Sludge Treatment Centre Permitting

Environmental Permit Variation Application - Beddington Sludge Treatment Centre Resubmission

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Thames Water

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Contents

1. Introduction

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

Previously, sewage treatment sites operated by sewerage undertakers treating indigenous sewage sludges ('sludge') separated from the main urban waste water treatment stream at the site along with the importation of similar wastes such as cess 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 sludge; blending with imported waste of a similar nature to indigenous sludge; anaerobic digestion of sludge; through to the storage of digested sludge cake prior to recovery to land offsite, including biogas storage and utilisation will fall within the scope of this permit variation application.

The previous permit in place at the site, EPR/YP3430LL/V005, for the operation of the CHP plant will be merged and remain in place as directly associated activities to this listed process. This application is for the purposes of varying the existing permitted activities to include the anaerobic digestion process as an installation activity.

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 variation application is for a bespoke installation permit for the biological treatment of sludge by anaerobic digestion, with a capacity above the relevant thresholds. The biological treatment of sludge includes treatment of the indigenous sewage sludge 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 the site at the Head of the Works, and, from imported waste materials, arriving by road transport into a dedicated waste import point near to the works inlet.

The operation of a biogas fuelled Combined Heat and Power (CHP) engines and dual fuelled boilers for the generation of electricity and heat at the site, (which are classified as 'existing' combustion sources under the Medium Combustion Plant Directive), although already permitted will be classified as a directly associated activities to this main listed activity. The existing boilers are inoperable (aged assets) with heat needs now being provided by the CHP engines.

The STC is located within Beddington STW, in the London Borough of Sutton, between the towns of Carshalton and Croydon.

The STC treats both indigenous sludges and imported sludges. Indigenous sludge is generated from the incoming flow to the STW, which passes through the aerobic treatment process under the UWWTD. Indigenous sludge is pumped to the Primary and SAS Buffer Tank via Sludge Screens. Sludge is then thickened using four drum thickeners, with filtrate draining to a pumping station before it is returned to the UWWTD process for additional treatment. Thickened sludge is then pumped to the Thickened Sludge Buffer Tank and fed to one of the three Primary Digester Tanks by digester feed pumps. Anti-foam is dosed in at the feed pumps as required.

Imports of sludge from other works are delivered to a sludge offloading point and Sludge Import Tank from tankers, is screened and pumped to the Primary and SAS Buffer Tank. All such imports are subject to appropriate waste pre-acceptance and acceptance checks, prior to acceptance. Indigenous SAS and imported sludge combine in the Primary and SAS Buffer Tank and are pumped to sludge thickening plant, as described above.

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

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

The Head of Works import is located upstream of the rag and grit screens and storm offtake and discharged wastes are passed from tankers to the urban waste water treatment processes.

Following treatment over an appropriate number of days within the Primary Digester Tanks, digested sludge gravitates to Secondary Digester Tank number 4 and then Secondary Digester Tank number 2, which operate in series. 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 the digested sludge cake output quality requirements. Sludge is then pumped to the Sludge Buffer Tank, prior to being pumped to the digested sludge dewatering plant for dewatering. During abnormal operations of the digested sludge dewatering plant, digested sludge automatically diverts into the Emergency Sludge Storage Tank and is returned to the Sludge Buffer Tank under normal operations. Dewatered digested sludge is deposited into the cake barn and dewatering filtrate is returned to the UWWTD process for additional treatment via the site drainage and a Liquor Buffer Tank. Digested sludge cake is stored in Cake Barn 1 prior to removal from the site or transferred to the second Cake Barn. Digested sludge cake is removed from the site under the Sludge Use in Agriculture Regulations (SUiAR)1989, and in accordance with the Biosolids Assurance Scheme (BAS).

Biogas from the Primary Digester Tanks and Secondary Digester Tanks is captured within roof mounted biogas holders for storage. There is a roof mounted biogas holder at the top of each of the Primary and Secondary Digester Tanks. The biogas transfer pipeline is above ground and 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. Each of the biogas holders is fitted with pressure release valves (PRVs) as a safety precaution in the event of over pressurisation of the system.

The biogas is taken from each biogas holder and joins a common biogas line before it is transferred via boosters for combustion in the CHP engines, generating electricity for use both within the site and for export to the grid. Heat generated by the CHP engines is used to maintain Primary Digester Tank temperatures via heat exchangers. In exceptional circumstances, there may be a future need for a temporary hire boiler to provide auxiliary heat; if this need is realised, a separate contact would be made with the EA Area Office.

In the event there is excess biogas, i.e. more than the CHP engines can utilise, or in the event that the CHP engines are unavailable, there are two ground mounted biogas flares. The CHP engines and boilers are currently operated under an Environmental Permit which will be merged with this permit.

There are also two emergency generators at Beddington STW that are used for emergency only and regular testing and operate outside of this permit (i.e. are not DAAs).

This application includes the import of treated sludge cake from other works, for temporary storage within the two cake barns, pending offsite recovery. All such imports will be subject to appropriate waste pre-acceptance

and acceptance checks, prior to import, including checking whether the incoming cake complies with the requirements of SUiAR and BAS.

Imported treated sludge cake is offloaded into an area within one of the cake barns, so as to be stored separately to indigenous sludge cake. The waste stream is the same as that arising from the treatment of sludge within the Beddington 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. All imported cake is stored on an impermeable engineered surface within the cake barn, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank.

2. Technical Description

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

Scope

The variation 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. There are a number of Directly Associated Activities (DAAs), including the operation of combustion plant for the generation of electricity and heat at the site, which is classified as an 'existing' combustion source under the Medium Combustion Plant Directive (MCPD).

The combustion plant, consisting of three biogas CHP engines and two (non-operational) dual fuelled boilers, is covered by an existing environmental permit under number EPR/YP3430LL/V005. This permit is subject to a substantial variation to convert it to an installation permit with the CHP engines and boilers becoming a DAA to the listed activity.

Site Location

The Beddington STC is located at Beddington STW within an industrial and commercial area in the London Borough of Sutton. The site is located between the towns of Carshalton (to the west) and Croydon (to the east). Immediately to the east of the site is the B272 road and then a large industrial/commercial estate. To the south are former sludge lagoons associated with the STW and residential properties. To the south-west and west are open green spaces of Beddington Park and Beddington Farmlands (a landfill site) and to the north is the Beddington Energy from Waste facility. The nearest residential receptors are approximately 130m to the east of the STC on the boundary of the wider STW.

A surface water body which is a small stream, Oily Brook, can be found approximately 20 m to the west of the installation and flows into the River Wandle which is approximately 420 m south of the installation. Most of the STW and STC is within a Flood Zone 1, indicating that there is a low probability of river flooding (<1:1000 annual probability of flooding). However, assets within the STC including the digested sludge dewatering area and parts of the cake barn area are within a Flood Zone 2 indicating an increased risk of flooding, with between a 1 in 100 and 1 in 1,000 annual probability of river flooding.

There are five statutory designated habitat sites within the relevant distances of the site. The closest site is Wilderness Island Local Nature Reserve (LNR) which can be found approximately 1,300 m south-west of the site. Three further LNRs, The Spinney, Carshalton, Spencer Road Wetlands and Wandle Valley Wetland are found within 2 km of the site. A SAC, Wimbledon Common, is 7.8 km north-west of the site. There are no Ramsar sites, SPAs or MPAs within 10 km of the site and no SSSIs or Ancient Woodland within 2 km of the site. There are 17 non-statutory designated local wildlife sites (LWS) within 2 km of the site, the closest of which is Beddington Park/Beddington Farmlands which include the area of the installation.

Beddington STC is located is within an Air Quality Management Area (AQMA). The London Borough of Sutton has declared the Sutton AQMA for the whole of the Borough for both nitrogen dioxide NO_2 – 1-hour and Annual Mean, and for Particulate Matter PM_{10} – Annual and 24-Hour Mean. The site is not within a Source Protection Zone (SPZ).

A site plan, showing the permitted area of the Beddington STC and the wider STW can be found in Appendix A.2 while a process flow diagram summarising the sludge treatment process can be found in Appendix A.5. A site tank

inventory is included below, followed by the site process description which identifies where tanks are located within the sludge treatment process.

Site tank inventory

Tank Purpose	Number	Operational Volume (m^3)	Construction
Primary + SAS Buffer Tank	1	443	Steel
Sludge Import Tank	1	157	Steel
Thickened Sludge Buffer Tank	1	471	Steel
Primary Digester Tank	3	5,700 (1,900 each)	Concrete
Overflow Tanks	2	50 (25 each)	Plastic
Secondary Digester Tank	2	3,800 (1,900 each)	Concrete
Sludge Buffer Tank	1	312	Steel
Emergency Sludge Storage Tank	1	2,750	Steel
Liquor Buffer Tank	1	350	Steel
Digested Sludge Poly Silo	1	24 tonnes	Steel
Diesel Tank	2	100,000 litres	Steel

Waste Activities

The STC comprises of imports of waste for biological treatment and two additional waste activities (imports of non-hazardous waste to the head of the works and imports of non-hazardous waste to the cake 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 Beddington 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 tankered waste close to the inlet of the wider STW. These wastes are imported by tanker 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 points is controlled by the issue of keys by Thames Water to approved contractors only, who have undergone appropriate waste pre-acceptance checks on the material they wish to import. These keys enable the delivery tankers to discharge waste into the works, through a data logger which records the volume of waste transferred.

The head of works import point is of engineered concrete and kerbed to one side. The head of works import area is connected to site drainage that returns to the main inlet of the wider STW. All transfers of waste are via the site supplied flexible hose pipe (to prevent misconnections) and through a data logger. The data logger records the volume of waste material discharged, which gravitates to a subsurface chamber where it combines with the incoming materials from the low-level sewer. This is pumped to the inlet, where it combines with other sewer derived materials and is subject to aerobic treatment, under the UWWTD outside of the scope of this permit. A webcam covers the waste import area.

A second additional waste operation at the same site is for the import of non-hazardous treated, dewatered sludge cake from other works, for temporary storage pending transfer offsite. 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 Beddington 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.

All imported cake will be stored on an impermeable surface within the cake barns, for the shortest time practicable, the duration depending on factors such as prevailing weather and availability of the landbank.

Sludge Processes

Indigenous sludge is drawn off the Primary Settlement Tanks (PSTs) and pumped via Sludge Screens to the Primary and SAS Buffer Tank. Sludge is removed from the base of the Primary and SAS Buffer Tank and is pumped by duty transfer pumps to one of four drum thickeners for thickening. The Primary and SAS Buffer Tank is odour abated by an Odour Control Unit (OCU) and contains a high-level control, which is linked to the site Supervisory Control and Data Acquisition (SCADA) system, that would automatically inhibit the transfer pumps from the PSTs to prevent over-filling of the tank.

Sludge from other works is accepted into an inter-site transfer point for biological treatment and is pumped into the Sludge Import Tank. The Sludge Import Tank is odour abated by an OCU. Inter-site transfers are accepted via site-supplied transfer hoses and a sludge logger. Access to the sludge logger is via a key fob issued to drivers and the logger records the volume of sludge transferred and the originating site. Imported sludge is passed to Sludge Screens, to remove inorganic material and rag which is deposited in a skip for offsite disposal. Screened sludge is then passed to the Primary and SAS Buffer Tank where it combines with indigenous sludge before it is pumped to the drum thickeners for thickening.

There are four drum thickeners which dewater the sludge with the addition of a liquid polymer from an intermediate bulk container (IBC). The raw polymer is mixed with potable water / final effluent water in a mixing tank and stored in a day tank on each of the drum thickeners before it is pumped to each drum thickener. Filtrate from the belts combines in a common line and gravitates to Liquor Return Pumping Station 1 and is returned to the UWWT process for further treatment. Thickened sludge is pumped to the Thickened Sludge Buffer Tank. Anti-foam from an IBC is injected into the sludge line, downstream of the digester feed pumps to reduce the incidences of foaming within the digesters.

The Thickened Sludge Buffer Tank is an enclosed, above ground tank that is of steel construction and is mixed by external mixer pumps. Sludge from the drum thickeners enters the Thickened Sludge Buffer Tank at a high level and is removed from the base of the tank and is pumped by duty digester feed pumps to one of the Primary Digester Tanks. The Thickened Sludge Buffer Tank is odour abated by an Odour Control Unit (OCU).

Digestion process

There are three Primary Digester Tanks (PDTs) at Beddington STC which are of identical concrete construction, although they have different types of roofs. The three PDTs are all subsurface and extend approximately 10 metres below the level of the raised earth bank that encloses them. Sludge is fed in near the base of each PDT (within the digester gallery) continuously, with each digester being fed in turn. Each PDT is fitted with an external mixing system to prevent settling of sludge and is fitted with level-controls that are connected to the site SCADA system to prevent overfilling. Sludge is pumped out of each PDT and into the Secondary Digester Tanks.

Heating is provided to the PDTs via a heat exchange system that uses low temperature hot water from the three site CHP engines for each digester. Biogas from the PDTs is captured in roof mounted biogas holders. Primary Digester Tanks number 1 has a dual membrane type biogas holder on the top of the tank while Primary Digester Tanks numbers 5 has a floating roof biogas holder on top of the tank. Primary Digester Tank number 3 is currently in the process of having a dual membrane roof installed. Primary Digester Tank number 5 is planned to have the floating roof replaced with a new dual membrane type biogas holder within the current AMP period.

After treatment over approximately 18 days, digested sludge is transferred in series to Secondary Digester Tank number 4 and then Secondary Digester Tank number 2. Both Secondary Digester Tanks are of identical concrete construction and both have a dual membrane type biogas holder. Each of the Secondary Digester Tanks are subsurface, extending approximately 10 metres below the level of the raised earth bank that encloses them. Sludge is fed in near the base of Secondary Digester Tank number 4 (within the digester gallery) continuously, from one of the Primary Digester Tanks during the drawdown cycle and then gravitates to digester number 2. Each digester is fitted with an external mixing system to prevent settling of sludge and is fitted with level-controls that are connected to the site SCADA system to prevent overfilling. After approximately 6 days in total, digested sludge is pumped to the Sludge Buffer Tank for dewatering. In the event of abnormal operations downstream of the Primary Digester Tanks, digested sludge can be transferred to one of the Overflow Tanks for temporary storage, before being removed from the STC.

There is a sixth tank present within the same area as the Primary and Secondary Digester Tanks at Beddington STC which is decommissioned and not in use.

Under normal conditions, sludge is pumped to the Sludge Buffer Tank and then pumped to the digested sludge dewatering plant. The Sludge Buffer Tank is above ground and of steel construction that is mixed by external mixer pumps. Ultrasonic levels monitor the level of sludge within the Sludge Buffer Tank and if a high-level is reached, external pumps automatically transfer sludge into the adjacent Emergency Sludge Storage Tank (ESST) which provides additional sludge storage capacity.

The ESST is an above ground tank that is of steel construction and mixed by external mixer pumps. Sludge is automatically diverted to the ESST and has to be returned to the Sludge Buffer Tank before it can be dewatered. Ultrasonic levels monitor the level of sludge in the ESST to prevent overfilling.

There are four belt presses used to dewater the digested sludge at Beddington STC, which are located adjacent to the cake barns. Digested sludge is pumped from the Sludge Buffer Tank to one of the belt presses via a subsurface sludge line. Powder polymer coagulant, from a bulk powder silo, is diluted with final effluent and / or potable water in a make -up tank, stored in a storage tank and dosed to each digested sludge feed line to the belt presses. Under normal operating conditions, three of the four pumps are in operation but all four can run in parallel as required. Dewatered digested sludge is conveyed by covered belts into the cake barn for temporary storage. Filtrate from the belt presses is pumped to the Liquor Buffer Tank before it is returned to the inlet channel by Liquor Return Pumping Station 2, for additional treatment via the UWWT process.

The Liquor Buffer Tank is aboveground tank of steel construction that is used as a holding tank for liquors from the dewatering process before they are returned via the site drainage for further treatment via the UWWTD route.

Cake Storage

There are two cake barns at Beddington STC, Cake Barn 1 that receives digested sludge cake from the dewatering plant and Cake Barn 2 that is typically used for longer term storage. Both cake barns are semi-enclosed on three sides by a concrete retaining wall that is approximately 2 metres high, followed by fly netting to roof level. Both cake barns are roofed and the flooring is made of engineered concrete. Digested sludge cake falls to the floor within the cake barn and can be moved by plant machinery to the second cake barn, as required. There is a one-way system in operation for the cake barns and a drainage channel, that is automatically flushed with final effluent on a regular basis, is located between the two barns. This drains to the site drainage and is returned to the inlet for additional treatment. In the event of non-compliant sludge being produced at Beddington STC, it is stored within one of the storage bays for an extended period of time and marked with a 'NC' sign to prevent it being removed from site.

Digested sludge cake is subject to removal from both of the cake pads at Beddington STC under the Sludge Use in Agriculture Regulations 1989 (SUiAR), and in accordance with the Biosolids Assurance Scheme (BAS). A site-specific bioaerosol risk assessment for the STC is provided as Appendix F.

Biogas

Biogas produced in the three Primary Digester Tanks and two Secondary Digester Tanks is captured within the roof mounted biogas holders found on top of each tank. There are currently dual membrane biogas holders on Primary Digester 1 and Secondary Digester 2 and one steel, floating roof biogas holders (on PDT no.5). Primary Digester 3 and Secondary Digester 2 are both having dual membrane biogas holders installed at the current time (tanks are being worked on consecutively). The dual membrane biogas holders each have an inner and outer bag that is fitted with biogas detection systems and Pressure Relief Valves (PRVs) that operate in an emergency as a safety precaution in the event of over pressurising the system. Air blowers keep the biogas holder inflated and exhaust air is monitored by methane detectors to identify any leaks of biogas. The floating roof biogas holders also have dual PRVs that operate in an emergency as a safety precaution in the event of over pressurising the system. The replacement of the floating roof biogas holders by dual membrane biogas holders will result in new PRVs being installed but will not change the overall number of PRVs within the installation. The biogas holders are protected by different safety features with PDT no.1 and 3 and Secondary Digester Tanks no. 2 and no. 4 having laser detectors which measures the level of the sludge depth within the tank and the height of the membrane. PDTs no.5 fitted with ultrasonic level sensors that measure the sludge depth within the tank and the digester bell height. All PDT and Secondary Digester Tanks are further protected by lightning protection for safety.

Biogas is withdrawn from the biogas holders and combines in an aboveground common biogas line for the CHP engines. There are condensate pots (one by the PDTs and one on the common biogas line) and chiller units located upstream of biogas boosters that capture entrained moisture from the biogas and a siloxane removal system which removes impurities from the biogas prior to combustion within the CHP engines. Condensate pots allow moisture to be removed from the biogas and returned for treatment via the site drainage system. Biogas is combusted in one of three CHP engines, two of which are Jenbacher engines with a thermal input of 1.3 MWth each (CHP engines no. 7 and no. 8) and a single Edina MWM TCG 2016 v12 CHP engine with a thermal input of 1.408 MWth (CHP engine 9). All three CHP engines are located externally within self-contained units designed for external use and operate continuously on biogas with no back up fuels. The CHP engines generate electricity for use within the site and low-grade heat for the digestion process. Electricity generated by the CHP engines is also exported from the site to the National Grid when there is an excess to the site needs.

CHP engines are classified as 'existing' combustion plant under the Medium Combustion Plant Directive as all three were put into operation before 20th December 2018 and are permitted by the existing Combined Heat and Power Plant Environmental Permit (EPR/YP3430LL/V005) which is varied by this permit variation application. Emissions from each of the CHP engines is via a 15 m high stack.

Low grade heat is supplied from the CHP engines via heat exchange to the digesters within the digester gallery. This low-grade heat is supplemented by combustion of either indigenous biogas or diesel within one of two auxiliary boilers. The boilers are each 0.814 MWth Strebel dual fuel boilers located within the boiler house. Emissions from the boilers is via two 7 m high stacks. A 1,250-litre capacity double skinned plastic diesel day tank

supplies the boilers and is located adjacent to boiler house. At the current time, both Strebel boilers are non-operational.

In the event there is excess biogas, i.e. more than the CHP engines can utilise, or in the event that the CHP engines or boilers are unavailable, there are two ground mounted biogas flares. A second above ground common biogas line transfers biogas to one of the two biogas flares located at the site. These operate automatically when the average level of biogas within the biogas holders reaches a high set point and automatically stops when levels fall back below a second set point. The second biogas flare can be manually activated in the event of a very high level of biogas within the biogas holders. The biogas flares are currently utilised for more than 10% of the year, exceeding 876 hours use and therefore as per 'Note d' of Table S3.1 of the current permit, annual monitoring is required.

Emergency Standby Generators

The STW has two emergency standby generators that are used for emergency purposes only and regular testing and each emergency standby generator is equipped with its own diesel day tank. Bulk storage is provided by two single-skinned steel fuel tanks located within a concrete bund of a suitable size. Neither emergency standby generator is considered to be a Directly Associated Activity to the STC as neither meets the criteria under Guidance "Understanding the meaning of regulated facility" RGN2.

BAT Considerations

A BAT gap analysis has been completed for the STC against the associated BAT conclusions and this gap analysis is attached as Appendix D. Further infrastructure assessment will be completed if required for this site, to a standard and timescale as per sector guidance and as agreed with the Environment Agency.

2.1 BAT 3, 6, 7: Return Liquors

The Beddington STC 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 Beddington STC including the Overflow Tanks, Sludge Buffer Tank, the Emergency Sludge Storage Tank and the Liquor Buffer Tank.

Thames Water is committed to meeting the requirements 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 Beddington 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 Secondary Digester Tanks' biogas holders are also fitted with dual pressure relief valves which operate in an emergency to minimise releases from over- or under-pressurisation. Site operations are covered by Thames Water's management system, including the preventative maintenance programme for the site.

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

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

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

* mesophilic anaerobic digestion

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

- VFA (volatile fatty acid) concentration: There is no specific range for VFAs as it depends on the feedstock. It is used as an indicator of digester health rather than a process control. The production of organic acids depends on the volume of solids fed to the digester. The typical range for VFAs in a primary digester is between 50 and 800 mg/L. When VFA concentrations climb above 1000 mg/L, the digester could be overloaded or experiencing other problems.

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

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

Waste Tracking

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

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

Odour

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

Bioaerosols

Digested sludge cake is stored in open-sided cake barns (Dutch barns) which are 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

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

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

Other Risk Assessments

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

2.4 Regulatory listing

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

The relevant listing under Schedule 1 is:

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

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

(i) biological treatment.

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

- Imports of waste, including sludge from other sewage treatment works and imports of municipal liquids or sludges similar in composition to UWWTD derived materials;
- 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 back to the head of the sewage treatment works;
- Transfer of surface water runoff 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;
- Transfer of biogas condensate via site drainage back to the head of the sewage treatment works;
- Combustion of biogas in biogas CHP engines
- Combustion of biogas or diesel in boilers (not in use);
- Operation of emergency flares;
- Operation of siloxane filter plant;
- Storage of diesel
- Storage of wastes, including waste oils; and
- Storage of raw materials.

The waste activities at the site are:

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

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

- 2x 1.3 MWth Jenbacher CHP engines;
- 1x 1.408 MWth Edina CHP engine; and
- 2x 0.814 MWth boilers (below MCP thresholds; SGC not relevant);

Total listed thermal input of site is approximately 5.636 MWth, of which approximately 4.008 MWth is in routine use. The routine use does not include temporary use of boiler plant that is brought to the site, as required.

At the current time, there are plans to upgrade the Beddington STC with the following aspects scheduled to be upgraded:

- Installation of a new dual membrane biogas holder above the Primary Digester Tank to replace the existing floating roof of Digester 5.

3. Form C2 Questions

1 About the permit

1a Discussions before your application

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

1b Permit number

What is the permit number that this application relates to?

EPR/YP3430LL/V005 issued 15/12/2015

1c What is the site name, address, postcode and national grid reference?

Beddington Sludge Treatment Centre

Beddington Sewage Treatment Works

Beddington Lane

Croydon

Surrey

CRO 4TH

2 About your proposed changes

2a Type of variation

This is a substantial variation

2b Changes or additions to existing activities

Table C2-1 Proposed changes to current activities.

Name	Installation schedule 1 references	Description of the installation activity	Description of waste operations	Proposed changes document reference
Beddington STC	*Section 5.4 Part A(1) (b); i*	Biological treatment by means of Anaerobic digestion		This document
Beddington CHP Plant			Operation of CHP engines and boilers,	

			now a DAA to installation	

2c Consolidating (combining) or updating existing permits

Yes

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

Yes

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

EPR/YP3430LL – Beddington Combined Heat and Power Plant

2d Treating batteries

2d1 Are you planning to treat batteries?

No, this application is not for the treatment of batteries

2e Ship recycling

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

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

2d Low impact installations (installations only)

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

No, this application is not for a low impact installation

2g Multi - operator installation

No. This is not a multi-operator installation

3 Your ability as an operator

3a Relevant offences

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

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

Event Name	Court	Date of hearing	Fine	Summary

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

				Environmental Permitting (England and Wales) Regulations 2016.

3b Technical ability

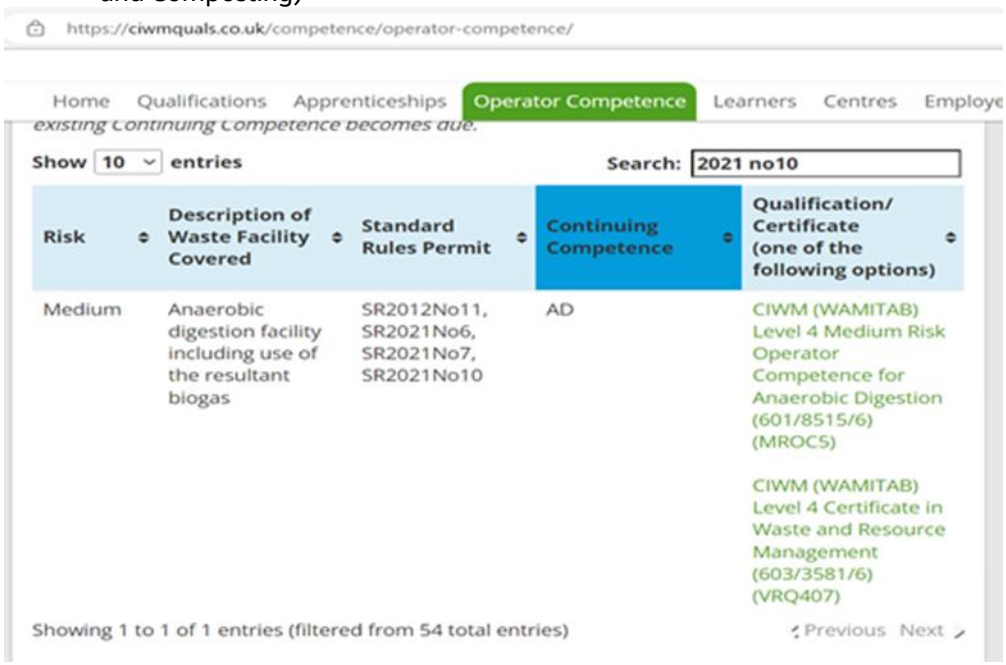
Thames Water uses WAMITAB qualified staff at their waste facilities. The relevant person for the site has been named below and full details have been provided separately on a spreadsheet

Mr Christian Sorrera

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

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

Yes. See Appendix C for the Site Condition Report.

5c Provide a non-technical summary of your application

Please see earlier text, Section 1.

5d Risk of fire from sites storing combustible waste

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

5f Adding an installation

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

6 Environmental risk assessment

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

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

Designated site review

Site Name	Designation	Direction from site	Distance from site
Wimbledon Common	SAC	North-west	7,800 m
Wilderness Island	LNR	South-west	1,300 m
The Spinney, Carshalton	LNR	West	1,600 m
Spencer Road Wetlands	LNR	North-west	1,750 m
Wandle Valley Wetland	LNR	North-west	1,900 m
n/a	MPA		
n/a	Ramsar		
n/a	SPA		
n/a	SSSI		
n/a	Ancient Woodland		

List of Local Wildlife Sites	
Caraway Place Pond Bandon Hill Cemetery Carshalton Ponds, The Grove and All Saints Churchyard Beddington Farmlands Beddington Park The Spinney (Nightingale Road Bird Sanctuary) St Mary's Court Wildflower Area, Bute Road Queen Elizabeth Walk Duppas Hill Waddon Ponds Wandle Park Upper River Wandle Therapia Lane Rough Mill Green Land north of Goat Road Croydon Cemetery complex Mitcham Common	All sites <2,000 m

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

There are four statutory designated habitat sites within the relevant distances of the site. The closest is Wilderness Island Local Nature Reserve (LNR), approximately 1,300 m south-west of the site. The Spinney, Carshalton is a second LNR approximately 1,600 m west of the site, Spencer Road Wetlands LNR is approximately 1,750 m north-west of the site and Wandle Valley Wetland approximately 1,900 m north-west of the site. Wimbledon Common, a SAC, can be found approximately 7.8 km to the north-west of the site. There are no Ramsar sites, SPAs or MPAs within 10 km of the site and no SSSIs or Ancient Woodland within 2 km of the site. There are 17 non-statutory designated local wildlife sites (LWS) within 2 km of the site, the closest of which is Beddington Park/Beddington Farmlands which include the area of the installation.

Most of the STW and STC is within a Flood Zone 1, indicating that there is a low probability of river flooding (<1:1000 annual probability of flooding). However, parts of the STW including assets within the STC including parts of the cake barn area are within a Flood Zone 2 indicating an increased risk of flooding, with between a 1 in 100 and 1 in 1,000 annual probability of river flooding.

The site is within an Air Quality Management Area (AQMA) which has been declared by the London Borough of Sutton. This AQMA, the Sutton AQMA for the whole of the Borough of Sutton has been declared for both nitrogen dioxide NO_2 – 1-hour and Annual Mean, and for Particulate Matter PM_{10} – Annul and 24-Hour Mean.

The site is not within a Source Protection Zone (SPZ) but is within approximately 75m of a Zone 3 SPZ.

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
Amenity issues: Litter, vermin and pests	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, amenity and recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. The site is located in an industrial and commercial area in the London Borough of Sutton. The nearest receptors are commercial/industrial receptor approx. 50m to the east and residential dwellings approx. 100m to the east of the permitted area of the installation. Ecological receptors: There are no MCAs, SPAs or Ramsar sites within 10km of site. There are no SSSI or Ancient Woodland sites within 2km of the site. There are 4 LNRs within 2 km of the site, the closest of which, Wilderness Island, is approx. 1.3 km to the south-west. The Spinney Carshalton is approx. 1.6 km to the west, Spencer Road Wetlands is approx. 1.75 km north-west and Wandle Valley Wetland is approx. 1.9 km north-west of the site. There is one SAC, Wimbledon Common, approx. 7.8 km north-west of the site. There are 17 Local Wildlife Sites within 2 km of the site.	The wastes handled at the site are primarily liquids and sludges, along with UWWTD derived material delivered by sewer. As such, there is no source of litter within the materials handled at the site. In the unlikely event pests or vermin are observed on site a suitable contractor is called in as soon as practicable.	X
Dust and bioaerosols	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Litter above. The impact of dust on human health will depend on the distance and wind direction. For bioaerosols the distance is 250 metres.	The wastes handled at the site are liquids, sewage sludges and digested sludge cake, along with UWWTD derived material delivered by sewer. The site will not be handling inherently dusty or powdery wastes. Digested sludge cake retains a high moisture content and is not dusty. Sludge cake is stored within two semi-enclosed cake barns that is approx. 145 m from the nearest sensitive receptors, residential properties where sensitive receptors may be present for over 6 hours. Roads will be maintained to avoid the production of dust. A wheelwash is used for vehicles exiting the cake barn area. Please see Appendix F for the site specific bioaerosol risk assessment.	✓

Assessment of point source emissions to air Emissions deposited from air to land	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. For human health and ecological receptors, see notes for Amenity issues above. The impact of emissions from air on human health will depend on the distance and wind direction.	The site is located within an AQMA. Air emissions have previously been assessed by the Environment Agency and deemed satisfactory. Pressure relief valves are not used routinely to control biogas volumes and would only operate in an emergency. There are multiple outlets at Beddington STC that use biogas to reduce the likelihood of flaring, for which incidents of flaring are recorded by the site. Fugitive emissions to air are assessed in Table C3-3b(i).	X
Assessment of point source and fugitive emissions to water	The nearest surface water body is a small stream, Oily Brook, which can be found approximately 20 m to the west of the installation and flows into the River Wandle which is approximately 420 m south of the installation. Most of the STC is within a Flood Zone 1, indicating that there is a low probability of river flooding. However, some assets including the sludge dewatering area and parts of the cake barn area are within a Flood Zone 2 indicating an increased risk of flooding, with between a 1 in 100 and 1 in 1,000 annual probability of river flooding. Surface water drainage within the site drains to the inlet of the adjacent sewage treatment works for full treatment prior to discharge.	The main product of the process is a digested sludge cake, which is stored within Flood Zone 2, inside of a semi-enclosed cake barn on a concrete pad or which is made of engineered concrete that is equipped with drainage. Other aqueous discharges generated by process are limited (comprising 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. Liquors from the digested sludge dewatering are first pumped to a Liquor Buffer Tank, where they can be held for short periods of time before being returned to the main works for treatment. 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. For human health and ecological receptors, see notes for Amenity issues above. The impact of emissions from odour on human receptors will depend on the distance and wind direction.	The wider sewage treatment works, which includes the area of the STC to be permitted has processes in place to minimise odour which includes physical containment, odour abatement, management systems, procedures and monitoring to control fugitive emissions of odour at the plant. Odour from the STC cannot be considered in isolation from the wider works. The sewage treatment works has an odour management plan, which is appended as Appendix E. Odour emissions are assessed in Table C3-3b(ii).	X

Energy	Global atmosphere (direct and indirect emissions)	Use of biogas on site within the CHP engines and/or boilers minimises the need to import non-renewable electricity from the National Grid. Export of renewable electricity to the National Grid can offset consumption of fossil fuels within the energy mix, lowering the carbon intensity of power. Good maintenance procedures will help the plant run efficiently and reduce site energy consumption. Use of LED lighting reduces site consumption.	X
Land and disposal of waste to other processes	Rivers and streams – see Assessment of point source and fugitive emissions to water above. Drainage systems/sewers. The site lies outside any Groundwater source protection zones (SPZ). Aquifers are classified as Unproductive (solid deposits) and Secondary A (superficial deposits).	All waste streams are disposed of off-site for recovery or disposal and will continue to be transferred (and consigned where hazardous) to appropriately permitted facilities.	X
Noise and vibration	Human health receptors: Single houses or groups of houses (estates, villages etc.). Schools and hospitals. Footpaths, amenity and recreation areas such as playing fields and playgrounds. Industrial estates and rail stations. The site is located in an industrial and commercial area in the London Borough of Sutton. The nearest receptors are commercial/industrial receptor approx. 50m to the east and residential dwellings approx. 100m to the east of the permitted area of the installation. Ecological receptors: There are no MCAs, SPAs or Ramsar sites within 10km of site. There are no SSSI or Ancient Woodland sites within 2km of the site. There are 4 LNRs within 2 km of the site, the closest of which, Wilderness Island, is approx. 1.3 km to the south-west. The Spinney Carshalton is approx. 1.6 km to the west, Spencer Road Wetlands is approx. 1.75 km north-west and Wandle Valley Wetland is approx. 1.9 km north-west of the site. There is one SAC, Wimbledon Common, approx. 7.8 km north-west of the site. There are 17 Local Wildlife Sites within 2 km of the site.	Site design has been chosen to minimise the impact of noise on offsite receptors through building orientation, finishes and location of openings. Noise from plant and equipment will be minimised through purchasing decisions and a robust preventative maintenance programme. There will be no sources of vibration within the facility. Noise and vibration emissions are assessed in Table C3-3b(iii).	X
Other issues (including visual impact)	Protected Species & Habitats	There are no records of protected species or protected habitat located within the specified screening distance (within 500m) of the site. The installation does not discharge directly to nearby	X

		watercourses and the final effluent discharge is regulated under a separate environmental permit.	
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. However, the CHP engine will need to be replaced prior to 2050 when they reach the end of their operational lifespans.	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. May need to increase bund or containment volume for sewage treatment works or individual assets. Land spreading activities could be restricted during very wet, winter months. Although the site has a large cake barn area which would allow digested sludge cake to be stored prior to application, contingency plans to move digested sludge cake to other sites may be required.	X

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

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

4. Form C3 Questions

1 – What activities are you applying to vary?

Table 1a – Types of activities

Installation name	Schedule 1 references	Description of the Activity	Activity Capacity	Annex I and II codes and descriptions	Non-hazardous waste treatment capacity
Beddington Sewage Treatment Works AR1	S5.4 A1 (b) (i) Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving biological treatment Anaerobic digestion of permitted waste in five Primary 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).	>950 wet tonnes per day (throughput based on 11,400 m3/ 12 days (min) = 950 m3 per day)	R3: Recycling reclamation of organic substances which are not used as solvents R13 Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced) 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 1,780,000 wet tonnes per annum including indigenous UWWTD derived sludge from within the wider Sewage Treatment Works as per volume, calculations in Note 1 below.
Directly Associated Activities					
AR2	Imports of waste, including sludge from other sewage treatment works and imports of municipal liquid or sludges similar in composition to UWWTD derived materials;				
AR3	Blending of indigenous sludges and imported wastes/waste sludge prior to treatment;				
AR4	Storage of digestate prior to dewatering;				
AR5	Dewatering of digested sewage sludge				
AR6	Transfer of dewatering liquors back to the head of the sewage treatment works;				
AR7	Transfer of surface water runoff back to the head of the sewage treatment works;				
AR8	Storage of dewatered digested sludge cake prior to offsite recovery;				

AR9	Storage of biogas;
AR10	Transfer of biogas condensate via site drainage back to the head of the sewage treatment works;
AR11	Combustion of biogas in biogas CHP engines
AR12	Combustion of biogas or diesel in boilers (not in use);
AR13	Operation of emergency flares;
AR14	Operation of siloxane filter plant;
AR15	Storage of diesel
AR16	Storage of wastes, including waste oils; and
AR17	Storage of raw materials.

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**
AR18	Imports of wastes: to the works inlet for treatment through the UWWTD route	D13: Blending or mixing prior to submission to any of the operations numbered D1 to D12	n/a	Maximum waste throughput 10,000 wet tonnes per annum
	Digested sludge cake for temporary storage pending off-site removal	R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced). R3: Recycling or reclamation of organic substances which are not used as solvents	n/a	Maximum waste throughput 1,000 wet tonnes per annum

For all Waste Operations	**Total capacity**	**18,633 wet tonnes**	**[a] + [b]**
	Total STC treatment capacity (tank volume)	14,033 wet tonnes	[a]
	Total cake pad storage capacity	4,600 wet tonnes	[b]
For waste imports to the head of the works	Annual throughput (tonnes each year)	Imports: 10,000 wet tonnes	
For waste imports of digested sludge cake for temporary storage	Annual throughput (tonnes each year)	Imports: 1,000 wet tonnes	
Note 1: Treatment Calculation based on: **Primary & SAS Sludge: 46.17 tds/day; worse case 1.00% dry solids = 4,617 m^3/day = 1,685,070 m^3/year** **Imports 5.13 tds/day; worse case 3.00% dry solids =171 m^3/day = 62,410 m^3/year** **Total Combined import calculation 4,788 m^3/day; or 1,747,480 rounded to 1,780,000 m^3/year**			

Table 1b Types of waste accepted

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

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

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

Waste Code	Description of Waste
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01 [note 1]]
Note 1: comprising but not limited to: Thickening and dewatering liquors, centrate and filtrate derived from TWUL processes Waste from a portable toilet	

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

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

1c Recovery of hazardous waste on land

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

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

2 – Point source emissions to air, water and land

Table C3-2a – Emissions to Air

Air emission points currently permitted under permit EPR/YP3430LL/V005 are in bold.

Emission point reference and location [note a]	Source	Parameter	Limit [note b]	Unit	Reference Period	Monitoring frequency	Monitoring standard or method
A7 and A8 [Note boiler units are no longer operational]	**Exhausts of boilers 2a and 2b via 7m unimpeded vertical stacks**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	No limit	-	Hourly mean	[Note c]	In accordance with Environment Agency guidance note M2 'Monitoring of emissions to air'
		Carbon monoxide	No limit	-	Hourly mean		
A9	**Emergency standby biogas flare**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	No limit	-	Hourly mean	[Note d]	
A10, A12 and A13	**Exhaust of Jenbacher CHP engines 1 and 2 and MWM engine via individual 15m unimpeded vertical stacks**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	500	mg/Nm^3	Hourly mean	Annually	
		Carbon monoxide	1,400	mg/Nm^3	Hourly mean	Annually	
		Total Volatile Organic Compounds (VOCs) [Note g]	No limit	-	Hourly mean	Annually	
A11	**Emergency standby biogas flare**	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	No limit	-	Hourly mean	[Note d]	
A14	Primary Digester Tank PRV	-	-	-	-	-	-
A15	Primary Digester Tank PRV	-	-	-	-	-	-
A16	Primary Digester Tank PRV	-	-	-	-	-	-
A17	Secondary Digester Tank PRV	-	-	-	-	-	-
A18	Secondary Digester Tank PRV	-	-	-	-	-	-
A19	OCU 1 [note h]	Hydrogen sulphide	No limit set	-	Average over sampling period	Once every 6 months	CEN TS 13649 for sampling. NIOSH 6013 for analysis OR US EPA M11

		Ammonia	20	Mg/m^3		Once every 6 months	EN ISO 21877 OR CEN TS 1369 for sampling NIOSH 6016 for analysis
A20	Siloxane Filter Stack	-	-	-	-	-	-

Note a: Emission points A1 to A6 are no longer in use

Note b: Limits are based on normal operating conditions and load. Uncertainty allowance for biogas engine is as stated in EA guidance LFTGN08 v2 2010

Note c: Annual monitoring of the boilers is only required if notified by the Agency, (based on a percentage usage of firing on biogas).

Note d: Annual monitoring is only required when flare operates in excess of 10% of the time, taken on an annual assessment period.

Note g: Annual monitoring of Total VOCs required, unless otherwise agreed in writing by the Environment Agency.

Note h: The monitoring of NH3 and H2S can be used as an alternative to the monitoring of the odour concentration if found relevant in the gas inventory. Along with HCl and TVOC

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

Table C3-2b – Liquor Transfers to Sewer

Emission point reference and location	Source	Parameter	Limit	Unit
T1 (as per site plan Appendix A.2)	Drum Thickening Liquor, OCU Waste Water, Surface Water Run Off	No parameters set	No limit set	-
T2 (as per site plan Appendix A.2)	Digested Sludge Dewatering Liquors, Biogas Condensate	No parameters set	No limit set	-
T3 (as per site plan Appendix A.2)	Surface Water Run Off	No parameters set	No limit set	-
T4 (as per site plan Appendix A.2)	Head of Works Import, Surface Water Run Off	No parameters set	No limit set	

3 – Operating techniques

3a - Technical standards

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

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

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

3b - General requirements

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

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

Risk Matrix and Terminology for Accident for Risk Assessment

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

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

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

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

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Emissions to air of NOx, SO_2, CO_2 and VOCs	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors	High	Low	Medium	Activities are managed and operated in accordance with the site management system (including inspection and maintenance of equipment, including engine management systems), point source emissions to air (CHP engines, boilers and biogas flare stacks) have emission limits. Each CHP engines has a stack height of 15 m high, both of the current boilers have 9 m high stacks, one flare stack is approx. 4 m high and flare stack approx. 6 m high. Site has a siloxane filter fitted on the main biogas pipeline connected to the CHP engines to remove impurities within the biogas. Previous modelling, which remains unchanged, identified no unacceptable impacts.	Low
Biogas transfer systems, biogas storage holders, CHP engines, biogas **flares or**	Abnormal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global	Low	Medium	Low	The biogas system utilised is subject to regular preventative maintenance, including a LDAR plan, to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow	Low

PRVs failure causing emissions of biogas		warming potential. Risk of fire and explosion				sensors and with isolation valves to minimise the potential for release if a leak is detected. Personnel on site wear portable biogas detectors in order to alert staff to presence of biogas. Two biogas flares are utilised for the safe disposal of surplus biogas above the level that can be safely stored or utilised, or during periods of plant breakdown. Use of biogas flares is recorded. PRVs are in place on the biogas holders to be operated in the event of failure of the biogas flares to prevent overpressurisation and catastrophic failure.	
Catastrophic loss of biogas emissions from biogas transfer systems, biogas storage holders, CHP 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 biogas system utilised is subject to regular preventative maintenance, including a LDAR plan, to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected. Two biogas flares are utilised for the safe disposal of surplus biogas above the level that can be safely stored or utilised, or during periods of plant breakdown. Use of biogas flares is recorded. PRVs are in place on the biogas holders to be operated in the event of failure of the biogas	Medium

						flares to prevent overpressurisation and catastrophic failure.	
Combustion of biogas within CHP engines and emergency flare. Combustion of biogas or diesel within boilers	Normal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Global warming potential	High	Low	Medium	Combustion plant is regularly maintained and appropriately sized to manage volumes of biogas. Combustion plant operates within permitted ELVs subject to routine monitoring against permit compliance. Combustion plant is located within a central location at Beddington STC. The nearest receptor to the boilers and the CHP engines is a commercial building approx. 100 m to the east and residential buildings approx. 160 m to the south-east.	Low
Release of bioaerosols and dust	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors. Odour impact of bioaerosols. Nuisance impact of dust.	Medium	Low	Low	The risk of bioaerosol and dust is as a result of digested sludge cake storage within two semi-enclosed cake barns. Cake barns are located in the southern part of the STC, adjacent to and facing each other. The enclosed sides face towards the nearby receptors, which are within 250 m of the cake barns. Residential receptors can be found approx. 125 m to the east of the cake barn and a commercial building can be found approx. 125 m to the north-east of the cake barn. The second cake barn is further from these receptors but still within 250 m. Digested sludge cake within the cake barns retains a high moisture content and is not prone to windblown dispersion leading to the generation of dust. Prevailing wind is from the	Low

						south south-west and digested sludge cake is stored below a solid wall with a clear freeboard between the top of the solid wall. Egress from the cake pad is via a wheelwash to minimise the transfer of digested sludge cake on to internal roads which could generate emissions of dust. Roads are made from concrete/asphalt and not prone to the generation of dust.	
Release of bioaerosols and dust from spillages	Abnormal	Emissions to air and dispersion leading to inhalation by local human and animal receptors with potential harm to health. Odour impact of bioaerosols. Nuisance impact of dust.	Low	Low	Low	Staff responsible for site housekeeping and cleaning of spillages in a timely manner. Sludge retains a high moisture content and is not prone to windblown dispersion which could cause the generation of dust in the event of a spillage. Internal site roads are made from concrete/asphalt and not prone to the generation of dust. Vehicle egress from the cake pad is through a wheelwash to reduce incidents of transfer from the pad to site roads.	Low
Spillage of liquids, including chemicals and oils.	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality	Low	Medium	Low	The installation lies outside of any Groundwater Source Protection Zones (SPZ). The nearest surface water body is a small stream, Oily Brook, which can be found approximately 20 m to the west of the installation and flows into the River Wandle which is approximately 420 m south of the installation.	Low

		Emissions to ground and ground water.				Chemicals and oils all stored within suitably bunded tanks and IBCs with rainwater removed as required to maintain 110% capacities. Penstock valves available within chemical delivery areas to contain large spillages Handling and use of chemicals and oils is carried out by trained personnel. COSHH data sheets available. Spill kits available on site. There are no point source emissions to water with drainage system pumping back to works inlet.	
Spillage from storage and digestion tanks, overtopping of tanks, leakage from same tanks and from buried pipes	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality Emissions to ground and ground water.	Low	Low	Low	The installation lies outside of any Groundwater Source Protection Zones (SPZ). Provision of suitable structurally integral tanks constructed from pre-cast concrete, or, steel with glass reinforced plastic. All tanks are subject to asset inspection and proactive maintenance programme including regular visual inspection for cracks or weeping. Visual checks during regular day-to-day operations and scheduled preventative maintenance of equipment, such as pumps, pipes, joins etc. Spill kits available on site. Staff are trained in their use	Low

						Biogas condensate discharged back to the works inlet through site drainage system. 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. Waste is stored securely for collection by appropriately licensed approved contractors. Litter picking activities are completed as required.	Low

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

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

Table C3-3b(ii) Odour risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
H_2S/biogas emissions from uncovered tanks	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	All tanks used for sludge digestion at Beddington STC are enclosed. The only unenclosed tanks are for digested sludge storage. Biogas will principally be generated in Primary Digester Tanks and captured for storage within the roof mounted biogas storage holders. Secondary Digester Tanks also enclosed with roof mounted biogas holders. H_2S production is controlled through the digestion process which can be manually overridden if required.	Low
Loss of containment from biogas holders and biogas pipework	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors	Low	Medium	Low	Biogas is stored within the dual membrane biogas holders or the floating roof biogas holders on the Primary Digester Tanks and Secondary Digester Tanks and are suitably sized to manage biogas generation and storage.	Low

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

						engines, (two boilers) and two biogas flares which are used in order of preference to maximise recovery of energy. CHP engines and boilers are subject to regular maintenance to maintain maximum use of outlets, with flares maintained in good working order should it need to be used. The nearest receptors are approx. 380 m west of the biogas holders.	
H_2S/biogas emitted when biogas cannot be combusted in CHP engines, boilers or flare	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	Biogas is principally stored within dual membrane biogas holders and the floating roof biogas holders on each digester which are suitably sized to manage biogas generation and act as buffer storage for biogas. Site has multiple outlets to use biogas – three CHP engines, two boilers and two biogas flares which are used in order of preference to maximise recovery of energy. The nearest receptors are approx. 140 m east of the closest biogas holder, with additional biogas holders a greater distance from the same receptors. CHP engines are subject to regular maintenance to maintain maximum use of outlets, with the biogas flares maintained in good working order should they need to be used.	Low

Storage of treated digested sludge cake	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	High	Low	Medium	Digested sludge cake is stored within two semi-enclosed cake barns towards the south of the installation. The nearest receptors are residential receptors approx. 125 m to the east of the cake barn and a commercial building which can be found approx. 125 m to the north-east of the cake barn. Digested sludge cake is an inherently low odour material and air dispersion is reduced by storage of digested sludge cake within the semi-enclosed cake barn which maintains a freeboard below the top of the solid wall.	Low
Failure of odour control units	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	High	Medium	Odour control units are subject to regular preventative maintenance. Media is replaced inline with the manufacturer's recommendations	Low
Storage of site generated wastes	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Low	Low	Wastes generated on site are not inherently odorous and is stored securely for collection by appropriately licensed approved contractors.	Low

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

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

Table C3-3b(iii) Noise risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Operation of CHP engine	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	Combustion assets are externally located and acoustically baffled within self-contained units. These provide a level of containment of noise and designed for external applications. Therefore, noise emissions are already low. Nearest sensitive receptors are commercial properties approx. 100 m east of the CHP engines. Good inspection regimes and maintenance of plant to ensure that excessive noise levels are not generated. Regular checks of noise mitigation measures fitted to items of plant. Such measures include silencers and baffles fitted to specific areas of plant. Where repair or replacement is required, the plant will, where possible, be taken out of service until repair or replacement of parts has been undertaken.	Low

Operation of fans on air cooled radiators	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	Air cooled radiators do not give rise to high levels of noise and are only used as required. They are located approx. 100 m from the nearest sensitive receptors, a commercial building. Good maintenance of fans to ensure that excessive noise levels are not generated. Where repair or replacement is required, this will be completed promptly.	Low
Operation of site vehicles	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.	High	Low	Medium	Vehicle movements across the site subject to speed limit to reduce generation of noise. Shovel loading of digested sludge cake takes place within the semi-enclosed cake barns which are located away from sensitive human receptors. The nearest receptors are approx. 140 m east of the cake barns	Low
Vehicle movements - tanker deliveries of waste and bulk collections of digested sludge cake	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.	High	Low	Medium	Imports of waste can be made to the inlet, which is approx. 50 m from the nearest receptors. Imports do not take place 24/7. Vehicle movements across the site subject to speed limit to reduce generation of noise. Shovel loading of digested sludge cake takes place within the semi-enclosed cake barns which are located away from sensitive human receptors. The nearest receptors are approx. 140 m east of the cake barns	Low

Vehicle movements - tanker deliveries of chemicals and raw materials	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors. Generation of vibration with ground transmission, causing loss of amenity to local human receptors.	High	Low	Medium	Deliveries likely to take place during daytime hours to dedicated delivery areas. The nearest of which is approx. 140 m from the nearest sensitive receptors. 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	Biogas flares are located away from sensitive receptors, over 325 m from the nearest sensitive receptors. Use of the biogas flares is minimized by prioritizing use of the three CHP engines. Use of the flares is recorded.	Low

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

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

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

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

3c - Types and amounts of raw materials

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

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

4 - Monitoring

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

Air emission points A1-A6 have been removed under previous variation applications.

The air emission points A7-A13 are monitored in accordance with EA guidance as applicable and the requirements of MCPD. A10, A12 and A13 (CHP engines) and A9 and A11 (emergency standby biogas flares) are subject to gas monitoring in accordance with the requirements of existing permit requirements and EA guidance.

Hours of operation of the standby biogas flares (A9 and A11) are monitored and logged. In the event that the total annual hours of operation exceed 10% of the hours in a year (876 hours), emissions from the flare would be subject to monitoring in accordance with EA guidance.

Point A19 (OCU) will be subject to bi-annual testing.

There is no routine monitoring proposed for points A14 – A18 (PRVs)or A20 (the Siloxane filter stack emission point).

Table C3-4a – Emission Monitoring

Monitoring point	NGR	Monitoring frequency	Methodology (standard)	Assessment procedures
A7 (Boiler 2a) Note unit is no longer operational	TQ 29906 66025	-	-	-
A8 (Boiler 2b) Note unit is no longer operational	TQ 29904 66024	-		-
A9 (Emergency standby biogas flare)	TQ 29737 65978	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 NO_2 expressed as NO_2) – Annually	In accordance with Environment Agency guidance note M2 "Monitoring of stack emissions to air".	BS EN 14792

Monitoring point	NGR	Monitoring frequency	Methodology (standard)	Assessment procedures
A10 (Jenbacher CHP Engine No. 7)	TQ 29898 66064	Oxides of Nitrogen (NO and NO_2 expressed as NO_2) – Annually Carbon Monoxide – Annually Total Volatile Organic Compounds–- Annually	In accordance with Environment Agency guidance note M2 "Monitoring of stack emissions to air".	BS EN 14792 BS EN 15058 BS EN 12619
A11 (Emergency standby Biogas Flare)	TQ 29729 65991	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 NO_2 expressed as NO_2) – Annually	In accordance with Environment Agency guidance note M2 "Monitoring of stack emissions to air".	BS EN 14792
A12 (Jenbacher CHP Engine No. 8)	TQ 29875 66061	Oxides of Nitrogen (NO and NO_2 expressed as NO_2) – Annually Carbon Monoxide – Annually Total Volatile Organic Compounds–- Annually	In accordance with Environment Agency guidance note M2 "Monitoring of stack emissions to air".	BS EN 14792 BS EN 15058 BS EN 12619
A13 (MWM CHP Engine No. 9)	TQ 29897 66047	Oxides of Nitrogen (NO and NO_2 expressed as NO_2) – Annually Carbon Monoxide – Annually Total Volatile Organic Compounds–- Annually	In accordance with Environment Agency guidance note M2 "Monitoring of stack emissions to air".	BS EN 14792 BS EN 15058 BS EN 12619
A14 (Primary Digester Tank PRV)	TQ 29850 66029	n/a		
A15 (Primary Digester Tank PRV)	TQ 29824 66018	n/a		
A16 (Primary Digester Tank PRV)	TQ 29799 66008	n/a		
A17 (Secondary Digester Tank PRV)	TQ 29860 66003	n/a		

Monitoring point	NGR	Monitoring frequency	Methodology (standard)	Assessment procedures
A18 (Secondary Digester Tank PRV)	TQ 29835 65993	n/a		
A19 (OCU)	TQ 29768 65986	Hydrogen sulphide Once every six months	CEN TS 13649 for sampling NIOSH 6013 for analysis OR US EPA M11	
		Ammonia: Once every six months	EN ISO 21877 OR CEN TS 1369 for sampling NIOSH 6016 for analysis	
A20 (Siloxane Filter Stack)	TQ 29876 66051	n/a		
S1 (Liquor sampling point)	TQ 29775 66023	n/a	MCERTS or ISO/IEC 17025 where available	
S2 (Liquor sampling point)	TQ 29905 65975	n/a	MCERTS or ISO/IEC 17025 where available	

4b - Point source emissions to air only

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

No

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

No

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

No

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

No

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

No

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

No

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

No

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

No

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

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

5 - Environmental impact assessment

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

No.

6 - Resource efficiency and climate change

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

The Primary Digester Tanks are heated using the recovered heat from the CHP engines.. Heat generated from the CHP engines is used to provide heat to the digesters and minimises the need to combust fuel within the boilers.

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

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

The main site energy source is electricity from the CHP engines supplemented by imported electricity from the National Grid. The site CHP engines combusts indigenous biogas with the electricity either used on site or exported to the public supply via National Grid if there is a surplus. The CHP engines also provides useable heat for hot water to the digesters, via heat exchangers. The boilers use diesel or biogas to supplement recoverable heat. Use of heat from the CHP engines reduces the demand on supplementary fuels in the two boilers.

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

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

Describe the specific measures you use for improving your energy efficiency

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

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

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

See response to question 3c above.

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

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

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

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

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

5. Form C4 Questions

1 About the permit

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

The original CHP permit was a waste level permit. This has now been incorporated within the installation permit as a DAA.

1b –types of waste accepted and restrictions

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

1c Deposit for recovery purposes

This is not a deposit for recovery application.

2 Point source emissions to air, water and land

Please see responses to form C3.

3 Operating techniques

3a Technical standards

Please see responses to form C3.

3b General requirements

Please see responses to form C3.

4 Monitoring

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

Please see responses to form C3.

4b Point source emissions to air only

Please see responses to form C3.

6. Form C6 Questions

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

Q1About the effluent – details and type, continued

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

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

1b Give this effluent a unique name

Liquor returns

1d Have you obtained all the necessary permissions in addition to this environmental permit to be able to carry out the discharge (see 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?

2,466 Cubic metres

3c What is the maximum rate of discharge?

28.54 Litres / second

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

2,466 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 and 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, [2,466m3 x 1000] / 86,400 seconds (24 x 60 x 60) from sources such as the thickening and dewatering.. This gives a value of 28.5416 litres, rounded up to 28.54 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 and biogas condensate generated from the inputs and outputs to/from the Primary Digester Tanks.

Q4 No questions

Q5 Should your discharge be made to the foul sewer?

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

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

5b2 Discharges from all other premises including trade effluent

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

Q6 How will the effluent be treated?

6a Do you treat your effluent?

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

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

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

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

The final effluent discharge from the wider sewage treatment works is specified in Environmental Permit TH/CSSV.0382/005

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 installations 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 installations effluents as per "Return Liquors BAT 3, 6, 7" within Appendix M.

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

7f What is the maximum temperature of your discharge?

20°C back into the sewage works

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

0°C

Q8 Environmental risk assessments and modelling

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

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

8d Discharges to groundwater

The installation does not discharge to groundwater

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

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

8f Environmental impact assessment

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

Q9 Monitoring arrangements

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

Not applicable to this installation

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

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

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

No flow meter installed

9e Does the flow monitor have an MCERTS certificate?

No. No flow meter installed

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

No. Not installed as part of this installation.

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

Please see site emission point plan.

Q10 Where will the effluent discharge to?

10a Where the effluent discharges to

Non-tidal river, stream or canal

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

No

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

N / A

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

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

Outlet 1

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

TQ 29520 66318

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

River Wandle, 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-BDN-DR-0001

A.2 Installation Boundary and Emission Point Plan

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

A.3 Site Impermeable and Permeable Surfaces Plan

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

A.4 Site Drainage Plan

See documents: BDNS1ZZ-DPL-001

A.5 Process Flow Diagram

See document: B22849AZ-JA-BEDDS1ZZ-LSX-DR-P-0001

A.6 Site Photographs

See document: TW_STC_EPR_19a_BDN_APPA.6

Appendix B. CoTC

See document: TW_STC_EPR_19a_BDN_APPB

Appendix C. Site Condition Report – H5

See document: TW_STC_EPR_19a_BDN_APPC

Appendix D. BAT Assessment

See BAT Assessment spreadsheet: TW_STC_EPR_19a_BDN_APPD

Appendix E. Odour Management Plan

Includes: Odour Management Plan and Odour Risk Assessment. See document: TW_STC_EPR_19a_BDN_APPE

Appendix F. Bioaerosol Risk Assessment

See document: TW_STC_EPR_19a_BDN_APPF

Appendix G. Containment Assessment

G.1 Containment Options Report (CIRIA 736)

See document: B22849AZ-JA-BDNS1ZZ-100-RP-Z-0001

G.2 Containment Assessment

See document: B22849AZ-JA-BDNS1ZZ-100-CA-P-0001

Appendix H. Leak Detection and Repair (LDAR) Plan

See document: TW_STC_EPR_19a_BDN_APPH

Appendix I. Residue Management Plan

I.1 Residue Management Plan

See document: TW_STC_EPR_19a_BDN_APPI.1

I.2 Material Safety Data Sheets Folder

See zip folder: TW_STC_EPR_19a_BDN_APPI.2

Appendix J. Accident Management Plan

See document: TW_STC_EPR_19a_BDN_APPJ

Appendix K. Acceptance of Third-Party Waste Imports

K.1 Acceptance of Third-Party Waste Imports

See document: TW_STC_EPR_19a_BDN_APPK.1

K.2 Acceptance of Thames Water Inter-Site Sludge and Cake

See document: TW_STC_EPR_19a_BDN_APPK.2

Appendix L. Air Quality Impact Assessment

Not required

Appendix M. Liquor Monitoring

See document: TW_STC_EPR_19a_BDN_APPM