# Sludge Treatment Centre Permitting

## Environmental Permit Application - East Hyde Sludge Treatment Centre Resubmission

TW_STC_EPR_12a_EHE_ASD | Re-submission

November 2023

**Thames Water**

EPR/TP3505MK/A001

# Sludge Treatment Centre Permitting

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| Project No: | B22849AM |
| Document Title: | Environmental Permit Application - East Hyde Sludge Treatment Centre Resubmission |
| Document No.: | TW_STC_EPR_12a_EHE_ASD |
| Revision: | Re-submission |
| Document Status: | For Issue |
| Date: | November 2023 |
| Client Name: | Thames Water |
| Client No: | EPR/TP3505MK/A001 |
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| File Name: | TW_STC_EPR_12a_EHE_ASD.docx |

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## Document history and status

| Revision | Date | Description | Author | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| Draft 1 | | Draft for review | JK | MKM | MKM | ED |
| Revision 1 | 15/09/21 | Revision following comments and clarification | JK | MKM | MKM | ED |
| Revision 1.1 | 29/09/21 | Final version for issue | JK | MKM | MKM | DF |
| Resubmission | November 2023 | Resubmission updates | TJ | JK | MM | HG |
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## Contents

# 1. Introduction

This application relates to a new biological treatment permit for the East Hyde Sludge Treatment Centre (STC), located at the East Hyde 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 ('sludges') separated from the main urban waste water treatment stream at the site along with the importation of similar wastes such as cess wastes and interworks sludge 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.

Now, all aspects of the sludge treatment process at the site, from the thickening of separated sludge from the main aerobic treatment flow, 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.

East Hyde STC does not currently hold an Environmental Permit but instead operates under a T21 waste exemption for recovery of waste at a waste water treatment works and with Regulatory Position Statement 109 allowing for operations of a combustion asset in the absence of an Environmental Permit.

A number of other sewage treatment related activities are undertaken at the site, outside of the scope of this permit, relating to the treatment of waste waters from the sewer network through aerobic processes. These activities are covered by the UWWTD.

## 1.1 Non-Technical Summary

This application is for a new 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 aerobic treatment process and treatment of imported sewage sludges from other sites, arriving by road to a dedicated sludge import point. The indigenous sewage sludges are generated from the aerobic treatment of both waste waters from the sewer network arriving into site at the works inlet, and, from imported waste materials, arriving by road transport into a dedicated waste import point at the works inlet. The storage of biogas and operation of a biogas fuelled Combined Heat and Power (CHP) engine and boiler for the generation of electricity and heat at the site, which are classified as an 'existing' combustion sources under the Medium Combustion Plant Directive (MCPD).

The site is located within a rural area, outside of the town of Luton, Bedfordshire, and is bounded on all sides by agricultural or otherwise undeveloped green space and a small number of domestic and commercial properties.

The STC comprises of an offloading point for permitted imported waste at the works inlet of the STW. This material is passed via screens for aerobic treatment. Sludge from the Primary Settlement Tanks (PSTs) is drawn off, passed via a further set of screens and pumped to one of two Picket Fence Thickeners (PFTs) for thickening. SAS from the Final Settlement Tanks is drawn off and pumped to the SAS Thickening Plant for thickening. Sludge is also imported from other works via a Sludge Import Tank (which is connected to an Odour Control Unit (OCU)), is passed via screens and pumped to the Sludge Blending Tank.

Thickened SAS, thickened primary sludge and imported sludge is mixed together within the Sludge Blending Tank. This tank is subsurface, enclosed and connected to an OCU. Pumps transfer the mixed sludges to the Digester

Feed Buffer Tank which is an aboveground and enclosed tank. From the Digester Feed Buffer Tank, dedicated pumps feed one of the three Primary Digester Tanks at the site. Each of the tanks is an above ground, steel tank with external insulation and is fitted with Pressure Relief Valves (PRVs).

Following treatment over an appropriate number of days within the Primary Digester Tanks, sludge is transferred to one of three, open topped, subsurface Secondary Digester Tanks located at the site. Digested sludge is held in the Secondary Digester Tanks for an appropriate retention time to ensure that the required level of pathogen kill is achieved in order to comply with digested sludge cake output quality requirements.

Digested sludge is then transferred to dewatering centrifuges where digested sludge is dewatered and the digested sludge cake is transferred via covered conveyors and is deposited on the engineered open cake pad for storage prior to removal from the site under the Sludge Use in Agriculture Regulations 1989 (SUiAR), and in accordance with the Biosolids Assurance Scheme (BAS). Drainage from the pad is captured by site drainage and is returned to the inlet channel of the works. Cake can also be transferred to a cake barn for storage if non-compliant and requiring quarantine.

This application includes the import of treated sludge cake from other works, for temporary storage on the site 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 cake will be offloaded to the cake pad. The waste stream is the same as that arising from the treatment of sludge within the East Hyde 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 impermeably cake pad, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank.

Biogas from the Primary Digester Tanks is captured and transferred to a double membrane Biogas Storage holder for storage. The biogas transfer 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 Biogas Storage holder and Primary Digester Tanks are fitted with pressure release valves as a safety precaution in the event of over pressurising the system.

The biogas is taken from the Biogas Storage for combustion in a CHP engine, generating electricity for use within the site, and heat to maintain the temperature in the Primary Digester Tanks. This is classified as an 'existing' combustion plant under the MCPD. In the event that additional heating is required for the Primary Digester Tanks, there is a dual fuelled auxiliary boiler that can combust biogas or fuel oil. In the event there is excess biogas, i.e. more than the CHP engine or boiler can utilise, or in the event that the CHP engine is unavailable, there is a ground mounted emergency flare. This is utilised under 10% of the year or less than 876 hours per year. The CHP engine is currently operated under RPS 109, which would be superseded by this permit.

# 2. Technical Description

This application is for a new bespoke installation permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended), following a change of interpretation of the UWWTD by the Environment Agency. It relates to a biological waste treatment permit for the East Hyde STC, located at the East Hyde STW, operated by Thames Water Utilities Limited (Thames Water).

**Scope**

The application covers the biological treatment of sewage sludge, both indigenous and imported from other waste water 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, along with the import of treated sewage cake from other sites for temporary storage pending offsite treatment on the cake pad There are a number of directly associated activities, including the operation of a biogas fuelled CHP engine for the generation of electricity and heat at the site, which is classified as an 'existing' combustion source under the MCPD.

**Location**

The site is located adjacent to the River Lea in a rural area, approximately 4.5 km south-east of the town of Luton. Immediately to the west of the site is the Upper Lea Valley Way shared footpath and part of National Cycleway, followed by agricultural fields. To the north is woodland and part of the River Lea. To the east is the River Lea, the B653 Lower Harpenden Road, a single carriage road and undeveloped green space. There are some residential and commercial developments on the east of the site, approximately central and also towards the southern end of the site. A railway line can also be found towards the east, approximately 120m away (at its closest point). To the south is further woodland and agricultural fields. The East Hyde STW is split in two by the West Hyde Road, a public road that crosses from west to east outside of the site perimeter; to the north is the works inlet and the cess/waste import, while the southern side of the site contains the aerobic and anaerobic treatment assets.

There are no Special Areas of Conservation (SACs), Marine Protection Areas (MPAs), Special Protection Areas (SPAs) or Ramsar sites within 10 km of the site. The nearest designated habitat is a Local Nature Reserve located 3 km to the south-east and the nearest Site of Special Scientific Interest (SSSI) is located 8 km to the north-west of the site. There are no designated National Nature Reserves within 2 km of the East Hyde STW.

There are ten areas of Ancient Woodland within 2 km of the site, with Graves Wood Ancient and Semi-Natural Woodland representing the closest such site approximately 430m to the West of the East Hyde STW.

There are twenty non-statutory designated Local Wildlife Sites (LWS's) within 2 km of the site, the closest of which is located adjacent to the East Hyde STW associated with the River Lea.

There are records of protected habitat and designated species within the specified screening distance (within 500m) of the site.

The area of the site to the north of the West Hyde Road is nearly entirely within a Flood Zone 3 indicating there is a high probability of fluvial flooding (having a 1 in 100 or greater annual probability of river flooding). The southern area of the site predominantly sits within a Flood Zone 1 area (>1:1000 annual probability of river flooding), although small areas of the STW are within a Flood Zone 2 or 3. All of the biological treatment assets are within a Flood Zone 1, indicated there is a low probability of fluvial flooding in this area.

The site is not within an Air Quality Management Zone (AQMA) or a Source Protection Zone (SPZ).

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

**Table 2.1 Site tank inventory**

| Tank Purpose | Number | Operational Volume ($m^3$) | Total Operational Volume ($m^3$) | Construction |
|---|---|---|---|---|
| Picket Fence Thickeners | 2 | 196 | 393 | Concrete |
| Sludge Blending Tank | 1 | 196 | 196 | Concrete |
| Digester Feed Buffer Tank | 1 | 58 | 58 | Steel |
| Primary Digester Tanks | 3 | 1,500 | 4,500 | Steel |
| Secondary Digester Tanks | 3 | 196 | 589 | Concrete |
| Sludge Dewatering Buffer Tank | 1 | 58 | 58 | Steel |
| Contingency Storage Tanks | 2 | 196 | 393 | Concrete |
| Polymer Tank | 1 | 3.5 | | Steel |
| Diesel Tank (CHP Building) | 1 | 44,500 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 barns). Biological treatment processes at the installation are for indigenous sludge separated from the UWWTD areas of the site and for treatment processes for imported sludge that arrives at East Hyde STC, normally by tanker and consists of sludge from other Thames Water sites, which forms a waste activity for the site.

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 barns. Imports to the cake barns are for temporary storage, pending recovery offsite; and are a contingency option primarily that will not be routinely used.

Waste imports to the head of the works consist of an offloading point for permitted imported wastes, which can be found at the inlet of the STW within the northern area of the site. These wastes are imported by tanker vehicles, 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 and by the physical site security measures at the site. The perimeter gate and fence restrict access to the northern area of the site, with the gate closed and locked outside of normal operating hours, preventing customers accessing the data logger out of hours. Issued keys enable the delivery tankers to discharge waste into the works, through a data logger which records the volume of waste transferred.

The imported waste materials combine with sewer derived materials in a raised inlet, that is mainly uncovered. From here it is subject to the UWWTD aerobic water treatment processes on site with the combined flow first passing via screens to remove inorganic material before combining with drainage and liquor returns from site drainage.

This application includes a second additional waste operation at the same site for the import of non-hazardous treated, dewatered sludge cake from other works. For temporary storage prior to 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. The waste stream is the same as that arising from the treatment of sludge within the East Hyde 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 will be stored on an impermeable surface on the cake pad for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank.

**Sludge Processes**

Sludge is removed from the six Primary Settlement Tanks (PSTs) via gravity and passes through a sludge screen that removes rag and inorganic content, which is discharged into skips for offsite disposal. Screened sludge is then pumped via a subsurface sludge pipeline to one of two Picket Fence Thickeners (PFTs) located on site at which point the sludge is within the permitted activities of the STC Environmental Permit at the site. Both tanks are subsurface, of concrete construction and covered. A rotating arm inside of each PFT slowly rotates and scrapes sludge into a central sump where pumps transfer the thickened sludge to the Sludge Blending Tank. Liquor from the PFTs weirs over the edge of the tank and drains to the site Liquor Return Pumping Station, where it is pumped back to the head of the works for additional aerobic treatment without any form of liquor treatment.

SAS from the Final Settlement Tanks is drawn off and pumped to the SAS Thickening Plant for thickening. There are three aquabelts which use a polymer coagulant to aid thickening. This polymer is made up from an Intermediate Bulk Container (IBC) and final effluent/potable water before being stored for use within a day tank. Liquor from the dewatering is returned to the head of the works for additional aerobic treatment via the site drainage and Liquor Return Pumping Station, without any form of liquor treatment. The thickened sludge is then pumped to the Sludge Blending Tank where it is mixed with indigenous primary sludge and imported sludge.

A second import offloading points is for permitted imports of sludges which occurs into the anaerobic process, to be mixed with indigenous sludges. Sludge is imported to the Sludge Import Tank from other waste water treatment works, via a data logger. The data logger measures both the transferred volume and records originating site of the material. The sludge is pumped from the Sludge Import Tank to the Sludge Blending Tank, via screens to remove inorganic material, which is deposited into a skip for removal from site and offsite disposal. The Imported Sludge Tank is odour abated and connected to an OCU that is shared with the Sludge Blending Tank. Pumps transfer the imported sludge into the Sludge Blending Tank where it is mixed with the indigenous sludges.

Two Contingency Storage Tanks are located between the PFTs and Sludge Blending Tank. These tanks are subsurface and of concrete construction with pipework that can be configured to receive sludge from either the PFTs or from the Sludge Blending Tank. Sludge is returned to the Sludge Blending Tank.

There is one, covered Sludge Blending Tank. This tank receives the thickened indigenous sludges and imported sludge and is connected to an OCU for odour control. The tank is subject to air mixing and high-level control monitors the level of sludge within the tank to prevent overfilling, inhibiting the transfer feed pumps in the event of a high-level alarm being received on the SCADA system. From the Sludge Blending Tank, sludge transfer pumps transfer the sludge to a Digester Feed Buffer Tank via aboveground sludge pipelines. The Digester Feed Buffer Tank is aboveground and covered. From the Digester Feed Buffer Tank, sludge is transferred to the Primary Digester Tanks for anaerobic digestion.

**Digestion Processes**

All three Primary Digester Tanks are above ground of the same glass coated steel construction with an insulating external layer, have fixed roofs with a small conical base that extends subsurface. They are surrounded by made ground. Each Primary Digester Tank is fitted with dual PRV for safety. In the event of foaming within the Primary Digester Tanks, anti-foam from an IBC is dosed in prior to the sludge being transferred to one of the three Primary Digester Tanks by the dedicated feed pumps. The digester feed pumps supply batches of sludge to the digesters and are controlled by a timer that is linked to SCADA, with sludge introduced into the top of each Primary Digester Tank along with sludge returning from the digester heat exchange system. The Primary Digester Tanks are subject to air mixing via biogas injection lances. The volume of sludge within each tank is monitored via the SCADA system with alarms to alert to the risk of over-filling. After 12 days, digested sludge is discharged from near the bottom of each tank through a limpet chamber and gravitates via aboveground pipes to Secondary Digester Tank number 1.

There are three Secondary Digester Tanks, which operate in series with sludge gravitating from Secondary Digester Tank 1, to Secondary Digester Tank 2 and finally Secondary Digester Tank 3 with the average retention time for digested sludge being 4-8 days. The Secondary Digester Tanks are all open tanks of concrete construction and mainly subsurface. All three of the Secondary Digester Tanks have high level alarms that are interlocked with the digester feed pumps. Sludge can also be manually returned from Secondary Digester Tank 3 to Secondary Digester Tank 2 in case of abnormal operations at the dewatering plant.

Fully digested sludge is then transferred to an aboveground Sludge Dewatering Buffer Tank and then to Sludge Dewatering Plant where digested sludge is dewatered. A polymer coagulant is automatically made and dosed to each Sludge Dewatering Plant using final effluent / potable water. Liquor from the centrifuges is returned to the works inlet via the Liquor Return Pumping Station, for treatment through the aerobic treatment route via site drainage without any form of liquor treatment.

**Cake Storage**

Digested sludge cake is transferred via covered conveyors and is deposited on the engineered open cake pad for storage prior to removal from the site under the Sludge Use in Agriculture Regulations 1989 (SUiAR), and in accordance with the Biosolids Assurance Scheme (BAS). Digested sludge cake from other STCs can also be imported for temporary storage at East Hyde STC prior to removal from the site under SUiAR, and in accordance with the BAS. This is intended to provide contingency storage in the event of spreading to land being temporarily unavailable.

Cake can also be transferred to a covered cake barn for storage. The cake barn is of made ground consisting of engineered concrete and is found on the Southern extent of the. Although the risk from bioaerosols is considered to be low there are residential and business receptors within 250 metres of each of the digested sludge cake storage areas at East Hyde. A site-specific bioaerosol risk assessment for the STC is provided as Appendix F.

**Biogas**

There is one double membrane Biogas Storage holder at East Hyde for the storage of biogas generated on site, which is equipped with dual pressure release valves as a safety precaution in the event of over pressurising the system. The area surrounding the Biogas Storage holder is classified as a potentially explosive atmosphere, fenced off for security, provided with lightening protection and there are strict management provisions on the control of potential ignition sources in accordance with the site DSEAR assessment.

The above ground biogas transfer 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 via the Liquor Return Pumping Station and returned to the works inlet. Biogas is transferred for use in either the CHP engine, boiler or emergency flare. A slam shut valve is present on the main biogas would also automatically isolate the Biogas Storage holder in the event of an emergency situation.

A siloxane filter is located upstream of the CHP engine on the biogas line to remove impurities from the biogas prior to combustion in the CHP engine. Use of siloxane filters reduces incidence of operational issues for the CHP engine. There is one CHP engine on site, with a thermal input of 1.4MWth, electrical output 459 kW, which is

located within the boiler house and receives biogas for combustion, generating electricity and recoverable heat. This is classified as an 'existing' combustion plant under the Medium Combustion Plant Directive. The electricity is used on site only and the recovered heat is passed via the heat exchange system to the Primary Digester Tanks. In the event that additional heating is required for the Primary Digester Tanks, biogas may be used in the onsite boiler to provide heat to the Primary Digester Tanks' heat exchange system. The boiler is dual fuelled with a thermal input of 1.1MWt which runs on both biogas and fuel oil. In the event there is excess biogas, i.e. more than the CHP engine or boiler can utilise, or in the event that the CHP engine or boiler are unavailable, there is a ground mounted emergency flare. This is utilised under 10% of the year, less than 876 hours per year. The thermal input of combustion plant at the site is 2.5MWth.

**Emergency Standby Generators**

Six emergency standby generators are located at East Hyde STW and provide back-up electricity in the case of failure of the grid. One generator is classified as new Medium Combustion Plant and permitted under Standard Rules SR2018 No.7 permit, EPR/EB3995YA. The other units are existing units but excluded from the requirement to hold a MCPD permit at present and are not classified as DAA's to this permit under the definition in Environment Agency guidance not RGN2. All generators operate for less than 50 hours per year; fuel for the units is stored correctly.

**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 site 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 East Hyde STC, including the Secondary Digester Tanks Sludge Blending tank and Sludge Dewatering Buffer Tank.

Thames Water is committed to meeting the requirement of BAT. 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 December 2024 delivery timescales will be subject to the outcome of 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 East Hyde 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, Figure 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 Biogas Storage holder are also fitted with dual PRVs, 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 East Hyde 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: 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. East Hyde fits into the first row of the table.
- Dry solids feed: see table below, East Hyde 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 Tank 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 normally stored on the engineered open cake pad in the central area of the site. Digested sludge cake can also be stored within a semi-enclosed and covered Cake Barn. Such areas of digested sludge cake are stored within 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**

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

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

An air dispersion model using ADMS has been prepared for the air emissions from combustion plants at the site and is provided as Appendix L to this application. The key findings are that the impact from the emissions are acceptable from an air quality perspective.

**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;*

In addition to the listed activity at the site, there is a directly associated activity of a biogas combustion plant which is also a specified generator (SG), covered by the MCPD under Schedule 25A and B of the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

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 head of the sewage treatment works;
- Transfer of surface water run-off via site drainage back to the head of the sewage treatment works;
- Storage of dewatered digested sludge cake prior to offsite recovery;
- Storage of biogas;
- Combustion of biogas in an MCPD/SG compliant biogas CHP engine and boiler
- Transfer of biogas condensate via site drainage back to the head of the sewage treatment works;
- Storage of raw materials.
- Storage of fuel oil;
- Storage of waste; and
- Operation of biogas flare stack.

The waste activity at the site is:

- 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.

In addition to the listed activity at the site, there is a directly associated activity of a biogas combustion plant which is also a specified generator, covered by the MCPD under Schedule 25A and/or B of the Environmental Permitting (England and Wales) Regulations 2016 (as amended). This comprises:

- 1x approx. 1.4MWth CHP engine
- 1x 1.1MWth boiler

Total thermal input of site is 2.5MWth in routine use.

**Combustion Plant**

| **East Hyde CHP Engine** | |
|---|---|
| MCP specific identifier* | East Hyde STC CHP Engine 1 |

| East Hyde CHP Engine | |
|---|---|
| 12 - digit grid reference or latitude/longitude | E 512176 N 217805 |
| Rated thermal input (MW) of the MCP | 1.4 MWth |
| Type of MCP (diesel engine, gas turbine, other engine or other MCP) | Other engine |
| Type of fuels used: gas oil (diesel), natural gas, gaseous fuels other than natural gas | Biogas |
| Date when the new MCP was first put into operation (DD/MM/YYYY) | 2009 |
| 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 | 8760; 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 |

| East Hyde Boiler | |
|---|---|
| MCP specific identifier* | East Hyde STC Boiler 1 |
| 12 - digit grid reference or latitude/longitude | E 512172 N 217804 |
| Rated thermal input (MW) of the MCP | 1.1MWth |
| 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) | Pre 2015 |
| 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 | 1,750; 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 B2 Questions

## 1 About the permit

### 1a Discussions before your application

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

### 1b Is the permit for a site or for mobile plant?

No. This application relates to a site.

## 2 About the site

### 2a What is the site name, address, postcode and national grid reference?

East Hyde Sludge Treatment Centre;

East Hyde Sewage Treatment Works;

West Hyde Road;

East Hyde;

Luton;

LU1 3TS.

NGR TL 12139 17830

### 2b What type of regulated facility are you applying for?

This application relates to a bespoke waste installation.

### 2c If you are applying for more than one regulated facility on your site, what are their types and their grid references?

This application is for a single regulated facility, namely an installation.

### 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.

### 2e Treating batteries

### 2e1 Are you planning to treat batteries?

No. This application is not for the treatment of batteries.

### 2f Ship recycling

### 2f1 Is your activity covered by the Ship Recycling Regulations 2015?

No. This application is not covered by the Ship Recycling Regulations 2015.

### 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<br><br>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:<br><br>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.<br><br>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.<br><br>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 |

| Event Name | Court | Date of hearing | Fine | Summary |
|---|---|---|---|---|
| | | | | 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.<br><br>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

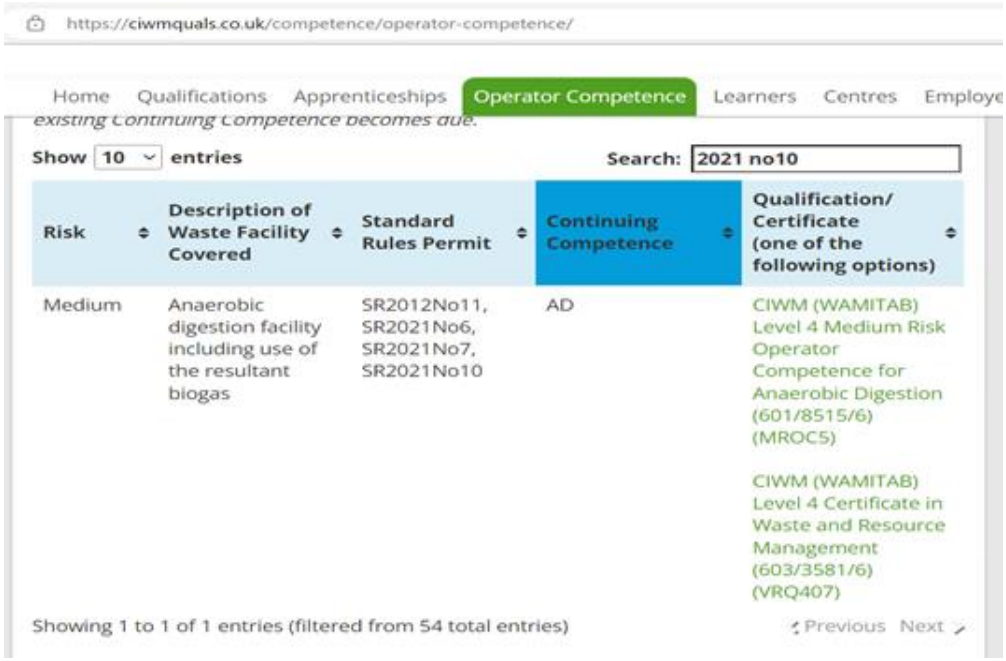
Thames Water uses WAMITAB qualified staff at their waste facilities. The relevant person for the site has been named below and full details have been provided separately on a spreadsheet.

Terry Palmer

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' is 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 Air Emission Points.
- A.3 Site Impermeable and Permeable Surface Plan.
- A.4 Site Drainage Plan.
- A.5 Process Flow Diagram.
- A.6 Site Photographs.

### 5b Provide the relevant sections of a site condition/baseline report if this applies

Yes. See Appendix C for the Site Condition Report.

### 5c Provide a non-technical summary of your application

Please see earlier text in Section 1.

### 5d Are you applying for an activity that includes the storage of combustible wastes?

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

# 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 |
|---|---|---|---|
| Batford Springs | LNR | South-East | 3,000m |
| Dallow Downs and Winsdon Hall | SSSI | North-West | 4,700m |
| n/a | Ramsar | n/a | n/a |
| n/a | SPA | n/a | n/a |
| n/a | SAC | n/a | n/a |
| n/a | MPA | n/a | n/a |
| Birch Wood | Ancient Woodland | North-West | 320m |
| Graves Wood | Ancient Woodland | West | 430m |
| Bramgar Wood | Ancient Woodland | North-East | 1,200m |
| Flaskets Wood | Ancient Woodland | East | 1,200m |
| George Wood | Ancient Woodland | North | 1,300m |
| Hardingdell Woods | Ancient Woodland | North | 800m |
| Horsleys Wood | Ancient Woodland | East | 1,100m |
| Round Wood | Ancient Woodland | East | 1,600m |
| Westfield Wood | Ancient Woodland | South | 1,800m |
| Withstocks Wood | Ancient Woodland | North-East | 2,300m |
| List of Local Wildlife Sites | | | |
| Bower Heath Common<br>Bramagar Wood County Wildlife Site (CWS)<br>Chiltern Green CWS<br>East Hyde Riverside CWS<br>Fir Tree Spring<br>Flasket's Wood CWS | | All sites <2,000 m | |

| Site Name | Designation | Direction from site | Distance from site |
|---|---|---|---|
| George Wood, Hyde CWS<br>Graves Wood CWS<br>Hardingdell and Fernell's Woods CWS<br>Horsley's Wood CWS<br>Kinsbourne Green Grassland<br>Luton Hoo Park CWS<br>Plummers Lane<br>River Lea CWS<br>River Lea Pastures, N. of Harpenden<br>Round Wood, Hyde CWS<br>Wall Wood<br>Westfield Wood<br>White Gables, Bower Heath Lane<br>Withstocks Wood | | | |

Data taken from MAGIC.gov.uk website, accessed May 2023and also from the EA Pre-Application Nature and Heritage Conservation Screening Report (July 2021) for the site. For habitat sites, the relevant distance for consideration are: International designations (SAC, MPA, SPA and Ramsar - 10km); National designations (Site of Special Scientific Interest (SSSI) – 2km); Local and National Nature Reserves, Local Wildlife Sites (LWSs) and Ancient Woodland (2km).

There are no SACs, MPAs, SPAs or Ramsar sites within 10 km of the site. The nearest designated habitat is a Local Nature Reserve located 3 km to the south-east and the nearest SSSI is located 8 km to the north-west of the site. There are no designated National Nature Reserves within 2 km of the East Hyde STW.

There are ten areas of Ancient Woodland within 2 km of the site, with Graves Wood Ancient and Semi-Natural Woodland representing the closest such site approximately 430m to the West of the East Hyde STW.

There are twenty non-statutory designated LWS's within 2 km of the site, the closest of which is located adjacent to the East Hyde STW associated with the River Lea.

There are records of protected habitat within the specified screening distance (within 500m) of the site comprising Chalk Rivers and Coastal and Floodplain Grazing Marsh (both of which are Priority Habitats). There are also records of a designated species within the specified screening distance (within 500m) of the site, namely European eel and European eel migratory route associated with the River Lea.

The site sits outside a Source Protection Zone (SPZ) but is within 1 km of a SPZ 1 and 500 m of Zones 2 and 3.

The majority of the permitted area of the site sits within Flood Zone 1 (<1:1000 annual probability of flooding) although some areas of the wider site are within Flood Zone 3 and Flood Zone 2, where there is an increased probability of annual flooding, between greater than 1:100 to a 1:100 to 1:1000 probability.

The site is not near to the boundaries of an AQMA, with the nearest AQMA located in excess of 3 km from the site.

| 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.<br>The site is located in a mainly rural area 400 m outside of the village of East Hyde. The nearest premises are located to the west of the site entrance and adjacent to the site on the B653 and West Hyde Road, comprising residential dwellings, a farm and a garden centre. A row of residential properties also borders the very South-East of the site. A public footpath runs along the Western perimeter of the site.<br>Ecological receptors: There are no SCAs, SPAs, MPAs or RAMSAR sites within 10 km of site. There are no SSSIs or LNRs within 2 km of the site.<br>The nearest designated habitat site is an LNR situated 3 km from the site. Graves Wood represents the closest Ancient and Semi-Natural Woodland to the site approximately 430m to the West. The River Lea CWS represents the closest non-statutory designated LWS located adjacent to 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.<br>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.<br>For human health and ecological receptors, see notes for Litter above.<br>The impact of dust on human health will depend on the distance and wind direction. For bioaerosols this distance is 250m. | The wastes handled at the site are liquids, sewage sludges and sewage cake, along with UWWTD derived material delivered by sewer.<br>The site will not be handling inherently dusty or powdery wastes. Digested sludge cake has sufficient moisture content to ensure it does not give rise to dust.<br>Roads will be maintained to avoid the production of dust. A wheel wash is used for vehicles exiting the digested sludge cake pad.<br>Anaerobic digestion of sludge takes place within a closed system. Digested sludge cake is normally stored on the open cake pad in the central area of the site. Digested sludge cake can also be stored within a semi-enclosed and covered cake barn which is protected from atmospheric conditions and minimises the risk of dispersion. Both locations are within 250 m of | **X** |

| Consideration | Receptors | Discussion | Detailed Environmental Risk Assessment? |
|---|---|---|---|
| | | sensitive receptors however the risk of bioaerosols is still classified as low-risk and monitoring is not required.<br>Please see Appendix F for the site specific bioaerosol risk assessment. | |
| Assessment of point source emissions to air<br>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.<br>For human health and ecological receptors, see notes for Amenity issues above.<br>The impact of emissions from air on human health will depend on the distance and wind direction. | The site is not located within an AQMA.<br>ADMS modelling indicates that CHP engine and boiler are acceptable from an air quality perspective; full details can be found in Appendix L.<br>Use of the emergency flares is limited to emergency situations and during planned maintenance activities to either the CHP engine or boiler. PRVs are not used routinely to control biogas volumes and would only operate in an emergency.<br>Fugitive emissions to air are assessed in Table B3-3b(i). | X |
| Assessment of point source and fugitive emissions to water | The River Lea flows along the Eastern boundary of the wider sewage works. The majority of the STW is in Flood Zone 1, although Eastern areas of the site near to the River Lea and works inlet, storm tanks and pumping station on the Northern extent of the site are within Flood Zones 2 and 3, with the greatest flood risk from fluvial flooding. Permitted areas of the STC waste treatment assets including digesters, combustion plant and Biogas Storage holder are all within Flood Zone 1, associated with lower probability of flooding.<br>Surface water drainage within the site drains to the screened sewage culvert or raw sewage culvert, upstream of the works inlet of the sewage treatment works for full treatment prior to discharge via 5 pumping stations. | The main product of the process is a digested sludge cake, which is stored within Flood Zone 1, on a concrete pad equipped with drainage and in a covered cake barn.<br>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 main sewage works inlet.<br>Due to the nature and small quantity of these emissions no further assessment of point source emissions is deemed necessary. | X |
| 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.<br>For human health and ecological receptors, see notes for Amenity issues above. | 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. | X |

| Consideration | Receptors | Discussion | Detailed Environmental Risk Assessment? |
|---|---|---|---|
| | The impact of emissions from odour on human receptors will depend on the distance and wind direction. | The sewage treatment works has an odour management plan, which is appended as Appendix E.<br>There have been odour complaints associated with the wider sewage works associated with periods of hot weather. | |
| Energy | Global atmosphere (direct and indirect emissions) | Use of biogas on site within the CHP engine and/or boiler minimises the need to import non-renewable electricity and gas from the National Grid. Export of surplus renewable electricity from the site to the National Grid can offset consumption of fossil fuels within the energy mix, lowering the carbon intensity of power.<br>Good maintenance procedures will help plant run efficiently and reduce energy consumption. | X |
| Land and disposal of waste to other processes | Rivers and streams – see Assessment of point source and fugitive emissions to water above.<br>Drainage systems/sewers.<br>The site lies outside any Groundwater Source Protection Zones (GPZ). Aquifers are classified as Principal (bedrock) and Secondary A (superficial drift). | 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.<br>The site is located in a mainly rural area 400 m outside of the village of East Hyde. The nearest premises are adjacent to the site entrance and on the B653 and West Hyde Road, comprising residential dwellings, a farm and a garden centre. A row of houses also borders the very South-East of the site. A public footpath runs along the Western perimeter of the site.<br>Ecological receptors: There are no SCAs, SPAs, MPAs or RAMSAR sites within 10 km of site. There are no SSSIs or LNRs within 2 km of the site. | Site design has been chosen to minimise the impact of noise on offsite receptors through building orientation, building design, finishes and location of openings.<br>Combustion plant is located away from nearby receptors and inside of buildings or enclosed containers.<br>Noise from plant and equipment will be minimised through purchasing decisions and a robust preventative maintenance programme.<br>Waste deliveries are only accepted during operational hours. Operation of shovel loaders and similar vehicles predominantly takes place on the cake pad which is located away from sensitive receptors. | X |

| Consideration | Receptors | Discussion | Detailed Environmental Risk Assessment? |
|---|---|---|---|
| | The nearest designated habitat site is an LNR situated 3 km from the site. Graves Wood represents the closest Ancient and Semi-Natural Woodland to the site approximately 430m to the West. The River Lea CWS represents the closest non-statutory designated LWS located adjacent to site. | There will be no sources of vibration within the facility.<br>Noise and vibration emissions are assessed in Table B3-3b(iii). | |
| Other issues (including visual impact) | Protected Habitats and Species | There are records of protected habitat within the specified screening distance (within 500m) of the site comprising Chalk Rivers and Coastal and Floodplain Grazing Marsh (both of which are Priority Habitats). There are also records of a designated species within the specified screening distance (within 500m) of the site, namely European eel and European eel migratory route associated with the River Lea. | **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. | Digesters may require reduced heat input to digester via heat exchange system and digesters 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.<br>However, the CHP engine will need to be replaced prior to 2050 when they reach the end of their operational lifespans.<br>Pre-digestion tanks are already covered and OCU's to be utilised as appropriate. OCU's may require oversizing compared to current use. | X |
| Climate Change | 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.<br>May need to increase bund or containment volume for sewage treatment works or individual assets.<br>Land spreading activities could be restricted during very wet, winter months. Although the site has a large cake pad which | X |

| Consideration | Receptors | Discussion | Detailed Environmental Risk Assessment? |
|---|---|---|---|
| | | would allow digested sludge cake to be stored prior to application, contingency plans to move digested sludge cake to other sites may be required. | |

**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 B3 Questions

**1 – What activities are you applying to vary?**

**Table B3-1a – 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 |
|---|---|---|---|---|---|
| East Hyde Sewage Treatment Works<br>AR1 | S5.4 A1 (b) (i)<br>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<br>Anaerobic digestion of permitted waste in six Primary Digester Tanks and Secondary 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). | 350 wet tonnes As per per day<br><br>(throughput based on 4,200m3/12 =350m3 per day | R3: Recycling reclamation of organic substances which are not used as solvents<br>R13 Storage of waste pending any of the operations numbered R1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced)<br>D15: Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where it is produced) | Maximum waste throughput 1,130,000 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; | | | | |
| 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 run-off via site drainage back to the head of the sewage treatment works; | | | | |

| | | | | |
|---|---|---|---|---|
| AR8 | Storage of dewatered digested sludge cake prior to offsite recovery; | | | |
| AR9 | Storage of biogas; | | | |
| AR10 | Combustion of biogas in an MCPD and SG compliant biogas CHP engine and boiler; | | | |
| AR11 | Transfer of biogas condensate via site drainage back to the head of the sewage treatment works; | | | |
| AR12 | Storage of raw materials. | | | |
| AR13 | Storage of fuel oil; | | | |
| AR14 | Storage of waste; | | | |
| AR15 | Operation of biogas flare stack; | | | |
| **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** |
| AR16 | Imports of wastes:<br>to the works inlet for treatment through the UWWTD route and screening of imports | D13: Blending or mixing prior to submission to any of the operations numbered D1 to D12 | n/a | Maximum waste throughput 25,000 wet tonnes per annum |
| AR17 | Imports of wastes:<br>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).<br>R3: Recycling or reclamation of organic substances which are not used as solvent | | Maximum waste throughput 1,000 wet tonnes per annum |
| **For all Waste Operations** | | **Total Capacity** | **8,187 wet tonnes** | **[a] + [b]** |
| | | **Total STC treatment capacity (tank volume)** | **6,187 wet tonnes** | **[a]** |
| | | Total cake pad storage capacity | 2,000 wet tonnes | [b] |

| | | | |
|---|---|---|---|
| For waste imports to the head of the works | Annual throughput (tonnes each year) | Imports: 25,000 wet tonnes | |
| For waste imports of digested sludge cake for temporary storage | Annual throughput (tonnes each year) | Imports: 1,000 wet tonnes | |
| Note 1: Import Calculation based on:<br>Unthickened Primary Sludge: 5.84 tds/day; worse case 0.50% dry solids = 1,168 m3/day = 426,240 m3/year<br>Unthickened SAS: 6.57 tds/day; worse case 0.40% dry solids = 1,642 m3/day = 599,400 m3/year<br>Imports – Liquid: 2.19 tds/day; worse case 0.80% dry solids = 274 m3/day = 99,900 m3/year<br>Total Combined import calculation 1,125,540 m3/year; rounded to 1,130,000 m3/year | | | |

## Table 1b Types of waste accepted

### Table B3-1b(i): Waste accepted for Anaerobic 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 B3-1b(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] |
| Note 1 – comprising but not limited to:<br>Thickening and dewatering liquors, centrate and liquor derived from TWUL processes<br>Waste from a portable toilet | |

### Table B3-1b(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

### Table B3-2a – Emissions to Air

| Emission point reference and location | Source | Parameter | Quantity | Unit |
|---|---|---|---|---|
| A1 | CHP Engine 1 | Oxides of Nitrogen (NO and $NO_2$ expressed as $NO_2$) | No limit set (2029/30 MCPD deadline applies) | $mg/m^3$ |
| | | CO | No limit set (2029/30 MCPD deadline applies) | $mg/m^3$ |
| A2 | Auxiliary Boiler 1 (dual fuel; primary fuel is biogas) | Oxides of Nitrogen (NO and $NO_2$ expressed as $NO_2$) | No limit set (2029/30 MCPD deadline applies) | - |
| | | Carbon Monoxide | No limit set (2029/30 MCPD deadline applies) | - |

| Emission point reference and location | Source | Parameter | Quantity | Unit |
|---|---|---|---|---|
| A3 | Emergency Flare | - | - | - |
| A4 | Biogas Storage holder pressure relief valve | - | - | - |
| A5 | Primary Digester Tank pressure relief valve | - | - | - |
| A6 | Primary Digester Tank pressure relief valve | - | - | - |
| A7 | Primary Digester Tank pressure relief valve | - | - | - |
| A8 | OCU 1 – new Sludge blending/import | - | - | - |

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

### Table B3-2b – Emissions to Sewer

| Emission point reference and location | Source | Parameter | Limit | Unit |
|---|---|---|---|---|
| T1 (as per site plan, Appendix A2) (TL 12129 17877) | Picket Fence Thickener Liquor, SAS Thickening Plant Liquor, Sludge Dewatering Plant Liquor, Biogas Condensate, OCU Waste Water, Surface Water Run Off | No parameters set | No limit set | - |
| T2 (as per site plan, Appendix A2) (TL 11937 18225) | Head of Works import | No parameters set | No limit set | - |

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

# 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);<br>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 | |

## 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 B2 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**

| Likelihood ↓ | Consequence | | |
|---|---|---|---|
| | 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.<br>Minor release to a non-sensitive receptor or pollution of water course.<br>Non-permanent health effects to human health (preventable by appropriate PPE).<br>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.<br>Large release impacting on the receiving media killing flora and fauna and requires remediation.<br>Nuisance causing non-permanent health effects to human health.<br>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.<br>Has a chronic or acute impact on human health.<br>Very large release that has a major impact on flora and fauna which may be very difficult to remediate.<br>Significant damage to buildings; structures; services; or the environment which prevents use long-term and may require complete replacement.<br>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 B2 Q6), due to the nature of the processes, the anaerobic digestion operations and 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 B3-3b(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 engine, boiler and emergency flare stack) have emission limits.<br><br>Emergency flare stack height of approx. 5 m, CHP engine and boiler flues approx. 8 m each.<br><br>Site has a siloxane filter fitted on the main biogas pipeline connected to the CHP engine to remove impurities within the biogas.<br><br>Air emissions modelling has been completed and shows that CHP engine and boiler are acceptable from an air quality perspective. | Low |
| **Gas transfer systems, biogas storage tank, gas engines, flares or PRVs failure** | 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.<br><br>The biogas system utilised is subject to regular preventative maintenance to minimise the | Low |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| **causing emissions of biogas** | | warming potential. Risk of fire and explosion | | | | 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.<br><br>Personnel on site wear portable gas detectors in order to alert staff to presence of biogas.<br><br>An 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.<br><br>PRVs are in place on the Biogas Storage holder to be operated in the event of failure of the emergency flare to prevent over pressurisation and catastrophic failure. | |
| **Catastrophic loss of biogas emissions from biogas transfer systems, biogas storage tank, gas engines, flares 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.<br><br>The biogas system utilised is subject to regular preventative maintenance to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation | Medium |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| | | | | | | valves to minimise the potential for release if a leak is detected.<br><br>An 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.<br><br>PRVs are in place on the Biogas Storage holder to be operated in the event of failure of the emergency flare to prevent over pressurisation and catastrophic failure. | |
| **Combustion of biogas within CHP engine and emergency flare. Combustion of biogas or fuel oil 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.<br><br>Combustion plant operates within permitted ELVs subject to routine monitoring against permit compliance.<br><br>CHP engine/boiler flue and emergency flare are located away from nearby receptors on the western side of the site and are 180 m from the CHP engine/boiler flue and 180 m away from the emergency flare. | Low |
| **Release of bioaerosols and dust** | Normal | Emissions to air and dispersion leading to inhalation by local human | High | Low | Medium | The risk of bioaerosols and dust is as a result of digested sludge cake storage within an open engineered cake pad located centrally, which is | Low |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| | | and animal receptors. Odour impact of bioaerosols. Nuisance impact of dust. | | | | the primary storage location. The nearest receptors are 130 m north of this location.<br><br>Digested sludge cake on the pad retains a high moisture content and is not prone to windblown dispersion leading to the generation of dust.<br><br>There is a further digested sludge cake storage area at East Hyde, a semi-enclosed barn which reduces the likelihood of dispersion from this location. However, this location is less than 50 m from the nearest receptors.<br><br>Internal site 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.<br><br>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.<br><br>Internal site roads are made from concrete/asphalt and not prone to the generation of dust. | Low |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| **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<br><br>Emissions to ground and ground water. | Low | Medium | Low | The closest surface water body is the River Lea which runs along the eastern perimeter of the site. The site lies outside any Groundwater Source Protection Zones (SPZ).<br><br>Chemicals and oils all stored within suitably bunded tanks and IBCs with rainwater removed as required to maintain 110% capacities.<br><br>Handling and use of chemicals and oils is carried out by trained personnel. COSHH data sheets available.<br><br>Spill kits available on site.<br><br>There are no point source emissions to water with drainage returning the 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<br><br>Emissions to ground and ground water. | Low | Medium | Low | The site lies outside any Groundwater Source Protection Zones (SPZ).<br><br>Provision of suitably structurally integral tanks constructed from steel and glass reinforced plastic or concrete. All tanks are subject to asset inspection and proactive maintenance programme including regular visual inspection for cracks or weeping. Due to some assets being subsurface, it may not be possible to identify all leaks immediately. | Low |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| | | | | | | Visual checks during regular day-to-day operations and scheduled preventative maintenance of equipment, such as pumps, pipes, joins etc.<br><br>Biogas condensate discharged back to the works inlet through site drainage system.<br><br>Spill kits available on site.<br><br>There are no point source emissions to water with drainage system pumping back to works inlet. | |
| **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.<br><br>Waste is stored securely for collection by appropriately licensed approved contractors.<br><br>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.

### Table B3-3b(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<br><br>Loss of amenity from odour nuisance | High | Low | Medium | Biogas will principally be generated in Primary Digester Tanks which are covered with fixed roofs. The nearest receptors are approx. 250 m from the Primary Digester Tanks.<br><br>Biogas is also generated in smaller quantities within the Secondary Digester Tanks, which are uncovered tanks. The Secondary Digester Tanks are located centrally and approx. 80 m to the east of the nearest sensitive receptors.<br><br>$H_2S$ production is controlled through the digestion process which can be manually overridden if required. | Low |
| **Loss of containment from biogas holder and biogas pipework** | Abnormal | Emissions to air and dispersion leading to inhalation by local human receptors<br><br>Loss of amenity from odour nuisance | Low | Medium | Low | Biogas is principally stored within the Biogas Storage holder which is suitably sized to manage biogas generation.<br><br>The biogas system utilised is subject to regular preventative maintenance to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation | Low |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| | | | | | | valves to minimise the potential for release if a leak is detected.<br><br>Personnel on site wear portable gas detectors in order to alert staff to presence of biogas.<br><br>Physical protection measures in place for the Biogas Storage holder, including fence and pipework is guarded by physical distancing from site roads.<br><br>PRVs available to safely manage pressures within the Biogas Storage holder 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<br><br>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.<br><br>PRVs subject to visual checks by site personnel.<br><br>Biogas is principally stored within the Biogas Storage holder which is suitably sized to manage biogas generation and act as buffer storage for biogas. Site has a CHP engine and boiler which are used in order of preference to maximise recovery of energy. In the event of neither asset being available, an emergency flare can be used to control biogas volumes before PRVs activate. | Low |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| | | | | | | CHP engine and boiler are subject to regular maintenance to maintain maximum use of outlets, with the emergency flare maintained in good working order should it need to be used.<br><br>The nearest receptors are residential properties approx. 200 m south-east. | |
| **$H_2S$/biogas emitted when biogas cannot be combusted in engine, boilers or flare** | Abnormal | Emissions to air and dispersion leading to inhalation by local human receptors<br><br>Loss of amenity from odour nuisance | Low | Low | Low | Biogas is principally stored within the Biogas Storage holder which is suitably sized to manage biogas generation and act as buffer storage when biogas cannot be combusted. Site has a CHP engine, boiler and emergency flare giving multiple outlets for biogas.<br><br>The nearest receptors are residential properties approx. 200 m south-east CHP engine and boiler are subject to regular maintenance to maintain maximum use of outlets, with the 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<br><br>Loss of amenity from odour nuisance | High | Low | Medium | Digested sludge cake can be stored within one of three locations. The normal storage location is the main cake pad that can be found in the central area of the site, with the nearest receptors 130 m north of this location.<br><br>Digested sludge cake is an inherently low odour material and air dispersion is reduced by | Low |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| | | | | | | shielding provided by vegetation between the cake pad and the receptors.<br><br>The additional location is used less frequently and is a semi-enclosed cake barn which minimises air dispersion which could impact receptors. | |
| **Failure of odour control units** | Abnormal | Emissions to air and dispersion leading to inhalation by local human receptors<br><br>Loss of amenity from odour nuisance | Low | High | Medium | Odour control units are subject to regular preventative maintenance.<br><br>Media is replaced in-line with the manufacturer's recommendations. | Low |
| **Storage of site generated wastes** | Normal | Emissions to air and dispersion leading to inhalation by local human receptors<br><br>Loss of amenity from odour nuisance | Low | Low | Low | Wastes generated on site are not inherently odorous and are 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. Note there is no history of substantiated noise complaints relating to the site:

### Table B3-3b(iii)Noise risk assessment

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| **Operation of CHP engine** | Normal | Generation of noise with air transportation, causing loss of amenity to local human receptors | High | Low | Medium | The CHP engine is located within an internal room of the boiler house building therefore noise emissions are already low.<br><br>The nearest receptors are approx. 175 m to the north and north-east, comprising of residential properties.<br><br>Good inspection regimes and maintenance of plant to ensure that excessive noise levels are not generated.<br><br>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 | High | Low | Medium | Air cooled radiators do not give rise to high levels of noise and are only used as required. | Low |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| | | of amenity to local human receptors | | | | They are located approx. 175 m from nearest sensitive receptors.<br><br>Good maintenance of fans to ensure that excessive noise levels are not generated. Where repair or replacement is required, this will be completed promptly. | |
| **Operation of site vehicles** | Normal | Generation of noise with air transportation, causing loss of amenity to local human receptors.<br><br>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 to reduce generation of noise. Deliveries to cake pad limited to day-time only.<br><br>Shovel loading of digested sludge cake takes place on the open, engineered pad during daytime hours only. | Low |
| **Vehicle movements - tanker deliveries of sludge and bulk collections of digested sludge cake** | Normal | Generation of noise with air transportation, causing loss of amenity to local human receptors.<br><br>Generation of vibration with ground transmission, causing loss of amenity to local human receptors. | High | Low | Medium | Imports are limited to during daytime hours only to points which are not in close proximity to sensitive receptors. Waste import point is approx. 200 m from receptors, sludge import is approx. 130 m from receptors and the cake pad is approx. 150 m from receptors.<br><br>Vehicle movements across the site subject to speed limit to reduce generation of noise.<br><br>Imports of waste do not take place 24/7. Shovel loading of digested sludge cake takes place on the open, engineered pad during | Low |

| Activity/Hazard | Normal or Abnormal | Environmental Impact (Pathway-Receptor) | Likelihood | Consequence | Risk | Risk Management | Residual Risk |
|---|---|---|---|---|---|---|---|
| | | | | | | daytime hours only. Bulk collections normally take place during daytime only. | |
| **Vehicle movements - tanker deliveries of chemicals and raw materials** | Normal | Generation of noise with air transportation, causing loss of amenity to local human receptors.<br><br>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 central area of the site.<br><br>Vehicle movements across the site subject to speed limit to reduce generation of noise. | 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 engine and boiler with use of the emergency flare recorded.<br><br>Emergency flare is located away from nearby receptors, approx. 175 m from the nearest residential receptor. | Low |

## Table B3-3b (iv) - Environmental Risk Assessment and Accident Management Plan

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

## Table B3-3b (v) - Bioaerosol Risk Assessment

The installation has the potential to generate bioaerosols which may pose a risk to nearby sensitive receptors. As summarised in the site-specific bioaerosol risk assessment presented in Appendix F.

### 3c - Types and amounts of raw materials

### Table B3-3c – Types and amounts of raw materials

Types 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 site has a number of emission points to air. Points A1 (CHP engine) and A2 (boiler) which will be subject to biogas monitoring in accordance with the requirements of MCPD and EA guidance as required.

Hours of operation of the emergency flare, emission point A3, 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.

Emission point A8 (OCU) will be monitored on a six-monthly basis.

There is no routine monitoring proposed for the PRVs (A4 to A7).

### Table B3-4a – Emission Monitoring

| Monitoring point | NGR | Monitoring frequency | Methodology (standard) | Assessment procedures |
|---|---|---|---|---|
| A1 CHP Engine | TL 12166 17808 | - | - | - |
| A2 Auxiliary Boiler | TL 12171 17811 | - | - | - |
| A3 Emergency flare | TL 12290 17687 | Annual monitoring is only required when flare operates in excess of 10% of the time, taken on an annual assessment period. Oxides of Nitrogen (NO and NO2 expressed as NO2) – Annually | In accordance with Environment Agency guidance note M2 "Monitoring of stack emissions to air". | BS EN 14792 |
| A4 Biogas Storage holder PRV | TL 12250 17722 | n/a | n/a | - |
| A5 Primary Digester Tanks PRV | TL 12219 17756 | n/a | n/a | - |
| A6 Primary Digester Tanks PRV | TL 12206 17770 | n/a | n/a | - |
| A7 Primary Digester Tanks PRV | TL 12195 17782 | n/a | n/a | - |

| Monitoring point | NGR | Monitoring frequency | Methodology (standard) | Assessment procedures |
|---|---|---|---|---|
| A8 OCU 1 – new Sludge blending / import | TL 12213 17909 | Hydrogen sulphide Once every six months | CEN TS 13649 for sampling NIOSH 6013 for analysis<br>OR<br>US EPA M11 | |
| | | Ammonia: Once every six months | EN ISO 21877<br>OR<br>CENTS 1369 for sampling NIOSH 6016 for analysis | |
| S1 (Liquor sampling point) | TL 12148 17838 | n/a | MCERTS or ISO/IEC 17025<br>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, however, a 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 Primary Digester Tanks are all suitably insulated. The CHP engine is suitably sized to maximise energy utilisation for the parasitic load, while minimising the use of the emergency flare.

Low energy lighting and LED lighting is installed across the plant. The heating water from the CHP engine is located in close proximity to the digester heat exchangers and transferred in insulated pipes to minimise heat losses in transmission.

### 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 site CHP, combusting indigenous biogas, supplemented by electricity imports from the public supply via National Grid to supply the treatment process. The CHP engine also provides useable heat for hot water to the Primary Digester Tanks via heat exchange.

Biogas is also combusted in the auxiliary boiler on site to meet additional heat demands from the Primary Digester Tanks, but the auxiliary boiler is dual fuelled and can also use fuel oil when there is insufficient biogas. Use of waste heat from the CHP engine reduces the demand on the auxiliary boiler.

### 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 into the digestion process) on site minimises the use of fossil fuels whilst recovering biological wastes. Location of the heat exchange, auxiliary boiler, CHP engine and Primary Digester Tanks 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 B4 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 permit application is for physical treatment of non-hazardous waste as a secondary activity waste operation to the main listed installation.

### 1b –types of waste accepted and restrictions

The EWC list is included in the responses to form B3.

### 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 B3.

## 3 Operating techniques

### 3a Technical standards

Please see responses to form B3.

### 3b General requirements

Please see responses to form B3.

## 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 B3.

### 4b Point source emissions to air only

Please see responses to form B3.

# 6. Form B6 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 thickening processes within the installation and dewatering processes within the installation. Lower volume constituents will include rainfall; biogas condensate; 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 B6 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?

2,992 Cubic metres.

### 3c What is the maximum rate of discharge?

34.63 Litres / second.

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

2,992 cubic metres.

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

Q3b –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, biogas condensate generated from the inputs and outputs to/from the Primary Digester Tanks.

Q3c – Maximum rate of discharge (L/second) is generated from the maximum volume of effluent per day [2,992.19 $m^3$ x 1000] / 86,400 (24 x 60 x 60) from sources such as thickening and dewatering. This gives a value of 34.631828 litres, rounded up to 34.63 litres per second.

Q3d – 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, 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 sewer 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 sewer 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 East Hyde STW. It is subject to aerobic treatment 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/CNTD.0084/008.

## 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 within Table B3-4a (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

The effluent discharge is 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)

Final effluent discharge

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

TL 12348 17817.

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

The River Lea via the wider UWWTD sewage treatment works.

### 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-EHE-DR-0001

## A.2 Installation Boundary and Air Emission Points

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

## A.3 Site Impermeable and Permeable Surface Plan

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

## A.4 Site Drainage Plan

See document: B22849AM-JAC-EHE-DR-0004

## A.5 Process Flow Diagram

See document: B22849AZ-JA-EHANP1ZZ-LSX-DR-P-0003

## A.6 Site Photographs

See document: TW_STC_EPR_12a_EHE_AppA.6

# Appendix B. CoTC

See document: TW_STC_EPR_12a_EHE_APPB

# Appendix C. Site Condition Report – H5

See document: TW_STC_EPR_12a_EHE_APPC

# Appendix D. BAT Assessment

See BAT Assessment Spreadsheet: TW_STC_EPR_12a_EHE_APPD.

# Appendix E. Odour Management Plan

See document: TW_STC_EPR_12a_EHE_APPE.

# Appendix F. Bioaerosol Risk Assessment

See document: TW_STC_EPR_12a_EHE_APPF

# Appendix G. Containment Assessment

## G.1 Containment Options Report (CIRIA 736)

See document: B22849AZ-JA-EHANP1ZZ-100-RP-Z-0001.pdf

### G.2 Containment Assessment

See document: B22849AZ-JA-EHANP1ZZ-100-CA-P-0001.xlsx

## Appendix H. Leak Detection and Repair Plan (LDAR)

See document: TW_STC_EPR_12a_EHE_APPH

## Appendix I. Residue Management Plan

### I.1 Residue Management Plan

See document: TW_STC_EPR_12a_EHE_APPI.1

### I.2 MSDS Zip File

See document: TW_STC_EPR_2a_EHE_APPI.2

## Appendix J. Accident Prevention and Management Plan

See document: TW_STC_EPR_12a_EHE_APPJ

## Appendix K. Acceptance of Third-Party Waste Imports

### K.1 Acceptance of Third-Party Waste Imports

See document: TW_STC_EPR_12a_EHE_APPK.1

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

See document: TW_STC_EPR_12a_EHE_APPK.2.

## Appendix L. Air Quality Assessment

See document: TW_STC_EPR_12a_EHE_APPL.

## Appendix M. Liquor Monitoring Proposal

See document: TW_STC_EPR_12a_EHE_APPM