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Camden County Energy Recovery Associates
600 Morgan Blvd.
Camden, NJ 08104
Tel: 856.966.7174

September 30, 2022

Mr. Anthony Fontana, Chief
Bureau of Solid Waste Permitting
Division of Solid & Hazardous Waste Permitting
New Jersey Department of Environmental Protection
401 E. State Street, 2nd Floor, West Wing
P.O. Box 420, Mail Code 401-02C
Trenton, NJ 08625-0414

Re: **Camden County Energy Recovery Associates**
Camden County Energy Recovery Center
Program Interest Number: 133512
Permit Number: RRF190001
Major Modification – Air Quality Control System Upgrade Project and Type 72 Waste Addition

Dear Mr. Fontana :

Camden County Energy Recovery Associates, L.P. ("the CCERA") hereby submits this application ("the Application") for a major modification of the Solid Waste Permit (Permit No. RRF190001) for the Camden County Energy Recovery Center ("the CCERC, the Facility") to the New Jersey Department of Environmental Protection ("NJDEP") seeking approval to upgrade the air quality control systems ("AQCS") at the Facility and to install and operate a Liquid Direct Injection ("LDI") system to receive and process Type 72 waste. Proposed modifications of the AQCS include conversion of the existing spray dryer scrubber on each Municipal Waste Combustor ("MWC") to a circulating dry scrubber ("CDS") system, replacement of the electrostatic precipitator ("ESP") on each MWC with a fabric filter baghouse, and improvement of the selective noncatalytic reduction system on each MWC. The proposed LDI system will allow for the processing of nonhazardous liquid wastes in each of the three (3) MWCs. Similar to the LDI waste streams processed at the former Covanta Warren Facility, the LDI wastes which will be processed at the CCERC are primarily rinse and/or wash waters used to clean out vessels and other equipment used in the manufacture of products such as shampoo, conditioner, latex products, and pharmaceutical products to name a few examples.

The Application includes a Solid Waste Facility Application Form for the proposed major modification required to implement the Project, equipment descriptions, details concerning the LDI waste approval and receiving process, and a Standard Operating Procedure for disposing of baghouse bags. Also included are general arrangement, elevation and P&ID drawings, a construction schedule, and details of Covanta Camden's outreach efforts to inform the public about the proposed project. A check in the amount of seventy-four thousand thirty-two dollars and no cents ($74,032) for the major modification permit fee as required pursuant to N.J.A.C. 7:26-4.3 will be submitted upon receipt of a billing invoice from the New Jersey Treasury Department.

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Camden County Energy Recovery Associates
600 Morgan Blvd.
Camden, NJ 08104
Tel: 856.966.7174

Thank you for your consideration of this matter. If you any questions concerning the Application or the proposed Project, please contact Mr. Gary Pierce of Covanta Environmental at (518) 207-7149.

Sincerely,

Todd Frace

Todd Frace
Facility Manager

cc: T. Byrne - NJDEP
K. Beccia - NJDEP
J. Bernardino – Covanta
M. Van Brunt - Covanta
T Gregan - Covanta
P. Earls - Covanta
J. Walsh - Covanta
G. Pierce - Covanta

AECOM

Application for a Major Modification to Solid Waste Facility Permit

Camden County Energy Recovery Center
Air Quality Control System Upgrade Project

Project number: 60654787

September 2022

Delivering a better world

Quality information

Prepared by	Reviewed by	Verified by	Approved by
			
Ian Miller	Brian Stormwind		

Revision History

Revision	Revision date	Details	Authorized	Name	Position

Prepared for:

Camden County Energy Recovery Associates, L.P.
Camden, NJ

Prepared by:

Ian Miller and Brian Stormwind
AECOM
250 Apollo Drive
Chelmsford, MA 01824
aecom.com

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List of Acronyms

AQCS	air quality control system
CCERA	Camden County Energy Recovery Associates, LP
CCERC	Camden County Energy Recovery Center
CCI	Camden Collaborative Initiative
CCMUA	Camden County Municipal Utilities Authority
CDD/CDF	Dioxin/Furans means tetra-through-octa chlorinated dibenzo-p-dioxins and dibenzofurans
CDS	circulating dry scrubber
CEMS	continuous emissions monitoring system
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CES	Covanta Environmental Services
CO	carbon monoxide
COMS	continuous opacity monitoring system
DCS	distributed control system
DOT	Department of Transportation
ECS	eddy current separator
ESP	electrostatic precipitator
FEHIS	Final Environmental and Health Impact Statement
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
ft	feet
GPM	gallons per minute
HCl	hydrogen chloride
ID	induced draft
lbs	pounds
LDI	liquid direct injection
MCF	Material Characterization Form
MVCCDC	Morgan Village Circle Community Development Corporation
µg	micrograms
µg/dscm7	micrograms per dry standard cubic meter, corrected to seven percent oxygen
mg/dscm7	milligrams per dry standard cubic meter, corrected to seven percent oxygen
MSW	municipal solid waste
MWe	megawatt (electrical)
MWC	municipal waste combustor
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NO_X	nitrogen oxides
O_2	oxygen
O&M	operations and maintenance
%	percent
PAC	powdered activated carbon
P&ID	piping and instrumentation diagram
PM	particulate matter
POTW	Publicly Owned Treatment Works
ppm	parts per million

PPS	polyphenylene sulfide
PTFE	polytetrafluoroethylene
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
SNCR	selective non-catalytic reduction
SO_2	sulfur dioxide
SOP	standard operational procedure
VOC	volatile organic compounds
WTE	waste-to-energy

1. Introduction

1.1 Project Summary

Camden County Energy Recovery Associates, L.P., ("CCERA"), a wholly-owned subsidiary of Covanta Energy LLC ("Covanta Energy"), operates the Camden County Energy Recovery Center ("CCERC" or "the Facility") under Program Interest Number 133512. As shown in **Figure 1-1**, the CCERC is located at 600 Morgan Boulevard in the City of Camden, New Jersey. The Facility site is bordered by Interstate 676 on the east, Newton Creek on the south and the southern part of the west property line, an active Conrail right-of-way on the balance of the west property line, and Morgan Boulevard on the north. The CCERA holds Solid Waste Permit No. RRF190001 ("the Solid Waste Permit") which was issued on May 2, 2019, and most recently amended on June 18, 2019, by the New Jersey Department of Environmental Protection. The CCERA holds an air pollution control operating permit No. BOP200001 ("Title V Operating Permit" or "Operating Permit") which was issued on December 22, 2004, and most recently amended on June 23, 2020, by the New Jersey Department of Environmental Protection ("NJDEP"). The current Operating Permit expired on December 21, 2019, and is in the process of being renewed. The current Operating Permit remains in effect pursuant to the permit shield provisions of New Jersey Administrative Code ("N.J.A.C.") 7:27-22, Operating Permits. On July 8, 2022, the CCERA applied for a minor modification of the Operating Permit to NJDEP to upgrade the air quality control system ("AQCS") equipment at the CCERC and include a delivery system to allow for the processing of nonhazardous liquid wastes (Type 72 waste) in each of the (3) Municipal Waste Combustion units ("MWC").

The CCERA hereby submits this permit application ("Application") to the NJDEP seeking approval of modifications (the "Project") of the Solid Waste Permit for the CCERC which include the receipt and processing of Type 72 waste at the CCERC, the proposed Type 72 waste delivery system and the proposed upgrades of the AQCS at the facility. The Type 72 waste delivery system includes two (2) storage tanks, pumps, piping, and ancillary equipment to receive liquid waste and deliver it to the three (3) MWC units. The proposed AQCS upgrades include conversion of the existing spray dryer scrubber on each MWC to a circulating dry scrubber ("CDS") system and replacement of the electrostatic precipitator ("ESP") on each MWC with a fabric filter baghouse. The changes also include improvements to the selective noncatalytic reduction ("SNCR") control system on each MWC. To facilitate the conversion from spray dryer scrubber to CDS, a new hydrated lime silo will be installed and one (1) of the existing pebble lime silos will be converted to a hydrated lime silo. At that point, the other existing pebble lime silo will be removed from service. The current project schedule includes commencement of construction of the Liquid Direct Injection ("LDI") system and upgrade of the first MWC in 2024 and commencement of operation of all three upgraded MWCs (municipal waste combustors) by September 2026, each contingent upon the timely receipt of required environmental and construction approvals. Based on experience at other Covanta waste-to-energy ("WTE") facilities, there will be a reduction in emissions of filterable particulate matter, metal emissions, acidic gas emissions, and the emissions of oxides of nitrogen ("NO_X") from historical average levels measured at the Facility. The Facility will also serve as an environmentally effective means for the proper disposal of Type 72 liquid waste.

1.2 Summary of Regulatory Requirements

The CCERC is subject to the provisions of N.J.A.C. 7:26 et seq (solid waste regulations) and N.J.A.C. 7:27 et seq. (air quality control regulations). New regulatory requirements under N.J.A.C. 7:27 et seq. will become effective as a result of the proposed Air Quality Control System Upgrade Project. The proposed Project will be a major modification to the current CCERC permit under N.J.A.C. 7:26-2.6.

1.3 The Applicant

The applicant for this Application is CCERA. The primary contact with overall responsibility for this Application is:

Name: Todd Frace
Title: Facility Manager
Address: 600 Morgan Boulevard, Camden, NJ 08104
Phone: 856-966-7174
E-mail: tfrace@covanta.com

The primary technical contact at the CCERA for this Application is:

Name: Gary Pierce
Title: Environmental Manager
Address: 221 Harborside Drive, Schenectady, NY 12305
Phone: 518-207-7149
E-mail: gpierce@covanta.com

AECOM was retained by the CCERA to perform the necessary technical analysis to support the Application. The primary contact at AECOM responsible for the preparation of the Application is:

Name: Brian Stormwind
Title: Associate Vice President, Manager, Air Quality Services - East
Address: 250 Apollo Drive, Chelmsford, MA 01824
Phone: 978-905-2413
E-mail: Brian.Stormwind@aecom.com

1.4 The Application

The Application, which is a proposed major modification to Covanta Camden's Solid Waste Facility Permit, contains seven (7) sections and six (6) Appendices.

Section 1 – Introduction provides information about the Project, regulatory requirements, and facility contact information.

Section 2 – Documentation of Fee contains a copy of the check in the amount of seventy-four thousand thirty-two dollars and no cents ($74,032.00) for the major modification fee as required pursuant to N.J.A.C. 7:26-4. Regulatory Review.

Section 3 – Project Description provides a detailed project and process description.

Section 4 – Drawing Revisions discusses the drawings contained in **Appendix B** of the proposed air quality control system upgrade and the Type 72 liquid waste system.

Section 5 – Project Schedule provides the schedule for design and construction of the Project.

Section 6 – Operations and Maintenance Manual Revisions discusses updates of O&M manual to incorporate changes associated implementation of the Project.

Section 7 – Community Outreach and Public Support describes the effort to inform the public in the surrounding area about the details of the Project.

Appendices

Appendix A – Solid Waste Facility Application Form

Appendix B – Project Drawings

Appendix C – Baghouse Description

Appendix D – Baghouse Bag Disposal Procedure

Appendix E – LDI Waste Stream Approval Flow Chart, Material Characterization Form

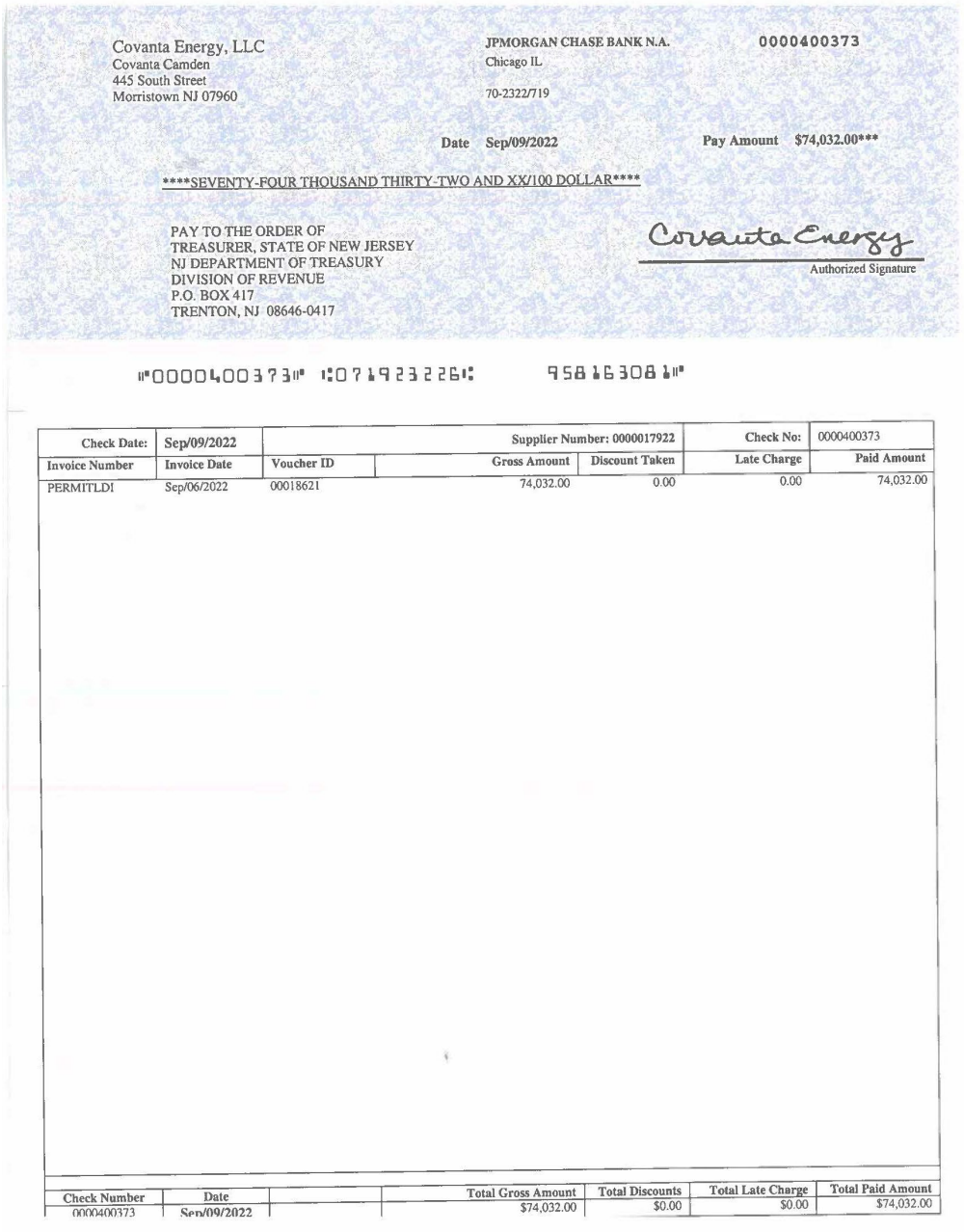
Appendix F – City of Camden Resolutions and Letter of Support

Figure 1-1. Location of Camden County Energy Recovery Center

2. Documentation of Fee

A check in the amount of seventy-four thousand thirty-two dollars and no cents ($74,032) for the major modification permit fee as required pursuant to N.J.A.C. 7:26-4.3 will be submitted upon receipt of a billing invoice from the New Jersey Treasury Department. A copy of the check is included below in **Figure 2-1**.

Figure 2-1. Copy of Major Modification Permit Fee Check



Covanta Energy, LLC
Covanta Camden
445 South Street
Morristown NJ 07960

JPMORGAN CHASE BANK N.A.
Chicago IL
70-2322/719

0000400373

Date Sep/09/2022

Pay Amount $74,032.00***

****SEVENTY-FOUR THOUSAND THIRTY-TWO AND XX/100 DOLLAR****

PAY TO THE ORDER OF
TREASURER, STATE OF NEW JERSEY
NJ DEPARTMENT OF TREASURY
DIVISION OF REVENUE
P.O. BOX 417
TRENTON, NJ 08646-0417

Covanta Energy
Authorized Signature

⑈0000400373⑈ ⑆071923226⑆ 9581630861⑈

Check Date:	Sep/09/2022		Supplier Number: 0000017922		Check No:	0000400373
Invoice Number	Invoice Date	Voucher ID	Gross Amount	Discount Taken	Late Charge	Paid Amount
PERMITLDI	Sep/06/2022	00018621	74,032.00	0.00	0.00	74,032.00

Check Number	Date		Total Gross Amount	Total Discounts	Total Late Charge	Total Paid Amount
0000400373	Sep/09/2022		$74,032.00	$0.00	$0.00	$74,032.00

3. Project Description

3.1 Existing Facility Description

The CCERC is a WTE facility that produces high temperature, high pressure ("superheated") steam from the combustion of solid waste. The steam is utilized to generate electricity at the Facility for in-plant use and for sale to the electrical grid for distribution.

The Facility is currently permitted to accept and process the following waste types:

- ID 10 – Municipal Waste (household, commercial, and institutional);
- ID 13/13C - Bulky Waste (except for major motor vehicle parts, noncombustible construction material, and noncombustible demolition debris);
- ID 23- Vegetative Waste;
- ID 25- Animal and Food Processing Waste; and
- ID 27- Dry Industrial Waste (except for asbestos and asbestos-containing wastes, dry non-hazardous pesticides, non-hazardous oil and chemical spill clean-up waste, dry non-hazardous chemical waste, and hazardous waste as defined in N.J.A.C. 7:260-1 et seq. and 40 CFR 261 which is generated by small quantity generators as defined in N.J.A.C. 7:260-1 et seq.).

The Facility is permitted to process up to 451,140 tons of solid waste per year. The rate at which the Facility can process waste is further limited by two (2) steam production rates contained in the Operating Permit: 1) a maximum steam production rate not to exceed 421,600 pounds per MWC (at a temperature of approximately 750 degrees ºF and a pressure of approximately 660 psig) over any discrete 4-hour block period (i.e., 12-4 AM, 4-8 AM, 8 AM-12 PM, etc.), and 2) 110% of the steam rate monitored during the most recent, compliant dioxins/furans (“CDD/CDF”) emission test. The more stringent of the two would apply.

The Facility operates twenty-four (24) hours per day, seven (7) days per week. Waste deliveries are made to the Facility Monday through Friday, from 7:00 AM to 5:00 PM and on Saturday between 7:00 AM to 12:00 PM.

The Facility is equipped with three (3) identically sized and independent MWCs for the combustion of waste, the generation of steam, and the handling of process by-products. The Facility generates high temperature, high pressure (superheated) steam. The steam is passed through a turbine which drives a generator that produces electricity. Steam is condensed and returned to the boiler after it is passed through water conditioners, and where necessary, make-up water is added. The cooling water is passed inside the heat transfer tubes to reduce the process steam temperature and pressure, which condenses the steam to liquid. The cooling water is then circulated over a cooling tower to remove the waste heat. Each of the two (2) turbine generators is rated at 17.5 electrical megawatts (“MWe”) for a Facility total of 35 MWe.

Each of the three (3) MWCs includes the following combustion equipment: a charging hopper (which is loaded from the refuse pit by an overhead crane), a feed chute and charging throat, ram feeders (to push the waste onto a grate), and a reciprocating inclined grate which carries the burning waste through the combustion process. The combustion system also includes forced draft fans, steam-heated air pre-heaters, an over-fire air system, auxiliary burners, flues, and ducts. Each MWC unit also has its own steam generation equipment including: waterwall tubes (water-filled tubes which line the large combustion chamber), superheater, attemperator, boiler generating bank, steam drum, a natural (convection) circulation system, and economizers. Auxiliary burners are utilized (as necessary) to comply with the conditions of the Operating Permit.

Each MWC unit is currently equipped with an air quality control system that includes an automatic combustion control system for maintaining a steam setpoint while also maintaining low concentrations of carbon monoxide ("CO"), an SNCR system for controlling NO_X emissions, an activated carbon injection system for the control of mercury and CDD/CDF emissions, a spray dryer scrubber system for the removal of acid gases (primarily SO_2 and HCl), and an ESP for the removal of particulate matter including metals. The combustion gas is cooled in the spray dryer scrubber system by evaporating a water slurry containing calcium hydroxide (a lime slurry). As the gas is cooled, the acidic compounds in the gas react with the alkaline lime slurry to form solid salts. The ESP removes particulate matter ("PM") by charging the particulate for subsequent collection by collection plates (aka electrodes). The fly ash that is collected by the ESP is sent to a conditioning system, after which it is combined with bottom ash and disposed or beneficially used of at a licensed non-hazardous waste (Subtitle D) landfill.

The quenched bottom ash from the extractors is conveyed to a permanent drum magnetic separator that removes ferrous metals from the bottom ash residue. After ferrous metal recovery, the bottom ash is transferred to an Eddy Current Separator ("ECS") where non-ferrous metal is recovered from the bottom ash for sale to the secondary market. The remaining bottom ash is combined with the fly ash collected by the air pollution control equipment, analyzed as per NJDEP requirements, and disposed of at a licensed landfill.

The Facility has a continuous emissions monitoring system ("CEMS") that monitors the following parameters: oxygen ("O_2"), sulfur dioxide ("SO_2"), carbon monoxide ("CO"), nitrogen oxides ("NO_X"), and a Continuous Opacity Monitoring System ("COMS") for opacity. An induced draft ("ID") fan for each MWC unit draws the combustion gases through the boiler passes and the air pollution control systems to the stack. The existing stack (365 feet high) contains four (4) flues, one (1) for each of the three (3) MWC units, and one (1) which is not currently in use. The flue which is currently not in use will be utilized during the control equipment changeover. This change is discussed further in **Section 3.2.1.5** and shown in **Figure 3-1**.

3.2 Proposed Modifications

The proposed modifications to the CCERC include an upgrade of the air quality control systems on each MWC, approval to dispose of Type 72 waste at the CCERC, installation and operation of a Liquid Direct Injection ("LDI") system to provide for the receipt and processing of Type 72 wastes at the Facility. The proposed modifications are discussed in the following sections of this Application.

3.2.1 Air Quality Control System Upgrades

The proposed AQCS upgrade project for each MWC includes improvements to several existing facility components and is summarized in **Table 3-1**.

The flue gas from each MWC is discharged to the atmosphere through dedicated flues in the existing stack. No changes are proposed to the flues, however, the induced draft fans that manage flue gas flow from the furnaces through the stack will be changed to accommodate the increased pressure drop attributable to the proposed CDS and fabric filter.

Table 3-1. Summary of AQCS Project Improvements

Existing	Improvement
SNCR system with semi-automatic controls	Advanced controls will provide automatic control of urea feed rate including feedback control from the stack NO_X analyzer.
	Use of LDI in one (1) or both injector levels to reduce NO_X formation while reducing or eliminating the need to use potable water, while potentially reducing reagent use.
Spray dryer scrubber evaporating lime slurry to control flue gas temperature and acid gases	Modify each spray dryer to be an evaporative tower where it is only evaporating water to maintain a flue gas temperature setpoint. Lime slurry will not be used with the dry recirculation system.
	Addition of circulating dry scrubber reactor where hydrated lime will be injected into the reactor. Residue with unreacted lime and carbon can be re-used for controlling emissions.
	Additional residue conveyors are included to enable the collection and controlled transfer of residue to either the CDS reactor or a disposal point where it would then be mixed with bottom ash.
Electrostatic precipitator for control of solid particulate	Replacement with a fabric filter baghouse where fly ash collected on the surface of the bags, inclusive of fresh and recirculated reagents, is available to provide improved control of filterable and gas phase emissions.
	A fabric filter baghouse control system to provide steady state operating conditions for filter cake management.

3.2.1.1 SNCR Controls Upgrade

The semi-automatic SNCR control system for each MWC unit will be upgraded to an automated system to ensure compliance with short-term and long-term NO_X emissions and to reduce annual mass emissions of NOx from the Facility to below the levels emitted in 2020 and 2021. The key improvement will be the continuous modulation of urea injection using information from the NOx CEMS located at the boiler flue outlet to meet a NOx stack concentration set point. The existing 8,000-gallon urea storage tank will continue to be used. Each MWC will continue to have the two (2) existing levels of nozzles available for injection of urea mixed with carrier water and/or LDI water. The LDI system is discussed in **Section 3.2.2**.

3.2.1.2 Scrubbing System Modification

The locations of the proposed CDS systems and fabric filter baghouses are shown in **Appendix B Drawing Camden Site Plot Plan, Proposed Baghouse Location**. **Drawing No. 8.21.11169.00.2000_00 WIP 210624** is a general arrangement – plan view of the proposed AQCS equipment. **Drawing No. 8.21.11169.00.2100_00 WIP 210624** is an elevation view of the flue gas ductwork looking plant east. A cutaway elevation view of the proposed baghouse looking plant north is shown on **Drawing No. 8.21.11169.00.2200_00 WIP 210624.**

The existing spray dryer scrubber system on each MWC unit will be changed to a CDS system with fly ash recirculation. For optimum acid gas neutralization reactions to occur, the flue gas temperature must

be maintained at a specific setpoint. The flue gas temperature at the outlet of the evaporative cooler will be maintained at the setpoint by modulating the injection rate of water into the flue gas in the existing spray dryer which will be converted into an evaporative cooler. The flue gas temperature at the spray dryer (evaporative cooler) is continuously monitored and will provide a feedback signal to the water control logic.

The existing lances and dual fluid nozzles and/or new and improved nozzles for the spray dryer system, will be used to atomize water into the flue gas stream. The dual fluid nozzles use compressed air to atomize water. The water used for reducing flue gas temperature is wastewater from the holding tank that includes boiler blow down, reverse osmosis reject water, and City water as required.

The existing ductwork that connects the existing spray dryer and ESP will be modified to transport flue gas to the new baghouse. Flue gas from the evaporator will initially go through the CDS reactor where both fresh reagents (powdered activated carbon and hydrated lime) and recirculated residue will be injected. An additional device referenced as a crusher is an integral part of the CDS and is provided to break up any large particles that have fallen out of the flue gas stream. The small particles are collected through a rotary valve and conveyed via screw conveyor to the CDS reactor where they are re-entrained into the flue gas stream. The scope and detail of the final CDS design will be documented during the final design phase.

The injection rate of hydrated lime flow to each reactor is automatically adjusted based on feedback from the stack sulfur dioxide ("SO_2") analyzer. The quantity of lime metered is managed by a weigh feeder for each unit. The injection rate of powdered activated carbon ("PAC") is a constant rate that is established during the most recent compliance stack test. A dedicated PAC feeder system ensures that the minimum flow rate is maintained. PAC is presently injected at the economizer location however that may change to the CDS reactor. Circulating dry scrubber technology improves contact between acid gases, mercury and organic substances with lime and activated carbon to increase the residence time for the reagents to react with the contaminants in the system. These advantages along with fly ash recirculation improves control efficiencies, optimizes reagent usage and reduces ash disposal volumes.

3.2.1.3 Baghouse

The fabric filter baghouse that will replace each ESP is a complete system that includes all necessary mechanical, structural and electrical components. The following is a general description with the final scope and design to be confirmed during the design phase of the Project.

Flue gas exiting the CDS will enter the baghouse for removal of filterable particulate matter and gas phase pollutants. Filterable particulate matter consisting of fly ash from the combustion process, fresh reagents, and recirculated residue is collected on the surface of the filter bags in order to form a filter cake that helps to capture filterable and gas phase pollutants from the flue gas.

Flue gas from the CDS is managed by a system of manifolds to optimize distribution of flue gas and particulate to each module while also minimizing pressure drop. That system includes:

- An inlet manifold that is the length of the baghouse and distributes flue gas to all six (6) modules; three (3) on the left and three (3) on the right. Flue gas velocity is reduced in this manifold to reduce pressure drop and optimize distribution to each of the six (6) modules. A mechanical conveyor on the bottom of this inlet manifold collects and transports any large particulate that may drop out from the reduced velocity.
- Each of the six (6) modules is designed for a side inlet of flue gas instead of the conventional hopper inlet used at many existing baghouses. This design allows for improved distribution of flue gas and particulate along the entire length of the bags while promoting a more effective filter cake on all bags.
- One (1) common outlet manifold that is the length of the baghouse receives flue gas from each of the six (6) modules.
- Each module is provided with a manually operated inlet damper (butterfly type) and a pneumatically operated outlet damper (poppet type).

- In addition to the compliance opacity monitor which is downstream of each baghouse, each individual module of the baghouse will be equipped with a bag leak detection system consisting of flue gas opacity monitor. This system will provide for early detection of bag leakage to prevent excess particulate emissions.

Each baghouse will be comprised of six (6) modules, each of which has its own bag cleaning system that uses an on-line pulse jet cleaning technology. The six (6) modules provide a nominal 2.3 gross air to cloth ratio at normal expected operating conditions. The filter bags will be fabricated of 260 - 550 g/m^2 (17 oz/yd^2) polyphenylene sulfide ("PPS") bags with a polytetrafluoroethylene ("PTFE") finish however alternative bags may be considered depending on available improvements in bag filter technology. Each filter bag is supported from within by a wire cage. The wire cages prevent the collapse of the filter bags during the filtering operation.

More information regarding the baghouse design is presented in **Appendix C**.

To keep the system draft pressure drop at an acceptable level, the filter bags are periodically cleaned of some of the fly ash collected on the surface of the bags. The baghouse cleans the bags using a short pulse of compressed air directed into the clean interior of the bags from the top. The compressed air pulse, opposite to the direction of gas flow, expands the bag which causes some of the collected fly ash (filter cake) on the outside of the bag to fall into the hopper below. Each module is equipped with a vibrator to help fluidize the collected fly ash for deposition into the fly ash collection and transport system. The scope and design of conveyors and associated equipment for collecting and managing the amount of fly ash directed to recirculation and disposal will be confirmed during the final design phase. Fly ash and bottom ash will continue to be combined to ensure that there is only one (1) residue from combustion that is disposed of at a landfill. Each module is also able to be isolated via a manual gate valve should it need to be taken out of service for any necessary maintenance.

A broken bag detector will be installed at each baghouse module to provide advance warning of potential bag failures. A highly dynamic spike will occur immediately after each online pulse cleaning. Comparing peak readings over time is a good indicator of the onset of worn filter media and the potential development of filter leaks as the cleaning action amplifies nascent defects by removing the filter cake and stretching the fabric thus better exposing a leak or worn fabric. Monitoring peak readings also serves to identify any prior visible emissions and allow for filter maintenance as a change in peak readings with a stable baseline will usually not result in visible emissions. In a bag failure event, the broken bag detector can help locate the broken bag in a specific baghouse module and shorten the downtime for potential bag replacement.

A specific standard operational procedure ("SOP") for proper disposal of filter bags, consistent with practices in place at other MWC facilities in New Jersey, that are removed from the baghouse for replacement will be provided in the updated O&M Manual for the Facility. The SOP is included in **Appendix D**.

3.2.1.4 Fly Ash Recirculation System

The fly ash recirculation system consists of a series of mechanical conveyors and other equipment that will be designed to re-inject a fraction of the total amount of fly ash from the baghouse and convey the balance to the fly ash conditioning system in the Residue Building. The following is a general description with the final scope and design to be confirmed during the design phase of the Project. All conveyors are self-contained and are interconnected to prevent the release of fly ash to the environment.

There are several conveyors provided with each baghouse including: 1) A conveyor that collects the captured fly ash from the inlet chamber, 2) a conveyor that collects the captured fly ash from the three (3) modules on the east side of the baghouse, and 3) a conveyor that collects the captured fly ash from the three (3) modules on the west side of the baghouse. These conveyors can convey the fly ash to two (2) different destinations. In normal operating mode, the conveyors will drop the fly ash into the main collection screw that leads to the recirculation hopper. The conveyors may also be reversed and drop fly ash into the emergency collection conveyor that leads directly to the conveyors that transport the ash to

the residue building. Each conveyor transition chute is equipped with a manual knife gate valve to isolate the conveyor for maintenance.

The main collection screw conveyor drops the fly ash through a rotary valve into the recirculation hopper. From the recirculation hopper, the fly ash is either metered back into the flue gas stream or skimmed off to the Residue Building for conditioning and disposal. The skimming screw skims excess fly ash from the recirculation hopper and transports it to the fly ash transfer conveying system that leads to the Residue Building. The skimming screw drops the ash through a rotary valve into the connecting conveyor.

The recirculation hopper has a bifurcated chute equipped with manual knife gate valves for isolation purposes. Fly ash is metered back into the flue gas stream via adjustable speed rotary valves below the hopper. These valves meter the ash into two (2) double shaft mixers. These mixers condition the ash with wastewater from the wastewater holding tank. Wastewater is controlled using a series of valves at different locations in the mixers. This additional moisture content improves the reaction efficiency of the hydrated lime in the fly ash and reduces the flue gas temperature within the reactor. After mixing, the recycled ash is injected into the reactor chamber and flows back into the baghouse.

3.2.1.5 Baghouse Outlet Duct, ID Fan and Stack

The outlet duct of each baghouse directs scrubbed flue gas to the ID fan for each boiler and ultimately to its respective flue in the stack for discharge to the atmosphere. For maintenance purposes, the ID fan outlet duct on each boiler can be isolated with a manual guillotine damper located just before the junction of the three (3) flue gas ducts.

The existing ID fans are not capable of supporting the increased pressure drop across the entire MWC unit resulting from the new fabric filters and CDS equipment. Therefore, it will be necessary to increase the size and capacity of the ID fans and motors. Since the new ID fans will be capable of greater draft, it is anticipated that some structural reinforcing of the boilers, flue gas path equipment and ductwork may be needed.

The proposed baghouse for each combustion unit will be located downstream of its recirculating dry scrubber reactor. Cleaned exhaust gas will pass through each unit to its individual flue in the stack. During construction, a fourth flue in the existing stack (see **Figure 3-1** below) will be used to assist in sequencing construction and operation of the upgrade project to minimize the amount of downtime to install and tie-in the baghouses. This flue has the same dimensions as the three (3) existing flues presently in use. The fourth flue will be utilized as the new Unit No. 3 flue. The former Unit No. 3 flue will be used as the new Unit No. 2 flue. The former Unit No. 2 flue will be used as the new Unit No. 1 flue. Finally, the former Unit No. 1 flue will be blanked off. This layout will optimize the alignment of the ID fans, ductwork, and the stack. CCERC proposes to relocate the CEMS, COMS and test ports from the stack to the respective flues.

3.2.1.6 Hydrated Lime Storage Silo

Two (2) hydrated lime silos will be used as the long-term system for ensuring adequate supply of lime reagent for all three (3) MWCs. One (1) of the hydrated lime silos will be new with the second silo being one (1) of the two (2) existing pebble lime silos that will be re-purposed for hydrated lime. Once all of the fabric filter baghouses and CDS systems are installed and in operation, one (1) of the two (2) existing pebble lime silos will be removed from the site.

The new field-erected hydrated lime storage silo will be approximately 13 feet in diameter and 43.75 feet straight-side storage height, which includes four (4) feet of freeboard. Hydrated lime will be delivered to the plant via pneumatic self-unloading truck trailers. The lime will be conveyed vertically from grade to the top of the lime silo through 4-inch diameter piping. The lime loading panel is located by the Powdered Activated Carbon Silo at the southeast corner of the Air Quality Control Building.

Conveying air is vented from the lime silo during lime unloading by the silo vent filter exhaust fan and passes through the lime bin vent filter before exhausting to atmosphere. The lime bin vent filter utilizes a fabric media to remove entrained lime from the vented air.

The lime storage bin has a capacity of 5300 ft^3 or approximately 92.75 tons @ a lime density of 35 lbs/ft^3. A double bifurcated chute discharge is located at the bottom of a 60-degree conical hopper. Three (3) of four (4) chutes are for delivery of the hydrated lime, one (1) dedicated to each unit's APC system. The fourth chute will serve as a manual backup to all three (3) unit's APC system. The bin will also be equipped with a vacuum/pressure relief valve to relieve excess pressure or vacuum that may occur within the bin.

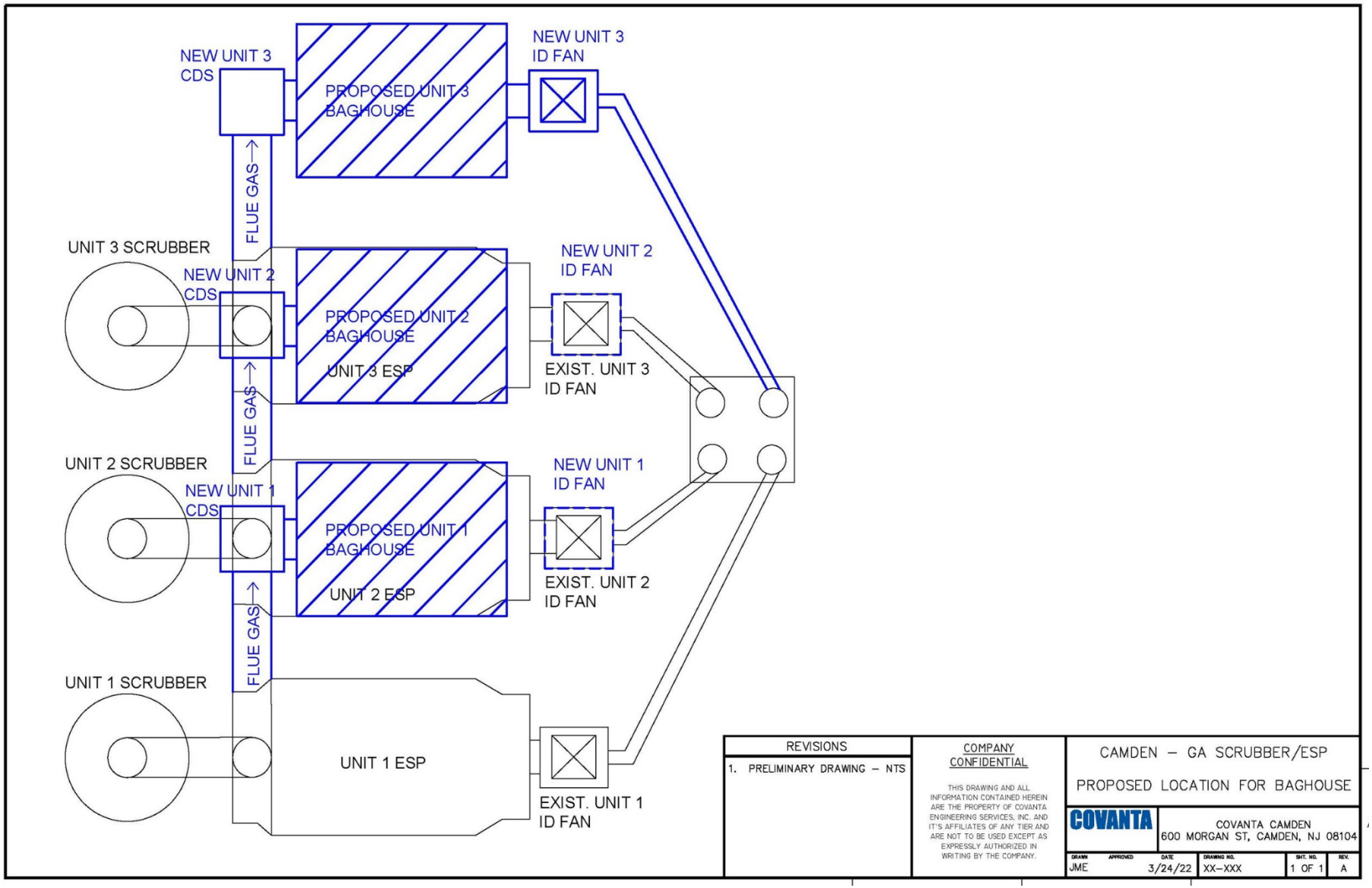
Three (3) gravimetric feeders will be provided, one (1) per MWC, to weigh and distribute the specified quantity of lime into the APC lime transport conveyor or the stand-by lime/air eductor system. Feed rates are adjustable through a distributed control system.

The lime feed conveyor receives lime from the lime weighing system and drops it into the reactor screw conveyor which leads to the reaction chamber where the lime is entrained in the flue gas.

The lime feed screw conveyors are backed up by a pneumatic conveyance system based on eduction. The blower forces air through the educator which sucks (educts) lime into the air stream to convey it into the reaction chamber. The eductor is equipped with a compressed air purge valve to help avoid and clear clogs.

As the AQCS are changed over from spray dryer scrubbers to CDS systems, one (1) of the existing 3,500 ft^3 pebble lime silos (Emission Unit U5 or U6) will be converted into a hydrated lime silo. The lime bag breaker (Emission Unit U8) will no longer be used after the AQCS changes are completed for all three (3) units.

Figure 3-1. Covanta Camden Pulse Jet Baghouse General Arrangement



3.2.2 Type 72 Waste and the Proposed LDI System

The CCERC hereby requests the addition of Type 72 Liquid Waste to the existing list of waste types that may be received and processed for disposal at the CCERC. Type 72 Liquid Waste is defined in N.J.A.C. 7:26-2.13(h)(1)(i) as follows:

Type 72 Non-hazardous liquid and semi-liquids: Liquid or a mixture consisting of solid matter suspended in a liquid media which is contained within, or is discharged from, any one vessel, tank or other container which has the capacity of 20 gallons or more. Also included are non-hazardous pesticide liquids. Not included in this waste classification are septic tank clean-out wastes and liquid sewage sludge.

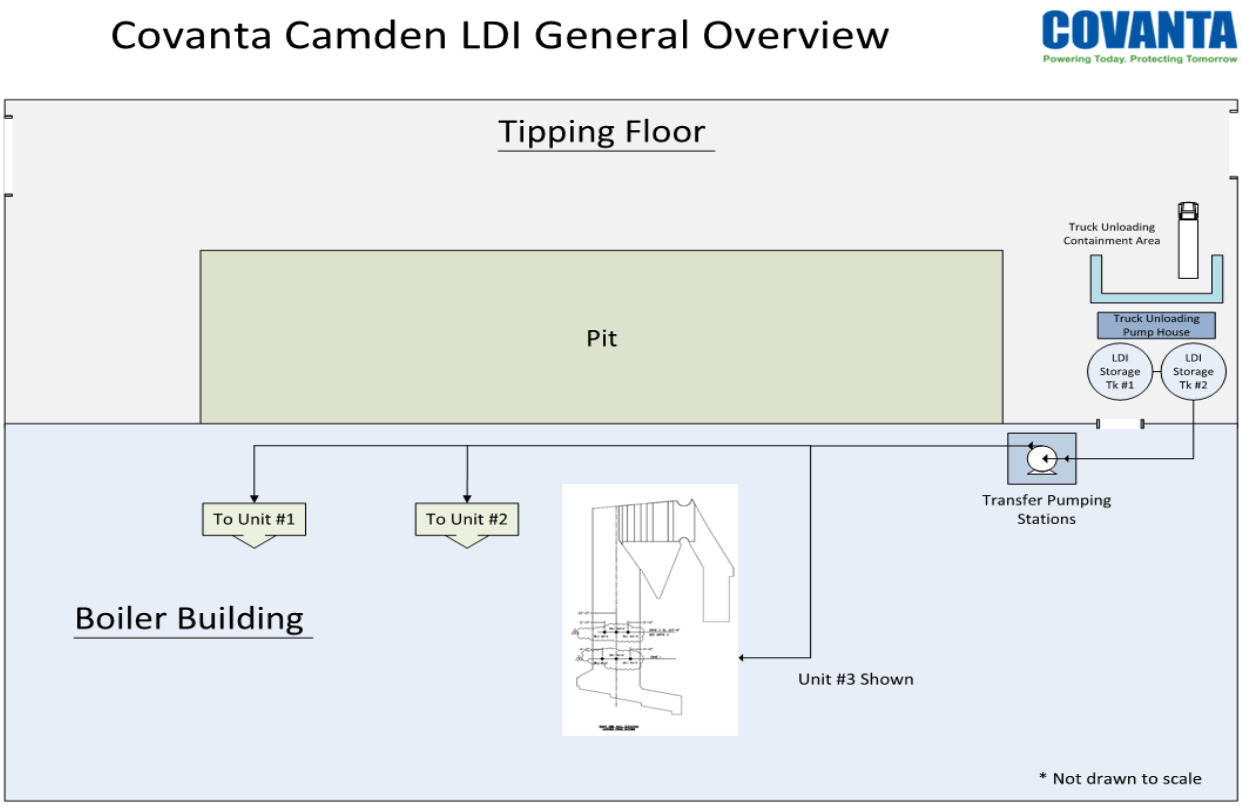
The Air Quality Control System Upgrade Project includes installation and operation of a Liquid Direct Injection ("LDI") system similar to the system installed and operated at Covanta's former Warren County Facility in Oxford, New Jersey.

LDI is a proven, environmentally sound method for the disposal of non-hazardous industrial liquid waste streams (Type 72 Liquid Wastes) as an alternative to disposal at Publicly Owned Treatment Works ("POTW"), land application, or discharge to surface impoundments. The New Jersey Department of Environmental Protection ("NJDEP"), Division of Air Quality, approved the ongoing use of LDI at the Warren County Facility on August 12, 2016, after the completion of a permitted Environmental Improvement Pilot Test. LDI was approved by the NJDEP Bureau of Solid Waste Permitting for ongoing use of LDI on June 29, 2017, after completion of a permitted RD&D program. The LDI program was conducted at the Warren Facility until plant operations were suspended in 2019. LDI is currently being successfully used to dispose of externally generated non-hazardous liquid waste streams at other Covanta WTE facilities including Covanta Niagara located in Niagara Falls, New York, and Covanta Indianapolis, located in Indianapolis, Indiana.

3.2.2.1 General Description of LDI System

The proposed LDI system for the CCERC will allow for unloading liquid waste tankers into two (2) 50,000-gallon storage tanks and injecting the non-hazardous liquids directly into the MWC furnace, through the existing urea injection system. Once injected, the water is instantly vaporized, and trace contaminants are either destroyed by the elevated furnace flue gas temperature and/or captured by the air pollution control equipment. The location of the proposed LDI system is shown in **Drawing Camden Site Plot Plan, Proposed LDI Location** in **Appendix B and will be located within the Waste Receiving Building**. A general overview of the proposed LDI system at the CCERC is shown below in **Figure 3-2**. The LDI system will consist of a truck unloading containment area and one (1) pump station that will service all three (3) MWCs. The pump station includes two (2) unloading pumps and two (2) storage tanks located inside the southwest corner of the Waste Receiving Building and two (2) 100% transfer pumps in the Boiler Building to transfer the Type 72 liquid waste from the two (2) storage tanks to any of the three (3) respective boiler injection nozzles. Type 72 waste will be injected into the furnaces through either or both levels of existing nozzles associated with the SNCR system.

Figure 3-2. LDI System Overview



The scope of the LDI system includes: 1) screening of waste deliveries, 2) receipt after confirming that waste has been approved for delivery, 3) off-loading and temporary storage of Type 72 liquid waste prior to processing and, 4) transfer and processing of Type 72 liquid waste by direct injection into the boilers. Tanker trucks will enter the Facility via the scale house where the trucks will be weighed, and paperwork reviewed to ensure that only approved waste is accepted and that the contents of the delivery vehicle matches the paperwork. Paperwork will include the manifest, a certification that the material is non-hazardous, and pre-shipment notification/certificate of disposal. After being weighed, the trucks will then proceed to the unloading containment area located inside of the southwest corner of the tipping floor in the Waste Receiving Building. Once positioned for unloading, Facility personnel will check the manifest and other paperwork for contents and load size.

After the paperwork for a delivery has been checked and approved, a mandatory fingerprint analysis of the load will then be conducted by Facility personnel. Samples of the material will be safely taken and analyzed as follows:

- pH with pH paper;
- Flashpoint with an open cup flashpoint tester;
- Solids with a beaker to evaluate settled solids;
- Compatibility using a 5-gallon bucket to combine a tank sample with a sample of the waste to be delivered; and
- Color using a beaker to observe the color of the waste.

As indicated, every load delivered to the Facility will be tested for pH, flash point, color, and reactivity with the current contents of the receiving storage tank, including the potential generation of any gaseous compounds. If the material does not meet the pH specification of 4-10, is reactive, or exhibits properties

which would render it unsafe to process, the load will be rejected. Upon satisfactory completion of the fingerprinting analysis, the waste will then be unloaded into the designated storage tank.

The trucks will be offloaded via one (1) of two (2) truck unloading pumps sized to allow for unloading in 20 minutes. A piping and instrumentation diagram ("P&ID") of the truck unloading system is presented in **Appendix B Drawing PIM 4740-P-001.** The trucks will be unloaded into one (1) of two (2) tanks located within the containment area inside the tipping hall. A strainer upstream of the pumps will protect the pumps from solids contained in the liquid waste streams. The liquid waste will be pumped to one (1) of the two (2) storage tanks located on the tipping floor. Each tank will be equipped with a carbon filter on the vent for odor control. The LDI pump system includes one (1) common delivery line for all three (3) MWCs and a common return line to the LDI storage tank. Each of the two (2) transfer pumps are rated in excess of the total flow capacity into the three (3) MWCs to allow for additional flow for recirculation back into the storage tanks. A P&ID of the liquid waste transfer pumping system is presented in **Appendix B Drawing PIM 4740-P-002.** The system will normally operate with only one (1) pump running at constant nominal 30 gallons per minute ("GPM") which includes the maximum amount of six (6) GPM per unit and an amount for recirculation (nominally 18 GPM). Shutoff valves to each boiler and a flow transmitter in the main vertical transfer line will provide feedback to the recycle valves back to the tank to ensure that maximum injection rates are not exceeded. A P&ID of the LDI boiler injection system is also presented in **Appendix B Drawing PIM 4740-P-003.** Flow to each boiler will be totalized in the distributed control system ("DCS") from a flow measurement in the line to each boiler injection point and is controlled using a manual globe valve.

The LDI system is designed to receive and process Type 72 non-hazardous liquid waste by liquid direct injection into the MWCs. A specific SOP for the proposed LDI system will be provided in the updated O&M Manual for the Facility. The SOP will include the Quality Assurance/Quality Control ("QA/QC") methods and tools Covanta Camden will use to approve a liquid waste that is proposed to be received and combined with other wastes in one (1) of the two (2) receiving storage tanks prior to processing in the MWCs. The industry standard SOP will be comparable to a quality control program used to evaluate receiving a product into a manufacturing process and will significantly manage any risk associated with receiving LDI waste at the Facility.

3.2.2.2 Liquid Waste Approval Process

The specific non-hazardous liquid waste streams (Type 72 Liquid Wastes) that will be accepted at the Facility are only those that are approved in accordance with the Covanta Review Process (See **Appendix E, Waste Approval Process Flow Chart**).

Type 72 Liquid Waste is defined in N.J.A.C. 7:26-2.13(h)(1)(i) as follows:

> *Type 72 Non-hazardous liquid and semi-liquids: Liquid or a mixture consisting of solid matter suspended in a liquid media which is contained within, or is discharged from, any one vessel, tank or other container which has the capacity of 20 gallons or more. Also included are non-hazardous pesticide liquids. Not included in this waste classification are septic tank clean-out wastes and liquid sewage sludge.*

Only waste streams meeting this definition and deemed acceptable in accordance with the Covanta's waste approval process will be accepted for processing at the Camden Facility.

All LDI waste streams proposed for receipt and processing at the Facility will be subject to a rigorous approval process. The waste approval process will be modeled after the process used for the LDI Program at the Covanta Warren Facility. Waste streams will be reviewed for compliance with environmental regulations, health and safety concerns, permit compliance and whether the waste can be processed. As shown on the Waste Approval Process Flow Chart, the review process for proposed LDI wastes is completed in two (2) steps. Covanta Environmental Services ("CES") assigns an account executive and requires the customer to complete a Material Characterization Form. A copy of the Material Characterization Form ("MCF") is included in **Appendix E**. The Form requires the generator of the waste to provide information on the nature of the waste, its physical form, the type of container it would be shipped in, and the nature of the waste-generating process. The generator is also required to provide the

regulatory waste classification of the waste, the concentrations of any metallic and organic constituents in the waste, and the components that comprise the waste. CES corporate approval personnel review the completed MCF for compliance with the above-referenced criteria and assess the need for pre -approval analyses.

All LDI wastewater proposed for processing at the CCERC must be categorized as non-hazardous under the Resource Conservation and Recovery Act ("RCRA"). Unacceptable materials will also include the following:

- Pesticides/Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA") Material;
- Department of Transportation ("DOT") Placarded Loads;
- Oily Waters;
- Isocyanates; and
- Material Not Approved Under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA").

All potential LDI waste streams will require some level of analytical testing from a New Jersey Certified Laboratory prior to being approved. There will be a level of mandatory testing that all waste streams must adhere to and, in some cases, additional testing based on the waste stream components and the process that generates the waste. A proposed waste stream cannot be approved without at a minimum testing for pH, total dissolved solids, and total suspended solids. Additional testing, if deemed necessary, may include analysis for flash point, total metals, volatile organic compounds ("VOCs"), total halogens, and any additional information the waste approver deems necessary to complete their review.

To qualify as an LDI stream for processing at the Facility, the material must have a pH in the range of 4-10, a flash point of greater than 160^{O} Fahrenheit, and a water content of 90-100%. Liquid wastes containing fluorine, iodine or bromine are unacceptable for processing with the LDI system at the Facility. The chlorine and sulfur content of the waste should preferably each be below 2% and the solids content of the waste should be below 10%.

If acceptable to the CES reviewer, the waste stream is passed on to the Facility for the second step of the review process. Facility management reviews the request from an environmental, health and safety, and an operational perspective. Upon completion of both reviews, the request for the waste stream is either accepted or rejected. CES notifies the generator of the decision and, if approved, allows the generator to schedule deliveries. Only Type 72 non-hazardous liquid waste streams that are approved through this process will be accepted at the CCERC. Each accepted waste stream will be re-evaluated annually, and the most recent date of approval recorded on the Facility's list of acceptable LDI waste streams. CCERA will notify the NJDEP's Bureau of Solid Waste Permitting, the Bureau of Solid Waste Compliance and Enforcement, and the Bureau of Air Permitting and Enforcement, by email when a new stream is accepted for disposal.

Similar to the LDI waste streams processed at the Warren Facility, the LDI wastes which will be processed at the CCERC are primarily rinse and/or wash waters used to clean out vessels and other equipment used in the manufacture of products such as shampoo, conditioner, latex products, and pharmaceutical products to name a few examples. These types of waste streams typically contain 90-95% water. The proposed LDI system for the CCERC will also allow for the processing of internally generated wastewater directly into the MWCs. Process wastewater from the Facility includes cooling tower blowdown and wash-down water. This would minimize the quantity of wastewater from the Facility that is discharged to the Camden County Municipal Utilities Authority ("CCMUA") Sewage Treatment Plant. LDI waste streams may also be used in the SNCR system as carrier liquid for injecting urea into the boilers for the control of NOx emissions.

3.2.2.3 System Processing Rate

The LDI system will be designed to process approximately 26,000 gallons per day of Type 72 waste at a nominal flow rate of six (6) GPM per boiler. This rate equates to processing approximately 182,000 gallons of Type 72 waste per week. LDI was injected at a maximum rate of 12-13 GPM during comprehensive stack emissions testing at the Warren Facility conducted in 2016. Compliance with all permitted emission limits was demonstrated. Operation of the LDI system at the Warren Facility did not affect the steam production rate, temperature, or pressure parameters as set by requirements in the solid waste permit for the Facility and those parameters are not anticipated to be affected by operation of the proposed LDI system at the CCERC.

The LDI system is designed with two (2) 250 GPM unloading pumps that can be used to simultaneously unload two (2) LDI trucks having a nominal capacity of 5,000 gallons. The unloading pumps are designed for tanker parking times of 60 minutes, including time for paperwork review, fingerprinting the waste stream, and hose connect and disconnect time. The Facility will manage deliveries weekly to ensure that accumulation beyond the storage volume capacity will not occur.

3.2.2.4 Traffic

LDI shipments will be received during normal waste receiving hours and will follow the truck routes established in the Camden County District Solid Waste Management Plan. Up to eight (8) LDI delivery vehicles per day will deliver Type 72 liquid waste to the Facility during waste receiving hours. The flow of on-site traffic is shown in **Figure 3-3** below. LDI vehicles will be weighed-in at the Facility's scale house and directed to the LDI Unloading Area. When added to average daily two-way truck traffic associated with the Facility, traffic volumes will remain well below maximum traffic volumes evaluated in the Final Environmental and Health Impact Statement ("FEHIS") for the Facility. LDI tons will displace Municipal Solid Waste ("MSW") tons depending upon the LDI processing rate because the weight of the LDI processed will count toward the Facility's total annual waste limit of 451,140 tons.

Figure 3-3. On-Site Traffic Pattern

3.2.2.5 Truck Unloading / Spills

Tanker trucks will enter the Facility via the scale house where the trucks will be weighed, and paperwork reviewed. The trucks will then proceed to the unloading containment area located in the southwest corner of the tipping floor. Trucks will unload via a truck unloading system into one (1) of two (2) double-walled storage tanks. The unloading area will be graded towards a curbed containment system that will collect any spillage during the unloading of material. This will prevent any potential spillage during the unloading process from traveling beyond the containment area. Unloading procedures will be in place to mitigate the potential for any discharges.

Liquid waste will be unloaded from the tanker trucks to the storage tanks via two (2) 250 GPM unloading pumps. Duplex filters upstream of the unloading pumps will protect the pumps from any solids contained in the liquid waste stream and allow for uninterrupted operation during cleaning. As shown in **Appendix B Drawing PIM 4740-P-001,** activated carbon filters downstream of the unloading pumps will treat the liquid to remove organics and chlorines from the stream.

The unloading pumps will have a local control station with run/stop control. The storage tanks will have level transmitter and level indication, high-high, high, low, and low-low level alarms to the Distributive Control System ("DCS") of the Facility. The local control station will have an interlock with the high-high level alarm system of the storage tanks to prevent overflowing of the tanks. The low-low level alarm will be interlocked with the transfer pumps that deliver the LDI waste from the storage tanks to each of the three (3) MWCs.

The transfer pumps will be controlled by the DCS. Flow measurement on the common discharge line of the transfer pumps will control recirculation valves back to the tanks via the DCS. Flow to all three (3) boilers will be totalized in the DCS from this same flow measurement. Flow to each boiler will be totalized in the DCS from a flow measurement in the injection line to each boiler.

A spill kit will be maintained in the immediate area of the storage tanks in the unlikely event a spill should occur.

3.2.2.6 Air Emissions and LDI

Section 3.2.2.1 provided a general description of the LDI system. Key points relative to air emissions are:

- Each liquid waste from each generator is evaluated including an assessment of its chemical composition.
- The manifesting system at CCERC will verify that only approved liquids will be accepted for disposal.
- Liquids with known or suspected heavy metal content are not allowed for disposal.
- Liquids are injected in a high temperature area of the furnace where thermal destruction of organics occurs.
- LDI is a small fraction (approximately 8% by weight) of the permitted annual total amount of solid waste processed at the Facility.
- LDI wastes are 90-100% water. The remaining constituents would be similar to those found in MSW.
- Because of the high-water content, the overall amount of combustible material will be lower relative to not processing LDI, as the water weight will count toward the Facility's total waste limitation.

A statistical analysis of similar LDI programs at two (2) other MWC facilities found no statistically significant increase in Facility emissions. **Table 3-2** presents results from the Covanta Warren MWC Facility and **Table 3-3** presents results from the Covanta Indianapolis MWC Facility. Both tables are organized to include average stack emissions with and without LDI. When reviewing these tables, it is important to note that:

- All average emission concentrations with and without LDI were well below the applicable stack emission limit. This is important by itself, but also because the absolute values of emissions are at

inherently low values relative to the permit limit, so any variation that appears to be large relative to a higher average stack value is small relative to the stack limit.

- Emissions concentrations vary for a variety of factors. Statistical analysis, using the Student's T-Test is used to determine if the processing of LDI results in significant changes in emissions that are outside of normal variation.
- The statistical comparison performed using the Student's T-Test comparing two samples, with and without LDI, found no statistically significant increase in emissions with LDI at a 95% confidence level. Several statistically significant decreases in emissions were found with LDI, particularly at the Indianapolis facility. However, statistical comparisons cannot assess causation, so the decrease cannot necessarily be attributed to LDI.

Table 3-2. LDI Emissions Data – Covanta Warren WTE

		2013-2015 without LDI		2016-2018 with LDI		Statistical Comparison	
Parameter	Emission Limit	Average	% Below Limit	Average	% Below Limit	T-test p-value	Conclusion
Cadmium (µg/dscm)	35	1.0	97%	0.9	97%	0.897	No Change
HCl (ppm)	29	2.3	92%	1.8	94%	0.616	No Change
Lead (µg/dscm)	400	17.0	96%	24.4	94%	0.388	No Change
Mercury (µg/dscm)	50	4.2	92%	1.0	98%	0.331	No Change
PCDD/F Total (ng/dscm)	30	3.3	89%	5.5	82%	0.578	No Change
PM - Filterable (mg/dscm)	25	1.3	95%	2.9	88%	0.340	No Change
NO_X (ppm)	205	136.5	33%	128.0	38%	0.033	Decrease
SO_2 (ppm)	29	7.5	74%	4.3	85%	0.028	Decrease

Notes:

- All emissions and results are corrected to 7% Oxygen, as required by permit
- Statistical evaluation completed using the Student's t-test for comparing two samples, Significance evaluated at 95% confidence level (i.e., p-values less than 0.05 indicate a significant difference between the two (2) samples: LDI and without LDI).

Table 3-3. LDI Emissions Data – Covanta Indianapolis WTE

Parameter	Emission Limit	2018-2010 without LDI		2012-2014 with LDI		Statistical Comparison	
		Average	% Below Limit	Average	% Below Limit	T-test p-value	Conclusion
Cadmium (µg/dscm)	35	0.8	98	0.3	99	0.0004	Decrease
HCl (ppm)	29	19.5	33	3.8	87	1.4E-12	Decrease
Lead (µg/dscm)	400	7.4	98	2.6	99	0.0001	Decrease
Mercury (µg/dscm)	50	7.6	85	1.1	97	2.0E-07	Decrease
PCDD/F Total (ng/dscm)	30	5.8	81	1.5	95	1.1E-05	Decrease
PM - Filterable (mg/dscm)	25	4.0	84	2.0	92	0.11	No change
NO_X (ppm)	205	169.4	17	159.9	22	0.275	No change
SO_2 (ppm)	29	11.6	60	8.4	71	0.04	Decrease

Notes:
- All emissions and results are corrected to 7% Oxygen, as required by permit.
- Statistical evaluation completed using the student's t-test for comparing two samples, Significance evaluated at 95% confidence level (i.e., p-values less than 0.05 indicate a significant difference between the two (2) samples: LDI and without LDI).

The data in **Tables 3-2** and **3-3** demonstrate that the injection of LDI at the Covanta Warren and Indianapolis MWCs did not contribute to a significant increase in emissions. The same result is expected for the CCERC. Stack compliance testing at the CCERC will be conducted with LDI in operation. The CEMS system for continuous monitoring of SO_2, NOx, and CO will also be on-line monitoring emissions during all periods of operation including periods with and without LDI.

3.2.2.7 Odor

Since the proposed LDI system is self-contained, odor issues are not anticipated. The storage tanks will be fitted with pressure relief valves and carbon filters to prevent odors during tank filling and operation. Also, the storage tanks will be located within the Waste Receiving Building which is maintained under negative pressure for odor control. Odor inspections will be conducted and recorded daily, and during each offload in accordance with the Operations and Maintenance Manual (O&M Manual). The O&M Manual contains actions required if odor is detected during an inspection.

- If an odor is present during an inspection the Facility supervisor will be contacted immediately;
- An immediate inspection of the LDI system will take place; and
- If the inspection does not reveal the source of the odor the LDI system will be paused until the odor is under control and the situation remediated.

No odor issues were experienced during LDI operation at the Warren Facility.

3.2.2.8 Noise

No new equipment will be added outdoors. Equipment added within the confines of the Waste Receiving Building and the Boiler Building include new tanks, pumps and unloading equipment. This equipment will not affect the overall noise levels at the facility, or at the site boundaries.

3.2.2.9 Benefits of LDI

The inclusion of the proposed LDI system in the AQCS Upgrade Project for the CCERC offers several benefits to the Facility and Project, including:

- No increase in air emissions. The inclusion of LDI will displace other solid wastes. Given the higher water content, the actual combustible content will decrease. The majority of the liquid waste components will be destroyed in the combustion process; any remaining components will be effectively addressed by the AQCS.
- No increase in odor, truck traffic, or the permitted amount of MSW processed at the Facility. The LDI tons processed will displace tons of MSW processed because the LDI will count toward the existing permitted annual waste processing limit.
- An additional revenue stream to help pay for the upgraded AQCS equipment and its operation, and contribute to the Community Benefit Agreements associated with implementation of the Project.
- An alternative option for disposal of non-hazardous liquid streams that can help reduce impacts and load on locally owned POTWs and divert liquid waste away from landfill solidification practices.

4. Drawing Revisions

In accordance with the project schedule contained in **Section 5.0** of this Application, Covanta Camden prepared bid specifications for the proposed air quality control system and LDI equipment in advance of receiving permit approvals from NJDEP in the 4th quarter of 2023. Preliminary design is expected to be completed during the 2nd quarter of 2023 with detailed design completed during the 1st quarter of 2024. Although the bid specifications reflected the proposed state-of–the–art recirculating dry scrubber and baghouse design features (i.e., air-to cloth ratio, filtration media, side inlet gas distribution, online cleaning, individual fabric filter suppliers may design their equipment with nominal variations to certain design criteria. These criteria may include the number and length of the bags, arrangement of the bags per module, fly ash hoppers and conveyors and other mechanical design features described in **Section 3.0** of the Application and the **Baghouse System Description** contained in **Appendix C**. These variations will not result in reduced environmental performance of the equipment. Covanta Camden will provide NJDEP with an update of the specific design details once they are available.

Preliminary project drawings of the proposed AQCS equipment are included in **Appendix B** of the Application:

- Site Plot Plan, Proposed Baghouse and CDS Locations;
- AQCS General Arrangement – Plan View (Drawing 8.21.11169.00.2000);
- Elevation View of Plant East Showing Flue Gas Ductwork (Drawing 8.21.11169.00.2100);
- Elevation View of Plant North Showing Baghouse Cutaway (Drawing 8.21.11169.00.2200);
- Site Plot Plan, Proposed LDI Location;
- LDI P&ID, Liquid Waste Truck Unloading System (Drawing PIM 4740-P-001);
- LDI P&ID, Storage Tanks and Transfer Pumps (Drawing PIM 4740-P-003); and
- LDI P&ID, Boiler Injection System (Drawing PIM 4740-P-003).

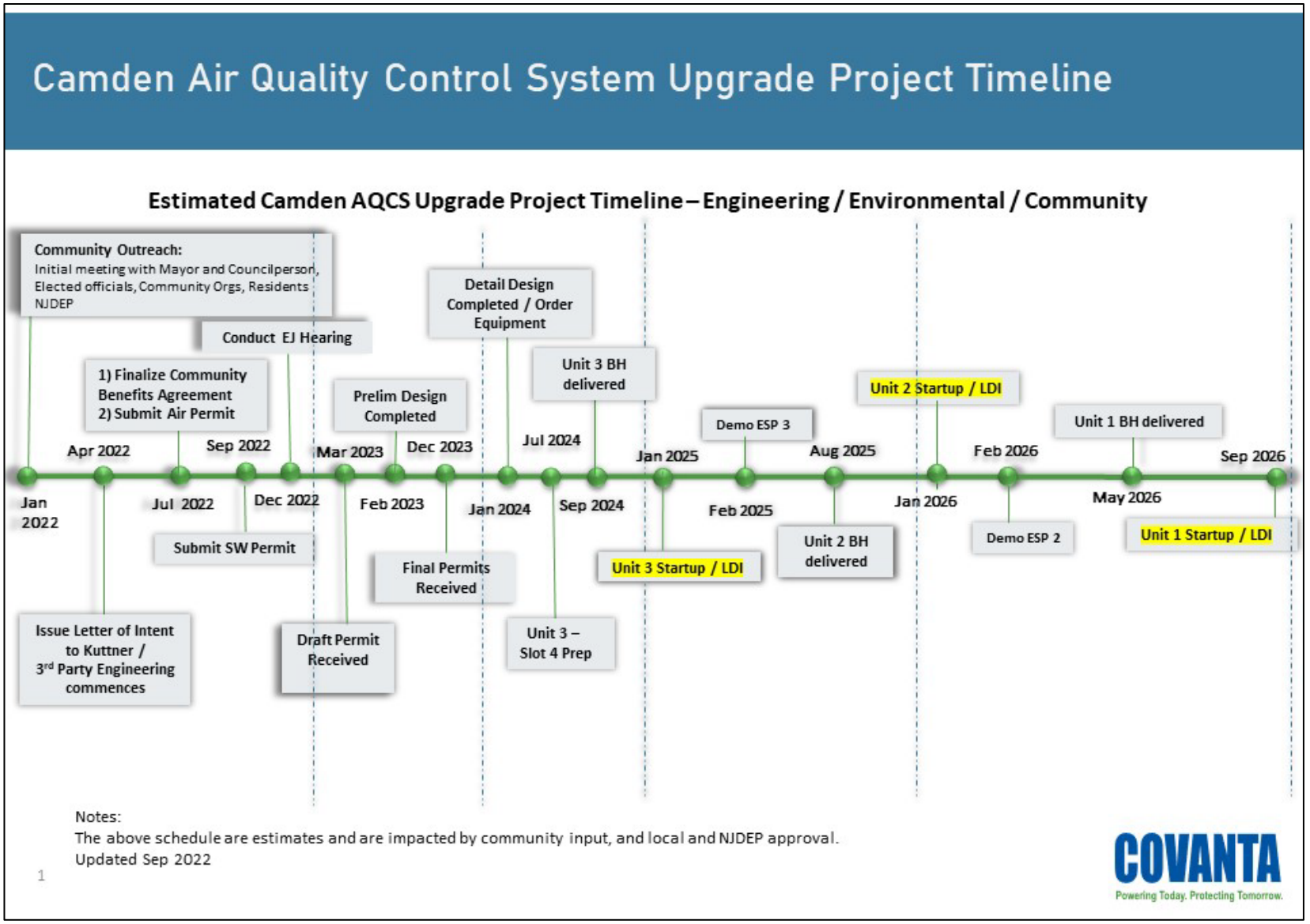
5. Project Schedule

The proposed upgrades of the MWCs will be installed in accordance with a phased construction schedule as indicated in the preliminary Project Schedule provided as **Figure 5-1**. This preliminary schedule indicates that CCERA will have a detailed design completed in January 2024 after NJDEP approves a modification to the Title V permit for the CCERC Project in late-2023. Permit issuance in this timeframe will allow for construction of the first AQCS upgrade to be completed in January 2025 and all three (3) MWCs to be installed and operational on or about September 2026.

As discussed in **Section 3.2.1.5**, since the baghouses will be built in the same location presently occupied by the ESPs, the baghouses will need to be offset from their respective MWC combustion unit to minimize the amount of downtime during their construction and tie-ins. Thus, as shown on **Figure 3-1**, Unit No. 3 baghouse will be constructed adjacent to the existing Unit No. 3 ESP. Upon completion of construction of the Unit No. 3 baghouse, it will be tied into service during a Combustor No. 3 outage. This tie-in will then allow ESP No. 3 to be demolished, thereby providing space for the construction of Unit No. 2 baghouse. Once Unit No. 2 baghouse is constructed and tied in, Unit No. 2 ESP will be demolished, which will provide space for the construction of Unit No. 1 baghouse. In accordance with the preliminary schedule, Project completion of all three (3) baghouses is anticipated to occur in or about September 2026. The phased construction approach will effectively minimize the disruption of service provided by the CCERC.

The proposed LDI system and the new hydrated lime silo will be constructed during the AQCS upgrade of the first MWC. Type 72 waste will only be processed in an MWC after completion of its AQCS upgrade. As the AQCS are changed over from spray dryer scrubbers to CDS systems, one (1) of the existing 3,500 ft^3 pebble lime silos (Air Operating Permit Emission Unit U5 or U6) will be converted into a hydrated lime silo.

Figure 5-1. Preliminary Covanta Camden Fabric Filter Upgrade Project Schedule



6. Operations and Maintenance Manual Revisions

As discussed in **Section 4.0** of this Application, complete design details of the CDS systems, baghouses, induced draft fans, conveyors for recirculating a portion of the fly ash collected in the baghouses to the CDS reactors, conveyors for transferring collected fly ash to the ash management system, and the LDI system are not scheduled to be available until the 1st quarter of 2024. At that point in time the CCERA will begin to prepare proposed revisions to the approved O&M Manual for the CCERC covering operation of the new air quality control systems and the LDI system. The new sections will apply to the upgraded AQCS on each MWC and the LDI system as they are placed into service. The existing procedures for the AQCS on each MWC will remain in effect until the last of the three (3) existing AQCS is removed from service (Scheduled for 3rd quarter 2026). In the meantime, the CCERA requests that the NJDEP provide a conditional approval for the proposed AQCS improvements and the proposed LDI system to allow for these revisions to the O&M Manual along with as-built drawings signed and sealed by a licensed New Jersey Professional Engineer to be submitted within 60 days of the completion and startup of the upgraded MWCs.

7. Community Outreach and Public Support

Consistent with the goals of New Jersey's Environmental Justice law (NJSA 13:1D-157) and Covanta's Outreach and Environmental Justice Procedure in support of that law, the CCERA has been actively discussing the details of the proposed CCERA AQCS Upgrade Project with numerous local citizens and organizations.

Covanta Camden has recently conducted meetings concerning the Project with the following:

- City of Camden Councilwoman Boucher;
- Heart of Camden Executive Director Morales;
- City of Camden Mayor Carstarphen and staff;
- Morgan Village Circle Community Development Corporation;
- Camden County Solid Waste Recycling Coordinator;
- Camden City School District Board of Education;
- Camden Collaborative Initiative ("CCI");
- NDEP – Air, Sustainable Waste, and Environmental Justice groups;
- State Senator Nilsa Cruz-Perez;
- State Assemblyman Moen;
- State Assemblyman Spearman;
- Waterfront South Community Meeting;
- Camden County Director of Solid Waste;
- Camden County Commissioner Nash;
- Camden Area Health Education Center;
- City of Camden African American Commission; and
- The Citizens of Newton Creek.

Discussions have focused on the upgraded emissions control equipment and associated emission reductions, the details of the proposed LDI system, and the benefits of the Project to the environment and the local community.

The Project has received support from the City of Camden and local citizens. **Appendix F** contains two (2) resolutions adopted by the City Council of the City of Camden on July 12, 2022, in support of the Project. Resolution No. MC – 20: 8510 authorized the City of Camden to enter into a Community Benefits Agreement with Covanta. Resolution No. MC – 20: 8511 supports the inclusion of the Camden County Energy Recovery Center for the disposal of non-hazardous liquid waste and semi-liquid waste (ID-72 waste). Also included in **Appendix F** is a letter dated June 27, 2022, from the Morgan Village Circle Community Development Corporation ("MVCCDC") supporting the permitting and installation of the AQCS and the processing of non-hazardous liquids.

In accordance with NJDEP Administrative Order 2021-25 (AO 2021-25), Covanta Camden intends to hold a virtual public hearing on the Project and related air and solid waste permit modifications. Notice of the hearing will be published 60 days in advance of the yet to be determined date of the hearing and public comments will be accepted for a 90-day period beginning upon publishing of the public hearing notice.

Appendix A

Solid Waste Facility Application Form

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Solid & Hazardous Waste
Bureau of Solid Waste Permitting
401 E. State Street
PO Box 420, Mail Code 401-02C
Trenton, New Jersey 08625
Tel: (609) 292-9880 ♦ Fax: (609) 984-0565
www.nj.gov/dep/dshw/swp

SOLID WASTE FACILITY PERMIT APPLICATION FORM

PLEASE PRINT OR TYPE

1A. **Applicant/Owner:** **Camden County Energy Recovery Associates L.P.**
Telephone: **856-757-6300**

Permanent Legal Address: **600 Morgan Street**

City: **Camden** State: **NJ** Zip Code: **08104**

Federal Tax I.D #: **22-2696144**

1B. **Applicant/Operator:** **Camden County Energy Recovery Associates L.P.**
Telephone: **856-757-6300**

Permanent Legal Address: **600 Morgan Street**

City: **Camden** State: **NJ** Zip Code: **08104**

1C. **Co-permittee:** **N/A** Telephone:_____

Permanent Legal Address:_____

City:_____ State:_____ Zip Code:_____

2. **Location of Work:**

Name of Facility: **Covanta Camden Energy Recovery Center**

Address (Street/Road): **600 Morgan Street**

Lot #: **3 & 15**

Block #: **641**

Municipality: **Camden** County: **Camden**

NJEMS Preferred ID #:_____

SW Facility ID #: **133512**

EPA ID #: **NJD986600393**

3. **Professional Engineer:**

Name: **Michael E. VanBrunt** N.J. License P.E. #: **24GE0448200**

Name of Firm: **Covanta Energy, LLC**

Address: **445 South Street**

City: **Morristown** State: **NJ** Zip Code: **07960**

Telephone: **(862)-345-5279**

4. **Application Type:** (Circle applicable letter)

A. Initial Solid Waste Facility (SWF) Permit
B. Existing SWF Annual Update
C. SWF Permit Modification (check here ____ if expansion)
D. SWF Permit Renewal
E. SWF Transfer of Ownership
F. Closure/Post-Closure Plan
G. Disruption Approval
H. Other – describe here _____

5. **Facility Type:** (Circle all that apply)

A. Sanitary Landfill
B. Incinerator/Resource Recovery Facility
C. Transfer Station
D. Transfer Station/Materials Recovery Facility
E. Intermodal Container Facility
F. Compost
G. Other – describe here_____

6. **Waste Types:** (Circle all types of waste requested for facility acceptance)

10. Municipal Waste
12. Dry Sewage Sludge
13. Bulky Waste
13C. Construction and Demolition Waste
23. Vegetative Waste
25. Animal and Food Processing Waste
27. Dry Industrial Waste
27A. Asbestos Containing Waste
27I. Incinerator Ash/Ash Containing Waste
72. Bulk Liquid and Semi-Liquid
73. Septic Tank Clean-Out Wastes
74. Liquid Sewage Sludge

Treated Regulated Medical Waste Untreated Regulated Medical Waste

7. **Facility Life and Capacity:**

	YEARS	TONS	CUBIC YDS
A. Currently Permitted/Authorized	_____	**451,140/yr**	_____
B. Proposed in this Application	_____	**SAME**	_____

8. **Utility Regulation:**

A. Is (will) this facility (be) (Public) or Sole Source? (circle one)

B. Certificate of Public Convenience & Necessity (CPCN) # **SW8509-133512**

USE ADDITIONAL PAPER, IF REQUIRED, IN ORDER TO GIVE FULL AND COMPLETE DISCLOSURES TO THE FOLLOWING ITEMS.

9. **Type of Organization:** (Circle appropriate letter.)

A. Proprietorship	D. Municipal Government	G. Authority
B. Partnership	E. County Government	H. Federal
(C. Corporation)	F. State Government	X. Other

10. **Organization Data:**

A. PARTNERSHIP DATA - State the name and address of each partner, including silent or limited, and their interest:

NAME	ADDRESS	PORTION OF INTEREST
Covanta Energy LLC	**445 South Street. Morristown, NJ 07960**	**99% LP Interest**
Covanta Camden GP,LLC	**445 South Street. Morristown, NJ 07960**	**1% GP Interest**

Registered in State: **NJ** County: _____

Date of Filing: **12/08/1993**

Agent's Name: **CT Corporation**

Street Address: **820 Bear Tavern Road** Telephone: **609-538-1818**

City: **West Trenton** State: **NJ** Zip Code: **08628**

B. CORPORATE DATA

Date of Incorporation: **February 6, 1986**

Agent's Name: **The Corporation Trust Company**

Street Address: **820 Bear Tavern Road** Telephone: **609-538-1818**

City: **West Trenton** State: **NJ** Zip Code: **08628**

Corporate Officers:

OFFICIAL TITLE	NAME	BUSINESS ADDRESS
See Attachment A		

Directors:

NAME	RESIDENCE	TERM OF OFFICE
See Attachment A		

Identify below any individual, corporation or other business organization having ownership or a controlling interest in the applicant. If applicable, the chain of ownership or control should be traced to the main parent company.

NAME: **See Attachment A**

ADDRESS:

NATURE OF CONTROL:

Principal Security Holders and Voting Power. Identify owner(s) of all securities in the applicant corporation having more than ten (10) percent of value.

NAME	ADDRESS	TYPE OF SECURITIES*	NUMBER OF VOTES

*(Common stock, Preferred stock, etc.)

11. **Other Permits Applied for or Obtained**

PERMIT TYPE:	N.A.	APPLICATION STATUS Pending	APPLICATION STATUS Approved	Date Applied for or Project Number
A. CAFRA	X			
B. Waterfront Development			X	86-1055-1
C. Tidal or Coastal Wetlands	X			
D. Freshwater Wetlands Permit			X	408-8804871
E. Freshwater Wetlands Transitional Area Waiver (after July 1, 1989)	X			
F. Stream Encroachment			X	13241
G. Water Quality Certificate (Section 401)			X	NJ0063355
H. Open Water Fill	X			
I. Tidelands (Riparian) Grant, Lease or License	X			
J. Divert Surface Waters for Private Use	X			
K. Temporary Water Lowering	X			
L. Sewer Systems: Collectors, Pump Station, etc			X	50-87-8196-4A
M. Underground Storage Tanks	X			
N. Hazardous Waste Permits	X			

PERMIT TYPE: (Use additional sheets if necessary)	N.A.	APPLICATION STATUS Pending	APPLICATION STATUS Approved	Date Applied for or Project Number
O. Air Quality Permits	____	X In Renewal	_____	PI# 51614 6/12/2018
P. Delaware and Raritan Canal Review Zone "Certificate of Approval"	X	_____	_____	_____
Q. Pinelands Certificate	X	_____	_____	_____
R. Green Acres Program Review	X	_____	_____	_____
S. Other State Agencies' Permit	____	_____	X	DRBC D-86-84
Type of Permit: _____				
T. Federal Permit	____	_____	_____	_____
Type of Permit: _____				

Brief Description of the Proposed Project and Intended Use:

Approval for project to convert the existing spray dryer scrubber on each Municipal Waste Combustion unit ("MWC") to a circulating dry scrubber ("CDS") system and replacement of the electrostatic precipitator ("ESP") on each MWC with a fabric filter baghouse. The changes also include improvements to the selective noncatalytic reduction ("SNCR") control system on rach MWC, a Liquid Direct Injection ("LDI") delivery system to allow for the processing of Type 72 nonhazardous liquid wastes in each of the three (3) MWCs, and associated modifications of the Facility to accommodate the proposed air quality control systems.

12. **Certifications:**

A. APPLICANT'S CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I understand that, in addition to criminal penalties, I may be liable for a civil administrative penalty pursuant to N.J.A.C. 7:26-5 and that submitting false information may be grounds for denial, revocation or termination of any solid waste facility permit or vehicle registration for which I may be seeking approval or now hold.

Todd Frace	Todd Frace
Print/Type Applicant/Owner Name	Signature of Applicant/Owner
10/04/2022	Facility Manager
Date	Title
Todd Frace	Todd Frace
Print/Type App./Operator Name	Signature of Applicant/Operator
10/04/2022	Facility Manager
Date	Title
Print/Type Co-Applicant Name	Signature of Co-Applicant
Date	Title

B. PROPERTY OWNER'S CERTIFICATION

I hereby certify that Pollution Control Financing Authority of Camden County
Property Owner's Name
is the owner of the property upon which the proposed work is to be done. This endorsement is certification that the owner grants permission for the conduct of the proposed activity and authorizes that staff of DEP may conduct on-site inspections as necessary for the review of this application.

In addition, the aforementioned property owner shall certify:

1. Whether any work is to be done within an easement -

   Yes _____ (Initial) No DLH (Initial)

2. Whether any part of the entire project will be located within property belonging to the State of New Jersey -

   Yes _____ (Initial) No DLH (Initial)

3. Whether any part of the entire project will be located within property belonging to a municipality or county -

   Yes _____ (Initial) No DLH (Initial)

Pollution Control Financing Authority of Camden County

9600 River Road, Pennsauken, NJ 08110

By: David A. Luthman, Executive Director
Type or Print Name and Address of Owner
if different from Item 1 on Page 1

10/04/2022
Date

Signature of Owner

C. APPLICANT'S AGENT

I, _____ and/or _____,
(Applicant/Owner) (App./Operator or Co-Permittee)
authorize to act as my agent/representative in all matters pertaining to my application the following person:

Name:_____

Title:_____

Firm:_____

Address:_____

City:_____ State:_____ Zip Code:_____

Telephone:_____

Occupation/Profession:_____

_____
(Signature of Applicant/Owner)

_____
(Signature of Applicant/Operator)

_____
(Signature of Co-permittee)*

AGENT'S CERTIFICATION

Sworn before me
this _____ day of

_____ _____

I agree to serve as agent for the above-mentioned applicant

_____ _____
Notary Public (Signature of Agent)

D. STATEMENT OF PREPARER OF PLANS, SPECIFICATIONS, SURVEYOR'S OR ENGINEER'S REPORT

I hereby certify that the engineering plans, specifications and engineer's reports applicable to this project comply with the current rules and regulations of the State Department of Environmental Protection with the exceptions as noted.

Mich E. Van Brunt
Signature of Engineer

Michael E Van Brunt
Print or Type Name

VP, Environmental Affairs
Position

Covanta
Name of Firm

5 October 2022
Date

PROFESSIONAL ENGINEER'S/ARCHITECT'S EMBOSSED SEAL

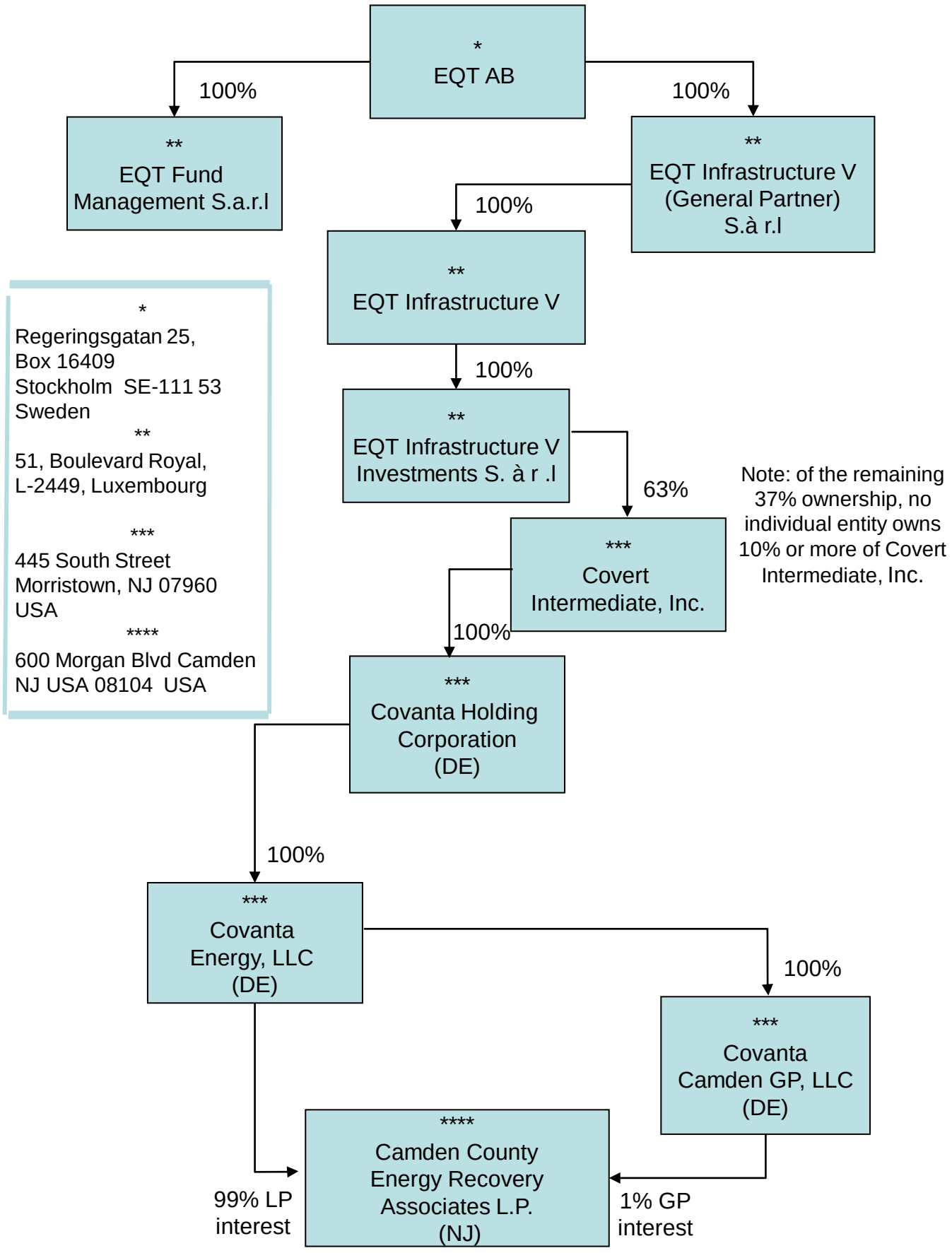
Attachment A

Exported On : 9/30/2022

Entity Name: Covanta Camden GP, LLC

Name	Title
Bily, Kirkland J.	Assistant Secretary
Gregan, Timothy H.	Vice President - Regional Operations Manager
Grizzetti, James	Vice President - Risk Management
Howe, A. Bradley	Assistant Secretary
Kam, Gregg	Executive Vice President & Chief Financial Officer
Kenyon, Thomas L.	Executive Vice President, General Counsel & Secretary
Koltis, Thomas J.	Assistant Secretary
Mohammed, Azeez	President & Chief Executive Officer
Reilly, James	Vice President and Treasurer
Shain, Michael Lee	Assistant Secretary
Stauder, Paul	Executive Vice President, Chief Revenue Officer
Taddeo, Paola	Vice President - Tax
Veenhof, Derek	Executive Vice President - Chief Commercial Officer

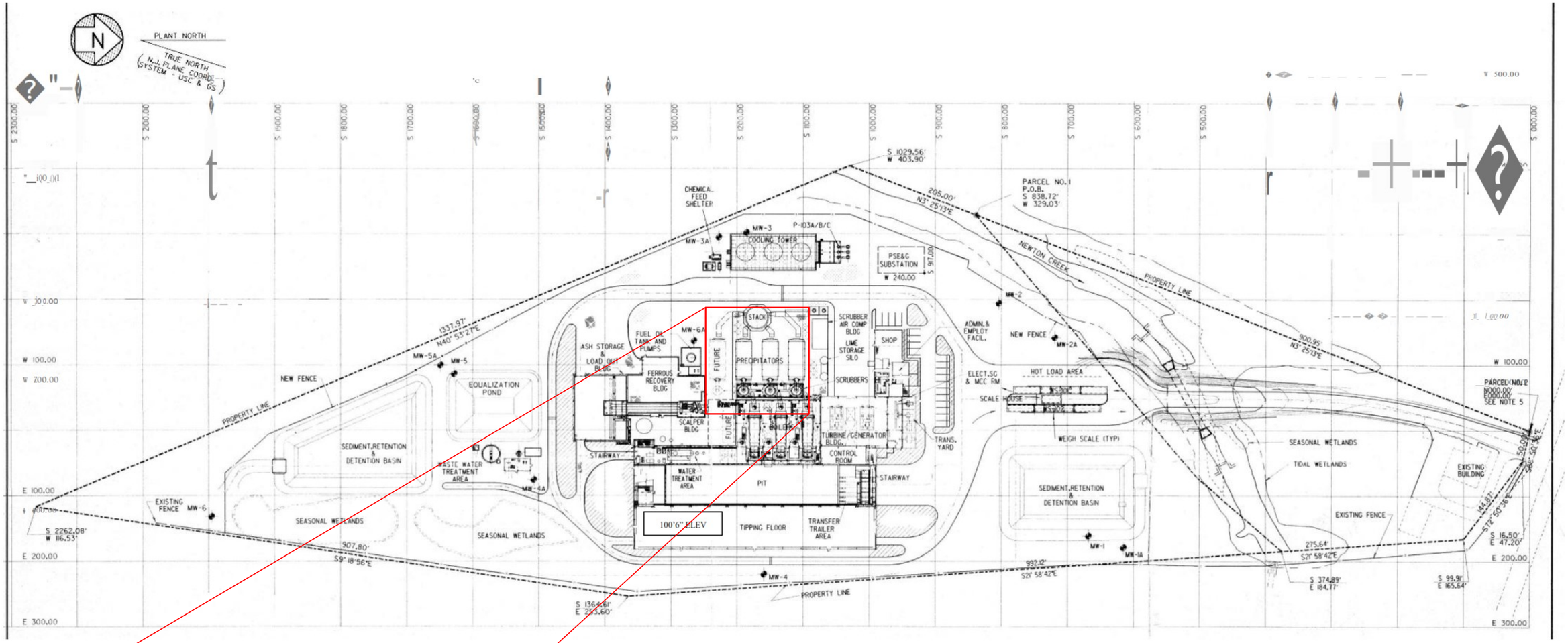
Camden County Energy Recovery Assoc.

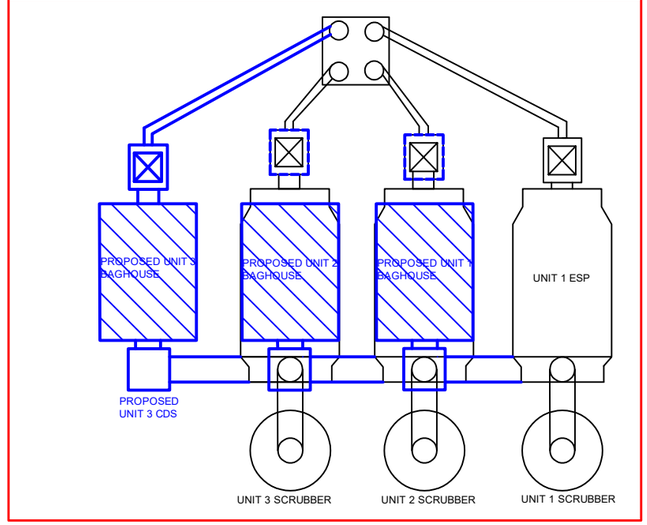


Appendix B

Project Drawings

1. **Camden – Site Plot Plan – Proposed Baghouse and CDS Locations**
2. **Drawing No. 8.21.11169.00.2000_00 WIP 210624 – AQCS General Arrangement – Plan View**
3. **Drawing No. 8.21.11169.00.2100_00 WIP 210624 – Flue Gas Ductwork - Elevation View Looking Plant East**
4. **Drawing No. 8.21.11169.00.2200_00 WIP 210624 – Baghouse Cutaway – Elevation View Looking Plant North**
5. **Camden - Site Plot Plan – Proposed LDI Location**
6. **Liquid Direct Injection P&ID – Liquid Waste Truck Unloading System (4740-P-001)**
7. **Liquid Direct Injection P&ID – Storage Tanks and Transfer Pumps (4740-P-002)**
8. **Liquid Direct Injection P&ID – Boiler Injection System (4740-P-003)**





REVISIONS
1. PRELIMINARY DRAWING – NTS

COMPANY CONFIDENTIAL

CAMDEN – SITE PLOT PLAN
PROPOSED BAGHOUSE LOCATION

COVANTA

COVANTA CAMDEN
600 MORGAN ST, CAMDEN, NJ 08104

DRAWN	APPROVED	DATE	DRAWING NO.	SHT. NO.	REV.
JME		3/25/22	XX–XXX	1 OF 1	A

PLANT NORTH

PRELIMINARY

SCOPE OF SUPPLY: COVANTA KNA

Date	No.	Revision	By

COVANTA CAMDEN

KUTTNER LLC
Port Washington, Wisconsin 53074-0343
Tel.: 262-284-4483 Fax: 262-284-4484
www.KuttnerNA.com

Plant	CAMDEN, NJ
Part. of plant	POLLUTION CONTROL
Group	BAGHOUSE
Part	ESP REPLACEMENT
Type of draw.	GENERAL ARRANGEMENT – ALTERNATIVE PLAN VIEW
Revision	0
CAD-No.	8.21.11169.00.2000_00
Size	D

Scale	2021	Date	Name
1/8" = 1'	Designed	6/16	TJ
	Checked	6/16	DG
	Drawing made by: AutoCad 2021M		

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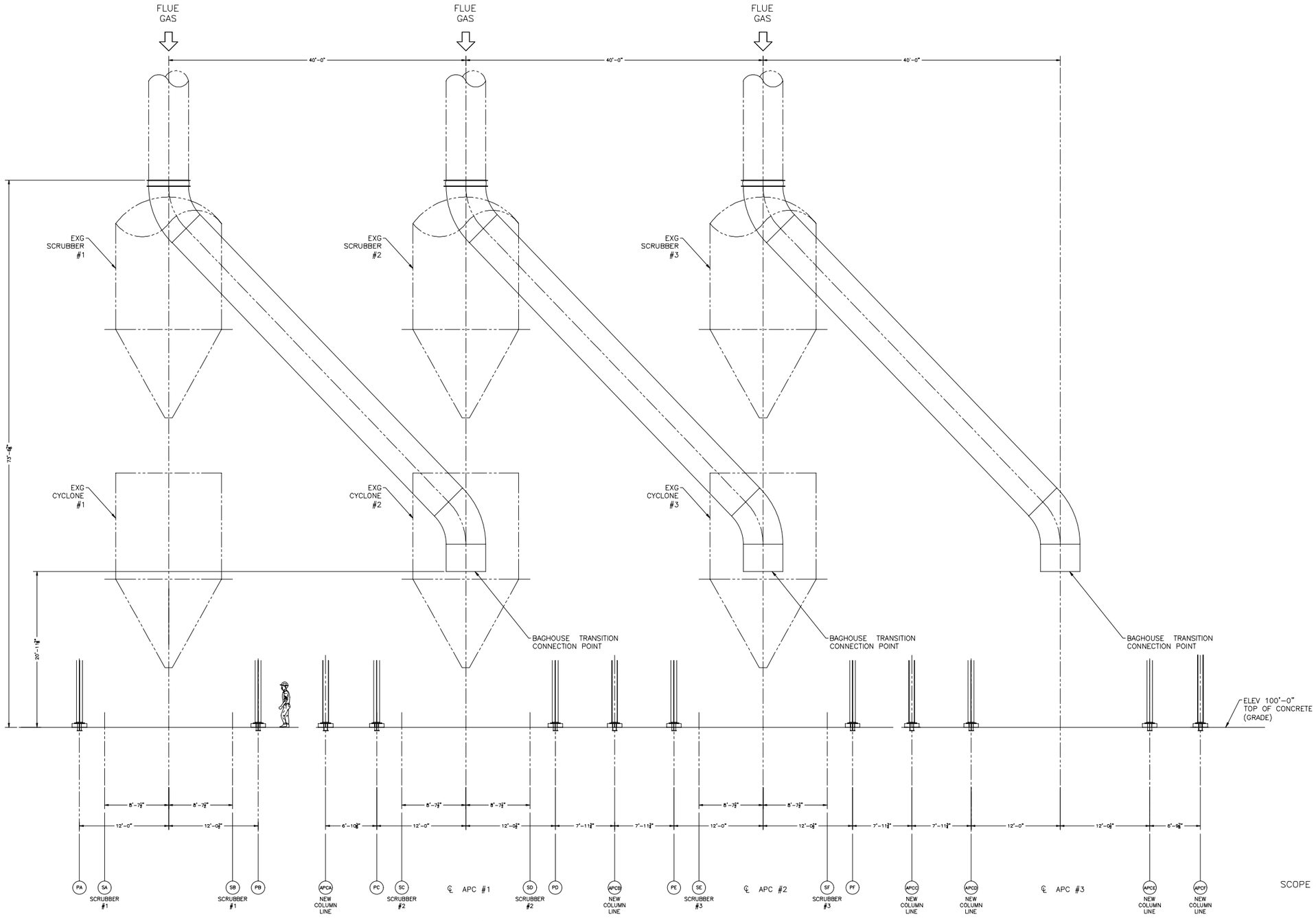

SECTION A–A
ELEVATION VIEW
LOOKING PLANT EAST
AT COLUMN LINE P1

PRELIMINARY

SCOPE OF SUPPLY: COVANTA KNA

PROTECTED INTELLECTUAL PROPERTY OF KUTTNER NORTH AMERICA
(SEE REMARK NEXT TO HEADER)

Date	No.	Revision	By

COVANTA CAMDEN

KUTTNER LLC
Port Washington, Wisconsin 53074–0343
Tel.: 262–284–4483 Fax: 262–284–4484
www.KuttnerNA.com

Plant	CAMDEN, NJ
Part of plant	POLLUTION CONTROL
Group	BAGHOUSE
Part	ESP REPLACEMENT – FLUE GAS DUCT
Type of drawing	GENERAL ARRANGEMENT – ALTERNATIVE ELEVATION VIEW

Scale	2021	Date	Name
5/32" = 1'	Designed	6/22	TJ
	Checked	6/22	DG
	Drawing made by: AutoDad 2021M		

Revision	CAD–No.	Size
0	8.21.11169.00.2100_00	D

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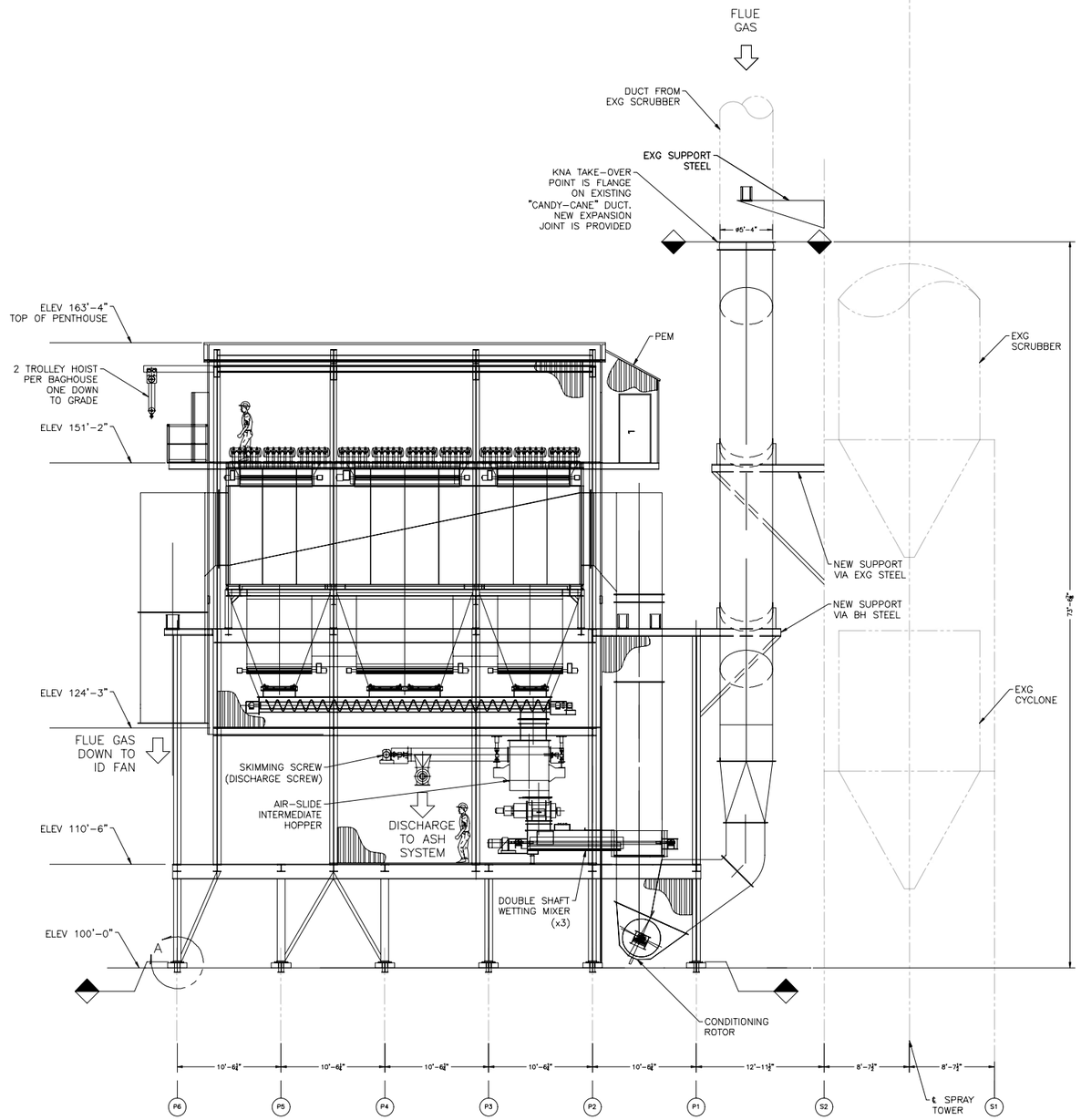
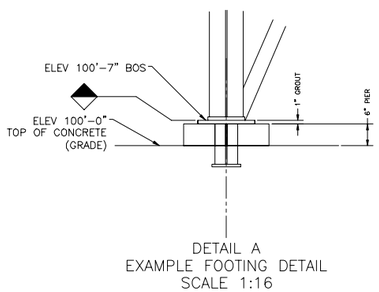
LUEHR FILTER BAGHOUSE
2x SDFv 32./10.0/3.0/90/100
FILTER BAG QTY: 3600
ISOLATABLE COMPARTMENTS: 6
FILTER AREA = 44,347 FT^2 (4,120 m^2)
PULSE VALVE QTY: 100



ELEVATION VIEW
LOOKING PLANT NORTH



DETAIL A
EXAMPLE FOOTING DETAIL
SCALE 1:16

PRELIMINARY

SCOPE OF SUPPLY: COVANTA / KNA

PROTECTED INTELLECTUAL PROPERTY OF KUTTNER NORTH AMERICA
(SEE REMARK NEXT TO HEADER)

Date	No.	Revision	By

Scale	2021	Date	Name
5/32" = 1'	Designed	6/24	TJ
	Checked	6/24	DG
	Drawing made by: AutoCad 2021M		

COVANTA CAMDEN

KUTTNER LLC
Port Washington, Wisconsin 53074-0343
Tel.: 262-284-4483 Fax: 262-284-4484
www.KuttnerNA.com

Plant	CAMDEN, NJ
Part of plant	POLLUTION CONTROL
Group	BAGHOUSE
Part	ESP REPLACEMENT
Type of drawing	GENERAL ARRANGEMENT – ALTERNATIVE ELEVATION VIEW
Revision	CAD-No. 8.21.11169.00.2200_00
Size	D

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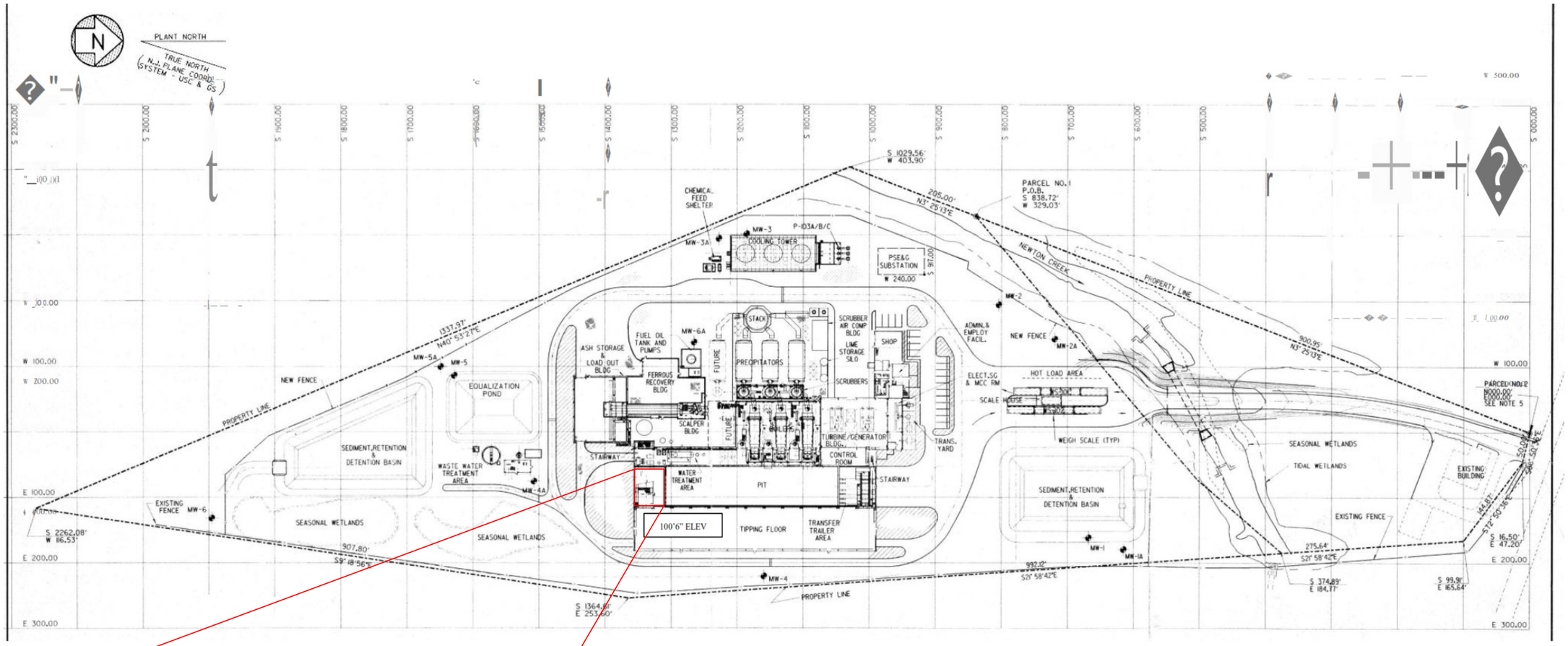
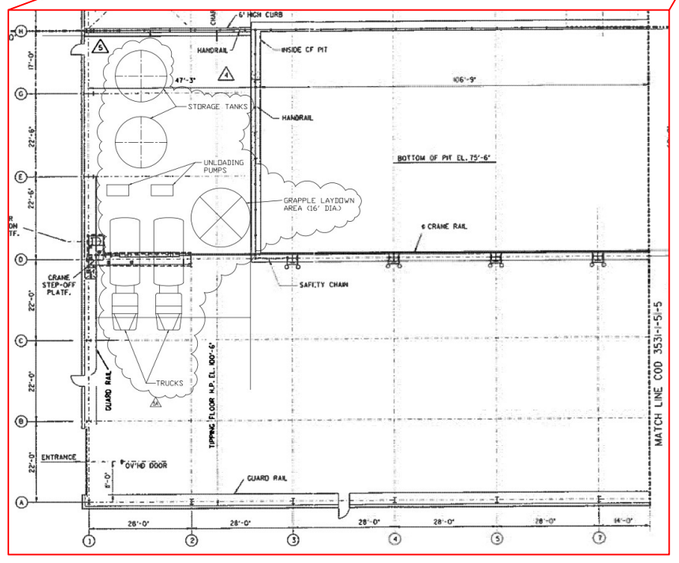




REVISIONS
1. PRELIMINARY DRAWING – NTS

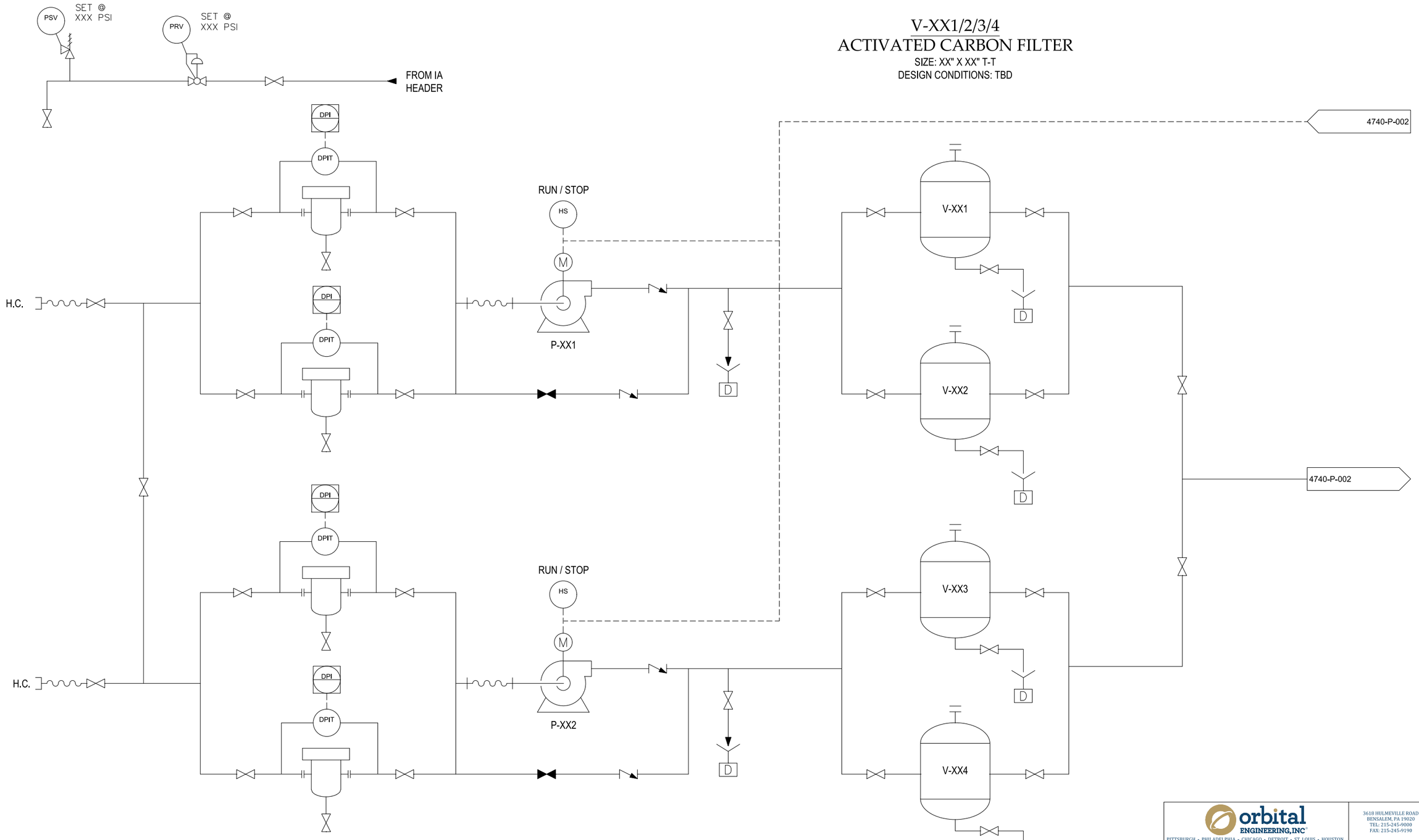
COMPANY CONFIDENTIAL

CAMDEN – SITE PLOT PLAN
PROPOSED LDI LOCATION

COVANTA

COVANTA CAMDEN
600 MORGAN ST, CAMDEN, NJ 08104

DRAWN	APPROVED	DATE	DRAWING NO.	SHT. NO.	REV.
JME		3/25/22	XX–XXX	1 OF 1	A



V-XX1/2/3/4
ACTIVATED CARBON FILTER

SIZE: XX" X XX" T-T
DESIGN CONDITIONS: TBD

P-XX1
LDI UNLOADING PUMP

DESIGN: 250 GPM
ΔP: XXX FT
S.G.: 1.0

P-XX2
LDI UNLOADING PUMP

DESIGN: 250 GPM
ΔP: XXX FT
S.G.: 1.0

orbital ENGINEERING, INC
PITTSBURGH - PHILADELPHIA - CHICAGO - DETROIT - ST. LOUIS - HOUSTON
3618 HULMEVILLE ROAD
BENSALEM, PA 19020
TEL: 215-245-9000
FAX: 215-245-9190

COVANTA UNION INC.
RENEWABLE ENERGY, LLC
600 MORGAN STREET
CAMDEN, NJ 08104

LIQUID DIRECT INJECTION SYSTEM
PIPING & INSTRUMENTATION DIAGRAM

REV #	DATE	DESCRIPTION	APP'D
A	12/02/20	ISSUED FOR APPROVAL	B.S.

SCALE	NONE	DATE	12/02/2020
DRWN	A.T.	CHK'D	B.S.
APP'D	B.S.		

ORBITAL PROJECT NUMBER	DRAWING NUMBER	REVISION
PHI.20.4740	4740-P-001	A

TK-XX1/2
LDI STORAGE TANK

SIZE: XX" X XX" T-T
CAPACITY: 50,000 GAL
S.G.: 1.0

4740-P-001

I

FY

FV

4740-P-003

LAHH

LAH

LI

LAL

LALL

MANWAY

TK-XX1

LT

HS

M

P-XX3

D

FY

FV

4740-P-003

4740-P-001

I

LAHH

LAH

LI

LAL

LALL

MANWAY

TK-XX2

LT

HS

M

P-XX4

D

4740-P-003

D

P-XX3
LDI TRANSFER PUMP

DESIGN: 18 GPM
ΔP: XXX FT
S.P.G.R.: 1.0

P-XX4
LDI TRANSFER PUMP

DESIGN: 18 GPM
ΔP: XXX FT
S.P.G.R.: 1.0

REV #	DATE	DESCRIPTION	APP'D
A	12/02/20	ISSUED FOR APPROVAL	B.S.

orbital ENGINEERING, INC
PITTSBURGH - PHILADELPHIA - CHICAGO - DETROIT - ST. LOUIS - HOUSTON

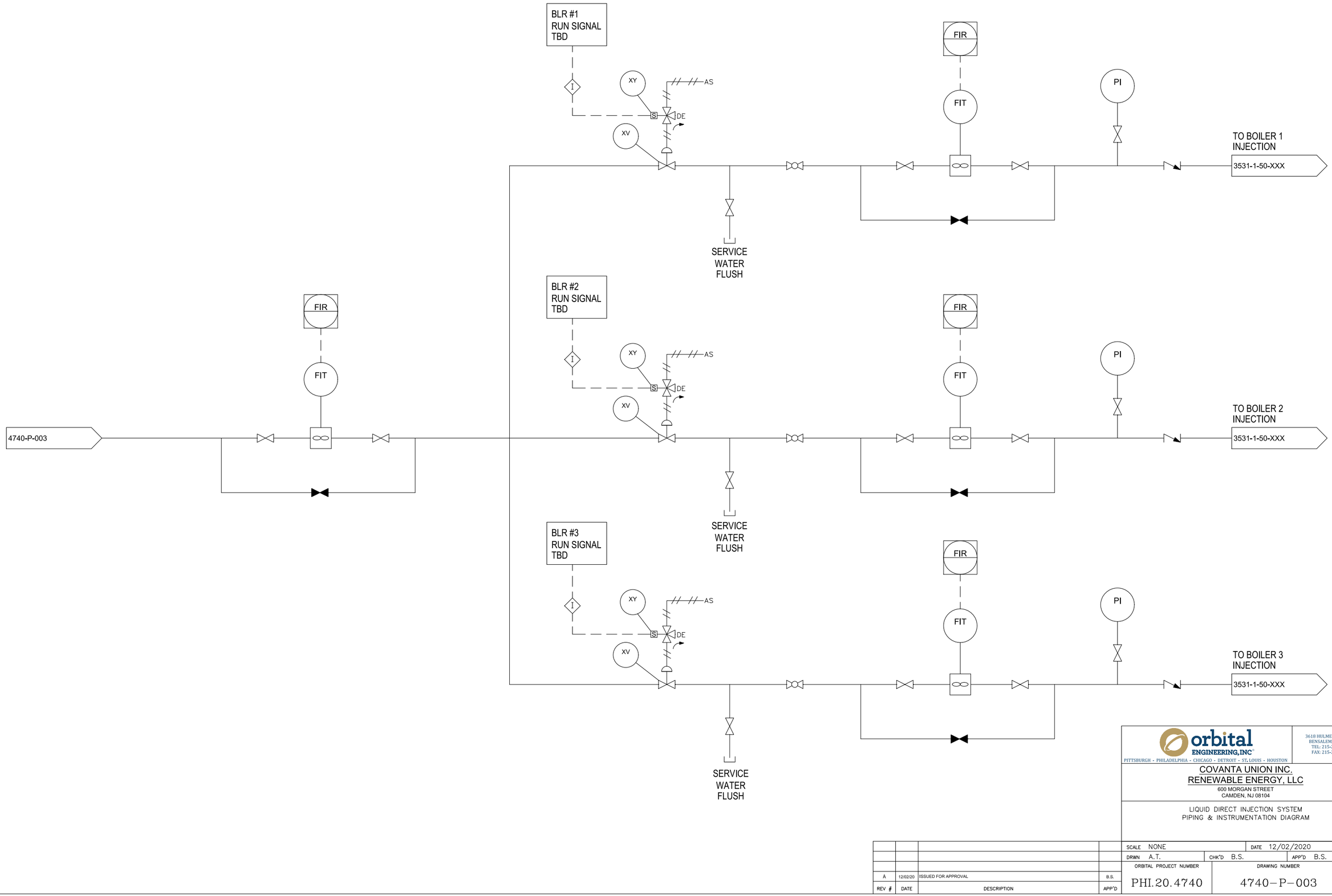
3618 HULMEVILLE ROAD
BENSALEM, PA 19020
TEL: 215-245-9000
FAX: 215-245-9190

COVANTA UNION INC.
RENEWABLE ENERGY, LLC
600 MORGAN STREET
CAMDEN, NJ 08104

LIQUID DIRECT INJECTION SYSTEM
PIPING & INSTRUMENTATION DIAGRAM

SCALE	NONE	DATE	12/02/2020
DRWN	A.T.	CHK'D	B.S.
		APP'D	B.S.

ORBITAL PROJECT NUMBER	DRAWING NUMBER	REVISION
PHI.20.4740	4740-P-002	A



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Appendix C

Baghouse Description

Camden Baghouse System Description

(Note: This document is preliminary and will be revised when the specific vendor is selected and the detailed design has been completed.)

INDEX

1.0 INTRODUCTION

1.1 PURPOSE

Treated flue gas is directed from the CDS reactor to the baghouse for cleaning. Entrained particulate is filtered from the gas stream as the gas passes through cloth filter bags within the baghouse. This particulate forms a "filter cake" of lime and flyash on the bag surfaces. Once formed, the filter cake acts as an additional filter medium. The filter cake also aids in the removal of acids in the flue gas. Filtered gas is delivered to the stack via the induced draft fan for exhaust to the atmosphere. Captured particulate is periodically cleaned from the bags and released into the baghouse hoppers for delivery to the ash conveying system by a pneumatically operated pulse air system. A portion of the captured particulate will be wet conditioned and recirculated back to the CDS reactor.

1.2 SYSTEM OVERVIEW

The baghouse is a self-cleaning modular dust collector designed to remove dust particles from the flue gas streams. It consists of six (6) modules per unit, each containing approximately 17 oz., PPS (generic 'Ryton') bags with a PTFE (e.g. generic 'Gore-Tex') laminate coating. The PPS bags are more robust than fiberglass bags and are a more effective filtration media. The PTFE laminate provides improved filtration for all particle sizes and facilitates cleaning of the filter bags. The inlet and outlet of each of the six (6) modules are connected to common inlet and outlet manifolds. Each module is provided with a manually operated inlet damper and a pneumatically operated outlet damper.

Fabric bags within each baghouse module filter collect dust from the flue gas. The dust laden gas enters the baghouse modules through a side inlet manifold, slows down, changes direction, and passes through the filter bags from the outside to the inside of the bag. Inlet of the gas stream at the side of the modules rather than beneath the bags provides for better distribution of the flue gas and reagent along the entire length of the filter bags, thus providing more effective utilization of the bag filter area. This results in a more uniform filter cake which promotes more effective abatement of emissions. The mechanics of turning and slowing the gas results in some of the dust falling directly into the hopper. The remainder is deposited on the outside of the filter bags. Each filter bag is supported from within by a wire cage. The wire cages prevent the collapse of the filter bags during the filtering operation.

To keep system draft pressure drop at an acceptable level, the filter bags are periodically cleaned of some of the collected material. The baghouse cleans the bags using a high volume, medium pressure pulse of compressed air directed into the clean interior of the bags from their top ends which are open. The compressed air pulse, opposite to the direction of gas flow, expands the bag which causes some of the collected filter cake on the outside of the bag to fall into the hopper below. The high volume, medium pressure pulse provides uniform cleaning of the bags along their entire length.

2.0 COMPONENTS

The overall baghouse design criteria and performance guarantees are as follows. Individual component descriptions and information are contained in the following sections:

Gas temperature (inlet):	Approximately 310° F
Type:	Pulse jet
Number of modules:	6
Air to Cloth Ratios:	
Maximum Continuous Rating:	2.33 ACFM/ft^2 of cloth
110% Maximum Continuous Rating:	2.56 ACFM/ft^2 of cloth
FILTER BAGS	
Material:	PPS
Finish:	PTFE laminate coating
Weight:	Approximately 17 ounces/square yard
Maximum temperature:	375 ^oF continuous
PERFORMANCE GUARANTEES	
Filterable outlet dust load:	12 mg/dscm @ 7% oxygen
Opacity:	10% permit maximum
Bag Life:	2-3 years (minimum)

2.1 MODULES

The baghouse is comprised of six (6) individual modules or compartments constructed of carbon steel. These modules provide the needed sectionalization for off line cleaning and/or maintenance. A module consists of a hopper, outlet plenum, tube sheet, and compressed air distribution system.

2.1.1 Hopper

The hopper collects fly ash for removal by the fly ash removal system. An access door is provided for inspecting each hopper interior. Each hopper is installed with a vibrator to dislodge any potential bridging as well as heaters and insulation.

A discharge flange connects the hopper to the flyash system. All compartment hoppers discharge to a baghouse conveyor. The baghouse conveyers discharge to an intermediate hopper. The intermediate hopper is utilized to feed the collected particles to the recirculation system's wetting mixers. A skimming screw conveyor continuously pulls nonrecycled residues out of the hopper into the residual handling system.

2.1.2 Compartment Outlet Plenum

Each module serves as the housing for the filter bags and contains an outlet plenum for the clean flue gas. The dirty gas and outlet plenum are separated by a tube sheet, to which the filter bags are mounted. An access door is provided for entry into the outlet plenum. This allows access to the top of the tube sheet for inspection, removal, or installation of the filter bag and cage assemblies. Clean gas exits the outlet plenum of each module through the outlet poppet damper and flows into the outlet manifold.

2.1.3 Tube Sheet

The tube sheet supports the filter bags and separates the clean and dirty sides of the baghouse. It also serves as a filter bag inspection platform inside the outlet plenum. The filter bag is inserted into the tube sheet and at the top of the bag a snap band attaches the bag to the tube sheet. The bag cage assemblies are inserted into the bag. The cage assembly is in two (2) pieces to allow for installation and removal in the limited space of the outlet plenum.

2.1.4 Pulse Air Distribution System

This system will utilize dedicated air compressors, air dryer and air header located in the APC area, solenoid actuated diaphragm valves, the pulse pipes, and the cleaning cycle controller. A single pulse pipe is positioned over each row of filter bags and connected to the air receiver with a solenoid actuated diaphragm valve.

The amount of compressed air delivered to the bags is a function of the volume and air pressure inside the air receiver and the length of time the diaphragm valve remains open. The operation of the valves is controlled by the cleaning cycle controller.

The duration of the pulse of air is very short. The valve opens and admits air to the pulse pipe which directs air into the filter bags.

The air burst passes through the top of the bag/cage assembly and down the filter bags. This sudden acceleration of the fabric from the cage followed by deceleration causes most of the accumulated filter cake to separate from the outside of the filter bag. The medium pressure, high volume pulse provides uniform cleaning of the bags along their entire length.

2.2 ACCESS DOORS

There are two access doors on each module, one for the outlet plenum and one for the hopper. During operation, it is important that the door is closed sealed to prevent leakage. In-leakage of outside air cools the steel which is a potential corrosion problem and will cause bag deterioration.

2.3 FILTER BAG

Each bag is approximately 6" in diameter. The bag material is PPS (generic ‘Ryton’) with a PTFE (generic ‘Gore-Tex’) laminate coating. The fabric weight is approximately 17 ounces per square yard. A wear cuff at the bottom of the bags prevents premature failure caused by bag-to-bag abrasion. Support for the fabric is provided by wire cages which are inserted into each bag.

Because of the need to control flexing of the bag material yarns, an engineered fit between the filter bag and the cage is provided. In addition to this, the vertical cage wires are spaced less than an inch apart to provide good support for the fabric. To provide adequate rigidity, the cages are constructed of 11 gauge wire with annular rings.

The filter bags are removed and installed from the clean flue gas outlet plenum. There is no need to enter the dirty side of the baghouse to replace bags. Once the pulse pipes are disconnected, each filter bag and cage assembly can be inserted or removed through an opening in the tube sheet.

The method utilized to seal the filter bag against the tube sheet is accomplished by a metal snap ring that is integral to the upper collar of the bag. Once the bags are inserted and positioned in the

inlet plenum tube sheet, a snap ring is used to attach it to the tube sheet. Snap ring spring pressure forms a tight seal to the tube sheet around the upper portion of the bag. A rigid flange on the cage assembly maintains the correct bag alignment. The cage is fabricated in two pieces to facilitate removal in the limited space. To reinstall the cage, first insert bottom portion into bag and angle top portion of the cage into bottom portion while inserting. The filter cage then slides-into the bag as one unit.

2.4 INLET AND OUTLET MANIFOLDS

The inlet and outlet manifolds distribute the flue gases into and out of each individual module. The manifolds are centrally located between the two rows of modules. The flue gas passages and manifolds have been designed to optimize the following essential criteria:

a. Minimize the plenum, compartment damper and system pressure drop.

b. Balance the flow and dust distribution between compartments and between filter bags within a compartment.

2.5 EXPANSION JOINTS

Expansion joints are located at the flue gas inlet and outlet plenums of each module. This allows relief of thermal stress at the points where the modules are connected to the manifolds. Stresses occur as a result of taking one module off line while the remaining modules are operating at higher gas temperatures. The forces generated by thermal expansion and contraction, if not accommodated, will result in misaligned dampers and structural damage to the modules and manifolds. Non-metallic joints are used because they are corrosion resistant and can handle three dimensional movement and extreme temperature variances without-cracking or splitting.

2.6 BAGHOUSE DAMPERS

Isolation dampers are located at the flue gas inlet and outlet plenums to each module.

2.6.1 Poppet Dampers

The baghouse is designed to operate under negative pressure, i.e., less than atmospheric pressure. Under these conditions, when a baghouse module is isolated for inspection or performing maintenance, the outlet popper damper is closed. Since this is the only damper that closes during isolation of a module, poppet dampers are used at this location. These dampers are selected for their minimal leakage characteristics.

Poppet dampers consist of a flat circular plate, or blade, connected to a shaft. The shaft is either raised to close or lowered to open the outlet damper. In the closed position, the blade is seated against an opening in the duct work. The duct opening is fitted with a raised collar onto which the circular blade seals. The poppet damper actuator provides enough force to cause a deflection of the blade as it seals around the collar, similar to the action of a diaphragm seal. The blade is flexible enough to provide a uniform metal seal without creating permanent deformation.

A guide bar provides alignment of the poppet shaft and prevents rotation of the blade, thereby allowing consistent sealing after repeated use. A machined packing gland is used to seal the poppet shaft at the point where it penetrates the duct.

A double acting air cylinder provides the force necessary to open and close the poppet damper. A pin and lock assembly is used to mechanically lock the poppet damper in the closed position for on line maintenance. The damper must be locked in a closed position before entering the module.

2.6.2 Butterfly Dampers

Butterfly dampers are used at the flue gas inlet of each module. Leakage is not as critical through this damper, because during module isolation, the poppet damper at the module outlet will also be closed. The primary concern is to use a damper that provides minimal pressure drop characteristics and functions well in a dirty flue gas stream.

Several design features are incorporated into the butterfly inlet dampers to minimize leakage and corrosion. This damper is also mechanically locked in the closed position to ensure safety during maintenance periods. The damper must be locked in a closed position before entering the module.

2.7 INSULATION LAGGING

Insulation and lagging are applied to all hot surfaces including modules, hoppers, inlet and outlet manifolds.

2.8 HOPPER HEATERS

The hopper heaters are typically low watt density types. The junction box is dust and water tight (NEMA 4X). The heater is controlled by a temperature sensor mounted on the hopper wall.

The hopper heaters are designed to maintain the lower one third of the hopper surface area at typically 270 to 310° F.

2.9 HOPPER LEVEL INDICATOR

There is one level indicator per hopper to detect a high ash level. Each hopper level detector provides a high hopper ash level alarm to the control room.

2.10 HOPPER VIBRATORS

There is one (1) electric hopper vibrator per hopper which produces a pattern of pulsating vibrations to keep the dust particles agitated and in a free flowing condition. The hopper vibrators are interlocked with the flyash system to prevent the hopper vibrators from operating when the associated hopper screw conveyer is secured.

2.11 COMPRESSED AIR SYSTEMS

Compressed instrument air is supplied to the baghouse by a compressed air system. The system is comprised of air compressors, air dryer and air receiver.

2.12 BAGHOUSE CONTROL

A screen on the plant control system displays the control system logic. The displays are arranged in a graphic layout which indicates the status of various modes in which the system is operating and monitors the overall pressure drop. It also allows remote control of the following functions:

a. System startup or shut down

b. Manual or automatic cleaning cycle

c. Manual cleaning of an individual compartment

d. Online or offline cleaning

e. Control of outlet dampers

3.0 OPERATION

3.1 STARTUP

3.1.1 Putting Baghouse in Service:

The baghouse will always be in service whenever the induced draft fan is in service.

3.1.2 Verify that all doors and hatches into the flue gas paths are closed and sealed.

3.1.3 Ensure that the hopper heaters are energized before startup and the hopper temperature "low" alarms are not activated.

3.1.4 Inspect instrument tubing and fittings for leaks.

3.1.5 Ensure that all of the local cleaning cycle timer control panels are in the off position.

3.1.6 Ensure that the baghouse control panel is energized.

3.1.7 Start the flyash handling system and verify complete operation.

3.1.8 Verify that the two sacrificial modules inlet and outlet dampers are open.

3.1.9 Start the ID and FD fans and purge the furnace. After purging is complete, shut down the FD fan and place the auxiliary burner in service. See the Combustion Air and Flue Gas System Description for details.

3.1.10 Verify that the pulse air is lined up to all six (6) compartments and that the pulse air regulator is set at 50 PSIG.

3.1.11 When the baghouse outlet gas temperature reaches 285°F, open two (2) module outlet dampers via their control switches. The baghouse outlet temperature will drop until these compartments are warm up.

3.1.12 When the baghouse outlet gas temperature again reaches 285°F and stabilizes, open the four (4) remaining module outlet dampers via their control switches.

3.1.13 Place all of the local cleaning cycle timer control panels to the “on” position.

3.1.14 Set the cleaning control switch to "online". This method is preferred for initial cleaning and will be the normal operating mode.

3.2 NORMAL OPERATION

With the baghouse in the normal filtering mode of operation, all the modules are on-line, filtering flue gas. When the differential pressure across the baghouse reaches approximately 6 inches WC (adjust based on actual operation), the pulse air unit will activate. This unit provides backpressure pulses across the filter bags to drop the accumulated ash off of the bags. Fabric filter bag cleaning is accomplished by sequentially cleaning the first row of bags in each module, one module at a time, until the baghouse differential pressure is reduced to less than approximately 5.5 inches WC (adjust based on actual operation). Each module remains on line during the cleaning cycle. Upon the baghouse differential pressure rises once again to approximately 6 inches WC, the next cleaning cycle begins where the previous cycle left off (i.e., cleaning begins with the first row of bags of the next module in the sequence). After the first row of bags in each module has been cleaned in this manner, cleaning is advanced to the second row of bags in the first module. Eventually each row of bags in each module is cleaned. All operations associated with fabric filter cleaning are controlled automatically or manually through the plant control system.

Online cleaning provides a more stable ID fan operation and subsequent stable combustion than cleaning by removing entire modules from service for cleaning (offline cleaning). It also provides for a more consistent filter cake and thus improved filtration. Online cleaning is also advantageous when one module has been taken out of service for maintenance or repairs. In this condition, taking a second module offline for cleaning will result in higher baghouse differential pressure.

Bag cleaning is accomplished using high volume, medium pressure compressed air pulses blown down into each bag from blow pipes mounted just above the tube sheet in the module outlet plenum. The air pulses travel down the bags in the direction opposite to the direction of the flue gas flow. The filter cake on the bags is dislodged by a combination of the dynamic pressure of the air pulses as they travel down the bags, and by the shock waves generated by the air exhausting from the blow pipe orifices.

The baghouse differential pressure will serve, in general, as the best indicator of overall baghouse performance. In particular, the differential pressure across the individual modules will be the best indicator of the condition of the filter bags. A sudden increase or decrease in pressure drop can mean blinded bags, leaks from holes in the fabric, cleaning system malfunction or full hoppers. Immediate action is required to isolate and solve the problem and prevent bag failures.

The baghouses will be designed so that offline cleaning may also be accomplished if necessary. The off-line cleaning mode allows a module being cleaned to be isolated from the flue gas flow. The offline cleaning feature is particularly useful when a compartment needs to be cleaned prior to performing maintenance and/or repairs on it. During offline cleaning, the outlet damper of the compartment to be cleaned is closed and then each row of bags within the compartment is sequentially cleaned by pulsing. After all the rows have been pulsed, a null period allows the ash which has been cleaned from the bags to settle into the hopper from where it is removed. The outlet damper is reopened at the time the compartment is to be returned to service.

3.2.1 Filter Bag Cleaning

3.2.1.1 Online Cleaning

3.2.1.1.1 The automatic online cleaning mode is initiated at a differential pressure of approximately 6 inches WC across the baghouse as described above. The bags are cleaned, one (1) row at a time, with a momentary burst of air from the compressed air system as described in the previous section. Each module is supplied with its own compressed air cleaning system. This system is comprised of one (1) common header and nineteen (19) diaphragm valves, each provided with a blow pipe which is aligned over a row of bags. The compressed air flows from the header, through the diaphragm valve and into the blow pipe.

3.2.1.1.2 The operation of the diaphragm valve is controlled by a solenoid valve, while the duration and frequency of energization (on and off times) of the solenoid valve are controlled by the cleaning cycle timer.

3.2.1.2 Offline Cleaning

3.2.1.2.1 In the automatic off-line cleaning mode, the baghouse allows the module being cleaned to be isolated from the gas flow.

3.2.1.2.2 The control system sequentially controls the operation of all module outlet poppet dampers and timers. The cleaning operation begins with the outlet poppet damper of the first module closing, preventing further filtering of dust laden gases in that module. A signal is sent from the control system to the module cleaning cycle controller, which sequentially pulses each row of bags. After all rows are pulsed, a null period allows the ash which has been cleaned from the filter bags to settle into the hopper from where it is removed. The outlet damper is then reopened, returning this module to service.

3.2.1.2.3 Then the control system closes the outlet poppet valve of the next module to be cleaned and the process is repeated until all of the modules are cleaned.

3.2.1.2.4 Each module will be out of service approximately four (4) minutes for offline cleaning in the automatic cleaning mode. The times allotted for damper closing, the null period or settling period, are programmed into and controlled by the control system. The duration of the pulse cleaning cycle is adjustable at the cleaning cycle timer for each specific module.

3.2.1.3 Manual Cleaning

3.2.1.3.1 The operator can initiate a manual cleaning of a module. This method is similar to offline cleaning except only one module is manually selected for cleaning.

3.2.1.3.2 The operator closes the outlet poppet damper for the module to be cleaned.

3.2.1.3.3 The operator then sends a signal to the module cleaning cycle controller which sequentially pulses each row of bags. After all rows are pulsed, a null period allows the ash which has been cleaned from the filter bags to settle into the hopper from where it is removed.

3.2.1.3.4 Upon completion of the cycle, the operator reopens the outlet damper, returning the module to service.

3.3 SHUTDOWN

Shut down of the baghouse should be accomplished in such a manner so as to prevent fabric filter damage due to lowering gas temperature, as there is potential for moisture or acid condensation on the bags.

Pulse jet cleaning should be manually initiated prior to shut down to remove any excess dust from the filter bags. Initiating a cleaning cycle prior to shut down reduces the likelihood of blinding the filter bags with hard caked dust resulting from moisture condensing on the bags as the unit cools. In addition, falling dust hazards are reduced should module entry be required.

3.3.1 Baghouse Shutdown

3.3.2 Shut down of the entire baghouse can be accomplished once the stoker grates are completely clear of garbage and the spray dryers have been shut down.

3.3.2.1 Stop feeding refuse and close the feed chute damper when refuse level drops below the acceptable level.

3.3.2.2 Place the auxiliary burner in service and burn off the remaining refuse.

3.3.2.3 Monitor the spray dryer inlet SO_2 level and inlet temp. After the level has dropped and remains below 5 PPM and 300°F, secure the spray dryer atomizer. See the Spray Dryer Absorber System Description for details.

3.3.2.4 After all the refuse is burned out, secure the auxiliary burner.

3.3.2.5 Close the module outlet dampers via their associated "open/close" selector switches as flue gas flow allows.

3.3.2.6 Place all of the local cleaning cycle timer control panels to the off position.

3.3.2.7 Isolate the modules by closing the module inlet dampers via their associated manual chain operators.

3.3.2.8 Run the flyash handling system after the baghouse is off line.

3.3.2.9 In order to preclude any condensation on bags, the hopper heaters should be left in service whenever possible.

EFERENCES (Note: Information will be filled-in when vendor has been selected and detailed design has been completed)

4.1 PIPING AND INSTRUMENTATION DIAGRAMS

Description	**Drawing Number**

4.2 VENDOR LOGIC DIAGRAMS

Description	**Drawing Number**

4.3 VENDOR MANUALS

Vendor	**Equipment**	**Equipment Manual**

Appendix D

CAM-SOP-751 Baghouse Bag Disposal Procedure

COVANTA
Powering Today. Protecting Tomorrow.

Standard Operating Procedure (SOP)

CAM-SOP-751 Baghouse Bag Disposal

Revision: 1.0 September, 06, 2022

Revision and Signoff Sheet

Applicability / Authorship

Level	Business Unit	Position	Prepared by	Contributors
Facility	Camden	Facility Manager	Todd Frace	

Change Record

Date	Author	Revision	Change Reference	Page #

Reviewers

Name	Version approved	Position	Date

Annual Review

Name	Version approved	Position	Date

TABLE OF CONTENTS

1 Introduction

1.1 Background

1.1.1 Prior to commencing this procedure, review all the steps that will be performed. If there are steps that cannot be done for any reason, bring them to the Shift Supervisor or Operations Manager attention prior to beginning the evolution.

1.2 Purpose

1.2.1 The purpose of this procedure is to provide procedural steps on handling used baghouse bags has an internally generated waste within the facility. Proper adherence to this procedure will ensure proper bag disposal.

2 Preparations & Communications

2.1 Preparations

2.1.1 Baghouse cell locked out and cooled down in accordance with applicable safety procedures.

2.2 Communications

2.2.1 Verify all affect employees are aware of baghouse bag changeout. This would include Facility Manager, Operations Manager, Facility Safety Manager, Facility Environmental Specialist and Tipping Floor Supervisor.

3 Safety, Health, & Environmental

3.1 Safety Warnings & Precautions

3.1.1 Do no handle until all safety precautions have been read and understood.

3.1.2 Wear protective gloves/protective clothing/eye protection/face protection/ respiratory protection.

3.1.3 Contaminated work clothing shall not be allowed out of the workplace.

3.2 Environmental Considerations

3.2.1 Bags must be doubled bagged and sealed prior to leaving the baghouse enclosure.

3.2.2 At no time shall compressed air be used to blow fly ash off the baghouse top.

3.3 Relevant Safety Procedures

3.3.1 Safety Procedure No. 03 - Hazard Communications

3.3.2 Safety Procedure No. 11 - Respiratory Protection

3.3.3 Safety Procedure No. 13 - Heavy Metals

3.3.4 Safety Procedure No. 15 - Lock-Out Tag-Out

3.3.5 Safety Procedure No. 16 - Confined Space Entry

3.3.6 Safety Procedure No. 43 - Personal Protective Equipment

3.4 Relevant JSA (‘s)

3.4.1 "N/A"

3.5 Required Permits

3.5.1 “N/A”.

4 References

4.1 Drawings

4.1.1 Baghouse G&A Drawing

4.2 Manuals

4.2.1 Covanta Camden Air Quality Control System OEM Manual.

4.3 Other

4.3.1 Covanta Technical Standard; Section 7.2.E.1 - Filter Bag Management.

4.3.2 EPA Response to Commissioner Burack Dated 10/10/2014.

5 Procedure

5.1 Isolate Baghouse / Cell

5.1.1 Prior to isolating cell or shutting down baghouse. The baghouse cell shall be ran through a minimum of three manual pulse cycles to remove as much ash and lime as possible.

5.1.2 Isolate the cell (by closing the outlet damper) early enough before the job to enable several pulse cycles before baghouse / cell is open.

5.1.2.1 Manually run several pulse cycles to clean bags in the off-line mode.

5.2 Lock-Out Baghouse Cell

5.2.1 Isolate and lock out the inlet & outlet dampers and pulse air per SP #15.

5.2.2 Verify the baghouse hopper is empty and lock out air lock and block bottom of the hopper per SP #15.

5.3 Remove Bags

5.3.1 Make sure that tools, old clamps and other metal items do not fall into the hopper as damage to airlocks and other dust handling equipment can occur. The hopper should be emptied to allow easier retrieval if any items fall into the hopper. If possible, block off the bottom of the empty hopper to allow easier retrieval of dropped items.

5.3.2 Ensure baghouse hopper door is closed while removing bags

5.3.3 Remove top cover and set aside.

5.3.4 Vacuum top of tube sheet to remove any loose ash.

5.3.5 Remove compartment air manifolds /pulse pipes.

5.3.6 Remove nuts and hold-down washers securing bags to be replaced.

5.3.7 Remove cages and stack inside baghouse enclosure.

5.3.8 Remove bags by pressing snap ring and removing bag. While pulling bag out of the tube sheet bag shall be rolled up and placed in a plastic bag

NOTE: If baghouse cage cannot be removed or bag is full of ash and can't be removed go to section 5.4 "Alternate Bag Removal Method" after all other bags removed.

5.3.9 Double bag baghouse bags in "Contractor Size" trash bag. Tape bag close and stack inside of baghouse enclosure for disposal.

5.3.10 Vacuum off tube sheet of all ash.

5.4 Alternate Bag Removal Process.

5.4.1 Bag / Cage Removal - If unable to remove the cage from the bag, take the following steps.

5.4.1.1 Layout a piece of plastic sheeting in the baghouse enclosure. Sheeting shall be long enough to sit the bag & cage on.

5.4.1.2 Remove bag and cage together and lay on the plastic sheeting.

5.4.1.3 Cut the bag lengthwise with a utility knife and remove the cage.

5.4.1.4 Roll up baghouse bag and double bag in trash bag. Tape bag close and stack inside of baghouse enclosure for disposal.

5.4.2 Bag Removal - If unable to pull bag out.

5.4.2.1 Verify bottom of hopper is blocked and hopper door is closed.

5.4.2.2 Using a utility knife cut the bag around the inside circumference. This will allow the bag to fall into the hopper.

5.4.2.3 Open the baghouse cell hopper door.

5.4.2.4 Roll baghouse bag up and place in trash bag. Double bag the baghouse bag has it is removed from the hopper access door. Tape bag and stow bag in the baghouse enclosure.

5.5 Bag Disposal

5.5.1 Bags shall be disposed of within one shift after completion of bag removal form a cell.

5.5.2 Bags shall be double bagged to ensure containment, removed from the baghouse enclosure and directly transferred to the waste feed area and inserted into the combustor via one of the three approved methods.

5.5.3 Hand Carried via Boiler Building

5.5.3.1 Verify bags are doubled bagged.

5.5.3.2 Hand carry bags from the baghouse enclosure, through the scrubber penthouse into the boiler building. Go down one flight of steps to the fifth floor to the charging deck entrance.

5.5.3.3 Obtain permission from the crane operator to enter charging deck. Enter charging deck and discard bags in the feed hopper of a operating combustor.

5.5.4 Transported via Small Dumpster from Baghouse Enclosure to Tipping Floor

5.5.4.1 Using the hoist system raise dumpster from the baghouse ground level to the upper level of the baghouse enclosure.

5.5.4.2 Ensure all bags are doubled bag and fill dumpster with bags.

5.5.4.3 Lower dumpster to ground floor.

5.5.4.4 Transport dumpster via mobile equipment to the tipping and dump bags into tipping floor pit.

5.5.4.5 Have crane operator feed bags into feed chute of operating boilers. Feeding of bags shall be staggered in accordance with combustor management practices.

5.5.5 Transported via Dumpster / Loader

5.5.5.1 Verify all bags are doubled bagged.

5.5.5.2 Sealed bags will be carried from the top of the baghouse enclosure to the ground floor and placed in dumpster or loader bucket.

NOTE: Bags shall not be dropped from the boiler building enclosure. All bags will be carried down and placed in dumpster / enclosure.

5.5.5.3 Transport dumpster via mobile equipment to the tipping and dump bags into tipping floor pit.

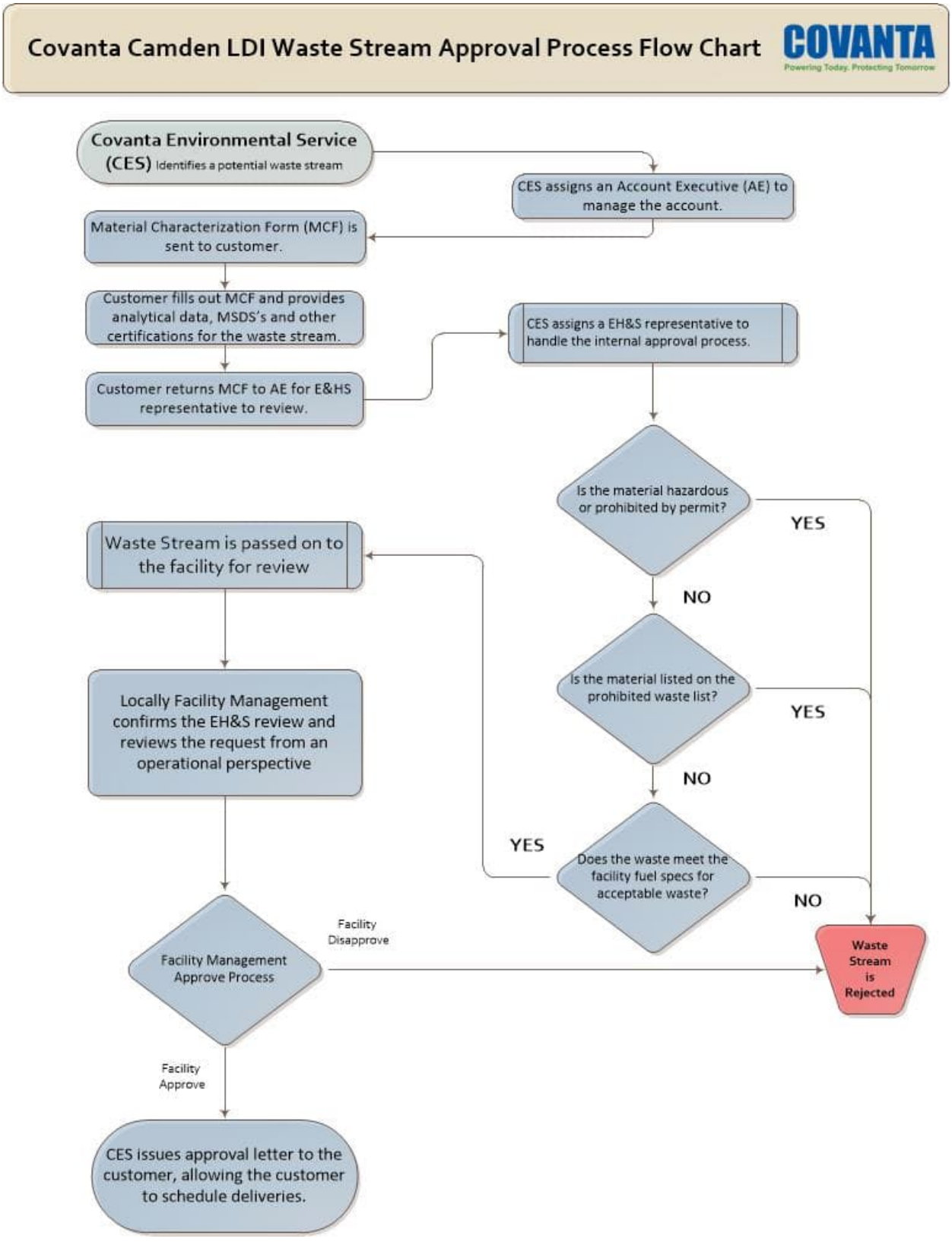
5.5.5.4 Have crane operator feed bags into feed chute of operating boilers. Feeding of bags shall be staggered in accordance with combustor management practices.

6 Appendix

Appendix E

LDI Waste Stream Approval Flow Chart and Material Characterization Form

Appendix E - LDI Waste Approval Process Flow Chart



COVANTA
Environmental
Solutions

Material Characterization Form (MCF)

Section 1 - General Customer Information REQUIRED SECTION *(If multiple generating or shipping locations, include a list as an attachment)*

Generator Company Information

Company Name _____

Address _____

City _____ State _____ Zip Code _____

Phone # _____ Fax # _____

Service Company Information

Company Name _____

Address _____

City _____ State _____ Zip Code _____

Phone # _____ Fax # _____

Primary Contact Information - *Enter the contact information for the person who can answer questions about the waste and process.*

Contact Name _____

Title _____

Company Name _____

Phone # _____ E-mail _____

Billing Information - *Identify where Covanta should forward invoices:*

☐ *Generator's Address;* ☐ *Service Company's Address; or* ☐ *other*

Address _____

City _____ State _____ Zip Code _____

Contact Name _____

Phone # _____ E-mail _____

Will a PO Number be required? ☐ *No* ☐ *Yes*

☒ ***Service Company Authorization***

On Behalf of the Generator of the waste profiled herein, I hereby authorize the aforementioned Service Company; and/or ☒ Covanta Environmental Solutions to complete Covanta's Material Characterization Form (MCF) and all other necessary forms for the disposal of the non-hazardous waste described on them. Furthermore, I understand that the completion of this authorization provides consent to characterize and profile this waste.

Generator's Representative

Name _____

Title _____

Signature _____ *Date* _____

Section 2 - Waste Stream Information

2.1 - Name of Waste - An answer on this item is **REQUIRED** _____

2.2 - Physical Form - An answer on this items is **REQUIRED**

☐ Consumer Packaged ☐ Bulk ☐ Solid (Non-Dusting) ☐ Powder ☐ Waxy Solid ☐ Liquid ☐ Semisolid ☐ Other: _____

2.3 - Other Physical Characteristics

Odor: _____ Flash Point (°F): _____ pH: _____ Heating Value (in BTUs/lb): _____ ☐ Estimated; or ☐ Measured

2.4 - Container Type - An answer on this items is **REQUIRED**

☐ Steel Drums ☐ Plastic (Poly) Drums ☐ Fiber Drums ☐ Supersacs ☐ Cubic Yard Boxes ☐ Totes ☐ Pails ☐ Other: _____

2.5 - Quantity per Delivery _____

2.6 - Frequency _____

2.7 - Delivery Vehicle _____

2.8 - Waste Process Description

Provide a detailed description of the waste generating process. Describe the materials used to generate the waste, as well as, any other chemical or physical constituents that may be present as a result of commingling or contamination. Provide a process flow diagram if possible. Attach additional pages if necessary.

Name of Waste: _____

Section 3 - Regulatory Waste Classification

3.1 Is the profiled waste an EPA **RCRA Listed Hazardous Waste** per 40 CFR 261? ☐ NO ☐ YES - **STOP, Waste is unacceptable**

3.2 Is the profiled waste an EPA **RCRA Characteristic Hazardous Waste** per 40 CFR 261? ☐ NO ☐ YES - **STOP, Waste is unacceptable**

3.3 Is the profiled waste a "Hazardous Waste" as defined by the State of Origin? ☐ NO ☐ YES - specify State ID: _____

3.4 Does the waste meet the definition of any of the following in the State of Origin? *(Check all that apply)*:

☐ None ☐ Special Waste ☐ Residual Waste ☐ Regulated Waste - State Waste Code: _____ ☐ Other: _____

3.5 Does the waste meet the exemption criteria from any of the following? *(Check all that apply. A separate addendum may be required)*

☐ Aqueous Solution (<24% Alcohol and >50% Water) ☐ Non-Terne Plated Used Oil Filters ☐ RCRA Empty ☐ Other: _____

3.6 Please describe how the previous questions were answered *(Check all that apply)*

☐ Analytical Data ☐ Generator Knowledge ☐ Other: _____

3.7 Please select any of the following terms that are associated with the profiled waste *(Check all that apply)*

☐ Household Hazardous Waste (HHW) ☐ FIFRA ☐ DOT Reg. ☐ OSHA ☐ CERCLA Site ☐ Radioactive ☐ Treated Medical Waste

Section 4 - Waste Composition

4.1 - Constituents - An answer on this item is **REQUIRED**.
Identify the *TOTAL* concentration of the following constituents, if present in the profiled waste. Report ***TOTAL*** concentration results as weight percent (wt.%) or ppm. ***Do not report TCLP results in this section.*** If a constituent is not applicable, please identify it by noting "N/A"; if not present, please mark it as zero (0). If the profiled waste stream is made up of several components, products or materials, please estimate these constituents' concentrations using generator knowledge or supporting information.

☐ N/A for all constituents below ☐ Zero (0) for all constituents below

Bromine	ppm	Antimony	ppm
Chlorine	wt.%	Beryllium	ppm
Fluorine	ppm	Cobalt	ppm
Iodine	ppm	Copper	ppm
Nitrogen	wt.%	Manganese	ppm
Sulfur	wt.%	Nickel	ppm
Arsenic	ppm	Vanadium	ppm
Barium	ppm	Zinc	ppm
Cadmium	ppm	Aluminum Oxide	ppm
Chromium	ppm	Silicates	ppm
Lead	ppm	Silicone	wt.%
Mercury	ppm	Titanium Dioxide	wt.%
Selenium	ppm	Water	wt.%
Silver	ppm	Alcohol	wt.%

4.2 - Composition - An answer on this item is **REQUIRED**.
Identify the components that make up the profiled waste. If packaging is considered as a component of the waste, please estimate the waste's packaging range. Attach additional pages if needed.

Component	Range (wt.%)
TOTAL COMPOSITION	≥100

Section 5 - Non-Hazardous Waste Certification

I certify, as an Authorized Representative of the Generator, that this document, including all completed forms and all pertinent addenda, accurately represent and describe the waste stream outlined. The information submitted is true, accurate and complete, and no available information has been omitted or falsified. I further certify that the profiled waste is non-hazardous based upon Federal, State and Local Regulations.

Generator's Authorized Representative

Name _____

Title _____

Company _____

Signature _____ Date _____

Appendix F

City of Camden Resolutions and Letter of Support

MBS:dh
07-12-22

RESOLUTION MC-22: 8510
On Motion Of: Noliemi Soria-Perez
APPROVED: July 12th, 2022

R-16

RESOLUTION AUTHORIZING THE CITY OF CAMDEN TO EXECUTE A COMMUNITY BENEFITS AGREEMENT WITH COVANTA

WHEREAS, Covanta is committed to making substantial improvements to the Camden County Resource Recovery Facility in the City of Camden; and

WHEREAS, Covanta desires to enter into a Community Benefits Agreement with the City of Camden to make certain commitments to the community and residents relating to workforce development and community investment; now, therefore

BE IT RESOLVED, by the City Council of the City of Camden that the proper officials are hereby authorized to enter into a Community Benefits Agreement with Covanta.

BE IT FURTHER RESOLVED, that pursuant to N.J.S.A. 52:27BBB-23, a true copy of this Resolution shall be forwarded to the State Commissioner of Community Affairs, who shall have ten (10) days from the receipt thereof to veto this Resolution. All notices of veto shall be filed in the Office of the Municipal Clerk.

Date: July 12, 2022

The above has been reviewed
and approved as to form.

MICHELLE BANKS-SPEARMAN
Acting City Attorney

ANGEL FUENTES
President, City Council

ATTEST:
LUIS PASTORIZA
Municipal Clerk

I, **LUIS PASTORIZA, MUNICIPAL CLERK OF THE CITY OF CAMDEN**, DO HEREBY CERTIFY that the foregoing is a true copy of a resolution entitled "**Resolution authorizing the City of Camden to execute a community benefits agreement with Covanta** adopted by the Council of the City of Camden, New Jersey, the **12th** day of **July, 2022** as taken from and compared with the original now on file in my office.

IN TESTIMONY WHEREOF, I have thereunto set my hand and affixed seal of the City of Camden, at this **29th** day of **July, 2022**

Luis Pastoriza, Municipal Clerk

RESOLUTION MC-22: 8511
On Motion Of: Noheml Soria-Perez
APPROVED: July 12th, 2022

MBS:dh
07-12-22

RESOLUTION SUPPORTING THE INCLUSION OF THE CAMDEN COUNTY RESOURCE RECOVERY FACILITY FOR THE DISPOSAL OF NON-HAZARDOUS LIQUID WASTE AND SEMI-LIQUID WASTE

WHEREAS, the City of Camden has been made aware that Covanta Camden operates a solid waste facility within the City of Camden; and

WHEREAS, this facility is located at Block 641, Lots 3 and 15 and is permitted to accept ID-10 Municipal Waste, ID 13/13C – Bulky Waste-(except for major motor vehicle parts, noncombustible construction material and noncombustible demolition debris), ID 23-Vegetative Waste, ID 25 --Animal and Food Processing Waste, and ID 27-Dry Industrial Waste (except for asbestos and asbestos-containing wastes, dry non-hazardous pesticides, non-hazardous oil and chemical spill clean-up waste, dry non-hazardous chemical waste, and hazardous oil and chemical spill clean-up waste, dry non-hazardous chemical waste, and hazardous waste as defined in N.J.A.C. 7:26G-1 et seq. and 40 CFR 261 which is generated by small quantity generations as defined in N.J.A.C. 7:26G-1 et seq.) for the purpose of property disposing of solid waste(s); and

WHEREAS, the above facility is acceptable to this governing body; now, therefore

BE IT RESOLVED, by the City Council of the City of Camden does hereby support the inclusion of the Camden County Resource Recovery Facility for the disposal of ID 72 Waste-Non-hazardous liquid and semi-liquid waste: liquid or a mixture of solid matter suspended in a liquid media which is contained within, or is discharged from, any vessel, tank or other container which has the capacity of 20 gallons or more (except for septic tank clean-out wastes and liquid sewage sludge) in the Camden County Solid Waste Management Plan.

BE IT FURTHER RESOLVED, that pursuant to N.J.S.A. 52:27BBB-23, a true copy of this Resolution shall be forwarded to the State Commissioner of Community Affairs, who shall have ten (10) days from the receipt thereof to veto this Resolution. All notices of veto shall be filed in the Office of the Municipal Clerk.

Date: July 12, 2022

The above has been reviewed
And approved as to form

MICHELLE BANKS-SPEARMAN
Acting City Attorney

ANGEL FUENTES
President, City Council

LUIS PASTORIZA
Municipal Clerk

I, **LUIS PASTORIZA, MUNICIPAL CLERK OF THE CITY OF CAMDEN**, DO HEREBY CERTIFY, that the foregoing is a true copy of a resolution entitled "**Resolution supporting the inclusion of the Camden County resource recovery facility for the disposal of non-hazardous liquid waste and semi-liquid waste** adopted by the Council of the City of Camden, New Jersey, the 12th day of July, 2022 as taken from and compared with the original now on file in my office.

IN TESTIMONY WHEREOF, I have thereunto set my hand and affixed seal of the City of Camden, at this 29th day of July, 2022

Luis Pastoriza, Municipal Clerk

June 27, 2022

Mr. Jack Bernardino, Area Asset Manager
Covanta Camden
600 Morgan Street
Camden, NJ 08104

Dear Mr. Bernardino:

I appreciate the time you and Covanta have taken to reach out to us at the Morgan Village Circle Community Development Corporation (MVCCDC).

As you know, the Morgan Village Circle Community Development Corporation is a 501(c)3 organization which originally came together to discuss how we could socially and physically improve our environment and the quality of life of our neighbors.

The mission of MVCCDC is to reverse deterioration in Morgan Village to improve neighborhood life: engage in activities that support social needs, personal/civic pride and charitable goals, altruism that benefits Morgan Village residents and businesses.

After thoroughly reviewing Covanta's proposal to install a new upgraded Air Pollution Control System and to take non-hazardous liquid waste, it is our understanding that this project will dramatically reduce emissions. We also understand that the processing of non-hazardous liquids will not increase emissions, odors, truck traffic, or result in an increase in permitted waste throughput. In addition, the introductions of liquid as a new waste stream will result in a more robust air pollution control system and Community Benefits Agreement.
Given these factors, the Morgan Village Circle Community Development Corporation supports the permitting and installation of the Air Pollution Control System and the processing of non-hazardous liquids.

As I have expressed many times to you, it's critical that the yearly $25,000.00 and the additional 2.5% of money from the non- hazardous liquids in the Community Benefits Agreement can only be used for projects that are in Morgan Village Strategic Neighborhood Plan. The intent of the plan is to guarantee that residents of Morgan Village have demonstrated our autonomy when we collectively developed the plan.

Additionally, When the Internal Revenue Service granted MVCCDC a 501©3 in 2004 we became a "Not for Profit Business." So MVCCDC can receive the CBA funds and can manage any project in the plan. As a Result, the City of Camden' Partnership would be for example: continue demolition of abandon houses and business; to improve curb appeal In Morgan Village.

Sincerely,

Esther Gross
Executive Director

aecom.com