Sludge Treatment Centre Permitting

Environmental Permit Variation Application - Rye Meads Sludge Treatment Centre Resubmission

TW_STC_EPR_17a_RMD_ASD | Updated Resubmission

March 2024

Thames Water

EPR/EB3030DF/V003

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Project Manager:	Harindra Gunasinghe
Author:	Mark McAree
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Jacobs U.K. Limited

7th Floor, 2 Colmore Square
38 Colmore Circus, Queensway
Birmingham, B4 6BN
United Kingdom
T +44 (0)121 237 4000

www.jacobs.com

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Contents

1. Introduction

This substantial variation application relates to a biological treatment permit for Rye Meads Sludge Treatment Centre (STC), located at the Rye Meads Sewage Treatment Works (STW), operated by Thames Water Utilities Ltd (Thames Water).It is being made due to sludge treatment operations within sewage treatment works requiring a suitable Environmental Permit under the Environmental Permitting Regulations 2016 (as amended), in order to comply with the requirements of the Industrial Emissions Directive.

Previously, sewage treatment sites operated by sewerage undertakers treating indigenous sewage sludges ('sludge') separated from the main urban waste water treatment stream at the site along with the importation of similar wastes such as cess waste, interworks sludges and cake transfers, were regulated under the Urban Waste Water Treatment Directive (UWWTD) and Environmental Permitting Regulations as exempt or waste management activities, although some works had parts of the process, specifically biogas utilisation covered by the Environmental Permitting regime. The Rye Meads STW currently has a waste operation environmental permit that covers the cesspit waste and sludge operational area and the reception and storage facilities associated with the treatment of imported non-residual sludge.. This permit is to be substantially varied to become separate waste operations to the primary listed activity at the site. The site also has a separate environmental permit for the operation of Combined Heat and Power (CHP) plant and boilers, which have biogas as their primary fuel, with the permit becoming a directly listed activity to the primary listed activity at the site.

Now, all aspects of the sludge treatment process at the site, from the thickening of separated sludge and Surplus Activated Sludge (SAS) from the main aerobic treatment flow, and blending with imported waste of a similar nature to indigenous sludge, anaerobic digestion, through to the storage of digested sludge cake prior to recovery to land offsite, including biogas storage and utilisation will fall within the scope of this permit variation application.

The previous permits in place at sites for the importation of tankered trade waste to the works inlet and operation of biogas engines will be varied and remain in place as Directly Associated Activities to this listed process. This application is for the purposes of varying the existing permitted activities to include the anaerobic digestion process as an installation activity.

Please note, there is an active digester refurbishment programme which includes installation of dual membrane gas storage on primary digesters replacing floating roofs.

1.1 Non-Technical Summary

This variation application is for a bespoke installation permit for the biological treatment of sludge by anaerobic digestion, with a capacity above the relevant thresholds. The biological treatment of sludge includes treatment of the indigenous sewage sludges and Surplus Activated Sludge (SAS) from the onsite from aerobic treatment process and treatment of imported sewage sludges from other sites, arriving by road to a sludge import point. The indigenous sewage sludges are generated from the aerobic treatment of both waste waters from the sewer network arriving at the site at the works inlet, and, from imported waste materials, arriving by road transport into a waste import point. These waste activities are already permitted at the site and will be varied to become separate waste operations to the primary listed activity at the site. The storage of biogas, pressurisation of gas in existing gas boosters, siloxane removal, operation of boilers for the generation of heat and steam and flaring of biogas will be classified as directly associated activities to this main listed activity. The operation of biogas fuelled Combined Heat and Power (CHP) Engines will be consolidated to be directly associated activities.

The operation of biogas fuelled CHP Engines for the generation of electricity and heat at the site is already permitted under an existing Environmental Permit and will be consolidated as a directly associated activities to the revised listed activity through this variation.

The Rye Meads Sludge Treatment Centre (STC) is located within the Rye Meads Sewage Treatment Works (STW), south of the A414, east of Hoddesdon, south of RSPB Rye Meads, and north the River Stort and a railway line.

The STC treats both indigenous sludges and imported sludges. Indigenous sludge is generated from the incoming flow to the STW, which passes through the aerobic treatment process, under the UWWTD. Indigenous sludges removed from the aerobic process are subject to thickening before they are mixed within the Sludge Blending Tank prior to transfer to one of the six Primary Digester Tanks (PDTs). Liquors from the thickening processes are returned to the Works Inlet of the STW via Liquor Return Pumping Station 1 and the site drainage.

Imported sludge from other works is imported via a sludge import point into the Sludge Import Tank and mixed with the indigenous sludges in the Sludge Blending Tank. SAS can also be imported to the SAS Buffer Tank.

The STC comprises an offloading point for permitted imported tankered wastes at the inlet of the sewage treatment works. The waste arrives at the STC via tanker and is discharged directly to a subsurface chamber where it combines with the low-level sewer and is pumped to the inlet, where it combines with other sewer derived materials and subject to aerobic treatment, under the UWWTD.

All imports will be assessed using the Thames Water standard waste pre-acceptance checks to ensure that they are appropriate for treatment via the UWWTD. Once pre-approved as suitable for treatment via the UWWTD route, the waste carriers are approved. Wastes will be subject to appropriate waste acceptance checks in accordance with Thames Water procedures. Incoming tanker vehicles are directed to the inlet offloading point, which is an impermeable surfaced area, equipped with sealed drainage.

Blended sludge from the Sludge Blending Tank is treated in the PDTs over an appropriate number of days. Digested sludge is then transferred to one of four Secondary Digester Tanks (SDTs), where it is treated over an appropriate number of days to achieve the required pathogen kill. The sludge is then transferred to one of two Digested Sludge Buffer Tanks which have air mixing, before digested sludge is subject to dewatering through either a belt press or a centrifuge (Digested Sludge Belt Dewatering or Digested Sludge Centrifuge Dewatering). Liquors from the dewatering process are captured by the site drainage and transferred to the head of the UWWTD process via the Liquor Return Pumping Station 2. Dewatered digested sludge is then taken to the Cake Pad for storage.

Biogas produced by the PDTs is stored within the Floating Roof Biogas Holders of the PDTs. The biogas is combusted on site and the pipeline is equipped with condensate pots that capture entrained moisture from the generated biogas and allow it to be drained into the site drainage system for treatment. The PDTs and Floating Roof Biogas Holders are fitted with pressure release valves (PRVs) and sensors as a safety precaution in the event of over pressurising the system.

Biogas is combusted within one of the two CHP Engines on site to produce electricity for the site and the heat generated is used to maintain the temperature of the PDTs. The site also exports electricity to the National Grid. In the event that additional heating is required for the six PDTs, this is provided by two onsite dual fuel boilers. The two boilers combust diesel or biogas. There are also two additional gas/oil boilers onsite which provide heat to offices and workshops in the winter.

In the event there is excess biogas, i.e., more than the CHP Engines can utilise, or in the event that the CHP Engines are unavailable, there is a ground mounted Emergency Flare. The Emergency Flare is utilised under 10% of the year or less than 876 hours per year.

This application includes the import of treated sludge cake from other works, for temporary storage on the Cake Pad pending offsite recovery. All such imports will be subject to appropriate waste pre-acceptance and acceptance checks, prior to import, including checking whether the incoming cake complies with the requirements of SUiAR and BAS.

Imported treated sludge cake is offloaded into an area on the Cake Pad, so as to be stored separately to indigenous sludge cake. The waste stream is the same as that arising from the treatment of sludge within the Rye Meads STC with the same characteristics, composition and eventual end use – application to land. As such, the infrastructure which is acceptable for use for site cake is appropriate for the imported material. Cake is stored on an impermeable engineered surface on the Cake Pad, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank.

2. Technical Description

This is a substantial variation for a bespoke installation permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended), following a change of interpretation of the Urban Wastewater Treatment Directive (UWWTD) by the Environment Agency. It relates to a biological waste treatment permit for Rye Meads Sludge Treatment Centre (STC), located at the Rye Meads Sewage Treatment Works (STW), operated by Thames Water Utilities Ltd (Thames Water).

Scope

This variation application covers the biological treatment of sewage sludge, both indigenous and imported from other wastewater treatment sites, by anaerobic digestion, with a capacity above the relevant thresholds. It also permits the acceptance of portable toilet wastes along with cess, septic tank, and similar sewage derived materials, to the Works Inlet for processing through the UWWTD treatment route. There are a number of Directly Associated Activities (DAAs), including the storage of biogas above the Primary Digester Tanks (PDTs), operation of biogas fuelled CHP Engines and dual fuelled boilers for the generation of electricity and heat at the site, which are classified as 'existing' combustion sources under the Medium Combustion Plant Directive (MCPD). There is one boiler that is newly classified as a 'new' MCP within the scope of V004.

Thames Water holds an existing bespoke waste operation permit, EPR/EB3030DF/V002, Rye Meads Sewage Treatment Works Non-Hazardous Sludge Import Facility, allowing the import of specified waste to the site for treatment and recovery or disposal. This permit will be subject to a variation to include the main listed activity with the current waste operations included within the new installation permit. .

The site holds a second environmental permit, a bespoke Environmental Permit under number EPR/FP3235LN/V003 which is also consolidated, becoming a DAA to the listed activity.

Site Location

Rye Meads STC is located south of the A414, 700m to the east of the town of Hoddesdon and approximately 10 km north of the M25 near junction 26. The site is immediately bounded to the north by Rye Meads Nature Reserve and is bounded to the east by agricultural land and open water. The Southern boundary of the site is contained by a train track and the River Stort.

To the west of the site is Tollhouse stream and the River Lee, and to the south is the River Stort Navigation and Marina. The majority of the STW sits within Flood Zone 3 (Land having 1 in 100 or greater annual probability of river flooding) with a high risk from flooding. While the majority of the STC is within Flood Zone 3, there are small parts within Flood Zone 2 and 1. This is land with a medium (between a 1:100 and 1:1000 annual probability of flooding) and low (>1:1000 annual probability of river flooding) annual probability of flooding, respectively. The site has flood defences along the east, south and west boundary, as well as defences which appear to protect the sludge cake storage area.

The site is located within proximity of three Nitrogen Dioxide (NO_2) – Annual Mean AQMAs and is inside a Zone 2 and 3 Source Protection Zone (SPZ).

There are seven habitat sites within the appropriate distance of the STC. Rye Meads Site of Special Scientific Interest (SSSI) and Hunsdon Mead SSSI are 1.9km and 0.1km from the site respectively. Lee Valley Ramsar site is split over multiple areas, the closest being 0.1km from the site. Lee Valley Special Protection Area (SPA) is also split over multiple areas with the closest 0.1km from the site. Lee Valley SPA and Lee Valley Ramsar site both cover similar areas. Wormley-Hoddesdon Park Woods Special Area of Conservation (SAC) is also split over several areas 3.7km from the site. Stanstead Lodge Ancient Woodland is 1.5km from the Rye Meads site. There are no Local Nature Reserves (LNR) or National Nature Reserves (NNR) within 2km of the site. There are 11 non-statutory designated local wildlife sites (LWS) within 2 km of the site including one LWS that is within 50m of the Cess Waste Import point of the STC installation.

A site plan, showing the permitted area of the Rye Meads STC and wider STW can be found in Appendix A.2 while a process flow diagram summarising the sludge treatment process can be found in Appendix A.5. A site tank inventory is included below, followed by the site process description which identifies where tanks are located within the sludge treatment process.

Site Tank Inventory

Tank Purpose	Number	Operational Volume (m^3)	Total Operational Volume (m^3)	Material
Primary Picket Fence Thickeners	2	904	1,808	Concrete
SAS Buffer Tank	1	238	238	Steel
Sludge Blending Tank	1	800	800	Steel
Sludge Import Tank	1	50	50	Concrete
Primary Digester Tanks	6	3,400	20,400	Concrete
Secondary Digester Tanks	4	6,227	24,908	Concrete
Digested Sludge Buffer Tanks	2	6,227	12,454	Concrete
Overall Total			**60,658**	
SAS polymer silo	1	8 Tonnes		Steel
Boiler fuel oil tanks	2	65,000 litres		Steel
Boiler day tank	1	6,000 litres		Steel
Domestic boiler day tank	1	1,000 litres		Steel

Waste Activities

The STC comprises of imports of waste for biological treatment and two additional waste activities (imports of non-hazardous waste to the head of the works and imports of non-hazardous waste to the cake pad). Biological treatment processes at the installation are for indigenous sludges separated from the UWWTD permitted areas of the site and for treatment processes for imported sludge that arrives at Rye Meads STC by road, normally by tanker and consists of sludge from other Thames Water sites.

Imports of non-hazardous waste are considered a secondary waste operation to the main listed activity and consist of portable toilet waste along with cess, septic tank and similar sewage derived materials to the head of the works for processing through the UWWTD treatment and of digested sludge to the cake pad. Imports to the cake pad are for temporary storage, pending recovery offsite.

Waste imports to the head of works consists of offloading point for permitted Cess/Domestic Tanker Waste Imports that is found outside of the STW perimeter fence but near to the site entrance on land owned by Thames Water. These wastes are imported by tankers and consist of liquids and associated sludges from domestic and municipal sources that are similar in composition to those materials derived from the sewer network and managed via the UWWTD route. No wastes are imported packaged in other ways than tankers. Access to the offloading point is controlled by the issue of keys by Thames Water to approved contractors only, who have undergone appropriate waste pre-acceptance checks on the material they wish to import. These keys enable the delivery tankers to discharge waste through a data logger, using the site supplied flexible hose pipes to prevent misconnection issues, which discharges to the main Works Inlet via a subsurface pipe.

Vehicles park on engineered hardstanding that is connected to drainage with any spillages contained within a bunded area by kerbing and sleeping policemen. A webcam covers the waste import area. The data logger records the volume of waste material discharged, which discharges to the main inlet channel, where it combines with other sewer derived materials and is subject to aerobic treatment, under the UWWTD outside of the scope of this permit.

A second waste operation at the same site is for the import of non-hazardous treated (digested) sludge cake from other works for temporary storage pending transfer offsite. Imported treated sludge cake is imported from other works, for temporary storage on the site Cake Pad. All such imports are subject to appropriate waste pre-

acceptance and acceptance checks, prior to import, including checking that the incoming cake complies with the requirements of SUiAR and BAS. The waste stream is the same as that arising from the treatment of sludge within the Rye Meads STC with the same characteristics, composition and eventual end use – application to land.

Cake is stored on an impermeable surfaced Cake Pad, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank. Imported cake is not imported for the purpose of mixing, treatment or blending with the outputs from the indigenous anaerobic digestion process. On arrival drivers delivering imported cake will be directed to the cake pad. Treated sludge cake is then subject to export from the site.

Existing waste operations are permitted by the existing Environmental Permit (EPR/EB3030SF/V002

Sludge Processes

Indigenous sludge is removed from the aerobic process and transferred to either; the Primary Sludge Buffer Tank 1 or the Surplus Activated Sludge (SAS) Buffer Tank, which is a smaller, open tank. Primary sludge from the Primary Sludge Buffer Tank 1, can transfer equally to one of the two Primary Picket Fence Thickeners (PFTs), which are uncovered, concrete tanks. The Primary PFTs are within the permitted process with tanks before the Primary PFTs being outside of the scope of the permit. A rotating fence moves around the inside of each of the Primary PFTs and sludge gravitates to the bottom of the tank where it is removed and pumped to the Sludge Blending Tank. Liquor from the tank weirs out of the tank and gravitates via site drainage and the Liquor Return Pumping Station 1 to the Works Inlet for treatment.

Alternatively, sludge from the Primary Sludge Buffer Tank 1 may first be pumped to Primary Sludge Buffer Tank 2, then pumped via subsurface pipework to the Primary Sludge Thickening Plant. The Primary Sludge Thickening Plant are within the permitted process, with tanks before the Primary Sludge Thickening Plant being outside of the scope of the permit. The Primary Sludge Thickening process is odour abated, connected to OCU 2 and liquor from this stage is transferred back to the head of the STW via the site drainage and the Liquor Return Pumping Station 1. The sludge is pumped via a subsurface pipeline to the Sludge Blending Tank. Sludge is dewatered with the use of a powder polymer coagulation, supplied via bulk bags, that is made up with Final Effluent / Potable Water and stored in a day tank for dosing into each belt.

SAS from elsewhere in the aerobic treatment process is pumped to the SAS Buffer Tank, an open topped aboveground tank of steel construction, which is flat bottomed with a small mixer pump. The SAS Buffer Tank is within the scope of the permit. SAS is then pumped via a subsurface pipeline to SAS Thickening plant in the SAS thickening building. A liquid polymer coagulant, delivered by a bulk tanker, and stored within a bulk SAS Polymer Silo outside of the building, is made up with Final Effluent / Potable Water and stored within a make-up tank for use. This is added to the SAS Thickening plant, with liquor discharging to site drainage for return to the STW, via the Liquor Return Pumping Station 1 and thickened SAS is pumped via subsurface pipework to the Sludge Blending Tank.

The Sludge Blending Tank mixes SAS, primary and imported sludge and has external mixing. It is odour abated via OCU 2 and of steel construction with a fixed roof. The sludge level in the tank is monitored and connected to SCADA which is monitored 24/7. In the event of a high-level alarm, all feed pumps are inhibited to prevent overfilling of the Sludge Blending Tank. Three digester feed pumps, operating as two duty pumps and one pump standing by, pump the blended sludge via subsurface pipes into one of the six Primary Digester Tanks (PDTs).

There is a sludge import point at Rye Meads STC for permitted imports of sludge from other works via the Sludge Import Tank and an offloading point consisting of a data logger and site supplied transfer hose. Access to the sludge logger is via a key fob and the data logger records where the sludge is from and the percentage dry solids of the sludge. Waste is discharged directly into the Sludge Import Tank, an aboveground tank of concrete construction that is covered and odour abated by OCU 2. From this Sludge Import Tank, the waste is screened to remove inorganic material which is deposited into a skip for offsite disposal and then the screened sludge is pumped to the Sludge Blending Tank to be mixed with indigenous sludge. This Sludge Import point is located on engineered concrete and is fitted with surface drainage that returns to the site drainage with the area bunded by

the provision of sleeping policemen. Rye Meads STC is able to accept sludge 24 hours per day. In the event of high sludge levels within the Sludge Blending Tank, further imports are inhibited.

Digestion Process

There are six PDTs on site which are of concrete construction which extend below surface level by approximately 3m with conical bottoms. Each PDT has a Floating Roof Biogas Holder over the tanks for biogas storage which are subject to AMP investment. The PDTs operate on a continuous basis and the normal residence time for the sludge is 12 days. The tanks are semi-buried by a grass bank which provides some insulation to the tanks. There is no air mixing, but recirculation pumps mix the contents of each tank. For safety, there are two Pressure Release Valves (PRVs) on each tank, the sludge level within each tank is monitored, and temperature probes monitor the water and sludge temperature, which are all connected to SCADA. The tanks are subject to periodic emptying and cleaning. Sludge is fed at the top and removed from the bottom via a limpet box. Additional heat is provided into the PDTs via heat exchanges which use either CHP Engine heat, or auxiliary boilers via a water and sludge recirculation heat exchanger in the base of the tank. There is no anti-foam dosing of the PDTs. Biogas produced by the PDTs is captured and stored in the Floating Roof Biogas Holders of each tank. After an appropriate time, sludge gravitates via subsurface pipes to the Secondary Digester Tanks (SDTs).

There are four SDTs. One of the tanks is filled on a rotation basis, as a duty tank, while the remaining three tanks hold sludge for pathogen kill purposes, with a residence time of approximately 10 days under normal operating conditions. Each of the four tanks are of concrete construction, mainly aboveground, uncovered, conical bottomed with up to 2m of the tank below ground. The tanks are fitted with level alarms to prevent overfilling and operate with a 1m free board with the selection and filling of the duty tank a manual process. Digested sludge is fed in at the top of the tank and is drawn off the bottom of the tank.

After approximately 10 days, sludge is transferred from the SDTs to one of two Digested Sludge Buffer Tanks and then to either Digested Sludge Centrifuge Dewatering or Digested Sludge Belt Dewatering. The Digested Sludge Buffer Tanks are subject to air mixing in order to prevent settling of the sludge prior to dewatering.

Polymer from an Intermediate Bulk Container (IBC) is diluted with Final Effluent / Potable Water in a make-up tank before being dosed to the dewatering plant. All drainage from the dewatering processes gravitates to the Liquor Return Pumping Station 2 where it is returned to the Works Inlet for further treatment. Dewatered and digested sludge cake is conveyed to the open Cake Pad via covered conveyors.

Cake Storage

The Cake Pad is an open pad which is constructed of engineered concrete with drainage. Vehicles exiting the Cake Pad pass through a wheel wash. Drainage from the Cake Pad returns to the Works Inlet via site drainage for further treatment. There is a second larger Cake Pad for storage of digested sludge cake at Rye Meads STC. Imports of waste are normally delivered to the site by road with records maintained of what waste is received, the quantity and the site of production. The location of each waste delivery is recorded.

Digested sludge cake is subject to removal from the Cake Pad at Rye Meads STC under the Sludge Use in Agriculture Regulations 1989 (SUiAR), and in accordance with the Biosolids Assurance Scheme (BAS). Although the digested sludge cake is stored on an open Cake Pad and is not subject to odour abatement, there is a low risk from bioaerosols as there are no sensitive receptors within 250 m who may be present for more than six hours. A site-specific bioaerosol risk assessment for the STC is provided as Appendix F.

Biogas

Biogas produced from the six PDTs is captured within the Floating Roof Biogas Holders on top of each PDT. The Floating Roof Biogas Holders are single skinned steel roofs. Each of the PDTs Floating Roof Biogas Holders are fitted with PRVs and sensors as a safety precaution in the event of over pressurising the system and would vent to atmosphere in the event of excess pressure within the Floating Roof Biogas Holder. They are further equipped with

lightning protection features for safety. Biogas is withdrawn from the Floating Roof Biogas Holders and joins a common biogas transfer pipeline where it is transferred to the CHP Engines or boilers for combustion onsite. In the event of an emergency, biogas may be diverted to the sites Emergency Flare.

The above ground biogas transfer pipeline is equipped with condensate pots that capture entrained moisture from the generated biogas. These condensate pots are emptied manually and are drained into the site drainage system and returned to the Works Inlet for further treatment, via the Liquor Return Pumping Station 1. Biogas is also passed through dehumidifiers and gas boosters prior to combustion.

The biogas is taken from the Floating Roof Biogas Holders for combustion in one of two MWM TCG 2020 V12 CHP Engines, each with a thermal input of 2.857 MWth, which are located externally. The CHP Engines generate electricity for use within the site, and recoverable heat which is passed via heat exchange to maintain the PDTs temperature. The site also exports electricity to and from the National Grid when there is a surplus. These are 'existing' combustion plant and are permitted by the existing Environmental Permit (EPR/FP3235LN/V003). In the event of additional heating being required by the Primary Digester Tanks, this is provided by two onsite dual fuel boilers, one of which is a Strebel boiler and one a Remeha boiler, both with a thermal input of 1.20 MWth each. The fuel oil for these boilers is stored in two Boiler Fuel Oil Tanks, each with 65,000 litre capacity. There is a further Boiler Day Tank for fuel oil, double skinned steel tank for digester circuit boilers with a 6,000-litre capacity on stilts. Boiler 3a is a 'new' MCP following refurbishment of the boiler. Appendix L, 'Air Quality Assessment' has not been adjusted given this is a like for asset replacement but as new MCP new ELVs now apply.

There are also two additional small boilers onsite which provide heat to offices and workshops in the winter, one of 0.56 MWth thermal input and one of 0.75 MWth thermal input. Both units are below the threshold to be classified as MCPs. The fuel oil for these is stored in a 1,000 litre double skinned steel Domestic Boiler Day Tank.

In the event there is excess biogas, i.e. more than the CHP Engines can utilise, or in the event that the CHP Engines are unavailable, there is a ground mounted Emergency Flare which is used during periods of essential maintenance and emergency use. The Emergency Flare is utilised under 10% of the year, less than 876 hours per year and its use is recorded.

There are four carbon-based siloxane filters on site, located upstream of the CHP Engines on the biogas line to remove impurities from the biogas prior to combustion in the CHP Engines. Under normal conditions, they operate two units and the other two are on standby. Any condensate from the filters drains back to the main drainage, via the Liquor Return Pumping Station 1.

Emergency Standby Generators

There are four emergency standby generators located at Rye Meads STW that provide back-up electricity in the case of failure of the grid. All generators operate for less than 50 hours per year. Emergency standby generators are all excluded generators and do not meet the criteria to be classified as DAAs.

BAT Considerations

A BAT gap analysis has been completed for the Sludge Treatment Centre against the associated BAT conclusions and this gap analysis is attached as Appendix D.

2.1 BAT 3; 6; 7: Return Liquors

The Rye Meads STC does not have a liquor treatment plant. Liquor treatment for waste waters arising within the permitted area is part of the waste water treatment process of the STW and does not fall within the permit boundary.

There are no direct emissions to water from the STC. The only indirect emissions are of the sludge related liquors, primarily sludge dewatering liquor, and surface (rain) waters, which are returned to the wastewater treatment works for aerobic treatment under Urban Wastewater Treatment Regulations.

Return Liquor Monitoring is included in Appendix M.

2.2 Management of Diffuse Emissions – BAT 14

There are open top tanks within the permit boundary at Rye Meads STC including pre-AD tanks (Primary Picket Fence Thickeners, SAS Buffer Tank,); post AD tanks (Secondary Digester Tanks and Digested Sludge Buffer Tanks) as well as floating roofs on the primary digesters for gas storage.

- **Open Tanks Pre-AD**

Thames Water is committed to meeting the requirements of BAT/BREF to the extent that BAT 14 and BAT 53 apply. A full BAT risk assessment is required to determine the potential need to cover open topped tanks. Thames is not able to commit to covering tanks by the stated deadline of 31st March 2025, delivery timescales will be subject to the outcome of the PR24 and subsequent price review discussions.

TWUL request the Environment Agency includes an Improvement Condition in the determined permit which addresses the detail included in b to d (below).

"b. Provide the specification of the abatement technology that will be implemented in line with BAT 14d and BAT 53 to treat air emissions.
c. Provide the proposed NGR of the OCUs air abatement plant emission points.
d. Provide a written statement which explains why the abatement plant will be effective at treating point source waste gas and odour emissions."

- **Open Tanks Post AD**

Thames Water is committed to meeting the requirements of BAT 14 and 34. A full BAT risk assessment is required to determine the potential need to cover open topped tanks. Thames is not able to commit to covering tanks by the stated deadline of 31st March 2025, delivery timescales will be subject to the outcome of the PR24 and subsequent price review discussions.

TWUL request the Environment Agency includes an Improvement Condition in the determined permit which addresses a and b (below).

"For all open tanks post AD, confirm that Thames Water will undertake the following:

"a. If digestate is still biologically active and you are producing combustible biogas you will take steps to collect the biogas and direct this to your gas collection system in line with BAT 14.

b. For open tanks that do not produce an explosive environment (i.e. less biologically active) you will enclose, collect and direct the waste gas emissions to an appropriate abatement system in line with BAT 14 and 34."

- **Floating roof digesters**

There are floating roof digesters within the permit boundary at Rye Meads STC. Thames Water is committed to meeting the requirements of BAT14. A full BAT risk assessment is required to determine the potential need to cover open topped tanks. Thames is not able to commit to covering tanks by the stated deadline of 31st March 2025, delivery timescales will be subject to the outcome of the PR24 and subsequent price review discussions.

2.3 Site Infrastructure

Management of emissions to water – BAT 19

Thames Water is committed to meeting the requirements of BAT. A full BAT risk assessment is required to determine the detailed design for Rye Meads secondary containment, the secondary containment options report (see Appendix G) is an outline solution that may be subject to change. Thames is not able to commit to secondary containment requirements by the stated deadline of December 2024, delivery timescales will be subject to the outcome of PR24 and subsequent price review discussions.

A figure showing the current site surfacing within the permit boundary is included within Appendix A.3

Process Controls

Anaerobic digestor operations are monitored automatically from the control centre at the site and outside of normal operational hours, from the regional control centre. Checks include digester health, temperature and operation. As described, tanks are equipped with appropriate high-level alarms and automatic cut off valves to minimise releases. The Primary Digester Tanks and Floating Roof Biogas Holders are also fitted with dual pressure relief valves which operate in an emergency to minimise releases from over- or under-pressurisation. Site operations are covered by Thames Water's management system, including the preventative maintenance programme for the site.

A range of process parameters are subject to routine monitoring or checking to ensure that the digestion process is operating optimally so that the required sewage cake output quality is achieved.

- pH: At a conventional digestion site such as Rye Meads the processes is maintained around pH 7 but within the range 6.72 – 7.6 (this is % dry solids and digester load dependant) for healthy operation.
- alkalinity: Levels dependant on feedstock characteristics (primary sludge: surplus activated sludge (SAS) ratio). Conventional digestion typically, 3,500 – 5,000mg/litre range.
- temperature: minimum target of 38° C. This is maintained within the range 36-40° C.
- HRT (hydraulic retention time): minimum target is 15-days, there is no upper limit. Retention times shall not be less than 12-days during plant outages to keep the product pathogen kill efficiency control.
- OLR (organic loading rate): see table below – this is dependent on the primary/SAS ratio. Beddington fits into the first row of the table.
- Dry solids feed: see table below, Beddington has a target of 6%DS, but this can vary between 3-8%DS and impacts the HRT.

Type of Digestion	0%- 35% SAS[x]	36%- 45% SAS	46%- 50% SAS	51%- 55% SAS	>55% SAS	Max Feed %DS
MAD* in Conventional Digestion	3	2.5	2	1.75	n/a	6
MAD after Pre-pasteurisation	4.5	4	3.5	3	n/a	7
MAD after Acid Hydrolysis	4.5	4	3.5	3	n/a	7
MAD after Thermal Hydrolysis	7	6.5	6	5.5	5.5	14

* mesophilic anaerobic digestion

[x] surplus activated sludge, arising from the UWWTD treatment route.

- VFA (volatile fatty acid) concentration: There is no specific range for VFAs as it depends on the feedstock. It is used as an indicator of digester health rather than a process control. The production of organic acids depends on the volume of solids fed to the digester. The typical range for VFAs in a

primary digester is between 50 and 800 mg/L. When VFA concentrations climb above 1000 mg/L, the digester could be overloaded or experiencing other problems.

- Ammonia – Ammonia concentrations of 50 to 1000 mg/L are beneficial, but ammonia levels of 1500 to 3000 mg/L (pH greater than 7.4) could be inhibitory but not always. An ammonia concentration higher than 3000 mg/L for prolonged period is toxic.

- VFA to Alkalinity ratio: Very important parameter to monitor for digestion process. The VFA to alkalinity ratio of below 0.4 is good and above this threshold value means diminishing alkalinity and low pH i.e. sour digester content. As long as this ratio is maintained higher VFA and alkalinity digester content can be acceptable and the digestion process is deemed healthy. Anaerobic digestion process is always controlled based on holistic parameters but not based on single parameter.

Waste Tracking

Because of the nature of the waste accepted at the site for treatment, and the processes undertaken, the location of any specific load of waste cannot be tracked directly within the installation. Instead, tracking, if required, is based on the normal operational periods for treatment, which can locate the approximate location of the imported material with the process, based on the number of days post acceptance.

Cake imports are stored separately on the Cake Pad, and their location can be identified on this basis.

Odour

The facility has an odour management plan which is supplied as Appendix E.

Bioaerosols

Digested sludge cake is stored on the Cake Pad which is in excess of 250 m of the nearest sensitive receptor, where people live or work for more than 6 hours at a time. See Appendix F for the site specific bioaerosol risk assessment.

Other Items

A leak detection and repair (LDAR) plan has been prepared for the site and this is presented as Appendix H.

Please see Appendix A, A.6 for photographs of key plant infrastructure.

Other Risk Assessments

There is no requirement for a fire prevention plan, due to the nature of the wastes treated at the site and the processes utilised, in accordance with Environment Agency guidance.

2.4 Regulatory listing

The installation is permitted as a Schedule 1 listed activity under the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

The relevant listing under Schedule 1 is:

Section 5.4 Disposal, recovery or a mix of disposal and recovery of non-hazardous waste

Part A(1) (b); Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC —

i. biological treatment;

The site includes the following Directly Associated Activities (DAA):

- Imports of waste, including sludge from other sewage treatment works
- Blending of indigenous sludges and imported wastes/waste sludge prior to treatment;
- Storage of digestate prior to dewatering;
- Dewatering of digested sewage sludge;
- Transfer of dewatering liquors via site drainage back to the sewage treatment works;
- Transfer of surface water runoff back to the sewage treatment works;
- Storage of dewatered digested sludge cake prior to offsite recovery;
- Storage of fuel including biogas and fuel oil;
- Pressurisation of biogas;
- Biogas scrubbing and removal of siloxanes;
- Combustion of biogas in MCPD and SG compliant biogas CHP Engines and boiler units;
- Combustion of fuel oil in MCPD compliant boiler units;
- Transfer of biogas condensate via site drainage back to the sewage treatment works;
- Operation of a biogas Emergency Flare stack;
- Storage of raw materials;
- Storage of diesel; and
- Storage of waste.

The waste activities at this site are:

- Imports of waste to the works inlet for treatment through the UWWTD route; and
- Imports of waste digested sludge cake for temporary storage pending off-site removal.

Directly associated activities at the installation which are in bold are currently permitted under permit EPR/FP3235LN/V003.

In addition to the listed activity at the site, there is a directly associated activity of two biogas fuelled CHP Engines which form a specified generator and also two dual fuelled boilers. As applicable, all are covered by the MCPD Schedule 25A and B of the Environmental Permitting (England and Wales) Regulations 2016 (as amended). This comprises:

- 2x 2.857 MWth MWM TCG 2020 V12 CHP Engines;
- 2x 1.2 MWth dual fuelled boilers (one of which is a 'new' MCP);
- Other combustion assets which are small boilers for domestic heating including 1 x 0.56 MWth boiler and 1 x 0.75 MWth boiler.

The total thermal input of the STC is approximately 9.424 MWth.

Combustion Plant (new MCP added by this variation)

Rye Meads Boiler 3a	
MCP specific identifier*	Rye Meads Boiler 3a (new MCP)
12-digit grid reference or latitude/longitude	539288, 210335
Rated thermal input (MW) of the MCP	1.2 MWth
Type of MCP (diesel engine, gas turbine, other engine or other MCP)	Boiler
Type of fuels used: gas oil (diesel), natural gas, gaseous fuels other than natural gas	Dual fuelled (Biogas or gas oil)

Date when the new MCP was first put into operation (DD/MM/YYYY)	28/10/22
Sector of activity of the MCP or the facility in which it is applied (NACE code**)	E37.0.0
Expected number of annual operating hours of the MCP and average load in use	Subject to final confirmation at point of submission but potential to run for c. 500 hours per annum as limited running mcp; up to 100% load
Where the option of exemption under Article 6(8) is used the operator (as identified on Form A) should sign a declaration here that the MCP will not be operated more than the number of hours referred to in this paragraph	N/A

3. Form C2 Questions

1 About the permit

1a Discussions before your application

The pre-application process is currently not available due to Environment Agency resourcing issues, discussions have been held with the local area Environment Agency staff. Nature and heritage conservation screening was requested and received via email from the pre-application advice service of the Environment Agency.

1b Permit number

What is the permit number that this application relates to?

EPR/EB3030DF/V002, issued 05/07/2016 **1c What is the site name, address, postcode and national grid reference?**

Rye Meads Sludge Treatment Centre

Rye Meads Sewage Treatment Works

Stanstead Abbotts

Ware

SG12 8JY

2 About your proposed changes

2a Type of variation

This is a substantial variation.

2b Changes or additions to existing activities

Table C2-1 Proposed changes to current activities.

Name	Installation schedule 1 references	Description of the installation activity	Description of waste operations	Proposed changes document reference
Rye Meads STC	*Section 5.4 Part A(1) (b); i*	Biological treatment by means of Anaerobic digestion		This document
Rye Meads Waste Import Facility			Import of waste now a waste operation at the installation	

Rye Meads CHP Plant			Operation of CHP engines and boilers, now a DAA to installation	

2c Consolidating (combining) or updating existing permits

Yes

2c1 Do you want to have a modern style permit?

Yes

2c2 Identify all the permits you want to consolidate (combine)

EPR/EB3030DF – Rye Meads Waste Import Facility

EPR/FP3235LN – Rye Meads CHP Plant

2d Treating batteries

2d1 Are you planning to treat batteries?

No, this application is not for the treatment of batteries

2e Ship recycling

2e1 Is your activity covered by the Ship Recycling Regulations 2015?

No, this application is not covered by the Ship Recycling Regulations 2015

2d Low impact installations (installations only)

2d1 Are any of the regulated facilities low impact installations?

No, this application is not for a low impact installation

2g Multi - operator installation

No. This is not a multi-operator installation

3 Your ability as an operator

3a Relevant offences

3a1 Have you, or any other relevant person, been convicted of any relevant offence?

Yes. The applicant has been convicted of a relevant offence within the last 12 months.

Event Name	Court	Date of hearing	Fine	Summary

EA v Thames Water Utilities Limited	Lewes Crown Court	3rd & 4th July 2023	Fine: £3,334,000.00 Prosecution Costs: £128,961.05 and victim surcharge of £120.00	Thames Water pleaded guilty to four charges under the Environmental Permitting (England and Wales) Regulations 2016. The detail of each summons is included below: Summons 1: Between 9 October 2017 and 14 October 2017 TW caused a water discharge activity, namely A discharge of sewage effluent from Crawley Sewage Treatment Works into the Gatwick Stream and the River Mole, except under and to the extent authorised by an environmental permit contrary to Regulation 38(1)(a) and Regulation 12(1)(b) of the Environmental Permitting (England and Wales) Regulations 2016. Summons 2: On and /or before 14 October 2017 TW did contravene condition 11 of environmental permit CNTM.1402 by failing to have capacity of not less than 11,000 m3 in the storm lagoon at Crawley Sewage Treatment Works contrary to Regulation 38(2) of the Environmental Permitting (England and Wales) Regulations 2016. Summons 3: Between 9 October 2017 and 14 October 2017 TW contravened condition 12 of environmental permit CNTM.1402 by failing to discharge when the rate of flow at the inlet sewer at Crawley Sewage Treatment Works is in excess of 840 l/s due to rainfall and /or snowmelt contrary to Regulation 38(2) of the Environmental Permitting (England and Wales) Regulations 2016. Summons 4: On and /or before 14 October 2017 TW did contravene condition 13 of environmental permit CNTM.1402 by failing to empty the storm lagoon at Crawley Sewage Treatment Works and return the contents for full treatment as soon as practicable after cessation of the overflow to the lagoon contrary to Regulation 38(2) of the Environmental Permitting (England and Wales) Regulations 2016.

3b Technical ability

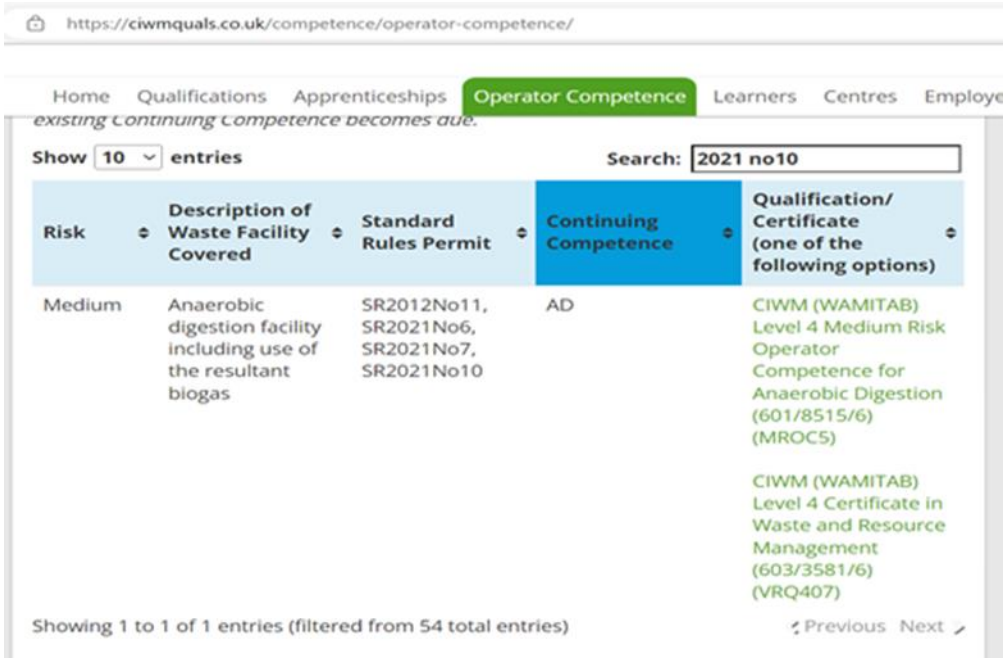
Thames Water uses WAMITAB qualified staff at their waste facilities. The relevant person for the site has been named below and full details have been provided separately on a spreadsheet:

James Locke

Please see Appendix B for evidence of competency

Following discussions with CIWM (WAMITAB), Thames Water understands there are two routes to holding an appropriate CoTC for the permit as laid out in the screen shot below:

a) CIWM (WAMITAB) Level 4 medium risk operator competence for anaerobic digestion (MROC5)
b) CIWM (WAMITAB) Level 4 Certificate In waste and Resource Management – VRQ" and optional "VRQ407 – Principles and practices of managing a biological treatment processing facility (Anaerobic Digestion and Composting)"



Thames intend to follow option B at this site.

Thames Water understands from the CIWM website that the proposed option is acceptable.

3c Finances

Installations, waste operations and mining waste operations only.

Do you or any relevant person or a company in which you were a relevant person have current or past bankruptcy or insolvency proceedings against you?

No

3d Management systems

What management system will you provide for your regulated facility?

Identify the form of the management system from the list:

• Own management system

Thames Water has a SharePoint based Environmental Management System, with site specific elements and procedures linked from across the organisation Thames Water also has an Asset Management System accredited to ISO 55001 and an Energy Management System accredited to ISO 50001.

Scope

Thames Water has an EMS in place for its permitted assets.

Environmental Policy

Implementation of Thames Water's Environmental Policy is approved by the Thames Water Executive Committee of the Thames Water Board and is the responsibility of all employees, with the Chief Executive being accountable for its implementation. The policy covers all company activities, including this installation, and applies to all individuals who are employed by, or carry out work on behalf of, any Thames Water company including contractors, temporary staff and agency workers. The Management Systems Team is responsible for the implementation and assurance of the EMS, the site operations teams will be responsible for maintaining ongoing compliance with the EMS and managing the site.

Management and Responsibilities

The Management Systems Team (EMS specialists) have responsibility for the management and upkeep of the EMS. Compliance with specific elements of environmental legislation is managed by the relevant Business Areas across the Company. The Environmental Assurance Team maintain a Legal Register and, in consultation with Operations Teams, the environmental permitting team and other specialists, assess environmental risks for in-scope areas using a significance scoring method under normal, abnormal and emergency conditions. Significant environmental aspects and impacts consider legal and other requirements, cost to the business, scale of impact and interested parties.

Management Systems Team are responsible for setting internal environmental standards which are then implemented by the relevant business areas. The Standards and other relevant information are communicated through several routes. Incident and corrective action routes exist to promote continual improvement. The team run a programme of Management System Audits to determined adherence to the environmental policy and environmental standards.

Local operating procedures are the responsibility of the operational teams that operate the sewage works.

The defined roles and responsibilities are allocated to relevant personnel, depending on their job description, qualifications, knowledge, experience and training. Training and competency are based on specific roles.

Operational Control

Procedures are in place within the EMS to identify and control environmental issues arising from company activities. Each department is required to achieve operational control of its activities using standardised systems.

Routine sewage treatment operations and activities are recorded within the corporate management database, SAP. These include routine inspections, monitoring and maintenance tasks.

Non-routine activities, such as major overhauls/refurbishments, which involve the use of sub-contractors are assessed for health & safety concerns; relevant environmental risks and with accompanying method statements to respond to these.

Contractors who are required to carry out major services are closely managed by operational or other staff to ensure that compliance with Thames Water's H&S and environmental policies is achieved. No contractors may

work on site without having undergone a full site induction and being issued with a Thames Water Operational Safety Authorisation (TWOSA) for the task(s) they intend to complete.

Processes on site operate continuously, 24-hours per day, 7-days per week, apart from maintenance periods. The plant is designed to operate unattended with process parameters being monitored continuously. Operating logs are stored electronically.

Maintenance and Monitoring

Management will have the ultimate responsibility for the effective maintenance of plant throughout the company. The facility has named staff that are responsible for day-to-day maintenance operations and contractors are also used as required. All maintenance is logged on SAP. The following basic inspections and maintenance activities are indicative of those carried out on site:

- Daily operation of plant (24/7) involves visual inspection of operational assets;
- Daily inspection of temporary pipe work installed;
- Routine maintenance programme for plant; and
- Routine lubrication programme.

Personnel responsible for the inspection, testing and maintenance of pollution prevention infrastructure are trained to an appropriate level.

All regular maintenance of all plant and equipment will be completed on the time scale specified by the equipment manufacturer including routine inspections.

Environmental Improvement

Thames Water is committed to environmental improvements and has established environmental targets and plans relating to materials and waste management, transport, climate change mitigation and adaptation (energy efficiency and renewable energy generation), water resources, biodiversity, river water quality, and drainage asset performance. TWUL's Environmental Governance Board meets on a regular basis to provide strategic direction, and interrogative review, attached to any environmental issue of substantive concern including emerging risks as well as current topics.

Competence, Training and Training Records

Thames Water aims to ensure that all employees are in possession of the knowledge, skills and experience necessary to perform their role in accordance with the company's operating procedures and in full compliance with the law. Training needs are identified by the employee's immediate supervisor or line manager.

For those sites treating 'waste' as defined by the Waste Regulations 2011, coverage at all permitted sites by staff who hold the appropriate level of WAMITAB 'Certificate of Technical Competence' will be monitored centrally. This aspect of the staff training is currently being reviewed in light of the change in permitting requirements for sludge treatment centres.

For each internal training course held a Training Record is issued.

Induction training is carried out by the responsible line manager and consists of an introduction to the Company's Environmental Health and Safety Policy and description of emergency response and spill prevention procedures.

Staff receive specific training in the plant's operation and the environmental impact of the process as well as health and safety. The operators will have a detailed understanding of the operational procedures for the site for both normal and abnormal operation. As part of the training, operators will receive specific instructions relating to those

aspects of plant operation that have the potential for a negative impact on the environment. This training will be provided by the equipment manufacturers or in-house staff as appropriate.

Contractors

There are several procedures to ensure contractors have the required skills and environmental competencies to carry out works at the site.

Initially, contractors are assessed by the procurement department for inclusion on the approved supplier list, which includes health and safety and environmental criteria for example, waste documentation such as waste carrier's licence/training certificates. Even when the contractors are on the approved supplier list, they are still further assessed for each specific contracted activity.

The contactor is required to submit a method statement prior to any commencement of work, identifying how work is to be undertaken and the associated risks. The method statement must be approved by the Site Manager, who will also identify any site hazards and issue an Authorisation to Work/Enter the site, following a site induction. When on-site, the contractor must carry this Authorisation to Work at all times.

Incidents, Non-Compliances and Complaints

Thames Water has procedures for incidents, non-compliances and environmental complaints.

Incidents are managed through corporate and site-specific procedures which ensure that all incidents are logged and that necessary preventative and/or corrective actions are taken.

Customer complaints are made via the Customer Services Centre which will log all complaints electronically. An action is raised to Waste Operations Control Centre (WOCC) who contact the CSM by telephone and email the complaint information to both the CSM and Performance Manager. The CSM and Performance Manager will review the complaint and take action to investigate the complaint. The CSM is responsible for contacting the customer and updating them on the outcome of the investigation and any actions taken. Where complaints relate to odour/noise/amenity, typical follow up action would include physical checks onsite of the operation of plant; offsite checks where needed; with all the actions taken being logged. Where appropriate, site management may contact the customer to discuss the outcome of the complaint, otherwise, there is a customer communication plan that identifies how and when contact will be made with customers and other stakeholders.

Information regarding complaints is recorded to allow determination of an appropriate response (corrective action) and identify what measures need to be taken in the future to prevent its reoccurrence (preventive action).

Communication

There are regular meetings held on site to discuss all aspects of the treatment works and performance against targets. These meetings include the operation and performance of the installation. Other communication methods to promote environmental management issues and continual improvement include: toolbox talks, environmental alerts, OSC portal forums, formalised event learning processes following an operational incident and compliance audits.

4 Consultation

Could the waste operation or installation involve releasing any substance into any of the following?

4a A sewer managed by a sewerage undertaker?

Yes. The site discharges into a drainage system of the wider sewage treatment works, controlled and operated by the applicant.

4b A harbour managed by a harbour authority?

No

4c Directly into relevant territorial waters or coastal waters within the sea fisheries district of a local fisheries committee?

No

4d Is the installation on a site for which:

4d1 a nuclear site licence is needed under section 1 of the Nuclear Installations Act 1965?

No

4d2 a policy document for preventing major accidents is needed under regulation 5 of the Control of Major Accident Hazards Regulations 2015, or a safety report is needed under regulation 7 of those Regulations?

No

5 Supporting information

5a Provide a plan or plans for the site

Please see Appendix A for:

- A.1 Site Location Plan
- A.2 Installation Boundary and Emission Point Plan
- A.3 Site Impermeable and Permeable Surfaces Plan
- A.4 Site Drainage Plan
- A.5 Process Flow Diagram
- A.6 Site Photographs

5b Do any of the variations you plan to make need extra land to be included in the permit?

Yes. See Appendix C for the Site Condition Report.

5c Provide a non-technical summary of your application

Please see earlier text, Section 1.

5d Risk of fire from sites storing combustible waste

No. The site processes sit outside the scope of the Environment Agency fire prevention plan guidance, as set out in the Environment Agency guidance.

5f Adding an installation

Please see the response to Q5b for the baseline report which is in the H5 template.

6 Environmental risk assessment

An environmental risk assessment of the site changes has been carried out in line with the requirements of the Horizontal Guidance Note H1 and Guidance given on gov.uk. This guidance specifies the following approach to carrying out an environmental risk assessment for a proposed activity:

- Identify potential risks that your activity may present to the environment;
- Screen out those that are insignificant and don't need detailed assessment;
- Assess potentially significant risks in more detail if needed;
- Choose the right control measures, if needed; and
- Report your assessment.

Designated site review

Site Name	Designation	Direction from site	Distance from site
Lee Valley	RAMSAR & SPA	West	50 m
Lee Valley	RAMSAR & SPA	North-West	2,100 m
Lee Valley	RAMSAR & SPA	South-West	5,250 m
Wormley Hoddesdon Park Woods	SAC	South-West	3,342 m
Epping Forest	SAC	South	9,990 m
Rye Meads	SSSI	West	50 m
Hunsdon Mead	SSSI	East	1,830 m
Amwell Quarry	SSSI	North	1,860
Stanstead Lodge Wood	Ancient & Semi-Natural Woodland	North-east	1,400 m

Stanstead Lodge Wood	Ancient Replanted Woodland	North-east	1,500 m
Totwellhill Bushes	Ancient & Semi-Natural Woodland	South-east	2,000 m
n/a	NNR		
n/a	LNR		
n/a	MPA		
List of Local Wildlife Sites			
Abbots Gravel Pit Rye Meads Gravel Pit Newlands Meadow (Stanstead Abbots) Durham Close Lake S. of the Maltings Senior's Lake Stanstead Bury Wood Lea Valley North Worlds End Admirals Walk Lane Rye House Power Station			All sites <2,000 m

Data taken from MAGIC.gov.uk website, accessed April 2021. For habitat sites, the relevant distance for consideration are: International designations (SAC, MPA, SPA and Ramsar – 10km); National designations (SSSI – 2km); Local Nature reserves, Local Wildlife Sites and Ancient Woodland (2km)

Rye Meads STW is in proximity to a number of designated habitats. There are RAMSAR, SPA and SAC sites within 10 km of the site. Lee Valley are RAMSAR and SPA designations, located 50 m, 2.1 km, and 5.3 km, in a West, North West and South West direction from Rye Meads STWs, respectively. Wormley Hoddesdon Park Woods and Epping Forest are designated as SACs and are located 3.3 km South West and 9.9 km South of the site, respectively. Rye Meads and Hunsdon Mead are designated as SSSI and are located 50 m West and 1.8 km East of the site, respectively. There are no NNRs or LNRs located within 2 km of the site, and there are no MPAs located within 10 km of the site. There 3 areas of Ancient Woodland within 2 km of the site, the closest is approximately 1.4 km to the north-east, Stanstead Lodge Wood Ancient and Semi-natural Woodland. There are 11 non-statutory designated local wildlife sites (LWS) within 2 km of the site, the closest of which is less than 50 m from the cess waste import point.

The site sits inside a source protection zone (SPZ). The majority of the wider STW and part of the permitted area of the STC sits within SPZ's 2 and 3.

The majority of the permitted area of the site sits within Flood Zone 3 with a high annual probability of flooding (Land having 1 in 100 or greater annual probability of river flooding). The permitted area of the site also sits fully within Flood Zone 2 and 1 area. This is land with a medium (between a 1:100 and 1:1000 annual probability of flooding) and low (>1:1000 annual probability of river flooding) annual probability of flooding, respectively.

Rye Meads STC is located within proximity of three Nitrogen Dioxide (NO2) – Annual Mean AQMAs. The closest of which is located 6.2 km North West of the site at Hertford AQMA, an area encompassing a number of properties and an area along Gascoyne Way in central Hertford. The second AQMA is located 8.9 km North East of the site at AQMA Sawbridgeworth, an area encompassing Sawbridgeworth, London Road and Cambridge Road and the adjoining roads. The third AQMA is located 14.5 km North East of the site at Bishops Stortford AQMA, an area encompassing a number of properties around the junction of Dunmow Road, Hockerill Street, London Road and Stanstead Road in Bishops Stortford.

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
Amenity issues: Litter, vermin and pests	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, amenity and recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. The site is located in a mainly rural area although close to a major conurbation and roads. Including the M25 approximately 10 km South of the site. The nearest commercial and industrial premises are approx. 300m South West, comprising a stadium and go kart track. The nearest residential dwellings are located approximately 300 m West of the site, consisting of a large park home (caravans) Ecological receptors: There are a number of ecological receptors including SACs, SPAs or RAMSAR sites within 10km of site and SSSIs within 2km of the site. The Lee Valley RAMSAR and SPA designations, are located 50 m, 2.1 km and 5.3 km, in a West, North West and South West direction from Rye Meads STWs, respectively. Wormley Hoddesdon Park Woods and Epping Forest are designated as SACs and are located 3.3 km South West and 9.9 km South of the site, respectively. Rye Meads SSSI is located approx. 50 m west of the site, while Hunsdon Mead SSSI and Amwell Quarry SSSI are located approx. 1.8 km east and north of the site, respectively. There are 11 LWS within 2 km of the site and 3 areas of ancient woodland. There are no MPA sites within 10km of site. There are no NNRs or LNRs within 2km of the site.	The wastes handled at the site are primarily liquids and sludges, along with UWWTD derived material delivered by sewer. As such, there is no source of litter within the materials handled at the site. In the unlikely event pests or vermin are observed on site a suitable contractor is called in as soon as practicable.	**X**
Dust and bioaerosols	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Litter above. The impact of dust on human health will depend on the distance and wind direction. For bioaerosols, this distance is 250 m.	The wastes handled at the site are liquids, sewage sludges and digested sludge cake, along with UWWTD derived material delivered by sewer. The site will not be handling inherently dusty or powdery wastes. Digested sludge cake and retains a high moisture content and is not dusty.	**X**

		Sludge cake is stored centrally on the Cake Pad which is located away from sensitive receptor. The Cake Pad is located more than 250 m from the nearest sensitive receptor. Roads will be maintained to avoid the production of dust. A wheel wash is used for vehicles exiting the Cake Pad. Anerobic digestion of sludge takes place within a closed system. Digested sludge cake is stored on the Cake Pad in the centre of the site, more than 250 m away from sensitive receptors and the risk from bioaerosols is low and monitoring is not required. Please see Appendix F for the site specific bioaerosol risk assessment.	
Assessment of point source emissions to air Emissions deposited from air to land	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Amenity issues above. The impact of emissions from air on human health will depend on the distance and wind direction.	Air emissions have previously been assessed by the Environment Agency and deemed satisfactory. Use of the Emergency Flare is limited to emergency situations and during planned maintenance activities to either the CHP engines or the boilers. There are multiple outlets at Rye Meads STC that use biogas to reduce the likelihood of flaring, for which incidents of flaring are recorded by the site. Pressure relief valves are not used routinely to control biogas volumes and would only operate in an emergency. Fugitive emissions to air are assessed in Table C3-3b(i). The site is not located within an AQMA but there are three AQMAs located near to the site.	X
Assessment of point source and fugitive emissions to water	The River Stort is located adjacent to the Southern boundary of the permitted area and Tollhouse Stream is located adjacent to the Western boundary of the permitted area, running through the wider sewage works. The River Lee is located adjacent to the Western boundary of the wider sewage works. The majority of the permitted area of the site sits within Flood Zone 3, with small areas within a Flood Zone 2. The greatest flood risk to the site is associated with the River Stort, The River Lee and its associated tributary (Tollhouse Stream) running through the site. A number of other water bodies immediately surround the site including Rye Meads and a Marina.	The main product of the process is a digested sludge cake, which is stored within Flood Zone 3, on the Cake Pad that is equipped with drainage. Other aqueous discharges generated by process are limited (comprising only biogas condensate, dewatering liquors, and surface water run off). These sources are discharged to the on-site drainage system where they are transferred to the main sewage works inlet. Due to the nature and small quantity of these emissions no further assessment of point source emissions is deemed necessary.	X

	Surface water drainage within the site drains to the inlet of the adjacent sewage treatment works for full treatment prior to discharge.		
Assessment of odour	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Amenity issues above. The impact of emissions from odour on human receptors will depend on the distance and wind direction.	The wider sewage treatment works, which includes the area of the STC to be permitted has processes in place to minimise odour which includes physical containment, odour abatement, management systems, procedures and monitoring to control fugitive emissions of odour at the plant. Odour from the STC cannot be considered in isolation from the wider works. The sewage treatment works has an odour management plan, which is appended as Appendix E. Odour emissions are assessed in Table C3-3b(ii).	X
Energy	Global atmosphere (direct and indirect emissions)	Use of biogas on site within the CHP Engine and/or boilers minimises the need to import non-renewable electricity from the National Grid. Export of renewable electricity to the National Grid can offset consumption of fossil fuels within the energy mix, lowering the carbon intensity of power. Good maintenance procedures will help the plant run efficiently and reduce site energy consumption. Use of LED lighting reduces site consumption.	X
Land and disposal of waste to other processes	Rivers and streams – see Assessment of point source and fugitive emissions to water above. Drainage systems/sewers. The site sits inside Zone 2 and 3 of a Source Protection Zone (SPZ). Aquifers are classified as Principal (solid deposits) and Secondary A (superficial deposits).	All waste streams are disposed of off-site for recovery or disposal and will continue to be transferred (and consigned where hazardous) to appropriately permitted facilities.	X
Noise and vibration	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, amenity and recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. The site is located in a mainly rural area although close to a major conurbation and roads. Including the M25 approximately 10 km South of the site. The nearest commercial and industrial premises are approximately 300m South West, comprising a stadium and go kart track.	Site design has been chosen to minimise the impact of noise on offsite receptors through building orientation, finishes and location of openings. Noise from plant and equipment will be minimised through purchasing decisions and a robust preventative maintenance programme. There will be no sources of vibration within the facility. Noise and vibration emissions are assessed in Table C3-3b(iii).	X

	The nearest residential dwellings are located approximately 300m West of the site, consisting of a large park home (caravans) Ecological receptors: There are a number of ecological receptors including SACs, SPAs or RAMSAR sites within 10km of site and SSSIs within 2km of the site. The Lee Valley RAMSAR and SPA designations, are located 50 m, 2.1 km and 5.3 km, in a West, North West and South West direction from Rye Meads STWs, respectively. Wormley Hoddesdon Park Woods and Epping Forest are designated as SACs and are located 3.3 km South West and 9.9 km South of the site, respectively. Rye Meads SSSI is located approx. 50 m west of the site, while Hunsdon Mead SSSI and Amwell Quarry SSSI are located approx. 1.8 km east and north of the site, respectively. There are 11 LWS within 2 km of the site and 3 areas of ancient woodland. There are no MPA sites within 10km of site. There are no NNRs or LNRs within 2km of the site.		
Other issues (including visual impact)	Protected Species and Habitats	There are protected species (Water Vole) identified within the specified screening distance of the site (up to 500m). Protected habitats (Reedbeds, Chalk Rivers, Coastal and Floodplain Grazing, and Marsh) have also been identified within the specified screening distance of the site (up to 500m).	**X**
Climate Change	Risks of increased temperature impacts resulting in digesters heating beyond optimal operating temperature and increased odour potential from site process. For human health and ecological receptors, see notes for Amenity issues above.	Primary Digester Tanks may require reduced heat input to digester via heat exchange system and Primary Digester Tanks are insulated against worse impacts. Warmer temperatures may require less boiler input/use as a result of less heat demand, or increased heat dumping via air cooled radiator. If less biogas is used, the site may require a new consumptive biogas solution, e.g. a CHP Engine or other technology that is appropriately sized to utilise additional biogas. However, the CHP Engines will need to be replaced prior to 2050 when they reach the end of their operational lifespans. Pre-digestion tanks, except Primary PFTs, are already covered and OCUs to be utilised as appropriate. OCUs may require oversizing compared to current use.	**X**

	Risks of increased storm events that causes surface water runoff exceeds capacity of site drainage system, or additional dewatering operations due to rainwater ingress, or caused bunds to infill. Increased precipitation may increase flooding on agricultural land, decreasing ability to spread digested sludge cake to land. For water environment receptors, see notes for Assessment of point source and fugitive emissions to water above	The STW design may require expansion or additional storm capacity; however, this would apply to UWWTD operations at the site rather than permitted activities. May need to increase bund or containment volume for sewage treatment works or individual assets. Land spreading activities could be restricted during very wet, winter months. Although the site has a large Cake Pad which would allow digested sludge cake to be stored prior to application, contingency plans to move digested sludge cake to other sites may be required.	**X**

Appendix 2 – Date of birth information for Relevant offences and/or Technical ability questions only

This information has been supplied separately for the ease of exclusion from the public register.

4. Form C3 Questions

1 – What activities are you applying to vary?

Table 1a – Types of activities

Installation name	Schedule 1 references	Description of the Activity	Activity Capacity	Annex I and II codes and descriptions	Non-hazardous waste treatment capacity
Rye Meads Sludge Treatment Works AR1	S5.4 A1 (b) (i) Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving biological treatment. Anaerobic digestion of permitted waste in six Primary Digester Tanks followed by combustion of biogas produced from the process	From receipt of permitted waste through to digestion and recovery of by-products (digestate and biogas).	1,700 wet tonnes per day (throughout based on 20,400 m^3/12 = 1,700 m^3 per day)	R1 Use principally as a fuel or other means to generate energy R3: Recycling reclamation of organic substances which are not used as solvents R13 Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced)	Maximum waste throughput 2,450,000 wet tonnes per annum including indigenous UWWTD derived sludge from within the wider Sewage Treatment Works. As per volume calculations in Note 1 below.
Directly Associated Activities					
AR2	Imports of waste, including sludge from other sewage treatment works and imports of municipal liquid or sludges similar in composition to UWWTD derived materials				
AR3	Blending of indigenous sludges and imported wastes/waste sludge prior to treatment				
AR4	Storage of digestate prior to dewatering				
AR5	Dewatering of digested sewage sludge				
AR6	Transfer of dewatering liquors via site drainage back to the head of the sewage treatment works				
AR7	Transfer of surface water runoff back to the head of the sewage treatment works				
AR8	Storage of dewatered digested sludge cake prior to offsite recovery				

AR9	Storage of fuel including biogas and fuel oil
AR10	Pressurisation of biogas
AR11	Biogas scrubbing and removal of siloxanes
AR12	Combustion of biogas in MCPD and SG compliant biogas CHP engine and boiler units
AR13	Combustion of fuel oil in MCPD compliant boiler units
AR14	Transfer of biogas condensate via site drainage back to the head of the sewage treatment works
AR15	Operation of a biogas flare stack
AR16	Storage of raw materials
AR17	Storage of diesel
AR18	Storage of waste

Waste Operations				
	Description of the waste operation	**Annex I (D codes) and Annex II (R codes) and descriptions**	**Hazardous waste treatment capacity**	**Non-hazardous waste treatment capacity**
AR19	Imports of wastes: to the works inlet for treatment through the UWWTD route	D13: Blending or mixing prior to submission to any of the operations numbered D1 to D12	n/a	Maximum waste throughput 50,000 wet tonnes per annum
	Digested sludge cake for temporary storage pending off-site removal	R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced). R3: Recycling or reclamation of organic substances which are not used as solvents	n/a	Maximum waste throughput 15,000 wet tonnes per annum

For all Waste Operations	**Total capacity**	**77,658 wet tonnes**	**[a] + [b]**
	Total STC treatment capacity (tank volume)	60,658 wet tonnes	[a]
	Total Cake Pad storage capacity	17,000 wet tonnes	[b]
For waste imports to the head of the works	Annual throughput (tonnes each year)	Imports: 50,000 wet tonnes	
For waste imports of digested sludge cake for temporary storage	Annual throughput (tonnes each year)	Imports: 15,000 wet tonnes	
Note 1: Treatment Calculation based on: **Unthickened Primary: 35.00 tds/day: worse case 1.00% dry solids = 3,500 m3/day = 1,277,513 m3/year** **Unthickened SAS: 17.50 tds/day: worse case 0.70% dry solids = 2,500 m3/day = 912,509 m3/year** **Imports – Liquid: 17.50 tds/day: worse case 3.00% dry solids = 583 m3/day = 212,919 m3/year** **Total combined import calculation: 2,402,940 m3/year, rounded to 2,450,000 m3/year**			

Table 1b Types of waste accepted

Table C3-1b(i): Waste accepted for Anerobic Digestion

Waste Code	Description of Waste
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)
19 06 06	digestate from anaerobic treatment of animal and vegetable waste (sewage sludge only)
19 08 05	sludges from treatment of urban wastewater
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 (sewage sludge only)

Table C3-1b(ii): Waste accepted at the head of the works import point

Waste Code	Description of Waste
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01 [note 1]
19 09 02	sludges from water clarification

Note 1 – comprising but not limited to: Thickening and dewatering liquors, centrate and filtrate derived from TWUL processes Waste from a portable toilet

Table C3-1b(iii): Waste accepted for temporary storage and transfer off site

Waste Code	Description of Waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste (sewage sludge only)

1c Recovery of hazardous waste on land

Are you applying for a waste recovery activity involving the permeant deposit of inorganic hazardous waste to land for construction or land reclamation?

No – Where the answer is no, there is no requirement to answer further questions in 1c.

2 – Point source emissions to air, water and land

Air emission points currently permitted under permit EPR/FP3235LN/V003 are in bold.

Table C3-2a – Emissions to Air

Emission point reference and location	**Source**	**Parameter**	**Limit**	**Unit**	Reference Period	Monitoring frequency	**Monitoring standard or method**
A4	**Combustion exhaust gases from small boiler 2a via stack A4 [Footnote B]**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	150	mg/m^3	Periodic	Annually	MCERTS BS EN 14792
A5	**Combustion exhaust gases from small boiler 2b via stack A5 [Footnote B]**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	150	mg/m^3	Periodic	Annually	MCERTS BS EN 14792

A6	**Boiler 3a/A6** **New medium combustion plant other than engines and gas turbines fuelled on gas oil [Footnote C]**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	200	mg/m^3	Periodic	Every 3 years	MCERTS BS EN 14792
		Carbon monoxide	No limit set	mg/m^3	Periodic	Every 3 years -	MCERTS BS EN 15058-
	Boiler 3a/A6 **New medium combustion plant other than engines and gas turbines fuelled on biogas (Footnote C)**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	200	mg/m^3	Periodic	Every 3 years -	MCERTS
		Sulphur dioxide	100	mg/m^3	Periodic	Every 3 years -	MCERTS BSEN 14791
		Carbon monoxide	No limit set	mg/m^3	Periodic	Every 3 years -	MCERTS BS EN 15058
A7	**Combustion exhaust gases from dual fuelled boiler 3b via stack A7 when fuelled on diesel**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	No limit set	-	-	-	-
	Combustion exhaust gases from dual fuelled boiler 3b via stack A6 when fuelled on biogas	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	150	mg/m^3	Hourly mean	Annually	BSEN 14792 (Permanent sampling access not required)
A9a	**Located within a common windshield reference A9**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	500	mg/m^3	Hourly mean	Annually	BSEN 14792
		Carbon Monoxide	1,400	mg/m^3	Hourly mean		BSEN 15058 Permanent sampling platform to meet the requirements of TGN M1

A9b	**Located within a common windshield reference A9**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	500	mg/m^3	Hourly mean	Annually	BSEN 14792 BSEN 15058 Permanent sampling platform to meet the requirements of TGN M1
		Carbon Monoxide	1,400	mg/m^3	Hourly mean		
A10	**Emergency Flare Stack**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	150	mg/m^3	Hourly mean	Annually [Footnote A]	BSEN 14792 (Permanent sampling access not required)
		Carbon Monoxide	50	mg/m^3	Hourly mean		
A11	Primary Digester Tank Pressure Relief Valve	-	-	-	-	-	-
A12	Primary Digester Tank Pressure Relief Valve	-	-	-	-	-	-
A13	Primary Digester Tank Pressure Relief Valve	-	-	-	-	-	-
A14	Primary Digester Tank Pressure Relief Valve	-	-	-	-	-	-
A15	Primary Digester Tank Pressure Relief Valve	-	-	-	-	-	-
A16	Primary Digester Tank Pressure Relief Valve	-	-	-	-	-	-

A17	OCU 2	Hydrogen Sulphide	No limit set	-	Average over sampling period	Once every six months	CEN TS 13649 for sampling NIOSH 6013 for analysis Or US EPA M11
		Ammonia	20	mg/m^3	Average over sampling period	Once every six months	EN ISO 21877 Or CEN TS 1369 for sampling NIOSH 6016 for analysis
Notes: Footnote A: Monitoring required if flare operates for more than 10% of the year. Footnote B: Boiler is a small (< 1 MWth) space heating boiler only so hours run recording alone proposed subject to agreement with EA Area office Footnote C: If the replacement boiler is confirmed as a 'Limited Operating Hours <500 hours (new) mcp' then the expectation is no ELVs but a testing requirement on biogas, and gas oil, 'Once every 500hrs of operation with a minimum frequency of once every three years'							

For A7, revised emission limits to apply from MCPD compliance date (2029)

There are no permitted emissions to water, sewer or land from the activities covered by this permit.

Table C3-2b – Emissions to Sewer

Emission point reference and location	Source	Parameter	Limit	Unit
T1 (NGR: TL 39326 10360)	Primary Sludge Thickening Liquors, SAS Thickening Liquors, Biogas Condensate, OCU Waste Waters, Surface Water Run Off, Boiler Waste Waters	No parameters set	No limit set	-
T2 (NGR: TL 39316 10354)	Digested Sludge Dewatering Liquors, Surface Water Run Off, Boiler Waste Waters	No parameters set	No limit set	-
T3 (NGR: TL 39211 10482)	Head of Works Imports	No parameters set	No limit set	-

3 – Operating techniques

3a – Technical standards

Description of the schedule 1 activity or directly associated activity	Relevant technical guidance note or Best available techniques as described in BAT conclusions under IED	Document Reference
Anaerobic Digestion plant S5.4A1(b)(i); Storage of waste (DAA)	Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (notified under document C(2018) 5070) (Text with EEA relevance.) BAT Conclusions for Waste Treatment	

3a1 Does your permit (in Table 1.2 Operating Techniques or similar table in the permit) have references to any of your own documents or parts of documents submitted as part of a previous application for this site?

Yes, please refer to ADMS modelling from the previous application which remains valid.

3b – General requirements

If the TGN or H1 assessment shows that emissions of substances not controlled by emission limits are an important issue, send us your plan for managing them.

Although screened out of the detailed Risk Assessment (Question C2 Q6), due to the nature of the process the installation has the potential to generate fugitive emissions to air and water, which are subject to a number of process controls.

Risk Matrix and Terminology for Accident for Risk Assessment

	Consequence		
Likelihood ↓	**Low**	**Medium**	**High**
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

Classification	Likelihood	Consequence	Risk
Low	Probability of an event is low and likely only to occur in the long-term (a yearly basis or less frequent).	Impact is low or a minor, short-term nuisance. Minor release to a non-sensitive receptor or pollution of water course. Non-permanent health effects to human health (preventable by appropriate PPE). Minor surface damage to buildings; structures; services; or the environment which can be repaired immediately.	A level of harm is possible although this may not be noticeable to a receptor and would be a short-term event without lasting effects. Level of harm can be reduced using industry best practice and appropriate management techniques.
Medium	It is probable that an event will occur periodically in the medium-term (twice yearly basis).	Impact is noticeable in the short to medium-term. Large release impacting on the receiving media killing flora and fauna and requires remediation. Nuisance causing non-permanent health effects to human health. Damage to buildings; structures; services; or the environment preventing short-term use and/or requiring repair.	A level of harm may arise to a receptor which is noticeable although not long-lasting and may require some remedial actions in order to prevent re-occurrences.
High	An event is very likely to occur in the short-term (monthly or weekly basis) and is almost inevitable over the long-term OR there is evidence at the receptor of harm or pollution.	Impact is significant, wide-ranging and long-lasting effect. Has a chronic or acute impact on human health. Very large release that has a major impact on flora and fauna which may be very difficult to remediate. Significant damage to buildings; structures; services; or the environment which prevents use long-term and may require complete replacement. May cause a long-term impact or contribute towards a global issue due to releases of greenhouse gases.	A level of harm is likely to arise to a receptor that is severe causing significant harm to human health or the environment without appropriate remedial and mitigation measures being implemented. Remedial works to infrastructure and processes is required in the long-term.

Although screened out of the detailed Risk Assessment (Question C2 Q6), due to the nature of the processes, the anaerobic digestion operations and digested sludge cake storage, along with biogas utilisation have the potential to generate fugitive emissions to air and water, which are subject to a number of process controls.

Table C3-3b(i) Fugitive emissions risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Emissions to air of NOx, SO_2, CO_2 and VOCs	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors	High	Low	Medium	Activities are managed and operated in accordance with the site management system (including inspection and maintenance of equipment, including engine management systems), point source emissions to air (CHP Engines, boilers and Emergency Flare stack) have emission limits Emergency Flare height of 15 m high for shared CHP Engines stack, 17 m high for boiler stack and Emergency Flare stack approx. 6 m high. Site has a siloxane filter fitted on the main biogas pipeline connected to the CHP Engines to remove impurities within the biogas. Previous modelling, which remains unchanged, did not find unacceptable impacts.	Low
Biogas transfer systems, Floating Roof Biogas Holders, CHP Engines, Emergency Flare	Abnormal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global	Low	Medium	Low	The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge.	Low

or PRVs failure causing emissions of biogas		warming potential. Risk of fire and explosion				The biogas system utilised is subject to regular preventative maintenance, including a LDAR plan, to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected. Personnel on site wear portable biogas detectors in order to alert staff to presence of biogas. A biogas Emergency Flare is utilised for the safe disposal of surplus biogas in the event of plant breakdown, or a surplus of biogas above the level that can be safely stored or utilised. Use of Emergency Flare is recorded. PRVs are in place on the Primary Digester Tanks / Floating Roof Biogas Holders to be operated in the event of failure of the Emergency Flare to prevent overpressurisation and catastrophic failure.	
Catastrophic loss of biogas emissions from biogas transfer systems, Floating Roof Biogas Holders, CHP Engines, Emergency Flare or PRVs	Abnormal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global warming potential. Risk of significant fire and explosion	Low	High	Medium	The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge. The biogas system utilised is subject to regular preventative maintenance, including a LDAR plan, to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow	Medium

						sensors and with isolation valves to minimise the potential for release if a leak is detected. A biogas Emergency Flare is utilised for the safe disposal of surplus biogas in the event of plant breakdown, or a surplus of biogas above the level that can be safely stored or utilised. Use of Emergency Flare is recorded. PRVs are in place on the Primary Digester Tanks / Floating Roof Biogas Holders to be operated in the event of failure of the emergency flare to prevent overpressurisation and catastrophic failure.	
Combustion of biogas within CHP engine and emergency flare. Combustion of biogas or diesel within boilers	Normal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Global warming potential	High	Low	Medium	Combustion plant is regularly maintained and appropriately sized to manage volumes of biogas. Combustion plant operates within permitted ELVs subject to routine monitoring against permit compliance. Combustion plant is located away from sensitive receptors, located centrally at Rye Meads STC. The nearest receptor to the CHP Engines is the marina on the River Stort, 380 m to the south-east and the nearest receptors to the boilerhouse is the visitor centre at the adjacent nature reserve 370 m to the west.	Low
Release of bioaerosols and dust	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors.	High	Low	Medium	The risk of bioaerosol and dust is as a result of digested sludge cake storage within an open engineered Cake Pad. This is located within a central location at Rye Mead STC, away from	Low

		Odour impact of bioaerosols. Nuisance impact of dust.				sensitive receptors. There are no sensitive receptors within 250 m of the Cake Pad – the nearest receptor is the marina on the River Stort, 260 m south-east. Digested sludge cake on the Cake Pad retains a high moisture content and is not prone to windblown dispersion leading to the generation of dust. Egress from the Cake Pad is via a wheel wash to minimise the transfer of digested sludge cake on to internal roads which could generate emissions of dust. Roads are made from concrete/asphalt and not prone to the generation of dust.	
Release of bioaerosols and dust from spillages	Abnormal	Emissions to air and dispersion leading to inhalation by local human and animal receptors with potential harm to health. Odour impact of bioaerosols. Nuisance impact of dust.	Low	Low	Low	Staff responsible for site housekeeping and cleaning of spillages in a timely manner. Sludge retains a high moisture content and is not prone to windblown dispersion which could cause the generation of dust in the event of a spillage. Internal site roads are made from concrete/asphalt and not prone to the generation of dust. Vehicle egress from the Cake Pad is through a wheel wash to reduce incidents of transfer from the pad to site roads. The site is very large and spillages would only impact upon receptors if they occurred close to the site boundary.	Low

Spillage of liquids, including chemicals and oils.	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality. Emissions to ground and ground water.	Low	Medium	Low	The site is located within a Source Protection Zone 2 and 3. Surface water bodies can be found close to the southern and western boundaries of the wider sewage treatment works and there are lagoons to the east and west. Chemicals and oils all stored within suitably bunded tanks and IBCs with rainwater removed as required to maintain 110% capacities. Penstock valves available within chemical delivery areas to contain large spillages. Handling and use of chemicals and oils is carried out by trained personnel. COSHH data sheets available. Spill kits available on site. There are no point source emissions to water with drainage system pumping back to works inlet.	Low
Spillage from storage and digestion tanks, overtopping of tanks, leakage from same tanks and from buried pipes	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality Emissions to ground and ground water.	Medium	High	High	The site lies partly within Groundwater Source Protection Zones 2 and 3. Open secondary digester tanks are within a close proximity of the River Stort. Provision of suitable structurally integral tanks constructed from pre-cast concrete, or steel with glass reinforced plastic. All tanks are subject to asset inspection and proactive maintenance programme including regular visual inspection for cracks or weeping.	Medium

						Visual checks during regular day-to-day operations and scheduled preventative maintenance, including a LDAR plan of equipment, such as pumps, pipes, joins etc. Biogas condensate discharged back to the Works Inlet through site drainage system. Spill kits available on site. Staff are trained in their use.	
Generation of solid waste resulting in litter	Normal	Releases of litter to the environment. Visual nuisance and local loss of amenity	Low	Low	Low	Site operations do not give rise to large amounts of solid wastes and litter that would be prone to dispersion by wind. Rags are stored within skips and retain high moisture content. Waste is stored securely for collection by appropriately licensed approved contractors. Litter picking activities are completed as required.	Low

Where the TGN or H1 assessment shows that odours are an important issue, send us your odour management plan.

Due to the nature of the process, the installation has the potential to generate odorous emissions resulting from the permitted activities. Odour management is a key operational objective, as summarised in the risk assessment table below. A copy of the site-specific odour management plan has been appended to this application as Appendix E.

Table C3-3b(ii) Odour risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
H_2S/biogas emissions from uncovered tanks	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	High	Low	Medium	Biogas will principally be generated in Primary Digester Tanks and captured for storage within the Floating Roof Biogas Holders. The nearest receptor to the Floating Roof Biogas Holders is the adjacent Rye Meads visitor centre which is approx. 380 m west. Small amounts may be generated within SDTs which are located on south of site, 200 m from nearest sensitive receptors. H_2S production is controlled through the digestion process which can be manually overridden if required. The site has received one historical odour complaints in six years.	Low
Loss of containment from Floating Roof Biogas Holders	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors	Low	Medium	Low	Biogas is principally stored within the Floating Roof Biogas Holders on each SDT which are suitably sized to manage biogas generation.	Low

and biogas pipework		Loss of amenity from odour nuisance				The biogas pipeline is mainly aboveground. The biogas system utilised is subject to regular preventative maintenance, including a LDAR plan, to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of methane monitors, pressure and flow sensors and with automatic slam shut isolation valves to minimise the potential for release if a leak is detected. Personnel on site wear portable gas detectors in order to alert staff to presence of biogas. Physical protection measures in place around the PDTs / Floating Roof Biogas Holders, including lightning protection, fencing and pipework is guarded. PRVs available to safely manage pressures within the Primary Digester Tanks / Floating Roof Biogas Holders and prevent under or over pressurization.	
Activation of biogas pressure relief valve	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	PRVs are only activated in emergency situations to maintain safety within the biogas system and are re-seated/repaired promptly to minimize biogas emissions. PRV subject to monitoring and visual checks by site personnel. Biogas is principally stored within Floating Roof Biogas Holders on each PDT which are suitably sized to manage biogas generation. Site has multiple outlets to use biogas - two CHP	Low

						Engines, two boilers and one Emergency Flare which are used in order of preference to maximise recovery of energy. CHP Engines and boilers are subject to regular maintenance to maintain maximum use of outlets, with flare maintained in good working order should it need to be used. The nearest receptors are approx. 380 m west of the Floating Roof Biogas Holders.	
H_2S/biogas emitted when biogas cannot be combusted in CHP Engines, boilers or Emergency Flare	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	Biogas is principally stored within the Floating Roof Biogas Holders on each PDT which are suitably sized to manage biogas generation and act as buffer storage for biogas. Site has multiple outlets to use biogas - two CHP Engines, two boilers and one Emergency Flare which are used in order of preference to maximise recovery of energy. The nearest receptors are approx. 380 m west of the Floating Roof Biogas Holders. CHP Engines and boilers are subject to regular maintenance to maintain maximum use of outlets, with Emergency Flare maintained in good working order should it need to be used.	Low
Storage of treated digested sludge cake	Normal	Emissions to air and dispersion leading to inhalation by local human receptors	High	Low	Medium	Digested sludge cake is stored on an open, engineered Cake Pad within the centre of the site. The Cake Pad is at least 260 m from the nearest receptor, which is the marine on the	Low

		Loss of amenity from odour nuisance				River Stort, south-east of the southern extent of the inter-site transfer pad. Digested sludge cake is an inherently low odour material and air dispersion is reduced by shielding provided by site buildings and by vegetation to the south of the Cake Pad.	
Failure of odour control units	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	High	Medium	OCUs are subject to regular preventative maintenance. Media is replaced inline with the manufacturer's recommendations	Low
Storage of site generated wastes	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	Wastes generated on site are not inherently odorous and is stored securely for collection by appropriately licensed approved contractors.	Low

If the TGN or H1 assessment shows that noise or vibration are important issues, send us your noise or vibration management plan (or both)

The installation has the potential to generate noise as a result of the permitted activities. Potentially noisy activities are subject to a number of process controls and noise management is a key operational objective, as summarised in the risk assessment table below.

Table C3-3b(iii) Noise risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk

Operation of CHP Engines	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	Combustion assets are acoustically baffled within self-contained units. These provide a level of containment of noise and designed for external applications. Therefore, noise emissions are already low. Nearest sensitive receptors are commercial properties approx. 360 m south-east of the CHP Engines. Good inspection regimes and maintenance of plant to ensure that excessive noise levels are not generated. Regular checks of noise mitigation measures fitted to items of plant. Such measures include silencers and baffles fitted to specific areas of plant. Where repair or replacement is required, the plant will, where possible, be taken out of service until repair or replacement of parts has been undertaken.	Low
Operation of fans on air cooled radiators	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	Air cooled radiators do not give rise to high levels of noise and are only used as required. They are located away from sensitive human receptors, 360 m from the nearest receptors. Good maintenance of fans to ensure that excessive noise levels are not generated. Where repair or replacement is required, this will be completed promptly.	Low

Operation of site vehicles	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.	High	Low	Medium	Vehicle movements across the site subject to speed limit and one way system to reduce generation of noise. Shovel loading of digested sludge cake takes place on the engineered Cake Pad which is located away from sensitive human receptors, in the centre of the site and more than 250 m from any sensitive receptors.	Low
Vehicle movements - tanker deliveries of cess	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.	High	Low	Medium	Imports of Cess are limited to daytime hours and take place to an import point outside of the main site boundary. The nearest sensitive receptors are approx. 380 m to the southwest. Vehicle movements are subject to a speed limit to reduce generation of noise and a turning cycle limit reversing obligations.	Low
Vehicle movements - tanker deliveries of waste and bulk collections of digested sludge cake	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.	High	Low	Medium	Imports of sludge can be made 24/7 and take place to a central Sludge Import point, approx. 400 m from the nearest sensitive receptor. Imports of cake can be made 24/7 and take place to a central import point, approx. 200 m from the nearest receptors. Vehicle movements across the site subject to speed limit to reduce generation of noise and subject to a one-way system to reduce reversing obligations. Shovel loading of digested sludge cake takes place on the Cake Pad which is located	Low

						centrally, away from sensitive human receptors, approx. 200 m from the nearest receptors at the southern extent of cake pad.	
Vehicle movements - tanker deliveries of chemicals and raw materials	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.	High	Low	Medium	Deliveries likely to take place during daytime hours to delivery areas within the middle of the site, approx. 330 m from the nearest sensitive receptors. Vehicle movements across the site subject to speed limit to reduce generation of noise and subject to a one-way system to reduce reversing obligations.	Low
Operation of emergency flare	Abnormal	Generation of noise with air transportation, causing loss of amenity to local human receptors.	High	Low	Medium	Use of the Emergency Flare is minimized by prioritizing use of the CHP Engines and boilers with use of the Emergency Flare recorded. The Emergency Flare is located away from sensitive receptors, over 370 m from the nearest sensitive receptors.	Low

Table C3-3b (iv) - Environmental Risk Assessment and Accident Management Plan

A site specific Accident Management Plan (AMP) is located in Appendix J.

Table C3-3b (v) - Bioaerosol Risk Assessment

The installation has the potential to generate bioaerosols which may pose a risk to nearby sensitive receptors. A site-specific bioaerosol risk assessment (BRA) is presented in Appendix F.

3c - Types and amounts of raw materials

Table C3-3c – Types and amounts of raw materials

Type and amounts of raw materials used by the installation are summarised in the site specific Residue Management Plan (RMP) which is located in Appendix I.

4 - Monitoring

4a - Describe the measures you use for monitoring emissions by referring to each emission point in Table 2 above

The air emission points A4-7 and A9a, A9b, and A10 are monitored in accordance with EA guidance and the requirements of MCPD as applicable.

The site has a number of emission points to air. It has been confirmed that the CHP Engine emissions from Points A1 – A3 have been permanently isolated and these have been removed from the permit.

Points A4-A7 (two small boilers and two large boilers) and A9a and A9b (two CHP Engines) are subject to gas monitoring in accordance with the requirements of existing permit requirements and EA guidance.

Hours of operation of the Emergency Flare (A10) are monitored and logged. In the unlikely event that the total annual hours of operation exceed 10% of the hours in a year (876 hours), emissions from the Emergency Flare as per the existing permit would be subject to monitoring in accordance with EA guidance. The biogas Emergency Flare at emission point A8 has also been permanently isolated and is removed from the permit.

Point A17, OCU, will have bi-annual testing.

There is no routine monitoring proposed for points A11 – A16 (PRVs)

Table C3-4a – Emission Monitoring

Monitoring point	NGR	Monitoring frequency	Methodology (standard)	Assessment procedures
A4 (Boiler 2a)	TL 39281 10399	Oxides of Nitrogen – Periodic Or hours run	MCERTS BS EN 14792	-
A5 (Boiler 2b)	TL 39283 10396	Oxides of Nitrogen – Periodic Or hours run	MCERTS BS EN 14792	-
A6 (Boiler 3a (new MCP))	TL 39289 10335	Oxides of Nitrogen – Periodic Carbon Monoxide – Periodic Sulphur dioxide - Periodic	MCERTS BS EN 14792 BS EN 15058 BS EN 14791	
A7 (Boiler 3b)	TL 39291 10333	Oxides of Nitrogen – Periodic Carbon Monoxide – Periodic	MCERTS BS EN 14792 BS EN 15058	

Monitoring point	NGR	Monitoring frequency	Methodology (standard)	Assessment procedures
A9a (CHP Engine 1)	TL 39383 10262	Oxides of Nitrogen – Annual Carbon Monoxide – Annual	MCERTS BS EN 14792 BS EN 15058	
A9b (CHP Engine 2)	TL 39383 10262	Oxides of Nitrogen – Annual Carbon Monoxide – Annual	MCERTS BS EN 14792 BS EN 15058	
A10 (Emergency Flare Stack)	TL 39378 10234	Annual monitoring is only required when flare operates in excess of 10% of the time, taken on an annual assessment period.	In accordance with Environment Agency guidance note M2 "Monitoring of stack emissions to air"-	
A11-A16 (Primary Digester Tanks PRV)	TL 39301 10321 TL 39332 10340 TL 39314 10299 TL 39346 10319 TL 39328 10278 TL 39359 10298	n/a	n/a	-
A17 (OCU2)	TL 39417 10330	Hydrogen sulphide Once every six months	CEN TS 13649 for sampling NIOSH 6013 for analysis OR US EPA M11	
		Ammonia: Once every six months	EN ISO 21877 OR CEN TS 1369 for sampling NIOSH 6016 for analysis	
S1 (Liquor sampling point)	TL 39382 10284	n/a	MCERTS or ISO/IEC 17025 where available	
S2 (Liquor sampling point)	TL 39435 10149	n/a	MCERTS or ISO/IEC 17025 where available	

4b - Point source emissions to air only

4b1 Has the sampling location been designed to meet BS EN 15259 clause 6.2 and 6.3?

No

4b2 Are the sample ports large enough for monitoring equipment and positioned in accordance with section 6 and appendix A of BS EN 15259?

No

4b3 Is access adjacent to the ports large enough to provide sufficient working area, support and clearance for a sample team to work safely with their equipment throughout the duration of the test?

No

4b4 Are the sample location(s) at least 5 HD from the stack exit

No

4b5 Are the sample location(s) at least 2 HD upstream from any bend or obstruction?

No

4b6 Are the sample location(s) at least 5 HD downstream from any bend or obstruction?

No

4b7 Does the sample plane have a constant cross sectional area?

No

4b8 If horizontal, is the duct square or rectangular (unless it is less than or equal to 0.35 m in diameter)

No

4b9 If you have answered 'No' to any of the questions 4b1 to 4b8 above, provide an assessment to how the standards in BS EN 15259 will be met.

As an existing operational site entering environmental permitting for the first time, sampling locations and sampling ports may not meet all of the requirements for BS EN 15259, but these are being checked onsite. Where a permanent sampling platform is not provided, temporary sampling platform is utilised to provide sufficient space, in accordance with standard industry practice, where sampling cannot be undertaken from the ground.

5 - Environmental impact assessment

5a Have your proposals been the subject of an environmental impact assessment under Council Directive 85/337/EEC of 27 June 1985 [Environmental Impact Assessment]?

No.

6 - Resource efficiency and climate change

6a - Describe the basic measures for improving how energy efficient your activities are

The CHP Engines are suitably sized to maximise energy utilisation for the parasitic load, while minimising the use of the flare. Heat generated from the CHP Engines are used to supplement heat generation for the PDTs and minuses the need to use fuels within the auxiliary boilers.

Maintenance activities and low energy lighting is installed across the plant contribute towards energy efficiency.

6b - Provide a breakdown of any changes to the energy your activities use up and create

The main site energy source is electricity from the CHP engines supplemented by imported electricity from the National Grid with diesel used in boilers. The site CHP Engines combusts indigenous biogas with the electricity either used on site or exported to the public supply via National Grid if there is a surplus. The CHP Engines also provides useable heat for hot water to the PDTs, via heat exchangers. Diesel may also be combusted when required, with the boilers to meet additional heat demands from the PDTs. Use of heat from the CHP Engine reduces the demand on supplementary fuels in the boiler(s).

6c - Have you entered into, or will you enter into, a climate change levy agreement?

No, the activities are not eligible to take part in the CCL Scheme.

Describe the specific measures you use for improving your energy efficiency

The production and use of biogas to generate electricity and produce heat (which is used in the digestion process) on site minimises the use of fossil fuels onsite and within the energy mix for the National Grid, whilst recovering biological wastes. Location of the heat exchange, boilers and CHP Engines all within close proximity minimises transmission losses on site, improving the efficiency of the process.

Regular and proactive maintenance of pumps and insulation of pipework will improve efficiency and minimise the electrical demands and heat losses on site.

6d - Explain and justify the raw and other materials, other substances and water that you will use

See response to question 3c above.

The processes take digested sludge which would otherwise require additional disposal and recover energy and nutrients which can be put to beneficial use.

Small quantities of chemical raw materials are required to control and maintain the process. These are all proven materials that are extensively used within the water industry.

The other main raw materials are used in the generation of electricity and heat and maintenance of combustion plant which is supplied to the treatment process.

6e Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste

The facility is a waste treatment plant, and the primary wastes produced through the processes on site are maintenance wastes. Production of maintenance waste is minimised by ensuring that preventative maintenance is carried out based on a combination of manufacturers' best practice and operational experience.

5. Form C4 Questions

1 About the permit

1a What waste operations are you applying to vary?, Waste operations which do not form part of an installation

The original CHP permit and import permit were both waste level permits. These have now been incorporated within the installation permit as a DAA.

The permit application is for the import of non-hazardous waste for temporary storage at the site.

1b –types of waste accepted and restrictions

The EWC list is included in the responses to form C3.

1c Deposit for recovery purposes

This is not a deposit for recovery application.

2 Point source emissions to air, water and land

Please see responses to form C3.

3 Operating techniques

3a Technical standards

Please see responses to form C3.

3b General requirements

Please see responses to form C3.

4 Monitoring

4a Describe the measures you use for monitoring emissions by referring to each emission point in Table 2 above

Please see responses to form C3.

4b Point source emissions to air only

Please see responses to form C3.

6. Form C2.5 Questions

1 About the permit

1a Discussions before your application

See earlier response.

1b What is your permit for?

Installation, including MCPD as DAA's

1c Site details

See response in C2

1d Listed Activities

See Table C3-2a above.

1e Type of Variation

Substantial variation

1f Change to existing activites

This variation includes a change an existing MCP, Boiler 3a, to a new MCP.

2 Emissions to air

2a Is your permit variation application for the addition of a new or existing MCP onto your existing IED Installation?

Yes. See Appendix D for the BAT Assessment and Table C3-4a above.

2b Is your permit variation application to add a new MCP(s) and there will now be a total aggregated thermal input of 20MW thermal or more?

No

2c Permit variation application for an MCP and/or SG which is not at a current IED installation:

Is your permit application for a MCP and/or SG which is

2c1 A unit greater than or equal to 20 MW thermal

No

2c2 A unit that burns waste biomass as described in Article 3(18)(b) of the Medium Combustion Plant Directive?

2c3 Do any of the MCPs and/or SG on site meet the criteria of a EPR Schedule 1, Part 2, Chapter 1, Section 1.1 Part B activity?

2c4 Do any of the MCPs and/or SG on site meet the criteria of a EPR Schedule 1, Part 2, Chapter 5, Section 5.1 Part B activity?

No to all

2d If your application is to add an MCP only which is standalone, does it require an air emissions risk assessment to assess the risk to habitats?

No

2e Do you want to declare that your existing MCP(s) will meet new MCP emission limit values (ELVs) from the medium combustion plant directive (MCPD) in order to demonstrate a low risk impact to habitats under a stage 1 or 2 air emissions risk assessment? If you do make this voluntary declaration we will include new MCP ELVs in your permit.

No

2f If your application is to add an SG (which may also be an MCP) which is standalone are you required to carry out dispersion modelling to assess the risk to human health and habitats from proposed emissions to air?

No – not a Specified Generator

2g If your application is to add MCP to your existing IED installation you must submit a revised air emissions risk assessment to demonstrate that modelling is not required, or a modelling report and modelling input files to demonstrate that the impacts of your proposals will be acceptable.

The new MCP is an existing boiler that has been substantially refurbished.

2h Does your application refer to an existing Mining Waste activity?

No

2i Information for MCP/SG

See Table in Section 1.

3 MCP/SG Emission Monitoring

3a Where you are applying to vary an IED installation describe the measures you use for monitoring emissions by referring to each emission point in Table 2 above

See information C3, Question 4.

3b – Point source emissions to air at IED installations only

3b1 Has the sampling location been designed to meet BS EN 15259 clause 6.2 and 6.3?

No

3b2 Are the sample ports large enough for monitoring equipment and positioned in accordance with section 6 and appendix A of BS EN 15259?

No

3b3 Is access adjacent to the ports large enough to provide sufficient working area, support and clearance for a sample team to work safely with their equipment throughout the duration of the test?

No

3b4 Are the sample location(s) at least 5 HD from the stack exit

No

3b5 Are the sample location(s) at least 2 HD upstream from any bend or obstruction?

No

3b6 Are the sample location(s) at least 5 HD downstream from any bend or obstruction?

No

3b7 Does the sample plane have a constant cross sectional area?

No

3b8 If horizontal, is the duct square or rectangular (unless it is less than or equal to 0.35 m in diameter)

No

3b9 If you have answered 'No' to any of the questions 4b1 to 4b8 above, provide an assessment to how the standards in BS EN 15259 will be met.

Sampling locations and sampling ports may not meet all of the requirements for BS EN 15259, but these are being checked onsite. Where a permanent sampling platform is not provided, temporary sampling platform is utilised to provide sufficient space, in accordance with standard industry practice, where sampling cannot be undertaken from the ground.

4. Supporting information

4a Provide a non-technical summary of your application to vary your existing permit

Please see Section 1.

4b If your application is to vary an IED installation or waste operation is the boundary of your existing site being extended to accommodate the addition of a MCP/SG*?

Yes. See drawings in Appendix A.

4c Existing MCP 1-5MWth or Tranche A SG requiring compliance by 1st January 2030.

Yes

7. Form C6 Questions

The relevant questions within the form are those applicable to effluent and / or surface water run-off arising from the operation of an installation.

Q1About the effluent – details and type, continued

1a Give a brief description of the effluent discharge you want a permit for, for example, treated domestic sewage effluent

This effluent is a mixture of waste liquors from the operation of the installation for the anaerobic treatment of separated sewage sludge. It primarily comprises of dewatering liquors returned to the work inlet following the dewatering of treated sewage sludge and thickening processes within the installation. Lower volume constituents will include rainfall; biogas condensate; siloxane filtrate; contaminated run off and washdown water. The only wastes treated within the installation are sewage related, either being separated from the UWWTD flow in the wider works, or comprise of waste imports, principally of sludge from smaller satellite treatment works.

1b Give this effluent a unique name

Liquor returns.

1d Have you obtained all the necessary permissions in addition to this environmental permit to be able to carry out the discharge (see C6 guidance notes for more details)?

Yes. The discharge is into the inlet of a sewage works controlled by the applicant.

Q2 About the effluent – how long will you need to discharge the effluent for?

2c Will the discharge take place all year?

Yes, the discharge will take place all year.

Q3 How much do you want to discharge?

3b What is the maximum volume of effluent you will discharge in a day?

3,750 cubic metres.

3c What is the maximum rate of discharge?

43.41 litres/second.

3d What is the maximum volume of non-rainfall dependent effluent you will discharge in a day?

3,750 cubic metres.

3f For each answer in question 3, show how you worked out the figure on a separate sheet

3b - The liquor arisings must come from the installation inputs as there is limited additional water inputs. The maximum volume of effluent discharged per day will consist of primary thickening liquors, post-digestion dewatering liquors and biogas condensate generated from the inputs and outputs to/from the Primary Digester Tanks

3c - Maximum rate of discharge (L/second) is generated from the maximum volume of effluent per day, [3,750.36 m3 x 1000] / 86,400 seconds (24 x 60 x 60) from sources such as the thickening and dewatering. This gives a value of 43.406944 litres, rounded up to 43.41 litres per second.

3d - The liquor arisings must come from the installation inputs as there is limited additional water inputs. The maximum volume of effluent discharged per day will consist of primary thickening liquors, post-digestion dewatering liquors and biogas condensate generated from the inputs and outputs to/from the Primary Digester Tanks

Q4 No questions

Q5 Should your discharge be made to the foul sewer?

5a How far away is the nearest foul sewer from the boundary of the premises?

Not applicable, the site is located within the curtilage of a sewage treatment works and discharges into the works inlet via the site drainage system.

5b2 Discharges from all other premises including trade effluent

Not applicable, the site is located within the curtilage of a sewage treatment works and discharges into the works inlet via the site drainage system.

Q6 How will the effluent be treated?

6a Do you treat your effluent?

No. The Effluent generated by the process of treating sludge within the installation is returned to the inlet of the wider Rye Meads STW, where it is subject to aerobic treated in a mixture with UWWTD related waste waters.

6b Fill in Table 2 for each stage of the treatments carried out on your effluent in the order in which they are carried out

Order of Treatment	Code Number	Description
First	09	Primary settlement within sewage works
Second	31	Activated sludge process
Third	21	Sand filtration

6c You must provide details on a separate sheet of the final effluent discharge quality that the overall treatment system is designed to achieve

The final effluent discharge from the wider sewage treatment works is specified in Environmental Permit TH/CLCR.0048/017.Q7 What will be in the effluent?

7b Are any of the specific substances listed in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' added to or present in the effluent as a result of the activities on the site?

At present, no sampling or analysis for all substances listed within the referenced risk assessment at the site has been undertaken. Only limited chemicals are added to the process within the installation boundary, primarily antifoam (in low doses, as required) and polymer to aid dewatering of sludge. A review of the appropriate MSDS data does not indicate the presence of 'specific substances' within those chemicals.

Sampling and analysis of the liquor returns to fully characterise the waste streams in accordance with BAT 3 will be undertaken at the site, in line with what is technically achievable, as per the commitment to undertake a chemical analysis of the installation's effluents as per "Return Liquors: BAT 3, 6, 7" within Appendix M.

7c Have any of the specific substances listed in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' been detected in samples of the effluent or in the sewerage catchment upstream of the discharge?

At present, no routine sampling or analysis for all substances listed within the referenced risk assessment at the site has been undertaken either for effluent from the installation or within the wider sewerage catchment. Thames Water commits to undertaking a chemical analysis of the installation's effluents as per "Return Liquors: BAT 3, 6, 7" within Appendix M.

7d Are there any other harmful or specific substances in your effluent not mentioned in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater'?

At present, no sampling or analysis for all substances listed within the referenced risk assessment at the site has been undertaken. A review of the MSDS sheets for chemicals used within the installation does not indicate the presence of any other harmful or specific substances. Thames Water commits to undertaking a chemical analysis of the installation's effluents as per "Return Liquors: BAT 3, 6, 7" within Appendix M.

7e If you have answered 'No' to any of questions 7a to 7d provide details on a separate sheet of how you have established that the effluent is not likely to contain specific substances

Thames Water commits to undertaking a chemical analysis of the installation's effluents as per "Return Liquors: BAT 3, 6, 7" within Appendix M.

A review has been undertaken of the relevant MSDS sheets for chemical used routinely within the installation to look for substances identified within the risk assessments listed.

7f What is the maximum temperature of your discharge?

20°C back into the sewage works.

7g What is the maximum expected temperature change compared to the incoming water supply?

0°C.

Q8 Environmental risk assessments and modelling

8b Discharges to lakes, estuaries, coastal waters or bathing waters

The installation does not discharge to lakes, estuaries, coastal waters or bathing waters.

8d Discharges to groundwater

The installation does not discharge to groundwater.

8e Discharges to freshwater (non-tidal) rivers from an installation, including discharges via sewer

No modelling has been undertaken on the output from the installation at present. The final effluent discharge from the wider works, which includes the installation arisings has previously been subjected to modelling as part of the environmental permitting discharge application process.

8f Environmental impact assessment

No environmental impact assessment has been carried out on the installation, as it is an existing facility.

Q9 Monitoring arrangements

9a What is the national grid reference of the inlet sampling point? (for example, SJ 12345 67890)

Not applicable to this installation.

9b What is the national grid reference of the effluent sample point?

No sampling point installed at present. Effluents will be sampled from the Sample points identified in Table C3-4a (approximately) within the installation.

9d What is the national grid reference of the flow monitoring point?

No flow meter installed.

9e Does the flow monitor have an MCERTS certificate?

No. No flow meter installed.

9f Do you have a UV disinfection efficacy monitoring point?

No. Not installed as part of this installation.

9h You should clearly mark on the plan the locations of any of the above that apply to this effluent

Please see site emission point plan.

Q10 Where will the effluent discharge to?

10a Where the effluent discharges to

Non-tidal river, stream or canal.

10b Is this effluent discharged through more than one outlet?

No.

10c If you answered yes to question 10b above make sure you show clearly on your discharge point appendix or appendices and site plan that this one effluent can discharge to more than one discharge point

N / A.

Appendix 5 – Discharges to non-tidal river, stream or canal

A5.1 Give the discharge point a unique name For example, 'Outlet 1' (you must use this name to identify the discharge point on the plan)

Outlet 1.

A5.2 Give the national grid reference of the discharge point

TL3925209765

A5.3 Give the name of the watercourse, canal or the main watercourse it is a tributary of if you know it

Toll House Stream.

A5.4 Is the discharge into a:

Non-tidal river.

A5.5 Does the discharge reach the watercourse or canal by flowing through a surface water sewer?

No.

A5.6 Does the watercourse dry up for part of the year?

No.

A5.61 If the watercourse does dry up for part of the year can you indicate a typical period when the surface water runs dry each year – start and finish (in months)

N / A.

A5.6.2 If the watercourse does dry up for part of the year, how many metres downstream of the discharge is it before the discharged effluent soaks in?

N / A.

A5.7 Is the discharge made to a roadside drain or ditch?

No.

Appendix A. Figures

A.1 Site Location Plan

See document: B22849AM-JAC-RMD-DR-0001

A.2 Installation Boundary and Air Emission Point Plan

See document: B22849AM-JAC-RMD-DR-0002

A.3 Site Impermeable and Permeable Surface Plan

See document: B22849AM-JAC-RMD-DR-0003

A.4 Site Drainage Plan

See documents: RYMES1ZZ-DPL-001, RYMES1ZZ-DPL-002 and RYMES1ZZ-SSP-001

A.5 Process Flow Diagram

See document: B22849AZ-RMDS1ZZ-LSX-DR-P-0001

A.6 Site Photographs

See document: TW_STC_EPR_17a_RMD_APPA.6

Appendix B. CoTC

See document: TW_STC_EPR_17a_ RMD_APPB

Appendix C. Site Condition Report - H5

See document: TW_STC_EPR_17a_RMD_APPC

Appendix D. BAT Assessment

See document: TW_STC_EPR_17a_ RMD_APPD

Appendix E. Odour Management Plan

Includes: Odour Management Plan and Odour Risk Assessment. See document: TW_STC_EPR_17_ RMD_APPE

Appendix F. Bioaerosol Risk Assessment

See document: TW_STC_EPR_17a_ RMD_APPF

Appendix G. Containment Assessment

G.1 Containment Options Report (CIRIA 736)

See document: B22849AZ-JA- RMDS1ZZ-100-RP-Z-0001

G.2 Containment Assessment

See document: B22849AZ-JA- RMDS1ZZ-100-CA-P-0001

Appendix H. Leak Detection and Repair Plan (LDAR)

See document: TW_STC_EPR_17a_ RMD_APPH

Appendix I. Residue Management Plan

I.1 Residue Management Plan

See document: TW_STC_EPR_17a_ RMD_APPI.1

I.2 MSDS Zip File

See zip folder: TW_STC_EPR_17a_ RMD_APPI.2

Appendix J. Accident Prevention and Management Plan

See document: TW_STC_EPR_17a_ RMD_APPJ

Appendix K. Acceptance of Third-Party Waste Imports

K.1 Acceptance of Third-Party Waste Imports

See document: TW_STC_EPR_17a_ RMD_APPK.1

K.2 Acceptance of TWUL Inter-Site Sludge and Cake

See document: TW_STC_EPR_17a_ RMD_APPK.2

K.3 Example Waste Transfer Note

See document: TW_STC_EPR_17a_ RMD_APPK.3

Appendix L. Air Quality Assessment

Not Required

Appendix M. Liquor Monitoring Proposal

See document: TW_STC_EPR_17a_ RMD_APPM