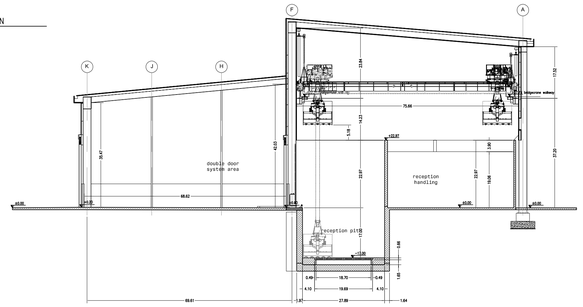
Design of:
ADVANCE ENGINEERING & SURVEYING, PLLC
CONSULTING IN -
CIVIL & ENVIRONMENTAL ENGINEERING
LAND SURVEYING & DEVELOPMENT
COMMERCIAL AND RESIDENTIAL
11 HERBERT DRIVE, LATHAM, N.Y. 12110
PHONE: (518) 698-3772 E-MAIL: ncostape@gmail.com

OVERALL SITE PLAN
RENSSELAER ENGINEERED FUELS PROJECT
36 RIVERSIDE AVENUE
CITY OF RENSSELAER * COUNTY OF RENSSELAER * NEW YORK
DATE: MAY 7, 2018 SCALE: 1"=60'

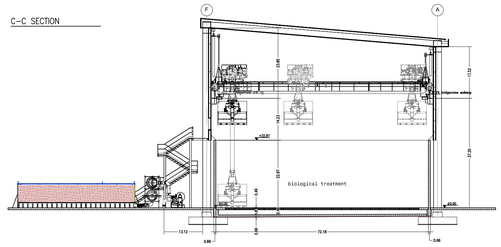
OVRSP
3 of 13 18058–SITE2

\\192.168.0.8\shared files\JOBS\Jobs 2018\#18058-rensselaer resource recovery facility, hart\Dwg\18058-SITE2.dwg, 8/9/2018 2:19:29 PM, Robert D Davis Jr, 1:1

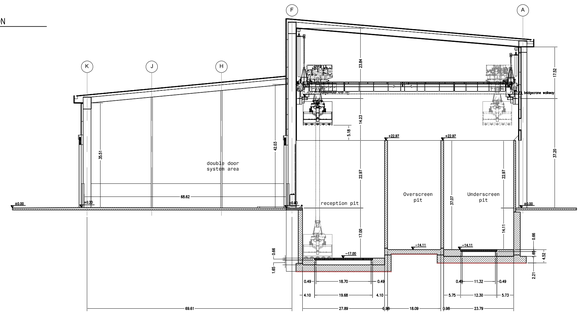
A–A SECTION



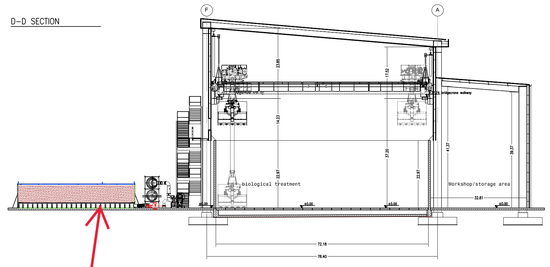
C–C SECTION



B–B SECTION

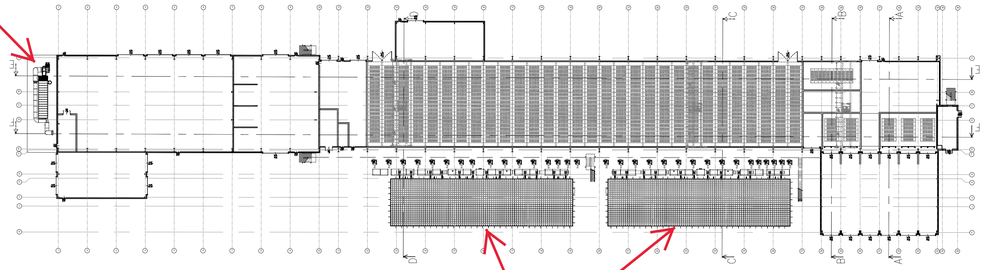


D–D SECTION



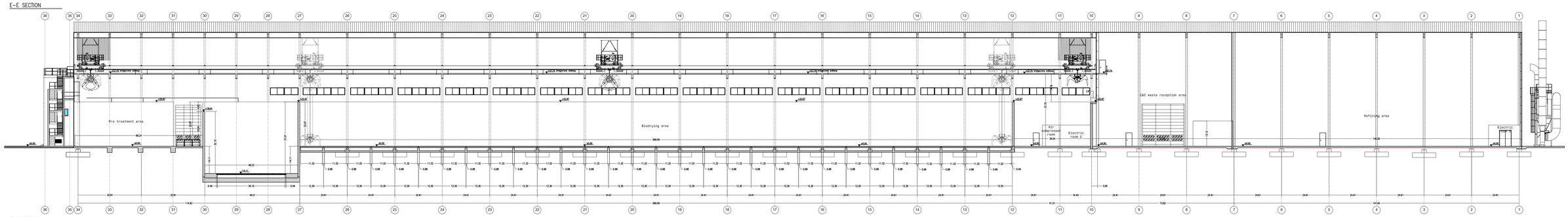
Emission Point No. 2
Odor Control Biofilter

Emission Point No. 1
Particulate Control
Baghouse.

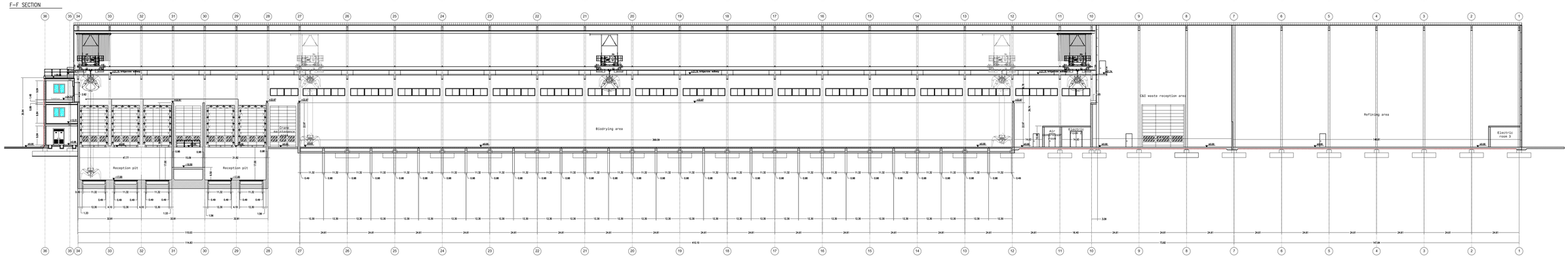


Emission Point No. 2
Odor Control Biofilter

E–E SECTION



F–F SECTION



NOTE:

Dimensions in feet; elevations in feet except where otherwise indicated

TOLLERANCES: ±1cm/±0.4" FOR CIVIL WORKS
±1mm/±0.04" FOR MECHANICAL WORKS

DO NOT TAKE DIMENSIONS IN SCALE ON DRAWING.
ALL MODIFICATIONS SHALL BE AUTHORIZED BY ENTSORGA ITALIA S.p.A.

DO NOT USE THIS DRAWING FOR CONSTRUCTION UNLESS EXPLICITY INDICATED IN THE REVISIONS BOX

ANY COMMENTS ON THIS DOCUMENT SHALL BE MADE IN WRITING TO ENTSORGA WITHIN SEVEN DAYS OF RECEIPT. THE RECIPIENT ACKNOWLEDGES AND ACCEPTS THAT IF NO COMMENTS ARE SUBMITTED WITHIN THIS TIMESCALE THE DOCUMENT SHALL BE DEEMED ACCEPTED

REV.	DATE	Drawn	Checked	Approved	Description
A	26/10/18	MD	WF	PPCM	SECOND EDITION
0	17/10/18	MD	WF	PPCM	FIRST EDITION

ENTSORGA
GREEN TECHNOLOGY REVOLUTION
Str. Prov. per Castelnuovo S., 7
15057 Tortona (AL)
Tel. 0131.811383
Fax 0131.862597
email info@entsorga.it

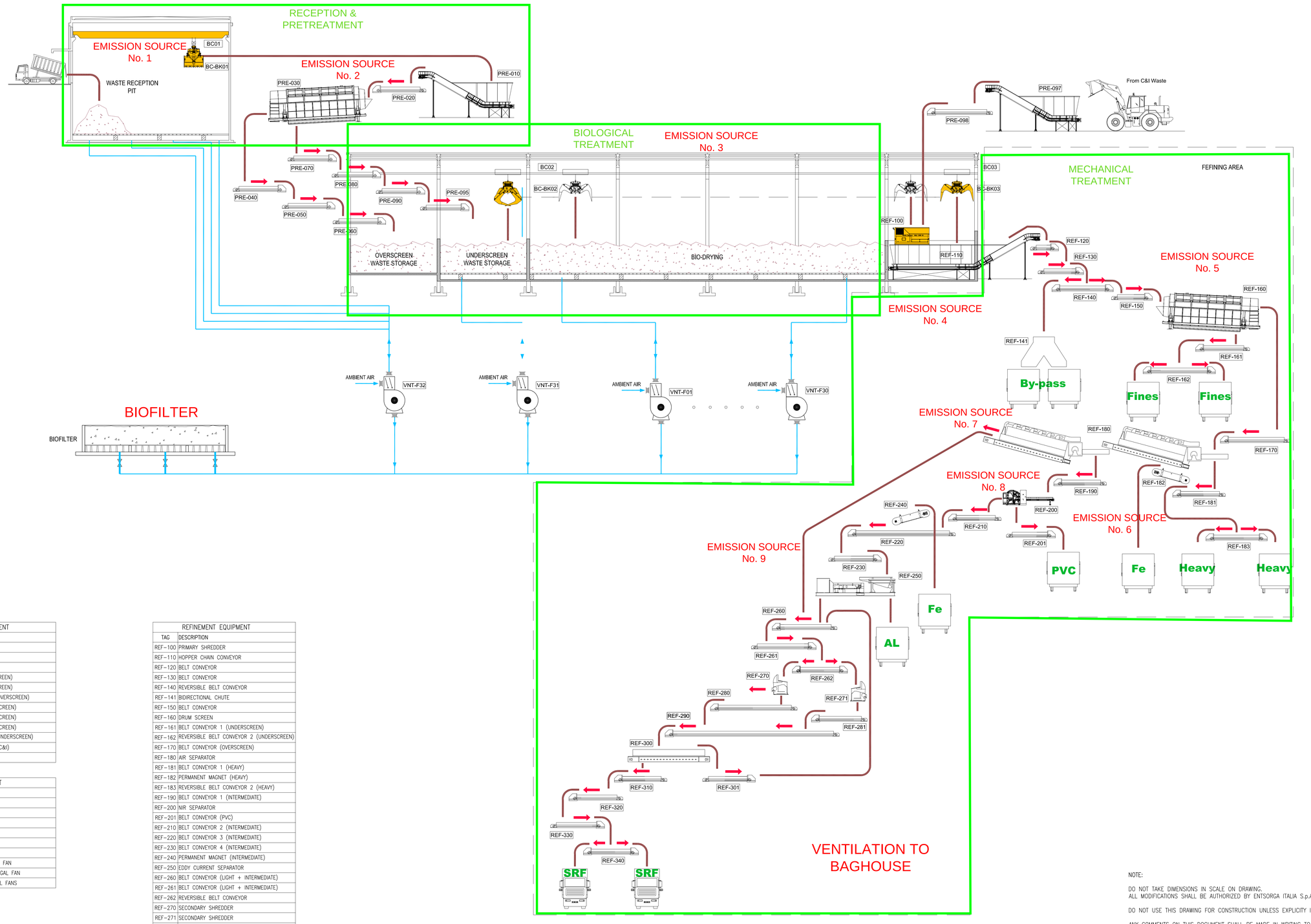
PROJECT: Rensselaer Resource Recovery Project

DRAWING TITLE: Building sections

REQUISITION	DATE:	FORMAT:	SCALE:	DWG. N°	SHEET:
–	17/10/18	E1	1:250	P479 D103/A	1of1

ATTACHMENT 3

MATERIAL FLOW DIAGRAM



PRE-TREATMENT EQUIPMENT	
TAG	DESCRIPTION
PRE-010	HOPPER CHAIN CONVEYOR
PRE-020	BELT CONVEYOR
PRE-030	DRUM SCREEN
PRE-040	BELT CONVEYOR 1 (OVERSCREEN)
PRE-050	BELT CONVEYOR 2 (OVERSCREEN)
REF-060	SHUTTLE BELT CONVEYOR (OVERSCREEN)
PRE-070	BELT CONVEYOR 1 (UNDERSCREEN)
PRE-080	BELT CONVEYOR 2 (UNDERSCREEN)
PRE-090	BELT CONVEYOR 3 (UNDERSCREEN)
PRE-095	SHUTTLE BELT CONVEYOR (UNDERSCREEN)
PRE-097	HOPPER CHAIN CONVEYOR (C&I)
PRE-098	BELT CONVEYOR

BIO-OXIDATION EQUIPMENT	
TAG	DESCRIPTION
BC01	BRIDGE CRANE
BC-BK01	BUCKET
BC-02	BRIDGE CRANE
BC-BK02	BUCKET
BC-03	BRIDGE CRANE
BC-BK03	BUCKET
VNT-F32	RECEPTION CENTRIFUGAL FAN
VNT-F31	UNDERSCREEN CENTRIFUGAL FAN
VNT-F01...30	BIOXIDATION CENTRIFUGAL FANS

WASTE STREAM

AIR PIPELINES

REFINEMENT EQUIPMENT	
TAG	DESCRIPTION
REF-100	PRIMARY SHREDDER
REF-110	HOPPER CHAIN CONVEYOR
REF-120	BELT CONVEYOR
REF-130	BELT CONVEYOR
REF-140	REVERSIBLE BELT CONVEYOR
REF-141	BIDIRECTIONAL CHUTE
REF-150	BELT CONVEYOR
REF-160	DRUM SCREEN
REF-161	BELT CONVEYOR 1 (UNDERSCREEN)
REF-162	REVERSIBLE BELT CONVEYOR 2 (UNDERSCREEN)
REF-170	BELT CONVEYOR (OVERSCREEN)
REF-180	AIR SEPARATOR
REF-181	BELT CONVEYOR 1 (HEAVY)
REF-182	PERMANENT MAGNET (HEAVY)
REF-183	REVERSIBLE BELT CONVEYOR 2 (HEAVY)
REF-190	BELT CONVEYOR 1 (INTERMEDIATE)
REF-200	NIR SEPARATOR
REF-201	BELT CONVEYOR (PVC)
REF-210	BELT CONVEYOR 2 (INTERMEDIATE)
REF-220	BELT CONVEYOR 3 (INTERMEDIATE)
REF-230	BELT CONVEYOR 4 (INTERMEDIATE)
REF-240	PERMANENT MAGNET (INTERMEDIATE)
REF-250	EDDY CURRENT SEPARATOR
REF-260	BELT CONVEYOR (LIGHT + INTERMEDIATE)
REF-261	BELT CONVEYOR (LIGHT + INTERMEDIATE)
REF-262	REVERSIBLE BELT CONVEYOR
REF-270	SECONDARY SHREDDER
REF-271	SECONDARY SHREDDER
REF-280	EXTRACTION CONVEYOR 1
REF-281	EXTRACTION CONVEYOR 2
REF-290	EXTRACTION CONVEYOR 3
REF-300	DISC SCREEN
REF-301	BELT CONVEYOR (SRF QUALITY CONTROL)
REF-310	BELT CONVEYOR 1 (SRF)
REF-320	BELT CONVEYOR 2 (SRF)
REF-330	BELT CONVEYOR 3 (SRF)
REF-340	REVERSIBLE BELT CONVEYOR (SRF)
REF-FF01	FABRIC FILTER

NOTE:

DO NOT TAKE DIMENSIONS IN SCALE ON DRAWING.
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REV.	DATE	Drawn	Checked	Approved	Description
A	26/10/18	MD	WF	PPCM	SECOND EDITION
0	17/10/18	MD	WF	PPCM	FIRST EDITION

ENTSORGA
GREEN TECHNOLOGY REVOLUTION
Str. Prov. per Castelnuovo S., 7
15057 Tortona (AL)
Tel. 0131.811383
Fax 0131.862597
email info@entsorga.it

PROJECT: Rensselaer Resource Recovery Project

DRAWING TITLE: Material flow chart

REQUISITION	DATE:	FORMAT:	SCALE:	DWG. N°	SHEET:
–	17/10/18	E1	NN	P479 D107/A	1of1

ATTACHMENT 4

FACILITY EMISSIONS SUMMARY

Calcs. By: RLA Date: 03/12/2019 Client: Rensselaer Resource Recovery, LLC
Checked By: AMM Date: 03/18/2019 Job: Rensselaer Engineered Fuels
Mechanical Biological Treatment Facility

FACILITY EMISSIONS SUMMARY - POTENTIAL TO EMIT

Description:	**Mechanical Biological Treatment of Municipal Solid Waste**	
Particulate Control:	**Moldow 142 MXNJC-324 Baghouse**	
Odor Control:	**BioFilter**	
Emission Unit Throughput:	**150,000**	**tons MSW received/year**
Process Operations:	**8,760**	**hours/year**
Air Extraction through Biofilter:	**47,605**	**cubic feet per minute (cfm)**
Air Extraction through Baghouse:	**44,150**	**cubic feet per minute (cfm)**

Description/ CAS number	Chemical name	Emission Point	Source Emission Rate mg/m^3	Potential to Emit (PTE) lb/hr	(lb/yr)	(ton/yr)
NY075-00-0	PM*	Baghouse	---	---	---	---
NY075-00-5	PM-10*	Baghouse	---	---	---	---
NY075-02-5	PM-2.5*	Baghouse	40	6.6	57,948	29.0
7664-41-7	Ammonia	Biofilter	17	3.0	26,555	13.3
7783-06-4	Hydrogen Sulfide	Biofilter	10	1.8	15,621	7.8

Notes:

* All particulate matter is conservatively assumed to be PM-2.5

--- = Not Applicable

1. Source Emission Rates provided by facility designer based on test data from operating comparable facility.
2. Process operations assumed to occur 24 hours per day, 365 days per year for maximum Potential to Emit

24 Wade Road · Latham, New York 12110
Tel: 518-456-4900 · Fax: 518-456-3532

Calcs. By: RLA Date: 03/12/2019 Client: Rensselaer Resource Recovery, LLC
Checked By: AMM Date: 03/18/2019 Job: Rensselaer Engineered Fuels
Mechanical Biological Treatment Facility

FACILITY EMISSIONS SUMMARY - ESTIMATED ACTUAL

Description:	**Mechanical Biological Treatment of Municipal Solid Waste**	
Particulate Control:	**Moldow 142 MXNJC-324 Baghouse**	
Odor Control:	**BioFilter**	
Emission Unit Throughput:	**150,000**	**tons MSW received/year**
Mechanical Process Operations:	**2,614**	**hours/year**
Biological Process Operations:	**8,760**	**hours/year**
Air Extraction through Biofilter	**47,605**	**cubic feet per minute (cfm)**
Air Extraction through Baghouse	**44,150**	**cubic feet per minute (cfm)**

Description/ CAS number	Chemical name	Emission Point	Source Emission Rate mg/m^3	Control Device Collection Efficiency %	Estimated Actual Emission lb/hr	(lb/yr)	(ton/yr)
NY075-00-0	PM*	Baghouse	---	95%	---	---	---
NY075-00-5	PM-10*	Baghouse	---	95%	---	---	---
NY075-02-5	PM-2.5*	Baghouse	40	95%	0.3	865	0.43
7664-41-7	Ammonia	Biofilter	17	99%	0.03	266	0.13
7783-06-4	Hydrogen Sulfide	Biofilter	10	99%	0.02	156	0.08

Notes:

* All particulate matter is conservatively assumed to be PM-2.5

--- = Not Applicable

1. Source Emission Rates provided by facility designer based on test data from operating comparable facility.
2. Baghouse process operations occur 9 hours per weekday and 7 hours per Saturday.
   Biofilter process operations occurs 24 hours per day, 365 days per year

24 Wade Road · Latham, New York 12110
Tel: 518-456-4900 · Fax: 518-456-3532

Greenhouse Gas (GHC) Emission Inventory for the Rensselaer Engineered Fuels Mechanical Biological Treatment Facility

Maximum Annual Waste Input (stons/year)[1]	GHG Pollutant [2]	Emission Factors (kg/Mg input waste)[3]	GHG Emissions (kg/year)	GHG Emissions (stons/year)	CO2e Global Warming Potential Multipliers[4]	CO2e Equivalent Emissions (stons/year)
150,000	N_2O	0.05	7,500	8.3	298	2,464
	CH_4	0.11	16,500	18.2	25	455
				Total CO2e Emissions (stons/year)		2,919

Notes:

stons = Short tons (2,000 lbs, 907 kg)

N_2O = Nitrogen Oxides or NOx

CH_4 = Methane

Kg = Kilograms = 1,000 grams

Mg = Megagrams = 1,000,000 grams

Note 1: Maximum Annual Waste Input based on limit of 150,000 stons/year from facility design.

Note 2: CO_2 emissions from composting biomass are not fossil derived and therefore are not included in the greenhouse gas emission calculations.

Note 3: Emission Factors from "Greenhouse gas emission from composting and mechanical biological treatment" Florian Amlinger et al. (Waste Management Research 2008)
The Facility is expected to be more efficient than the methods used for this analysis, therefore the lower Emission Factor used conservatively calculation emissions.

Note 4: CO2e Global Warming Potential Multipliers per 40 CFR 98 Table A-1 to Subpart A.

24 Wade Road · Latham, New York 12110
Tel: 518-456-4900 · Fax: 518-456-3532

ATTACHMENT 2

RENSSELAER COUNTY SEWER DISTRICT APPLICATION

DO NOT LEAVE ANY AREA BLANK. USE N/A (NOT APPLICABLE) WHERE NECESSARY

RENSSELAER COUNTY SEWER DISTRICT #1
INDUSTRIAL PRETREATMENT PROGRAM
INDUSTRIAL AND COMMERCIAL DISCHARGER WASTE QUESTIONNAIRE

General Information

1. Company Name: Rensselaer Resource Recovery, LLC

2a. Mailing Address: 80 Red Schoolhouse Road, Suite 101
Chestnut Ridge, NY 10977

2b. Premises Address: 36 Riverside Avenue
(if different) Rensselaer, NY 12144

3. Standard Industrial Classification (SIC) Code: 4953

4. Name of Contact Official: Dennis Soriano
4a. Email of Contact dsoriano@biohitech.com

5. Title of Contact Official: Director of Business Development

6. Telephone Number: 845-330-2533
7. Fax Number: N/A

Instructions

Begin this Questionnaire by completing # 8 below. Then proceed to # 9, following the directions as they are provided. Depending upon your responses, you may be directed to either submit the first two pages of the Questionnaire only or complete the entire form. In either case, you must endorse the Certification on page 2 for your response to be valid.

8. Provide a brief description of the firm's activities on the premises:

Solid Waste Processing Facility with a capacity/throughput of 150,000 tons per year of municipal solid waste.

9. Does your facility generate any wastewater other than sanitary (sanitary wastewater is defined as wastewater from sanitary conveniences, personal washing and/or from cooking, serving and clean-up from food prepared for on-site consumption only)? Yes If no, proceed directly to the Certification and Validation section on page two and complete that section. Then return pages 1 and 2 only to the address provided. If yes, proceed to 10.

10. Provide (or estimate) the amount of wastewater generated daily by your facility: 6,275 gal.
Is this [ ] measured [X] estimated? Then proceed to 11.

11. Do you treat incoming waters before use? No If you do, describe the handling and disposal of any treatment skimmings or sludges. _____

_____ Regardless of your answer, proceed to 12.

12. Do your operations fall into any of the industrial categories listed in attached Table 1? Yes
If yes, you must complete the entire form. Go directly to page 3 and begin. If no, proceed to 13.

13. Do your operations use or discharge any of the chemicals listed in attached Table 2? N/A
If yes, you must complete the entire form. Go directly to page 3 and begin. If no, proceed to 14.

14. Do your operations result in the collection and disposal of any hazardous wastes? No
If yes, you must complete the entire form. Go directly to page 3 and begin. If no, proceed to 15.

15. Do you use biocides, fungicides or any other spoilage prevention additives? No If yes, you must complete the entire form. Go directly to page 3 and begin. If no, proceed to 16.

16. Do you treat your wastewaters in any fashion? No With the exception of animal or vegetable-based grease and oil removal (grease traps), if you answered yes, you must complete the entire form. Go directly to page 3 and begin. Otherwise, proceed to 17.

17. Are wastewaters generated by operations at your facility likely to contain any substances that are not routinely associated with domestic (household) activities? Unknown If yes, you must complete the entire form. Proceed to page 3 and begin. If no, proceed to 18.

18. If you have not previously been directed to complete the entire form, you need only complete the Certification and Validation section below and return pages 1 and 2 of this form to the address provided.

Certification and Validation

The Certification below must be endorsed for this Questionnaire to be valid and complete. All users should carefully read the Certification and have a clear understanding of the provisions and penalties set forth for knowingly submitting false or incomplete information. If you will be completing the entire form that follows, endorse the statement below only after fully completing and reviewing the entire Questionnaire.

CERTIFICATION STATEMENT

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and that based upon my inquiry of those individuals immediately responsible for obtaining the information, I believe the information submitted is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

DENNIS SORIANO
Name of Signing Official (Print)

DIRECTOR OF BUSINESS DEVELOPMENT
Title of Signing Official

Dennis Soriano
Signature of Company Official

3/28/19
Date

Please direct all completed questionnaires to:

Andrew Ratigliano
Rensselaer County Sewer District
Ned Pattison County Government Center
1600 7th Avenue
Troy, NY 12180

DO NOT LEAVE ANY AREA BLANK. USE N/A (NOT APPLICABLE) WHERE NECESSARY

PRODUCTION INFORMATION

1. List the company's principal products or services on the premises with the appropriate Standard Industrial Classification (SIC) codes and briefly describe the specific production or process activities that take place. Attach additional sheets, if necessary. Additional sheets attached? [X] Yes [ ] No

The Facility processes Municipal Solid Waste (MSW) into a Solid Recovered Fuel (SRF) that is an alternative to coal.

*Please see Section 2.0 of the attached excerpts from the Facility Operations & Maintenance Plan.

2. List the principal process materials (raw materials, catalysts, intermediates, clean-up materials) associated with the activities in 1. above. Attach MSDS forms for all such materials. Also, indicate if your company accepts its used finished product shipping containers back for recycle, and if so describe the cleaning process for these containers. Attach additional sheets, if necessary. Additional sheets attached? [ ] Yes [X] No

The Facility processes Municipal Solid Waste (MSW).

3. Number of separate production buildings on the site: 1

4a. Indicate the number of separate sewer connections (to public sewers) from your production or operations: 1 or

4b. Do your operations share a connection to the public sewers with another entity (Example: multi-tenant building)? No

5. Average number of employees per shift: 1st 7 2nd 2 3rd 2

6. Days of operation: Sun. X Mon. X Tue. X Wed. X Thur. X Fri. X Sat. X

7. Is there a scheduled shutdown? Yes If so, when? Periodic Maintenance

8. Does the facility have:

a. a Spill Prevention, Control and Countermeasure (SPCC) Plan? No
b. a Toxics Management Plan? No
c. a Slug Control Plan? No
d. a Best Management Practices Program? Yes

RCSD may, in the future, request copies of any of the above Plans that are currently in effect.

WATER AND WASTEWATER

9a. Indicate water sources and consumption:

Source:	Consumption (gal) Annual	Avg/Day*
Municipal Water Supply	2,463,750	6,750
Well		
Surface Water (river, lake, pond)		
Other:		

* Divide annual consumption by number of actual working or process days.

9b. Describe any raw water treatment processes undertaken on site. Include the means of disposal of any residuals generated by those processes.

N/A

10. Indicate below water uses (by % or by actual usage) and means of disposal:

	%	Usage (gal/day)	Disposal Means*
Cooling Water (contact with process)	0	0	-
Cooling Water (non-contact)	0	0	-
Boiler Feed	0	0	-
Process Water	92.8	5,825	Sanitary Sewer
Sanitary Usage	7.2	450	Sanitary Sewer
Air Pollution Control			-
Plant and Equipment Washdown			-
Contained In Product			-
Total	**100**	**6,275**	**Sanitary Sewer**

* e.g. sanitary sewers, combined sewers, storm sewers, direct to stream or river, subsurface injection, septic system, waste hauler, evaporation, other (indicate specifics)

11. Are wastewater discharges to the sanitary or combined sewer system:

a. Discharged during actual production? Yes
If yes: Intermittent?_____ or Continuous? X

b. Discharged after production? No
If yes: Batch Process Wastewater Discharge?____ or Clean-Up (i.e. floor washings, tank rinses)?_____

12. Turn to attached Table 1 listing industrial categories for which USEPA has established federal discharge regulations and limitations. Do any of the operations at your facility fall within any of these categories? Yes X No _____ If yes, complete 12 (a) - 12 (d).

12a. Under which federally regulated category(s) do operations at your facility fall? _____
Centralized Waste Treatment

12b. Has a Baseline Monitoring Report been submitted to RCSD? No If so, when? _____

12c. Have Periodic Compliance Reports been submitted to RCSD? No If so, dates of last two reports: _____ and _____.

12d. Has final compliance been achieved? N/A If no, explain: _____

13. If wastewater discharges from the company have been analyzed to determine pollutant concentrations, and if this data has not already been submitted to RCSD, attach a copy of the latest laboratory report. Report attached? [ ] Yes [X] No

14. Turn to Table 2 (two pages). Indicate (✓) any of the substances on the Table that might be used, stored or generated on the premises or that might be contained in the facility's wastewater discharged.

* Please see page 12 of the attached excerpts from the Facility Operations & Maintenance Plan for typical physical/chemical characteristics of combined leachate below Table 2.

15. Does the company utilize any specific water conservation methods? Yes If so, describe.

Collection of roof rainwater for use in process operations.

16. Describe any wastewater treatment equipment and processes currently in use, and attach a schematic of same. Facilities and processes designed for pollutant removal as well as those designed to equalize flow and pollutant loadings should be included. Be sure to indicate whether treatment is provided at the end of specific processes or post-process and previous to final discharge. Also, if any additional treatment facilities are planned, so indicate. Schematic attached? [X] Yes [ ] no

Please see attached Sheet P479 D108/A Water Flow Chart.

17. Have provisions been made for discharge flow monitoring and wastewater sampling/analysis? If so, describe. With regard to wastewater monitoring, outline methods of sample collection and analysis, or indicate the name of the consultant or contractor providing such services.

No

OTHER WASTES; MISCELLANEOUS

18. Describe any accepting, holding and storage facilities and practices for all raw materials, process and clean-up chemicals and finished products.

*Please see Section 2.0 in the attached Operations & Maintenance Plan.

19. Was the company required to take part in USEPA's Toxic Release Inventory by submitting information under SARA Title 313? No If yes, attach a copy of the latest report to USEPA.

20. Has your company filed an EPA Form 8700-12 (Notification of Hazardous Waste Activity)? No If yes, attach a copy of the submitted form.

A BLANK PAGE IS ADDED TO THIS QUESTIONNAIRE IMMEDIATELY FOLLOWING THIS PAGE. INFORMATION REQUESTED BELOW SHOULD BE PLACED ON THAT PAGE WITH REFERENCE MADE TO THE QUESTION BEING ANSWERED. ADD ADDITIONAL PAGES AS NECESSARY.

21. Are any sludges, solvents, thinners, oils, still bottoms, fly ash, fillers, etc. or residual materials generated by the processes on-site? No If yes, explain and describe disposal practices.

22. Are residuals (skimmings, sludges, backwashes, etc.) generated as a result of wastewater treatment (or pretreatment) processes prior to discharging the wastewater into the municipal system? No If yes, explain and describe disposal practices.

23. Do you store industrial wastes? No If yes, explain and describe disposal practices.

Please return to page 2 of this Questionnaire and, after carefully reading the Certification and Validation Section and the Certification Statement, complete the Certification section. Then transmit the completed form to Rensselaer County Sewer District No.1 at the address provided below:

Andrew Ratigliano
Rensselaer County Sewer District
Ned Pattison County Government Center
1600 7th Avenue
Troy, NY 12180

ADDITIONAL INFORMATION

Please number any additional items below to be consistent with the item in the Questionnaire to which they refer.

*Questions 5 & 6: The process will run continuously while MSW receiving hours will generally be from 7am to 4pm Monday through Friday and 7am to 2pm on Saturday.

*Questions 13 and 14: Please page 12 of the attached excerpts from the Facility Operations & Maintenance Plan for typical chemical composition of leachate.

*Question 16: Please see the attached Sheet P479 D108/A Water Flow Chart.

*Question 18: Please see the process description in the attached excerpts from the Facility Operations & Maintenance Plan

Table 1: Categorically Regulated Industries and Processes

If your facility employs or will be employing processes or unit operations in any of the industrial categories or business activities listed below (regardless of whether or not they generate wastewater, waste sludge or hazardous waste), place a checkmark in the box beside that category of business activity (✓ all that apply) and answer 'Yes' to question 12 of the Questionnaire. If you are in doubt about any of the categories, place a question mark (?) in the [ ] space below and indicate 'Unknown' as the response to Item 12.

Industrial Categories

[ ] Dairy Products Processing
[ ] Canned and Preserved Fruits and Vegetables Processing
[ ] Sugar Processing
[ ] Textile Mills
[ ] Feedlots
[ ] Organic Chemicals, Plastics and Synthetic Fibers
[ ] Soap and Detergent Manufacturing
[ ] Fertilizer Manufacturing
[ ] Iron and Steel Manufacturing
[ ] Phosphate Manufacturing
[ ] Steam Electric Power Generating
[ ] Leather Tanning and Finishing
[ ] Asbestos Manufacturing
[ ] Timber Products
[ ] Builders Paper and Board Mills
[ ] Metal Finishing
[ ] Oil and Gas Extraction
[ ] Pharmaceutical Manufacturing
[ ] Ore Mining and Dressing
[ ] Paint Formulating
[ ] Ink Formulating
[ ] Pesticide Chemicals
[ ] Explosives Manufacturing
[ ] Photographics (Development and Printing)
[ ] Battery Manufacturing
[ ] Metal Molding and Casting
[ ] Coil Coating
[ ] Aluminum Forming
[ ] Electric and Electronic Components
[X] Centralized Waste Treatment
[ ] Transportation Equipment Cleaning
[ ] Metal Products and Machinery
[ ] Concentrated Aquatic Animal Production
[ ] Grain Mills
[ ] Canned and Preserved Seafood Processing
[ ] Cement Manufacturing
[ ] Electroplating
[ ] Inorganic Chemicals Manufacturing
[ ] Petroleum Refining
[ ] Nonferrous Metals Manufacturing
[ ] Ferroalloy Manufacturing
[ ] Glass Manufacturing
[ ] Rubber Manufacturing
[ ] Pulp, Paper and Paperboard
[ ] Meat Products
[ ] Coal Mining
[ ] Mineral Mining and Processing
[ ] Paving and Roofing Materials (Tars and Asphalts)
[ ] Gum and Wood Chemicals Manufacturing
[ ] Carbon Black Manufacturing
[ ] Hospitals
[ ] Plastics Molding and Forming
[ ] Porcelain Enameling
[ ] Copper Forming
[ ] Nonferrous Metals Forming and Metal Powders
[ ] Landfills
[ ] Waste Combustors

Table 2: Substances of Concern

Indicate [✓] all of the substances below which may be used, stored or generated at your facility or that might be contained in your effluent discharge.

A
[ ] Acenaphthene
[ ] Acenaphthylene
[ ] Acetone
[ ] Acrylic Acid
[ ] Acrylonitrile
[ ] Alachlor
[ ] Aldicarb
[ ] Aldicarb sulfone
[ ] Aldicarb sulfoxide
[ ] Aldrin
[ ] Alkyl dimethyl benzyl ammonium chloride
[ ] Alkyl diphenyl oxide sulfonates
[ ] Aluminum
[ ] Ametryn
[ ] Aminomethylene phophonic acid salts
[ ] Aminopyridines
[X] Ammonia
[ ] Aniline
[ ] Anthracene
[ ] Antimony
[X] Arsenic
[ ] Arylthiozoles
[ ] Atrazine
[ ] Azinphosmethyl
[ ] Azobenzene

B
[ ] Barium
[ ] Benzene
[ ] Benzidine
[ ] Benzisothiazole
[ ] Benzo(a)anthracene
[ ] Benzo(b)fluoranthene
[ ] Benzo(k)fluoranthene
[ ] Benzo(g,h,i)perylene
[ ] Benzo(a)pyrene
[ ] Beryllium
[ ] Bis(2-chloroethyl) ether
[ ] Bis(2-ethyl, hexyl) phthalate
[ ] Boric Acid, Borates and Metaborates
[ ] Boron
[ ] Bromide
[ ] Bromobenzene
[ ] Bromochloromethane
[ ] Bromodichloromethane
[ ] Bromoform
[ ] Bromomethane
[ ] Butoxyethoxyethanol
[ ] Butoxypropanol
[ ] Butylate
[ ] n-Butylbenzene
[ ] sec-Butylbenzene
[ ] tert-Butylbenzene
[ ] Butylbenzyl phthalete
[ ] Butylisopropyl phthalate

C
[ ] Cadmium
[ ] Carbofuran
[ ] Carbon tetrachloride
[ ] Carboxin
[ ] Chloramben
[ ] Chlordane
[X] Chloride
[ ] Chorinated dibenzo-p-dioxins
[ ] Chlorinated dibenzofurans
[ ] Chlorine
[ ] Chlorobenzene
[ ] 4-Chlorobenzotrifluoride
[ ] Chloroethane
[ ] 2-Chloronaphthalene
[ ] 2-Chlorotoluene
[ ] 4-Chlorotoluene
[ ] 5-Chloro-o-toluidine
[ ] Chromium
[ ] Chromium, Hexavalent
[ ] Chrysene
[ ] Cobalt
[X] Copper
[ ] Cyanide

D
[ ] Dalapon
[ ] 4,4'-DDT
[ ] 4,4'-DDD
[ ] 4,4'-DDE
[ ] Demeton
[ ] Dechlorane Plus
[ ] Diazinon
[ ] Dibenzo(a,h)anthracene
[ ] Dibromochloromethane
[ ] 1,2-Dibromo-3-chloropropane
[ ] Dibromodichloromethane
[ ] Dibromomethane
[ ] 2,2-Dibromo-3-nitrilopropion amide
[ ] Di-n-butyl phthalate
[ ] 1,2-Dichlorobenzene
[ ] 1,3-Dichlorobenzene
[ ] 1,4-Dichlorobenzene
[ ] 3,4-Dichlorobenzotrifluoride
[ ] Dichlorodifluoromethane
[ ] 1,1-Dichloroethane
[ ] 1,2-Dichloroethane
[ ] cis-1,2-Dichloroethylene
[ ] trans-1,2-Dichloroethylene
[ ] 1,1-Dichloroethylene
[ ] Dichlorofluoromethane
[ ] 2,4-Dichlorophenol
[ ] 2,4-Dichlorophenoxyacetic acid
[ ] 1,1-Dichloropropane
[ ] 1,2-Dichloropropane
[ ] 1,3-Dichloropropane
[ ] 2,2-Dichloropropane
[ ] 1,1-Dichloropropene
[ ] cis-1,3-Dichloropropene
[ ] trans-1,3-Dichloropropene
[ ] 2,3-Dichlorotoluene
[ ] 2,4-Dichlorotoluene
[ ] 2,5-Dichlorotoluene
[ ] 2,6-Dichlorotoluene
[ ] 3,4-Dichlorotoluene
[ ] 3,5-Dichlorotoluene
[ ] Dieldrin
[ ] Di (2-ethyl, hexyl) adipate
[ ] Diethylphthalate
[ ] N,N-Dimethyl aniline
[ ] Dimethylformamide
[ ] Dimethyl phthalate
[ ] Dimethyltetrachloroterephthalate
[ ] 2,6-Dinitrotoluene
[ ] Di-n-octyl phthalate
[ ] Diphenamid
[ ] 1,2-Diphenylhydrazine
[ ] Diquat dibromide
[ ] Dodecylguanidine acetate
[ ] Dodecylguanidine hydrochloride
[ ] Dyphylline

E
[ ] Endosulfan
[ ] Endothall
[ ] Endrin
[ ] Ethylbenzene
[ ] Ethylene chlorohydrin
[ ] Ethylene dibromide
[ ] Ethylene glycol
[ ] Ethylene oxide

F
[ ] Fluometuron
[ ] Fluoranthene
[ ] Fluorene
[ ] Fluoride

G
[ ] Glyphosate
[ ] Guaifenesin

H
[ ] Heptachlor
[ ] Heptachlor epoxide
[ ] Hexachlorobenzene
[ ] Hexachlorobutadiene
[ ] a-Hexachlorocyclohexane
[ ] b-Hexachlorocyclohexane
[ ] g-Hexachlorocyclohexane
[ ] Hexachlorocyclopentadiene
[ ] 2-Hexanone
[ ] Hexazinone
[ ] Hydrazine
[ ] Hydrogen sulfide
[ ] 1-Hydroxyethylidene-1,1-diphosphonic acid
[ ] 2-(2-Hydroxy-3,5-di-tert-pentylphenyl) benzotriazole

I
[ ] Ideno (1,2,3-cd) pyrene
[X] Iron
[ ] Isodecyl diphenyl phosphate
[ ] Isophorone
[ ] Isopropylbenzene
[ ] 4-Isopropyltoluene
[ ] Isothiazolones

L
[ ] Lead
[ ] Lindane

M
[ ] Magnesium
[ ] Malathion
[ ] Manganese
[ ] Mercaptobenzithiazole
[X] Mercury
[ ] Methacrylic acid
[ ] Methoxychlor
[ ] (1-methoxyethyl) benzene
[ ] (2-methoxyethyl) benzene
[ ] Methylbenz(a) anthracenes
[ ] Methyl chloride
[ ] Methyl biisocyanate
[ ] Methylene chloride

[ ] 4-(1-Methylethyloxy)-1-butanol
[ ] 2-Methylethyl-1,3-dioxane
[ ] Methylethyl ketone
[ ] Methyl parathion
[ ] 2-Methyl styrene
[ ] 3-methyl styrene
[ ] Metribuzin
[ ] Mirex

N
[ ] Naphthalane
[ ] Niacinamide
[ ] Nickel
[X] Nitrates
[ ] Nitriloacetic acid
[ ] Nitrites
[ ] Nitrobenzene
[ ] N-Nitrosophenylamine

O
[ ] Oxamyl

P
[ ] Parathion
[ ] Pentachlorophenol
[ ] Phenanthrene
[ ] Phenols
[ ] Phenyl ether
[ ] Phenylpropylamine
[ ] cis-1-Phenyl-1-propene
[ ] trans-1-Phenyl-1-propene
[ ] 3-Phenyl-1-propene
[ ] Phosphorus
[ ] Picloram
[ ] PCBs
[ ] Prometon
[ ] Propham
[ ] n-Propybenzene
[ ] Pyrene
[ ] Pyridine

Q
[ ] Quarternary ammonium compounds

S
[X] Selenium
[ ] Silver
[ ] Simazine
[ ] Styrene
[X] Sulfates
[ ] Sulfides
[ ] Sulfites

T
[ ] Tebuthiuron
[ ] Terbufos
[ ] Tetrachlorobenzene
[ ] 1,1,1,2-Tetrachloroethane
[ ] 1,1,2,2-Tetrachloroethane
[ ] Tetrachloroethylene
[ ] Tetrahydrofuran
[ ] Thallium
[ ] Theophylline
[ ] Toluene
[ ] o-Toluidine
[ ] Tolytriazole
[ ] Toxaphene
[ ] 1,2,4-Tribromobenzene
[ ] Trobutylitin oxide
[ ] Trichlorobenzenes
[ ] 1,1,1-Trichloroethane
[ ] 1,1,2-Trichloeoethane
[ ] Trichloroethylene
[ ] Trichlorofluoromethane
[ ] 2,4,5-Trichloro-phenoxy propanoic acid
[ ] 1,1,2-Trichloropropane
[ ] 1,2,3-Trichloropropane
[ ] cis-1,2,3-Trichloropropene
[ ] trans-1,2,3-Trichloropropene
[ ] alpha,2,4-Trichlorotoluene
[ ] alpha,2,6-Trichlorotoluene
[ ] alpha,3,4-Trichlorotoluene
[ ] alpha,alpha,2-Trichlorotoluene
[ ] alpha, alpha,4-Trichlorotoluene
[ ] 2,3,4-Trichlorotoluene
[ ] 2,3,5-Trichlorotoluene
[ ] 2,3,6-Trichlorotoluene
[ ] 2,4,5-Trichlorotoluene
[ ] 2,4,6-Trichlorotoluene
[ ] 1,1,1-Trichloro-2,2,2-trifluoroethane
[ ] 1,1,2-Trichloro-1,22-trifluoroethane
[ ] 1,2,3-Trimethylbenzene
[ ] 1,2,4-Trimethylbenzene
[ ] 1,3,5-Trimethylbenzene
[ ] 2,3,6-Trimethylbenzene
[ ] 2,4,6-Trimethylbenzene
[ ] Triphenyl phosphate
[ ] 2,3,7,8-TCDD

V
[ ] Vanadium
[ ] Vinyl chloride

X
[ ] Xylenes

Z
[X] Zinc

6.264.845 Gallons/year

17,164 Gallons/day

LEACHATE EVAPORATION DURING BIODRYING PHASE

RECEPTION PIT LEACHATE — 936,600 Gallons/year — 2,566 Gallons/day

UNDERSCREEN PIT LEACHATE — 224,785 Gallons/year — 616 Gallons/day

OVERSCREEN PIT LEACHATE — 0 Gallons/year — 0 Gallons/day

BIOSTABILIZATION AREA LEACHATE — 224,785 Gallons/year — 616 Gallons/day

BIOFILTER LEACHATE — 739,955 Gallons/year — 2,027 Gallons/day

LEACHATE RAISING WELL

2,126,125 Gallons/year

5,825 Gallons/day

LEACHATE COLLECTION TANK. TANK CAPACITY MIN. 6 DAYS OF STORAGE

TO CLEANING PLANT

RECIRCULATION

IN BIODRYING MAX 500,000 Gallons/year

IN BIODRYING (Need a Biofilter Upgrade) MAX 317,550 Gallons/year (870 gallons/day)

See Wheater disposal in pubblic sewer is allowed

CONTROL ROOM BULDING DIRTY WATER (Restrooms)

OFFICE BUILDING (Restrooms)

164,250 Gallons/year

450 Gallons/day

TO PUBLIC SEWER

164,250 Gallons/year

450 Gallons/day

FROM PUBLIC MAIN WATER

1,795,800 Gallons/year

4,920 Gallons/day

BIOFILTER WETTING

503,700 Gallons/year

1,380 Gallons/day

DOORS WATER MIST

ALTERNATIVE SOLUTION IN CASE OF THE RAINWATER AREN'T COLLECTED

ROOF RAINWATER

STORAGE TANK

SAMPLING WELL

SURFACE STREAMS OR SEWER

YARDS RAINWATER

WEIGHT BRIDGE

Secondary precipitation treated

Main precipitation treated

Cockpit separator

WATER RAIN TANK

OIL SEPARATOR

HUMIDITY FLOW CHART

EVAPORATION

MSW
RH 34%
10,540,470 Gallons/year

C&I
RH 22%
1,476,458 Gallons/year

BIODRYING

REFINEMENT

SRF
3,307,435 gallons/year

SCRAPS
318,523 gallons/year

NOTE:

DO NOT TAKE DIMENSIONS IN SCALE ON DRAWING.
ALL MODIFICATIONS SHALL BE AUTHORIZED BY ENTSORGA ITALIA S.p.A.

DO NOT USE THIS DRAWING FOR CONSTRUCTION UNLESS EXPLICITY INDICATED IN THE REVISIONS BOX

ANY COMMENTS ON THIS DOCUMENT SHALL BE MADE IN WRITING TO ENTSORGA WITHIN SEVEN DAYS OF RECEIPT. THE RECIPIENT ACKNOWLEDGES AND ACCEPTS THAT IF NO COMMENTS ARE SUBMITTED WITHIN THIS TIMESCALE THE DOCUMENT SHALL BE DEEMED ACCEPTED

REV.	DATE	Drown	Checked	Approved	Description
A	26/10/18	MD	WF	PPCM	SECOND EDITION
0	17/10/18	MD	WF	PPCM	FIRST EDITION

ENTSORGA
GREEN TECHNOLOGY REVOLUTION
Str. Prov. per Castelnuovo S., 7
15057 Tortona (AL)
Tel. 0131.811383
Fax 0131.862597
email info@entsorga.it

PROJECT: Rensselaer Resource Recovery Project

DRAWING TITLE: Water flow chart

REQUISITION	DATE:	FORMAT:	SCALE:	DWG. N°	SHEET:
–	17/10/18	E1	NN	P479 D108/A	1of1

Sterling Environmental Engineering, P.C.

OPERATIONS AND MAINTENANCE PLAN

FOR

RENSSELAER ENGINEERED FUELS
MECHANICAL BIOLOGICAL TREATMENT FACILITY
RENSSELAER, NY

Prepared For:

Rensselaer Resource Recovery, LLC
80 Red Schoolhouse Road, Suite 101
Chestnut Ridge, New York 10977

Prepared By:

Sterling Environmental Engineering, P.C.
24 Wade Road
Latham, New York 12110

January 22, 2019

"Serving our clients and the environment since 1993"

OPERATIONS AND MAINTENANCE PLAN

FOR

RENSSELAER ENGINEERED FUELS
MECHANICAL BIOLOGICAL TREATMENT FACILITY
RENSSELAER, NY

Table of Contents

1.0 PURPOSE

The purpose of this Operation and Maintenance (O&M) Plan is to describe the operation and maintenance of the Rensselaer Engineered Fuels Mechanical Biological Treatment (MBT) Facility (hereinafter the "Facility") and to give a detailed overview of various operations and actions necessary to ensure the Facility functions at optimum performance. The MBT Facility processes municipal solid waste (MSW) to produce a marketable Solid Recovered Fuel (SRF). Facility operations are regulated by New York State Department of Environmental Conservation under 6 NYCRR Part 360 (Solid Waste Management Facilities) and 6 NYCRR 362-2 (Municipal Solid Waste Processing Facilities).

This document must be used in conjunction with the Facility drawings and other referenced documents as these represent an integral part of the O&M Plan.

2.0 DESCRIPTION OF THE PROCESS

2.1 Reception of Incoming Material

All vehicles entering or exiting the Facility will be weighed at the scales to determine the weight of the incoming material. A visual and radiation inspection will be carried out before tipping to validate that the waste conforms to the definition of "acceptable" MSW. These wastes include mixed paper, paperboard, green/kitchen organics, the organic content contained within packaging, and textiles. Generally, only mixed, unsorted waste will be acceptable at the Facility. No hazardous waste or source separated recyclables will be accepted at the Facility. All waste will be managed in accordance with the Facility Waste Control Plan.

Planned hours for accepting waste are Monday through Friday, 7:00 AM to 4:00 PM, and Saturday, 7:00 AM to 2:00 PM. Waste will be received from licensed haulers in standard waste collection trucks or transportation trailers.

The following items will be removed by mechanical pre-sorting at the entry stage of the Facility for ultimate processing outside the Facility. There will be an effort to send these items back with the hauler or contact the generator for pickup.

a) Tires
b) Electronics (TV's, computers, etc.).
c) Other bulky goods such as couches, washers, dryers, appliances, white goods, etc.
d) Automotive and lawn mower batteries

The following items are prohibited from acceptance at the Facility:

a) Hazardous waste
b) Liquid Waste
c) Clean, source separated recyclables and compost materials collected for recycling or composting
d) Construction and demolition waste
e) Compressed Gas Cylinders

The following MSW components will be processed into a fuel:

a) Mixed unsorted paper
b) plastic

c) wood
d) textile
e) other mixed municipal waste

The following items will be separated by the Facility for ultimate disposal into a permitted landfill or recycled for beneficial reuse, as applicable:

a) rocks
b) dirt
c) glass
d) PVC plastic

In compliance with the Facility Waste Control Plan, all incoming material must enter the Facility through the scales. At that time the following information will be generated by the operators through the scale house computer system. The documentation will contain the following information:

- Customer name
- Date and Time of arrival
- Origin of Material
- Description of Material (Organic, MSW, Other)
- Weight

The composition of waste will change seasonally and over time, and the mechanisms for monitoring and notification of variations to the waste composition will be revised based on the receiving waste stream.

MSW is a heterogeneous mixture of waste composed of different materials; the focus of the MBT system is biological treatment of the organic fraction and mechanical processing of the treated residues including plastic and paper. The organic fraction, particularly the putrescible content, begins to decompose immediately when discarded. For this reason, upon arrival, the waste is directly tipped into the reception pit of the processing Facility. The storage pit inside the processing Facility has a ventilated base, which allows for aeration. Air being passed through the waste during delivery is treated using the biofiltration system, which limits odor emissions. The reception pit material should be processed within 24 hours upon delivery to the Facility.

The aerated reception pit is also capable of blowing warm air, originating from inside the building, into the newly delivered waste once the doors are closed; this is used to heat up this waste (which in the winter can be close to freezing) and to initiate the biological process. Access to the pit for delivery vehicles is by means of fast opening roller shutter doors. The period of time that the doors will be open will be limited only to the delivery of waste; to achieve this, the doors are remote-controlled high-speed doors. The doors are also equipped with a sprayed water barrier to prevent the passage of flies and dust outside of the building when the doors are open. The sprayed water barrier is activated when the doors are opened. The delivery of waste is monitored and controlled directly by Facility operators inside the control room.

When necessary, any oversize items (wastes that cannot be processed such as tires) are removed using the overhead grapple crane in manual mode and placed next to the side service door prior to removal. The Facility is constantly under negative pressure, so any air flow will be into the Facility preventing any malodorous air from escaping. This is completely managed automatically by the control system and does not require any intervention by Facility personnel. In addition, during the waste reception phase, no Facility personnel will be in direct contact with the wastes being delivered into the reception pit.

The ramps to the reception pit area are sloped to ensure any leachate from the delivery vehicles will flow to the reception pit or to the trench drains which are piped to the reception pits.

Commercial and industrial (C/I) MSW will be brought directly to the C/I waste storage area of the building. This area also has quick closing doors, but because of the nature of the material will not be placed into reception pits. This material will be added to the biorefining piles by the overhead crane and mixed throughout the process as required to maintain the moisture content of the MSW as it continues through the process.

2.2 Waste Acceptance Criteria

The following waste characteristics are anticipated for received MSW:

- Dry material 40 to 50%
- Organic material 50 to 80% of the dry material
- Porosity ≥35%
- pH ≥ 5.5 to ≤8
- Maximum mass density 0.55 t/m^3 (31 pounds per cubic foot)
- Maximum loss of pressure of the entry material 2000 Pa a 60 $m^3/m^2/h$

No oversize waste (e.g., appliances), hazardous waste (e.g., used solvent), compressed gas cylinders, and vehicles batteries will be accepted.

Inspection of MSW will begin at the curb-side by the hauler. It is the haulers' responsibility to remove or not accept oversized items, hazardous waste, compressed gas cylinders, and/or vehicle batteries. It is up to the hauler to notify the customers in such a manner that local residents DO NOT place such waste in waste removal containers. It will not be the responsibility of Facility personnel to verify incoming waste composition.

If such waste should be detected in the incoming loads, the Facility operator shall use the Bridge Crane in Manual mode to place such waste next to the Service Door of the Facility, where it will be removed by Facility technical personnel.

2.3 Tipping Procedure (Unloading)

To keep the pit accessible to delivery vehicles, the Facility operator will be responsible for identifying and activating the location were material may be discharged. This will be executed from the control room by implementing an appropriate sequence for the fast opening door activation. The operator may decide which doors may be opened and which doors may have the water spray barrier activated while they are in the open position. The procedure for tipping is the following:

DOOR INDICATOR LIGHTS:

- RED: the door is closed and not available for tipping
- YELLOW and flashing: the door is opening or closing; not available for tipping
- GREEN: the door may be opened and tipping is possible

Tipping Procedure:

- During normal Facility operations, all doors will remain closed and the Door Indicator Lights will all be RED.
- The Operator may decide to enable a certain Door for Tipping. This is done by manually pressing the designated switch on the control panel in the Control Room. If the Bridge Crane is operating in the Reception Area, the Yellow LIGHT will continue to FLASH until the Bridge Crane has cleared that Area.
- Once the designated door has been enabled, the Door Indicator Light will become GREEN.
- The delivery vehicle may approach the designated DOOR.
- When the delivery vehicle approaches the designated DOOR, a sensor will automatically OPEN the enabled Door. The Door Indicator Light will turn from GREEN to flashing YELLOW during opening.
- When the Door is fully open, the Door Indicator Light will turn GREEN again.
- The delivery vehicle may enter the reception area and unload the waste to the reception pit.
- When the delivery vehicle has finished unloading and leaves, the Door will automatically CLOSE. The Door Indicator Light will turn from GREEN to flashing YELLOW during closing.
- Upon Door closure, the Door Indicator Light will turn GREEN again.
- The Control Room Operator, at this point, may decide to disable the Door for additional tipping. If disabled, the Door Indicator Light will turn from GREEN to RED.
- If for any reason the Door should remain OPEN longer than the preconfigured max-time, an Acoustic Alarm (Siren) will be activated, indicating that there is a possibility that the vehicle or the driver has experienced difficulty or accident.

The automatic detection system will recognize that the doors are opened and will inhibit the Bridge Crane from operating in the Reception or Unloading Area.

2.4 Pretreatment

Before sending the waste into the Biostabilization area, the waste is moved from the reception pit to the pre-treatment area by the automatically controlled grapple crane.

The pre-treatment equipment consists of the following:

- Hopper
- Chain conveyor
- Drum screener with bag opening section and mesh (150 to 200 mm mesh opening)
- Unloading conveyors

Waste is transferred by means of a conveyor belt into a storage pit next to the Drum Screener. The Drum Screener is loaded automatically by the control system and does not need any intervention by personnel, avoiding direct contact with the waste. A closed-circuit television (CCTV) camera is located above the Drum Screener hopper to check for potential obstructions.

The drum screener opens the bags and enables the separation of an oversize (Overscreen) and undersize (Underscreen) fraction.

- **The overscreen** is placed into a separate storage pit and is sent directly to the SRF refining line. This stream is composed of inerts (plastic, paper, and card) and would not play any part during the biological treatment. This oversize fraction is typically between **12** and **25%** of the input.
- **The underscreen** is placed in a storage pit having a ventilated floor through which air is circulated to ensure aerobic degradation of organic waste occurs

The screener hopper has a capacity of 20 m^3 (26 CY) while the crane bucket has a capacity 4 m^3 (5 CY).

2.5 Accelerated Biostabilization

The Overhead Crane collects and transports the underscreen from the storage pit to the Biostabilization area. The transported material is then laid out in piles of appropriate height.

The material is laid out on prefabricated grilled concrete plates which allow the passage of air during the process. Between these grilled elements and the flooring of the building exists an open area called the "plenum" where the air pressure is equalized. This is done so the air pressure is uniform across the whole area of material being treated. The biostabilization area is split into sub-areas running across the width of the Facility; each sub-area is independently managed allowing optimization of treatment for each row.

For a period of up to 15[1] days, the underscreen material is subjected to forced aeration to promote aerobic biological processes and oxidation of the organic content. This in turn produces heat, which dries and sanitizes the material. Aeration is cycled by both blowing and by aspiration through the grilled plates, to guarantee a more homogeneous treatment of the final product.

The fans that operate in each sub-area are controlled by inverters, which regulate air flow as a function of temperature of the process. Each sub-area has a temperature probe, which transmits data to the Control System (this will be described in more detail later in this document).

The Control System assesses incoming data and changes the air flow direction, the amount of air, and the composition of the air (process air and clean air), to optimize the biological process to achieve SRF specification.

During the accelerated biostabilization phase, the waste loses moisture content and is effectively biodried. However, in some modes of operation (biostabilization and composting) it is necessary to avoid excessive drying of the biomass to prevent the biological process ceasing. This is achieved by wetting the material. Monitoring and wetting are managed automatically by the Control System, which avoids intervention by personnel and eliminates exposure to the biostabilizing material.

2.6 SRF Refining

At the end of the Biostabilization cycle, the material is removed from the Biostabilization hall and placed into the Refining Area Hopper using the Bucket and Overhead Crane. The Hopper feeds a conveyor belt leading into the Refining area. Besides the Hopper is a Shredder that receives the overscreen fraction. Both streams are fed to a conveyor belt that conveys this material to the main SRF refining line.

The refining line is located in a separated building with a dust capture system.

The refining line is composed of the following equipment:

- Primary Shredder
- Drum Screener mesh 10 or 20 mm
- Air/Drum separator
- Secondary Shredder

[1] This is dependent upon the SRF specification and input waste composition

- Magnetic belt
- Eddy Current separator
- Conveyors
- Eventual boilers, compactors, chutes.

Each machine has a unique user and maintenance manual.

The refining line removes specific streams that are excluded from the SRF (e.g., ferrous/non-ferrous metal, PVC). The removed streams are discharged into roll off containers that are sent for recovery and replaced when full. The remaining stream is the final SRF that will typically be directly loaded into walking floor trailers.

This phase is monitored by the CCTV and the Control System with only limited intervention by Facility personnel.

3.0 BIO-DRYING HALL FIRE FIGHTING SYSTEM

The large amount of stored material and the high calorific value of the same, directly implies that there is a high potential that fire could occur within the stored material. Taking into consideration the above, it is evident that a Fire Fighting System is necessary to safeguard the equipment within the Facility as well as the Facility itself.

The Fire Fighting System must be able to suppress any fire within minutes of the alarm.

The most efficient system is based on a foam solution, which deploys a foam blanket over the waste surface smothering the fire. This system can be deployed quickly and in an automatically, without putting Facility personnel at risk and without producing undesired leachate.

Fire Fighting "Foam" Systems suppress fires by separating the fuel from the air (oxygen). There are various types of foam systems that can be implemented, but in general they all function in the following manner:

- Foam blankets the fuel surface smothering the fire.
- The fuel is cooled by the water content of the foam.
- The foam blanket suppresses the release of flammable vapors that can mix with air.
- After 3-4 hours, the foam disappears without any side effect on waste.

Upon smothering the fire with the foam blanket, the Bio-Stabilization Facility will also have water hydrants at the disposal of Facility personnel to better extinguish the fire and suppress any residual fires that may continue to burn below the surface of the stored material. The water hydrants are used to intervene locally when a concentrated fire source is detected. These devices are located outside the building at the level of the walkway running alongside the building itself. They can be operated by personnel standing on the walkway, outside the building spraying water inside the building through open windows.

Heat escape openings with proper fusible switches may be provided on the roof to better protect the building.

3.1 Foam System

For a standard 60-70 ktpa Facility the following equipment is required:

- 9 High Expansion Fixed Foam Generators, longitudinally positioned alongside the Bio-Stabilization Building.
- 1 High Expansion Fixed Foam Generators Short Range, longitudinally positioned along the perimeter of the Bio-Stabilization Building.
- 1 Bladder Tank (capacity 3000 Lts.) for liquid deployment by dedicated fixed piping.
- 15 - 200 Lts. Containers of high expansion synthetic foam, to be placed inside Bladder Tank.

The Fire Fighting "Foam" System that will be installed inside the Bio-Stabilization building will consist of the following:

- Dedicated piping and valves, connecting the generators with the Bladder Tank.

The high expansion fixed foam generators have been designed for the fixed protection of large warehouses or confined volumes, where large foam volumes must be produced in short times. Inside their cylindrical body the foam solution is sprayed at a high speed through high efficiency nozzles, and impact onto an outlet cone made of perforated sheet. The combined action of air aspiration through the Venturi effect and the impact onto the perforated outlet cone allows producing quality foam with up to 1:700 expansion ratios. This normally supplied with a male inlet thread, or with a Flanges connection on request.

The Bladder-Tank System works without the need for any external energy supply. The foam concentrate is stored in a rubber bag (bladder), which is contained inside the tank, and is displaced from it by means of water under pressure taken from the main water supply and injected into the main water line through the pressure drop generated by a Venturi orifice. The Bladder Tank will be located inside the Fire Fighting System Room. The dedicated piping will be connected to the Bladder Tank and will run along the outside of the Bio-Stabilization Building connecting all the fixed and oscillating generators. The minimal pressure that the piping must sustain is equal to 7 bar.

3.2 Water Hydrant Network Fire Fighting System

In addition to the "Foam" system, a network of Water Hydrants will be installed along the walkway and next to the fast opening doors of the Bio-Stabilization building. The Water Hydrant Network consists of the following components:

- Wall Mounted Hydrants together with 20m of Hose and appropriate nozzles.

3.2.1 Refining Area

The Refining Area is equipped with traditional water hydrants in suitable number to cover the area.
The conveyor belts are provided with water sprinklers and flame detectors to immediately fight the fire over the belt. In case of fire, the belt must automatically stop to avoid fire spreading.

3.3 Fire Alarm System

An automated firefighting system is subject to an efficient and suitable fire detection and alarm system. Within the Bio-Stabilization Area and within the Refining Area, a system of sensors will be installed to detect the presence of fires within the building. These sensors will be connected to a Fire Alarms system, which when activated will automatically activate the Fire Fighting System. The fire alarm system will be properly certified.

3.3.1 Bio-Stabilization Area

Within the Bio-Stabilization Area the following sensors will be installed:

- 3 detectors of combustion particles (light scattering measurements): 1 mounted in the extracted air manifold; 2 mounted inside the building.
- 3 flame detectors.

3.3.2 Refining Area

Within the Refining Area a separate system will be installed, primarily based on the following sensors:

- optical smoke detectors
- flame detectors over each conveyor belt

3.4 Fire Alarm Pull Stations

Fire Alarm manual pull stations will be positioned in critical points of the Facility, such as close to the Emergency Exits. The manual pull stations activated by pushing in the protective covering activating the alarm pulling down the lever.

3.5 Fire Alarm Management

As indicated in this document, two permanent Fire Fighting Systems have been configured for the Bio-Stabilization Facility. One is based on a "Foam" solution while the other is based on standard water hydrant solution. In addition, various types of Fire Alarm sensors have been implemented to detect fire hazards. These sensors, which are normally connected with each other, will also be connected to the Facility Control System, thus all sensor activities can be monitored not only in the control room, but also remotely over the Internet. Once the Fire Alarms have been activated, the Fire Fighting Procedure will be implemented along with Emergency Evacuation procedures of Facility personnel.

The Fire Fighting "Foam" System may be configured to work in automatic mode. The system will be automatically activated whenever any of the Bio-Stabilization Alarm sensors are activated. It is possible to configure various automatic procedures that will be automatically put into motion once the Alarms have been activated.

These procedures can be the following:

- The Fire Fighting "Foam" System is activated, and foam is introduced throughout the Processing Area.
- Fire Alarm message is sent to the local Fire Department.
- All power to the Facility Equipment is shut down automatically to protect the safety of the employees.
- Cranes and other equipment may execute special procedures such as immediate stop of the refining equipment or parking procedure for cranes.

3.6 Exterior Fire Fighting System

The exterior firefighting system consists of fixed fire hydrants. These hydrants will be installed per local fire code.

4.0 AIR HANDLING

During the MBT process, the material needs to receive sufficient air so optimum oxidation conditions occur. The demand for oxygen, carried by the air, will vary with time; more demand occurs at the start of process when the mixture of materials is rich in organics, and demand is less at the end when the reaction has consumed a large part of the organic material. For this reason, based on the continuous temperature measurements of the material and based on the process reaction, the amount of incoming air is managed by inverters, which are controlled by the Control System.

The process air may be differentiated according to its function:

- "**Stoichiometric**" air is the minimal amount of air required for the bio-oxidation process to take place within the waste mass; this is a minimal part of the total air flow.
- Temperature controlling air: this is the air in addition to the "stoichiometric" air that needs to be added to manage heat generation and overall temperature within the reactor.

The Ventilation System is dimensioned according to the maximum volume of air required to maintain thermal control. In the Biostabilization phase, this volume of air is **20 Nm^3/h (12.5 scfm) for each ton of waste being treated**.

The air flow rate may be decreased during the process down to 5 Nm^3/h (3.1 scfm) for each ton of waste.

The quantity of air that is necessary during the bio-stabilization phase has been determined through data analysis of similar processing facilities and confirmed by experimentation and analysis commissioned and coordinated by the University of Milan[2].

4.1 Air Calculations

The calculations to determine the air supply for the material during bio-oxidation are based on the minimal quantity of oxygen that is necessary for a biological reaction (stoichiometric oxygen). The volume of oxygen supplied is always greater and can vary considerably depending on the difference in composition within the waste.

5.0 ODOR AND AIR PURIFICATION SYSTEM

The Facility is fully enclosed and under negative pressure, which results in reducing any odor release outside the building. A separate air ventilation system is responsible for aspiration of odorous air from inside the building and subsequent venting through the biofilter for air purification.

The only possible odor release is when the doors are opened for waste delivery or for maintenance. It is important to keep the doors closed at all times, unless strictly necessary for Facility operation and only for a minimum time requirement.

5.1 Introduction

Biofiltration is a biological process that reduces the odors present in the exhaust air using a mixed population of microbes, including bacterium, mildews, and yeasts, that all work as natural agents for odor removal.

[2] Fabrizio Adani – *"Operative parameters for closed reactors and composting in biostabilization plants"* – Università di Milano DIFCA - 1998

These micro-organisms metabolize most of the organic and inorganic compounds produced during bioxidation through a large series of reactions that transform the compounds into odorless products.

The microbe colony resides on the surface of a natural support through which the air to be treated is blown. The support, which is the 'bed' of the biofilter may be formed of mold, peat, woody pieces, green compost, or by a mixture of these and other materials, including plastics.

The odorous gaseous substances are absorbed by the filtering material and degraded by the microbe flora, which uses it as nutrient together with the filter material itself. The biological activity requires an oxygen supply that is provided by the same exhaust air entering the biofilter. The biological reaction emits carbon dioxide (CO_2), water, inorganic compounds, and biomass. Below are some of the typical biologic reactions of the biofilter:

$$H_2S + 2O_2 \rightarrow Bio \rightarrow SO_4^{=} + 2H^+$$

$$NH_3 + H_2O \rightarrow Bio \rightarrow NH_4^+ + OH^-$$

$$2NH_4^+ + 3O_2 \rightarrow Bio \rightarrow 2NO_3^- + 8H^+$$

$$\text{volatile organic compounds} + O_2 \rightarrow Bio \rightarrow CO_2 + H_2O$$

Below are the key characteristics of the system:

- Completely natural processes - no man-made chemical substances are used.
- The process is not selective. Though it is a biological process (no chemicals are used), the biofilter can reduce different types of odorous compounds.
- No installation required - the system structure is on the ground and easily accessible to control and maintain (in standard configurations).
- Low energy cost - the high porosity and limited height of the biofilter allow reduced load losses and the use of ventilation Facility with low power absorption. The moistening pump for the biofilter works automatically. Moreover, no additional pumps for chemical additives are necessary, as compared to other odor reduction technologies.
- Low maintenance - several tests are necessary to check the temperature and humidity of the filter, the operation of fans and nozzles (daily basis), load loss (monthly basis), wear and tear, and pH of the filtering bed (control required every 6 months, during which time it is necessary to check the effectiveness of odor control).
- Filtering material lasts on average between 2 - 5 years, depending on the wear rate and the microbiological depletion. At the end of this period the filter bed must be replaced.
- At the end of its working life, the disposal of the biofilter has no environmental consequence - no chemical agents are used so there is no question of secondary pollution. The biofilter can be sent to a permitted landfill, or if it has the required composition, may be used as a fuel.

5.2 Description

The bio-oxidation of waste tends to odors due to ammonia, nitrogen based organic compounds, volatile fatty acids, sulphur, and various sulphur-based substances.

The biofilter consists of a modular tank, made of prefabricated aluminium elements. Inside the tank there is a PVC watertight liner, a modular grid to allow air flow and above that the filtering bed. Underneath the filtering bed and below the supporting grid there is a plenum through which air is blown. The air passes through the filter bed and it is released to the atmosphere. The grid is made up of modular polypropylene tiles with polypropylene support columns 500 mm (1.6 ft) high. The load bearing capacity is 1000 kg/m^2(205 psf).

The bottom of each biofilter is slightly sloped to convey the percolate through the draining pipes.
The biofilter is completed by a moistening system for the filtering material. The system is made of a network of sprinkler nozzles positioned above the biofilter itself. Moistening of the Biofilter is automatic and is triggered by sensors (to measure the humidity of the bed), using the management software, which operates the sprinkler nozzles.

5.3 Working Principles and Maintenance

To ensure correct operation of the Biofilter System, the proper environment must be maintained for the development of micro-organisms, according to the following properties:

- Humidity of the filtering material: 50-70%
- Porosity: the high porosity allows the flowing and distribution of the incoming stream of gases and oxygen onto a wide surface; the height of the biofilter within 0.8-2 m (2.6-6.6 ft) allows reduced load losses.
- Working temperature: 5°C-45°C (41°F-113°F); according to the Q10 rule the biological activity doubles every 10°C (50°F). For temperature control, the biofilter uses thermometers positioned at different depths of the filtering mass.

Care must be taken to check the PROCESS WATER OUTLET PIPES from the biofilter to remove any possible obstructions.

6.0 WATER HANDLING

The water drainage system is composed of a network of different disposal pipes, which are separated according to their different sources.

6.1 Process Leachate

The leachate is created during the tipping of the waste into the reception pits. A smaller amount is created in the Biostabilization area during the process, especially if the material has high water content.

Leachate originating from the waste percolates underneath the slotted slab into the plenum (which is waterproofed) and is collected by means of drain pipes into the leachate pits (one for each Biostabilization section) and then to a leachate tank.

Each leachate pit is protected by a *hydraulic guard* to avoid air release from the drain pipe. The pits must be periodically inspected to identify possible obstructions that my affect the leachate discharge. The drain pipe can be cleaned by a *jet spray device* inserted in the inspection hole of each drain pipe.

6.2 Leachate tank

A double-walled tank collects leachate originating from the waste area.

6.3 Dimensioning of the Leachate Tank

Liquids generated from waste during storage or processing must be collected and sent to the Leachate Tank through a dedicated sewage network. Inside the Leachate Tank, two pumps are located to pump accumulated leachate back into the process area for wetting the waste mass.

Any leachate runoff is collected in dedicated pits, which are connected to each other; the piping that connects the pits is PVC and is at a gradient for drainage into the Leachate Tank.

The Leachate Tank will have two (2) alarm sensors: one high level warning, and one low level warning.

6.4 Physical/Chemical Characteristics of the Leachate

Table 1 – Typical Composition of Combined Leachate from the Reception Pit Area and Process Water from Biofilter Area

Parameter	Value
Electrical conductivity	3330 mS/cm
Chemical oxygen demand	466 mg/l
Biological oxygen demand	240 mg/l
pH	7.91
Suspended Solids	130 mg/l
Residue at 105 C	0.10%
Ammonical nitrogen	377.0 mg/l
Chloride	85.8 mg/l
Nitrate	671 mg/l
Sulphate	103 mg/l
Arsenic	0.0070 mg/l
Copper	2.72 mg/l
Iron	4.95 mg/l
Mercury	0.0270 mg/l
Selenium	0.222 mg/l
Zinc	1.07 mg/l
Cadmium	<0.05 mg/l
Chromium (VI)	<0.01 mg/l
Total chromium	<0.05 mg/l
Lead	<0.05 mg/l
Nickel	<0.05 mg/l
Mineral Oils	<1 mg/l
Chlorinated pesticides	<0.01 mg/l
Phenols	<0.01 mg/l
PCB and PCT (total)	<0.001 mg/l
Total aromatic solvents	<0.1 mg/l

Parameter	Value
Total chlorinated solvents	<0.1 mg/l

6.5 Rain Water on the Biofilter

Rain water that percolates from the Biofilter during heavy rainfalls is considered process water and is collected through dedicated pipelines and is discharged to the local sanitary sewer lines.

6.6 Rain Water

Rain Water within the Facility footprint is collected in a dedicated storm water management system and can either be re-used on site or discharged as appropriate.

7.0 NOISE MANAGEMENT

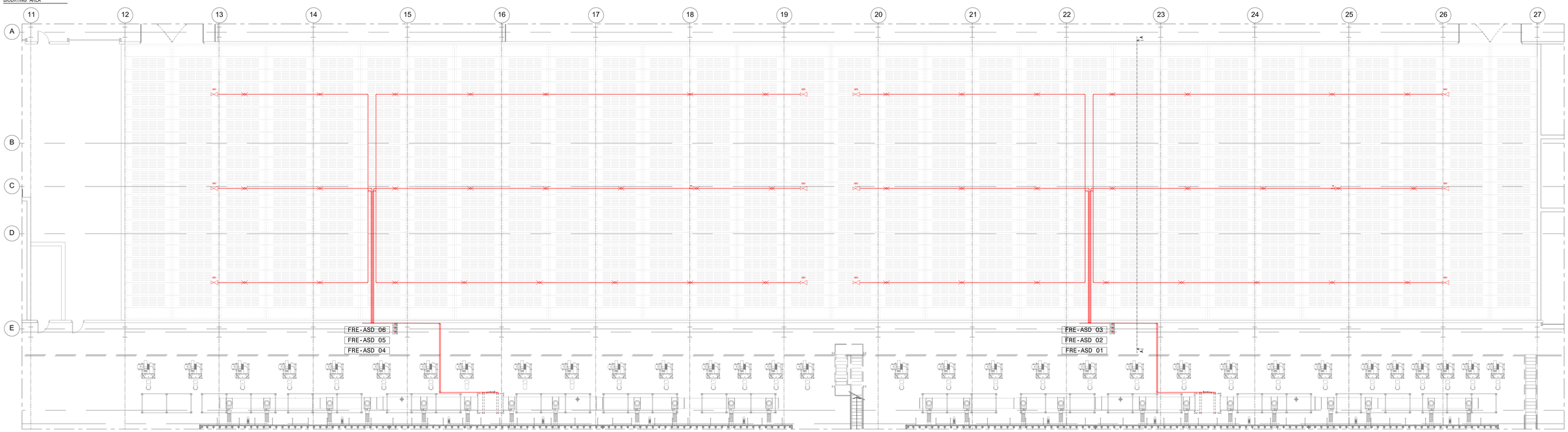
Noise generated during various phases of waste treatment originates mainly from the pre-treatment and refinement equipment and the fans, all of which are enclosed within the building with necessary levels of acoustic shielding. Satisfactory noise impact assessments have been done for other MBT Facilities operating in Europe and this experience can be drawn upon where appropriate.

All equipment complies with the Occupational Safety and Health Act requirements, the National Electrical Code, and National Fire Protection Association Standards.

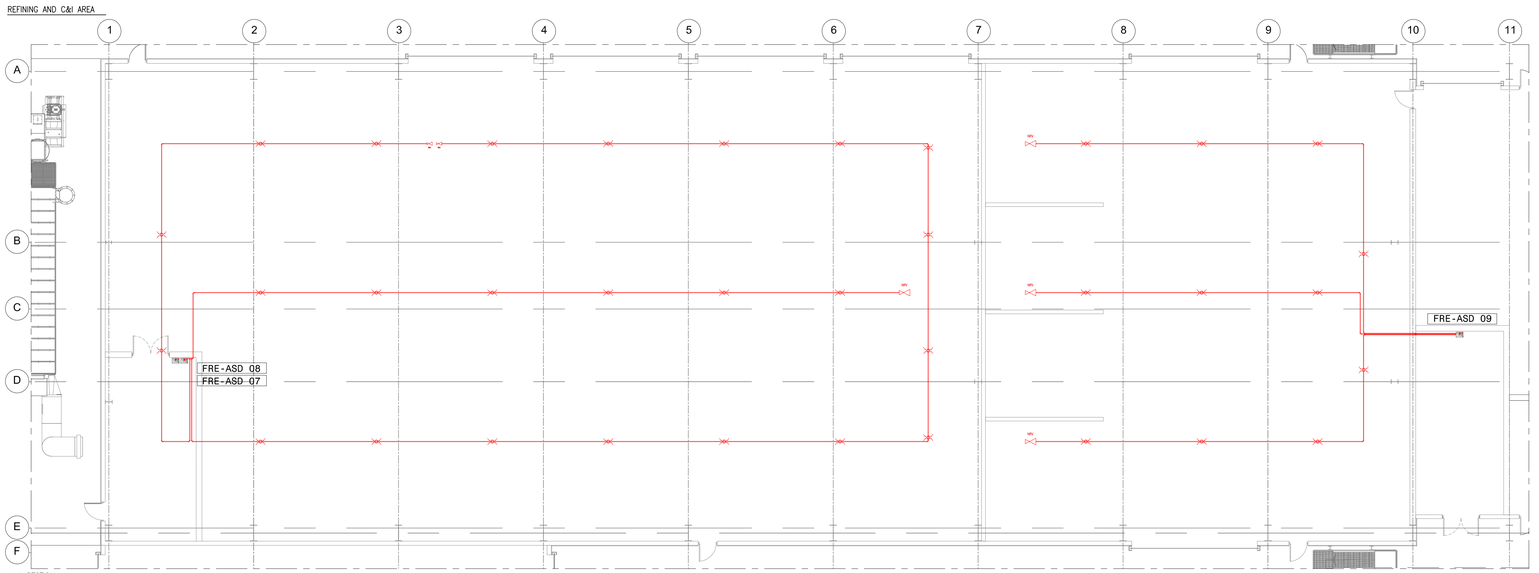
ATTACHMENT 3

FACILITY DRAWINGS D214 AND D217

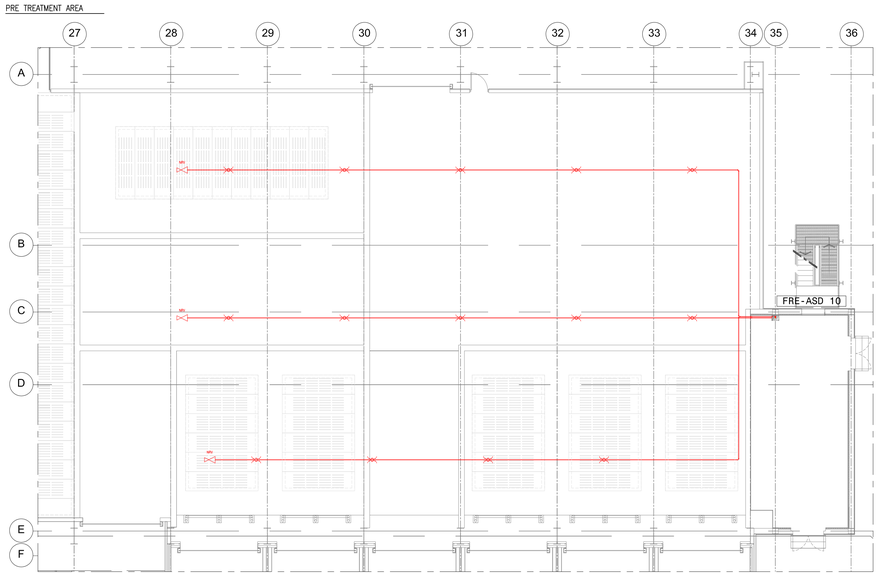
BIODRYING AREA



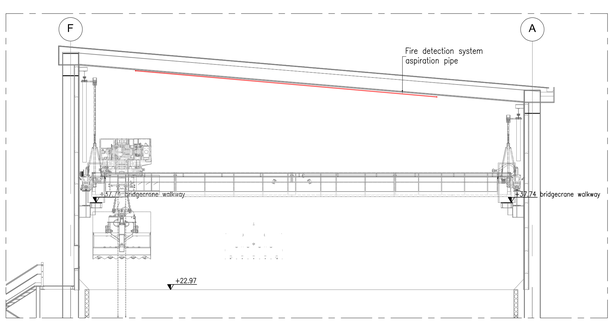
REFINING AND C&I AREA



PRE TREATMENT AREA



A–A SECTION



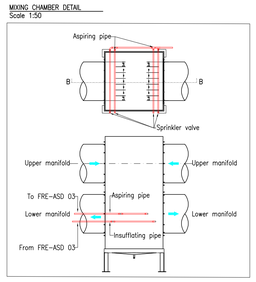
NOTE:

1. THE POSITION OF THE ABS PIPE IS INDICATIVE
2. THE ABS PIPES HAVE TO BE HOOKED TO THE ROOF STRUCTURE
3. THE FIRE DETECTION SYSTEM MUST BE VERIFIED BY DESIGNER THAT WILL CERTIFY THE COMPLIANCE OF THE DESIGN WITH STATUTORY REGULATION AND CODES IN FORCE IN U.S.A.

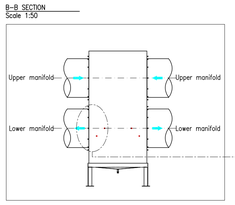
KEY	
	LASER ANALYZER (ASD)
	ABS PIPE #3/4" PN16
	#1/8" HOLES ON PIPES EACH 6 METERS
	NON RETURN VALVE
	SPRINKLER VALVE
FRE-ASD 01	LASER ANALYZER FOR BIOLOGICAL TREATMENT AREA
FRE-ASD 02	LASER ANALYZER FOR BIOLOGICAL TREATMENT AREA
FRE-ASD 03	LASER ANALYZER FOR MIXING CHAMBER
FRE-ASD 04	LASER ANALYZER FOR BIOLOGICAL TREATMENT AREA
FRE-ASD 05	LASER ANALYZER FOR BIOLOGICAL TREATMENT AREA
FRE-ASD 06	LASER ANALYZER FOR MIXING CHAMBER
FRE-ASD 07	LASER ANALYZER FOR REFINING AREA
FRE-ASD 08	LASER ANALYZER FOR REFINING AREA
FRE-ASD 09	LASER ANALYZER FOR C&I AREA
FRE-ASD 10	LASER ANALYZER FOR PRE-TREATMENT AREA

NOTE:
1. All caps and junctions must be mechanically sealead and not glued
2. Pipes brackets must be provided each meter
3. During installation be sure not to let dirt inside the pipes. Verify that the holes are not occluded

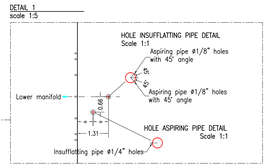
MIXING CHAMBER DETAIL
Scale 1:50



B-B SECTION
Scale 1:50



DETAIL 1
scale 1:5



NOTE:

Dimensions in feet; elevations in feet except where otherwise indicated

TOLLERANCES: ±1cm/±0.4" FOR CIVIL WORKS
±1mm/±0.04" FOR MECHANICAL WORKS

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REV.	DATE	Drawn	Checked	Approved	Description
A	26/10/18	MD	WF	PPCM	SECOND EDITION
0	17/10/18	MD	WF	PPCM	FIRST EDITION

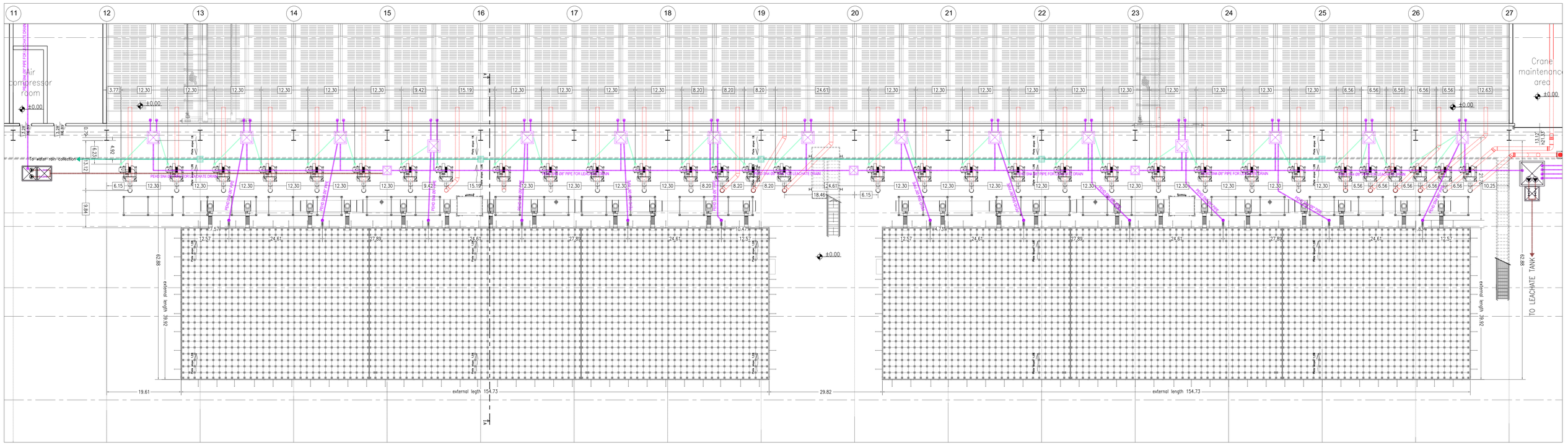
ENTSORGA
GREEN TECHNOLOGY REVOLUTION
Str. Prov. per Castelnuovo S., 7
15057 Tortona (AL)
Tel. 0131.811383
Fax 0131.862597
email info@entsorga.it

PROJECT: Rensselaer Resource Recovery Project

DRAWING TITLE: Typical air sampling fire detection system

REQUISITION	DATE:	FORMAT:	SCALE:	DWG. N°	SHEET:
–	17/10/18	E1	1:125	P479 D214/A	1of1

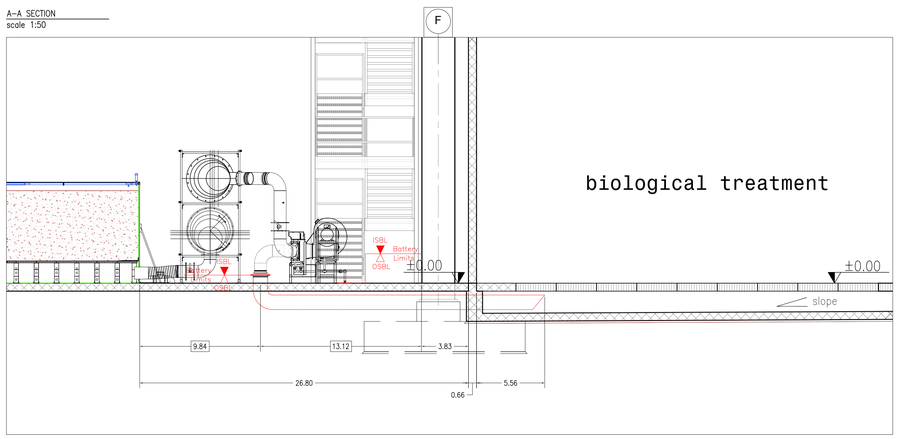
PLANT



KEY	
	PEHD pipe for leachate drain
	Closed well with manhole cover for leachate
	PVC pipe for condensate drain
	Grilled well for collecting water from squares
	Pvc pipe for ground rainwater drain
ISBL	Supply: ENTSORGA scope of work Installation: CLIENT scope of work
OSBL	Supply and Installation: CLIENT scope of work

NOTE: Boxed dimensions are mandatory

A–A SECTION
scale 1:50



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PROJECT: Rensselaer Resource Recovery Project

DRAWING TITLE: Biofilter and ventilation layout

REQUISITION	DATE:	FORMAT:	SCALE:	DWG. N°	SHEET:
–	17/10/18	E1	1:120	P479 D217/A	1of1