Bioresources Permitting

Derby ASD for Resubmission

Document No. | 2.0

April 2024

Severn Trent Water Ltd

EPR/CP3638XZ/V003

Bioresources Permitting

Project No:	B19589DB
Document Title:	Derby ASD for Resubmission
Document No.:	
Revision:	Version 2.0
Document Status:	Issue
Date:	April 2024
Client Name:	Severn Trent Water Ltd
Client No:	EPR/CP3638XZ/V003
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File Name:	ASD Variation -Derby FOR ISSUE MAY 24

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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
Draft	01/09/2022	Client comment	JK	SP	MM	MM
Final	29/09/2022	Issue	JK	SP	MM	MM
Version 2.0	19/04/2024	Updated for re-submission	JK	MKM	JC	MKM

Contents

1. Introduction

This application relates to a substantial variation application for a bespoke installation bioresources treatment permit for the Derby Sewage Treatment Works, operated by Severn Trent Water Ltd.

The site is currently permitted for the operation of an existing Combined Heat and Power (CHP) Plant under the Environmental Permitting (England and Wales) Regulations 2016 (as amended), specifically three biogas engines, three standby dual fuelled boilers and a flare. This operation will be varied and become a Directly Associated Activity (DAA) to the main listed activity of the site, namely the biological treatment of sewage sludge for recovery. The site also has a current T21 waste exemption which allows for the recovery of waste at a waste water treatment works which will be superseded by this variation.

This substantial permit variation application relates to the addition of a listed activity to the site, that of biological treatment of waste under the Industrial Emissions Directive. It relates to the non-urban waste water treatment directive (UWWTD) treatment of indigenous UWWTD derived sludge and imported UWWTD sludges from other works and cess and septic tank imported material which is of a similar composition. Note that these operations are currently operated at the site, under the UWWTD and The Controlled Waste Regulations 2012 (paragraph 3 exclusion). The anaerobic digestion process will require an extension to the current site boundary.

The listed activity starts from the point of the separation of the sludge from the main UWWTD treatment stream, through to its storage on the site cake pad, prior to its recovery to land offsite. The additional aspects of the permit includes the biogas handling and treatment system as a directly associated activity, including biogas fuelled gas engines and dual fuel boilers. Although not permitted under the Medium Combustion Plant Directive (MCPD), these units are existing units, permitted prior to 2018.

A bespoke installation permit is required for this site due to its proximity to a number of designated habitat sites.

A number of other activities are undertaken at the site, outside of the scope of this permit, relating to the treatment of sewage derived materials through aerobic processes. These activities are covered by the UWWTD.

There is an adjacent permit, relating to a food waste AD plant, operated by a separate legal entity within Severn Trent Plc. The two permits do not overlap, although both permits utilise some of the same site infrastructure such as site roads and perimeter fencing.

1.1 Non-Technical Summary

This application is for a substantial variation to environmental permit EPR/CP3638XZ/V002 under the Environmental Permitting (England and Wales) Regulations 2016 (as amended), following a change of interpretation of the Urban Waste Water Treatment Directive by the Environment Agency.

The current permit for the site covers the operation of three CHP engines combusting biogas that is generated by the onsite anaerobic digestion of sewage sludge along with three auxiliary boilers duel fuelled by site generated biogas and diesel (gas oil). Sewage sludge arises from the indigenous treatment of UWWTD derived materials supplied to the site by the sewer network and from tanker imports of waste materials to the works inlet that are similar in composition to UWWTD derived materials. Indigenous sludge is mixed with imports of waste sludges from other water treatment plants and subject to biological treatment via anaerobic digestion within one of three anaerobic digester tanks located on site. Digested sludge can also be imported for dewatering only.

Previously, sewage treatment sites operated by sewerage undertakers importing sludges and liquids were only regulated for the import and treatment of these materials to the wider site and indigenous sludges arising from the treatment of sewage was not required to be included in a permit. It has now been determined that the treatment of indigenous sludges do need to be permitted as they fall outside of the Urban Waste Water Treatment Directive (UWWTD).

This variation application is:

- To incorporate the addition of a new listed activity to the permit, that of biological treatment by anaerobic digestion, to make this an installation permit;
- To increase the overall waste throughput of the site to include both imported and indigenous derived sewage and similar wastes;
- To change the operation of biogas fuelled Combined Heat and Power units on the site to a directly associated activity;
- To change the operation of diesel fuelled auxiliary boilers on the site to a directly associated activity; and
- To amend the site boundary to include the area of the anaerobic digestion plant and directly associated activities.

The installation covers the biological treatment of sewage sludge, both indigenous and imported from other waste water treatment sites, in a mixture with imported cess and septic tank derived wastes, by anaerobic digestion, with a capacity above the relevant threshold. There are a number of directly associated activities, including the operation of three dual fuelled CHP units for the generation of electricity and heat at the site, which are currently permitted.

The site is located in an industrial area on the eastern side of Derby in a loop of the River Derwent.

The waste activity comprises an offloading coupling for tankers and cess vehicles to discharge through, located at the works inlet. All tanker imports are passed through a logger to record the incoming volume and the company carrying out the import. The import is directly into the works inlet, with no holding or blending tanks before the import. Once the tanker waste has mixed with the incoming UWWTD material, its treatment falls outside the scope of the Environmental Permitting Regulations.

There is also a waste import for digested cake from other sites, for temporary storage on site prior to removal for treatment elsewhere. This cake would be stored in a segregated area of the cake pad.

The installation is for the biological treatment of non-hazardous wastes by means of anaerobic digestion. It also comprises an import point at the works inlet for cess and septic tank imported materials from third parties to join the UWWTD route for aerobic treatment. There is also an import point for sludge transfers from other waste water works, near to the anaerobic digester assets. This material is transferred and blended with the indigenous sludge separated from the main aerobic treatment flow and site derived SAS (surplus activated sludge).

The thickening sludge blending tank is used to ensure that the incoming materials are properly mixed to give a more homogeneous mixture, prior to transfer to the acid phase digesters which pre-treat the sludge for digestion in the downstream gas phase digesters. All digesters are above ground, enclosed, tanks and manufactured of concrete and operate on a continuous process basis, that is incoming sludge is added to the process as digested sludge is removed from the primary digesters. Removed sludge is transferred to one of two above ground pathogen kill tanks to ensure that the required level of pathogen kill has been achieved. Following this, fully digested sludge is transferred to site dewatering equipment, where, following the addition of polyelectrolyte based coagulant, it is dewatered and stored on the sites open cake pad. Treated cake is removed from the pad for landspreading under the Sludge Use in Agriculture Regulations 1989, in accordance with the Biosolids Assurance Scheme (BAS).

Separately, digested sludge from other treatment sites can be imported for dewatering purposes within the site dewatering plant.

Biogas is captured from the primary anaerobic digesters and stored within a telescopic roof biogas storage holder. The above ground biogas transfer pipeline is equipped with condensate pots that capture entrained moisture from the generated biogas and allow it to be drained into the site drainage system for treatment. The

biogas storage vessel is fitted with pressure release valves as a safety precaution in the event of over pressurising the system.

The biogas is taken from the storage vessel for combustion in one of three currently permitted CHP engines, generating electricity for use both within the site and for export to the grid, and heat to maintain primary digester temperature. Biogas can also be used in three dual fuelled auxiliary boilers. In the event there is excess biogas, i.e. more than the CHP can utilise, or in the event that the CHP is unavailable, there is a ground mounted emergency flare. This is utilised under 10% of the year.

There is a request for a pre-operational condition within this application. The three CHP engines currently at the site are scheduled to be replaced. The new engines will share the location of the existing engines, including their stack locations. As the emissions will remain as at present, a pre-operational condition is requested to update the permit emission references to new references when the replacement engines are commissioned.

2. Technical Description

This application is for the substantial variation of the site's existing permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended), following a change of interpretation of the Urban Waste Water Treatment Directive by the Environment Agency. It relates to the permitting of indigenous sewage sludge and imported sewage sludge and other wastes for treatment by anaerobic digestion for the Derby Sewage Treatment Works, operated by Severn Trent Water Ltd (Severn Trent).

Scope

The substantial variation to the permit is to include a new listed activity, the biological treatment by anaerobic digestion, of indigenous sewage sludge in a mixture with imported cess and septic tank derived wastes. The existing biogas fuelled CHP engines and dual fuel boilers will become a DAA to this installation activity. The site operates 24 hours per day with the site being unstaffed overnight. A standby rota picks up alarms overnight.

Location

The site is located in an industrial area on the eastern side of Derby in a loop of the River Derwent. The majority of the installation sits on an island within the River Derwent loop, with a separately permitted food waste AD plant to the west of the boundary and then industrial premises. To the south on the island is a waste treatment plant and more industrial premises. To the east is the wider sewage works and then industrial premises, while to the north is more industrial premises. The nearest residential properties are approximately 650m northeast of the site.

The site sits entirely within an area benefitting from flood defences, which is classified as flood zone 2 (with defences), indicating that it has between1:100 and 1:1000 probability of flooding in any year. The site sits outside any designated source protection zone (SPZ) for groundwater, but is within a drinking water protected area and safeguard zone, with respect to surface water. There are three designated habitat sites, all local nature reserves (LNR) within 2km of the site along with 15 local wildlife sites (LWS). The nearest SSSI is approximately 3km from the site. There are no SAC; SPA; or RAMSAR sites within 10km of the site. The site is not within an Air Quality Management Area. The cake pad at the site is approximately 120m from the nearest offsite receptors, which are industrial premises to the northwest of the installation. The River Derwent surrounding the site is also designated for a protected species, the European Eel.

Waste Activities

The waste activity comprises an offloading coupling for tankers to discharge through, located at the works inlet. All imports are passed through a logger to record the incoming volume and the company carrying out the import. The import is directly into the works inlet, with no holding or blending tanks before the import. The waste codes for imported waste accepted at the installation are detailed in Form C3, Table C3-1b. Once the tanker trade waste has mixed with the incoming UWWTD material, its treatment falls outside the scope of the Environmental Permitting Regulations. All wastes imported for treatment have been subject to pre-acceptance checks and approval prior to acceptance, including testing of samples of the waste, when required by Severn Trent's waste pre-acceptance procedures. Wastes imports are booked in to the site on a daily basis and offloading monitored by site operatives. Imported wastes are subject to periodic checking at the site for compliance with the supplied pre-acceptance data, in line with the organisations waste acceptance procedures.

There is also a waste import for digested sludge for dewatering prior to storage on the cake pad, as well as imports of treated cake from other sites, for temporary storage on site prior to removal for land application elsewhere. Imported cake would be stored in a segregated area of the cake pad.

Installation Activities - Sludge Processes

There is an offloading coupling for tankers to discharge UWWTD derived sludge from other waste treatment sites to. All wastes imported for treatment have been subject to pre-acceptance checks and approval prior to

acceptance. Wastes imports are booked in to the site on a daily basis and offloading monitored. Imported wastes are subject to periodic checking at the site for compliance with the supplied pre-acceptance data, in line with the organisations waste acceptance procedures.

Sludge is passed through a logger to record the incoming volume of sludge, with the imported sludge being blended with thickened indigenous SAS and indigenous primary sludges prior to the biological treatment process, within an enclosed thickening sludge blending tank (2,245m^3). SAS is stored in an open topped Surplus Activated Sludge (SAS) buffer tank of approx. 600m^3 capacity prior to blending.

The digestion process is a two-step process using acid phase digestion to pre-treat the sludge before the gas phase digestion in conventional digester tanks. There are two acid phase digester (APD) and three above ground gas phase primary anaerobic digesters (primary digesters) which are of concrete construction. All digesters are fully enclosed. Each of the acid phase digesters and primary digesters are fitted with pressure relief valves, which operate in an emergency only. The digesters operate on a continual basis with incoming sludge added to the process as digested sludge is removed. Sludge is held within each digester, before being passed to the two pathogen kill tanks for the period specified by the site's HACCP (hazard and critical control point) plan for the Sludge (Use in Agriculture) Regulations. The two pathogen kill tanks are above ground, open topped, concrete tanks of approx. 3,663m^3 capacity. The digested sludge is then mixed with a polymer coagulant and imported digested sludge and dewatered using one of two centrifuges. The supernatant liquor is returned to the head of the STW for aerobic treatment via the UWWTD treatment route.

Cake Storage

The sludge cake is transferred to an open, engineered cake pad following dewatering. The sludge is analysed to check compliance with Sludge Use in Agriculture Regulations (1989) (SUiARs), in accordance with the Biosolids Assurance Scheme (BAS) and once the sludge is confirmed to be compliant it is removed from site for land spreading. Digested sludge can be imported from other waste water treatment sites for dewatering within the site dewatering plant. Cake storage on the pad allows for around 30 weeks of operational storage.

Should a quantity of cake be deemed non-compliant with regards to SUiAR or BAS requirements, it is Severn Trent policy that the cake will not be exported from site until it meets the standards required by the relevant onward legislation (SUiAR/EPR) and BAS. Non compliant cake can be separated and stored on the cake pad within a quarantined bay, and suitably recorded until remedial actions can be decided and implemented. Remedial actions may include additional treatment (e.g. the addition of quick lime) or alternative disposal (e.g. restoration). The compliance result would be reported to the Bio-resources Operations Manager, the process support team and other relevant stakeholders. The treatment process would be reviewed to understand the likely cause of failure and mitigating actions to ensure the quantity of non-compliant material produced would be minimised. The most appropriate treatment/disposal options would be reviewed, and next steps agreed. For additional treatment, arrangements would be made to ensure the treatment was conducted safely and resulted in compliant sludge cake. For lime treatment, this would be performed by Severn Trent's nominated contractor on site with suitable work authorisations and operating procedures in place. Once the material has been treated, it would be recycled to land once suitable checks to confirm compliance had been completed. For alternative disposal, a suitable disposal outlet would be identified. Their site permit would be reviewed to ensure the site was suitable and formal quotation received. Deliveries would then be scheduled with the agreement of the receiving site who may require additional sampling or sample assessment and "trial loads" before regular deliveries can commence. Delivery volumes may be dependent on availability of the receiving site and/or other resources.

The timescales for these processes will vary dependent on various factors; e.g. the nature of the additional treatment required, availability of resources or equipment, availability of alternative disposal (e.g. suitable restoration site) and Severn Trent may be dependent on third parties. Severn Trent will attempt to implement the relevant actions in a reasonable timeframe but due to dependency on the availability of a restoration site, this could be several months. Where loads cannot be moved within a reasonable timeframe, options would be discussed with local Environment Agency officers.

During the period where quarantined cake is stored on site, it will be securely stored on the cake pad and inspected weekly during the site stock checks.

Waste cake from other sites may also be imported to the site for temporary storage on the cake pad, prior to removal offsite. This cake will be stored separately on the pad from indigenous cake, and will be identified as imported cake on site.

Liquor Returns

Site drainage and liquor returns from operational areas are captured within the site wide drainage system and returned to the head of the works for treatment within the UWWTD treatment route. The site drainage plan is included within **Appendix A**.

There are two transfer points for liquor to return to the works inlet, which is shown on the emission point plan and are listed in Table C3-2, one to the north of the site and the other to the east.

The UWWTD processes, which fall outside of the scope of this permit application, at the wider site consist of:

- Primary settlement tanks (PSTs);
- Activated sludge lanes (ASPs);
- Tertiary settlement.

Treated, final effluent is then discharged to the River Derwent under the terms of environmental permit:

- MI/T/48/45678/R/007

(The final effluent sampling point is at grid reference SK 39360 34490)

Waste waters are captured within the site drainage system and returned to the works inlet for treatment via the UWWTD treatment route.

The main decision on whether additional treatment is required for the return liquors is carried out at the commissioning stage of the sludge facility, and reassessed on upgrading of any on site techniques. This assessment would result in whether an on site liquor treatment plant is required prior to returning the liquors to the wastewater treatment works inlet. There are two key parameters that determine the need for treating liquor prior to returning to the inlet. If the liquors are from pre-digestion sources, then BOD will be the primary factor. From post-digestion activities, Ammonia is the key factor. The need for a liquor treatment plant within the design is assessed by our Process Design Team (TPE). The assessment will take into account expected sewage and sludge loads, the load from the digestion process, the final effluent permit conditions for the sewage treatment works and the capacity of the existing secondary sewage treatment stage. The installation of advanced digestion processes such as THP, usually results in the requirement for an LTP. Once the site is commissioned, the Process Team continue to assess the performance of the liquor returns through the ASP process sampling.

There are no direct emissions to water from the sludge treatment facility. The only indirect emission is of the sludge liquors and surface waters, which are returned to the wastewater treatment works for aerobic treatment under Urban Wastewater regulations. The liquors returned from the sludge treatment facility have originated from wastewater treatment works that are also under the control of Severn Trent Water. Therefore, the majority of process controls and sampling are carried out upstream of the point where liquors are returned from the sludge treatment facility to the onsite wastewater treatment works.

Biogas

Biogas from the primary digesters is captured and transferred to a floating roof gas holder. Biogas can then be combusted within one of three, currently permitted, CHP engines on site, which runs on biogas only and provides both electricity to the site processes and heat to maintain the primary digester temperature. Electricity can also be exported to the National Grid when there is excess supply above the site needs. The site also has three dual

fuelled auxiliary boilers and an auxiliary flare stack that can combust biogas when there is excess biogas that cannot be combusted by the CHPs or when the CHPs are offline for maintenance. Biogas is transferred from the gas holder via a biogas pipeline that is largely above ground and is fitted with condensate pots that capture entrained moisture from the generated biogas, and allow it to be drained into the site drainage system for aerobic treatment via the UWWTD treatment route.

There are three CHP engines at the site:

2x Jenbacher 316 models, with a thermal input of 2,140kW, electrical output of 850kW;

1x Perkins Ener-g 4006, with an approx. thermal input of 750kW, electrical output of approx. 300kW.

The three engines are currently covered by a waste permit.

In the event there is excess biogas, i.e. more than the CHPs can utilise, there are three dual fuelled auxiliary boilers and one ground mounted emergency flare. The flare is utilised under 10% of the year. Hydrogen sulphide (H_2S) and siloxane levels are monitored within the biogas and treated if required by their concentrations. No routine dosing for H_2S with ferrous sulphate is undertaken within the permitted processes on site.

Process Monitoring

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, including for the presence of foaming, which is treated with anti-foam as appropriate. All tanks are equipped with appropriate high-level alarms and automatic cut off valves to minimise the risk of overtopping. Site operations are covered by Severn Trent's ISO14001 accreditation for all operations, and technical competence is provided by the organisations CMS and training program.

BAT Considerations

The existing site infrastructure is not currently fully compliant with the requirements of BAT, specifically with regards to containment and surfacing.

Site drainage from operational areas is captured within the site wide drainage system and returned to the head of the works for treatment within the UWWTD treatment route. These returns enter the inlet after the storm offtake and therefore, cannot bypass onsite treatment via the UWWTD route. Site drainage plans are included within Appendix A.

BAT Assessment

Site tank inventory

Tank Type	Number	Volume (m^3)	Construction	Status
Thickening Sludge Blending Tank	1	2,245	Steel	Enclosed
Surplus activated sludge (SAS) Buffer Tank	1	600	Steel	Open
Acid Phase Digester Tank	2	800	Concrete	Enclosed

Primary Digesters	1	3,159	Concrete	Enclosed
	2	3,000	Concrete	Enclosed
Pathogen Kill Tank	2	3,663	Steel	Open
Primary Sludge Storage Tank	1	683	Steel	Enclosed

A full assessment of the relevant sections of the Waste Treatment BREF are supplied as Appendix D.

Containment

The site infrastructure is not currently fully compliant with the requirements of BAT, specifically with regards to containment. A spill risk assessment and proposed containment solution, in accordance with CIRIA 736 is supplied as Appendix F.

The outline containment solution does not utilised flood gates within its design.

Open Topped Tanks

There are a number of open top tanks within the permit boundary at Derby, including the pathogen kill tanks. It is acknowledged that there may be emissions of biomethane and/or odour from some of these tanks, and Severn Trent is preparing a monitoring exercise to determine the nature of any emissions and the quantity. Based on these outputs, the requirement for covering the tanks will be assessed, in accordance with the design of the existing tanks and HSE requirements around ATEX and DSEAR, in accordance with the applicability notes for BAT 14d.

As part of any tank cover design, the initial monitoring data will be necessary to determine if the correct routing of any gas from the tank headspace would be to the biogas utilisation system or to a new OCU. The quantification of tank emissions is needed to determine if the gas treatment assets also require upgrading, e.g. existing engine utilisation levels. If an OCU is the required for the gases, the quantification and nature of the emissions will be required in order to ensure that the unit is sized correctly, with the right media to deal with the substances present.

Due to the variability of air pressure on the potential release rate of gas from the tank contents, it is proposed that the monitoring exercise will involve 4 rounds of sampling over a 6 month period, to reflect levels at different ambient air temperatures and atmospheric pressures.

All proposed coverings will be subject to a cost benefit analysis, based upon the Environment Agency tool.

A full assessment of the relevant sections of the Waste Treatment BRef are supplied as Appendix C.

Liquor Returns Monitoring

There are no direct emissions to water from the sludge treatment facility. The only indirect emission is of the sludge liquors and surface waters, which are returned to the wastewater treatment works for aerobic treatment under Urban Wastewater regulations. The liquors returned from the sludge treatment facility have originated from wastewater treatment works that are also under the control of Severn Trent Water.

Severn Trent Water have always undertaken periodical sampling of ammonia on the centrate returns with regard to loading impacting the operation of the treatment works. We are currently shadow sampling twice monthly for Ammonia, Soluble BOD, Total BOD, Orthophosphates and Suspended Solids on the dewatering centrate at Derby

using the sample points noted in the table C3-3. Direct regular sampling of these returns is a fairly recent addition to our processes so our understanding of the variance in these returns is developing. COD, BOD, Total Nitrogen, TOC, Ammoniacal Nitrogen, total Phosphorous, suspended solids and pH are directly available at our UKAS accredited contract laboratory and we will begin sampling for these determinands. Not all processes have flow meters on the return lines, assumptions will be made from the throughput of the asset. Temperature would be a field based measurement, currently this is not measured. STW will aim to sample for PFOS and PFOA on a six monthly basis to build up a data set but due to the two weeks analysis turn around, these are not of use to the live operational process.

The data obtained from the return sampling will then be used to optimise the process and STW will carry out root cause investigations with the process support teams to understand what changed on site and ensure that we can reduce the risk to the inlet. If any abnormalities are identified in the sample data following root cause investigations, the Process Team will collaborate with wider site based teams and the Catchment team to ascertain the cause.

As part of the new IED permit and in line with BAT 3, we commit to carrying out further chemical analysis of the waste water, testing for all pollutants expected to be present in the discharge. We are currently in discussion with UKAS accredited laboratories to see what analysis is possible on our leachate returns, and what 'minimum reporting value' is appropriate. This review will be undertaken in line with EA guidance, for example 'Surface Water Pollution Risk Assessment for your environmental permit', and 'Monitoring Discharges to Water'. The sampling will be undertaken by our suitably trained internal teams that already undertake compliance sampling for EA discharge permits to MCERTS standards. Analysis will be contracted to UKAS accredited laboratories.

Other Considerations

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

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

The cake pad at the site sits within 120m of the nearest offsite receptors, which are industrial buildings located to the northwest of the site. Severn Trent has undertaken bioaerosols monitoring of cake pads at this site and found there is a low risk of bioaerosols. For both upwind and downwind locations results remained below the industry standard threshold values of 500cfu/m^3 for Aspergillus Fumigatus. Upwind and downwind locations results remained below the industry standard threshold values of 1000cfu/m^3 for Total Bacteria.

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

2.1 Regulatory listing

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

The relevant listing under Schedule 1 is:

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

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

(i) biological treatment;

In addition to the listed activity at the site, there is a directly associated activity of a biogas combustion plant which is also a specified generator, which are already permitted under the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

The site includes the following Directly Associated Activities (DAA), with currently permitted activities in bold:

- Import of sewage sludge, cess and septic tank wastes, and digested sludge;
- Blending of imported wastes prior to treatment;
- Storage of imported digested cake for treatment elsewhere;
- Storage of digestate prior to dewatering;
- Import of digested sludge for onsite dewatering;
- Dewatering of digested sewage sludge;
- Mixing of indigenous dewatered digested sludge cake and imported waste digested sludge cake;
- Operation of acid phase digestion (APD);
- Transfer of centrate back to the head of the sewage treatment works;
- Storage of dewatered sewage cake prior to offsite recovery;
- Storage of biogas;
- **Combustion of biogas in an MCPD and SG compliant biogas CHP unit and auxiliary boilers;**
- **Emergency flare;**
- Storage of raw materials;
- **Combustion of gas oil in three standby dual fuel boilers;**
- **Storage and handling of waste including waste oils;**
- **Surface water collection and drainage system**; and
- **Carbon filtration of biogas fuel prior to CHP engines.**

The waste activities at the site are the import of liquids and thin sludges for aerobic biological treatment; the use of the wet well dewatering bay; and the storage of imported raw and digested cake for treatment elsewhere.

3. Application Forms and Letter of Authorisation

4. Application Form Questions:

4.1 Form C2

1 About the permit

1a Discussions before your application

A pre application variation habitats assessment was obtained from the Environment Agency. This application was previously submitted in September 2022, and has been revised following discussions around the containment solution, including the email from Tommy Wager on 4th April 2024.

1b Permit number

What is the permit number that this application relates to?

EPR/CP3638XZ/V002 varied 02/04/13

1c Site details

What is the site name, address and postcode of the site?

Severn Trent Water Limited
Derby Sewage Treatment Works
Megaloughton Lane
Spondon
Derby
Derbyshire
DE21 7BA

Grid reference: SK 38948 34639

2 About your proposed changes

2a Type of variation

What type of variation are you applying for?

This variation application is to add an installation and a waste activity to the existing CHP permit. Note that this is due to a change in regulatory interpretation and the activities on site are currently operational. The variation is required as part of the IED, consisting of one listed activity: anaerobic digestion for recovery and disposal. There is also a waste activity for the import of specified waste materials to the works inlet for treatment via the full flow, or UWWTD stream.

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
Derby STW	S5.1A1(b)i – operation of an anaerobic digester >100tpd			
Megaloughton Lane CHP Plant		Operation of three biogas fuelled Combined Heat and Power units; three boilers and an emergency flare to be a DAA		

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)

See Table 2 below

Table C2-2

Table 2 – Permit Numbers
EPR/CP3638XZ/V002 - Megaloughton Lane CHP Plant

2d Treating batteries

2d1 Are you proposing 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.

2f Low impact installations

2f1 Will any changes mean that any of the regulated facilities will become low impact installations?

No, this application is not for a low impact installation.

3 Your ability as an operator

3a Relevant offences

Table C2-3 – relevant offences

Total payout	Type	Date	Location	Offender	Description of offence
£870,000	Prosecution	Jun '20	Shropshire, England	Severn Trent Water Ltd	Causing an unpermitted discharge, contrary to Regulation 38(1)(a) and regulation 12(1)(b) of the Environmental Permitting (England & Wales) Regulations 2010 and failing to comply with permit conditions, contrary to regulation 38(2).
£1,558,536	Prosecution	Dec '21	Worcestershire, England	Severn Trent Water Ltd	Sentenced for four breaches of the Regulations for four cases. Sewage was discharged contrary to Regulation 38 (2) of the Environmental Permitting (England and Wales) Regulations 2016. (Blackminster) Breach of a limit contrary to regulation 38(2) Environmental Permitting (England and Wales) Regulations 2016. (Bromsgrove, Stoke Prior, Priest Bridge)
£2,088,658	Prosecution	Feb '24	Staffordshire. England	Severn Trent Water Ltd	Sewage was discharged into the river in conditions other than those set out in table S3.3 of the Environmental Permit, contrary to Regulation 38 (2) of the Environmental Permitting (England and Wales) Regulations 2016.

3b Technical ability

Severn Trent Water utilises a competence management system (CMS) to demonstrate technical competence at the site.

Please see the appended CMS certificate for the organisation, which has a scope including waste storage and treatment.

The EU Skills coordinator has confirmed to STW there is no need to identify a specified person as TCM if the organisation is under the EU Skills scheme. The following is taken directly from the gov.uk website:

EU Skills scheme: The EU Skills scheme considers the competence of your business as a whole. To join this scheme you need to have a competence management system in place and this must be certified by one of the scheme's approval bodies.

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?

There are no current or past bankruptcy or insolvency proceedings against the applicant.

3d Management systems

Confirm that you have read the guidance and that your management system will meet our requirements.

Yes, we can confirm that this is the case.

Does your management system meet the conditions set out in our guidance?

Yes. The Company holds BS EN ISO 14001:2015.

Please see Appendix B for EMS and CMS certificates.

Scope

Severn Trent Water was awarded certification to BS EN ISO14001:2015 for its Environmental Management System in August 2018. The certified EMS scope covers "Management and delivery of waste treatment processes. Transfer and storage of highway waste on depots. Tankered waste imports, sludge treatment and associated biogas activities, Mothballed landfill monitoring activities. Head office function at Severn Trent Centre."

Environmental Policy

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

https://www.severntrent.com/about-us/governance/our-policies/Management and Responsibilities

The Management Systems Team (EMS specialists) has overall 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 Management Systems Team (EMS specialists) maintain a Legal Register and, in consultation with Operations Teams, their permit compliance advisors 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 take into account legal and other requirements, cost to the business, scale of impact and interested parties.

Management Systems Team (EMS Specialists) are responsible for setting internal environmental standards with Standard owners which are then implemented by the relevant business areas. The Standards and other relevant information are communicated through a number of routes. Incident and corrective action routes exist to promote continual improvement.

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 to identify and control environmental issues arising from Severn Trent Water activities. Each department is required to achieve operational control of its activities and, using a central database, identify and record any departmental environmental issues.

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 and environmental risks and method statements are produced to address these, as part of the Managing Contractors process.

Contractors who are required to carry out major services are closely managed by the team to ensure that compliance with Severn Trent 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 a work authorisation.

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. The following basic inspections and maintenance activities are carried out on site:

- Daily operation of plant (24/7) involves visual inspection of operational assets;
- Daily inspection of temporary pipe work installed;
- Weekly visual inspections of the bulk oil storage tanks and the oil pipework (visual check on above ground pipework);
- Weekly inspection of all bunds (oil, transformer, temporary, etc.) and condition of containerised engines;
- 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 to ensure compliance with the Infrastructure Monitoring Programme.

All regular maintenance of all plant and equipment will be completed on the time scale specified by the equipment manufacturer including routine inspections (e.g. weekly ignition testing will show when spark plugs have reached the end of their service life). A full engine overhaul is likely to be scheduled every 20,000 operating hours. This high-level preventative maintenance is designed to avoid unscheduled down time, maximising the plant availability and its ability to control emissions and maintain an efficient level of operation between overhaul services. Record sheets will be completed that would highlight any issues that may require operator intervention outside the routine maintenance programme.

Environmental Improvement

Severn Trent 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.

he EMS and CMS are subject to periodic Senior Management Reviews to consider environmental performance, objectives and targets and continual improvement. These are carried out at least annually.

Competence, Training and Training Records

Severn Trent 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.

The EMS delivers a structured environmental awareness programme and targeted awareness training, where a need is identified. Managers and the CMS (Competence Management System) Manager review the competence of those working for the company where the tasks have the potential to cause a significant negative environmental impact, or impact on the operation of permitted activities within the EMS scope. The EMS Team, Permit Compliance Advisors and relevant Departments are responsible for rolling out the Basic Environmental Awareness permit training and job specific training.

For each internal training course held a Training Record is issued through the employees' role specific records on SAP.

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. All training is overseen by a dedicated in-house Learning and Development team, through "The Academy" process.

Severn Trent Water is able to demonstrate that permitted activities are managed by technically competent staff with its Competence Management System (CMS) that is independently certified to meet the requirements of an Industry Standard. All appointed Technically Competent Persons (TCPs) undergo EMS awareness training and CMS training. TCPs are required to re-take training every 2 years. A list of technically competent persons is stored within the CMS documentation on SharePoint.

Managing 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 or a TCP who is suitably qualified, 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

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

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

Complaints are managed by Customer Services, where all complaints are logged on the Complaints Records Online Storage System (CROSS). The Regional Managers are responsible for ensuring that action is taken and for liaising with the relevant regulatory bodies (where appropriate). They ensure that any complaint is investigated and, if found to be justified, that work is undertaken to resolve the issue. They also provide an appropriate response to the complainant in a timely manner detailing the reason behind the issue and the actions taken to resolve the matter.

Information regarding complaints is recorded to allow determination of an appropriate response (corrective action) and to determine what measures need to be taken in the future to prevent its reoccurrence (preventive action). These records will be maintained as part of the management system for a minimum of four years.

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: 'Lessons Learnt' bulletins, OSC portal forums and compliance audits.

Auditing

The controls for addressing environmental aspects and impacts are checked through the EMS audit programme which is managed by the EMS Auditor. Findings are reported to Site Managers and their Leadership Team. All permitted sites are internally audited by the permitting team every three years as a minimum. These inspections support the EMS audit programme and are audited by the EMS Team on a sample basis. The EMS also checks that other audit programmes exist for our wider environmental obligations, for example, MCerts and Operator Self Monitoring compliance assessments.

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?

No – site drainage is managed within the wider sewage works, which is entirely within the boundary of this permit, 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 1999, 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 the following plans:

Figure 1 – Site Location Plan

Figure 2 – Installation Boundary and Air Emission Points

Figure 3 – Site Drainage Plan

Figure 4 – Process Flow Diagram

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

Yes. See Appendix D for the site report for the extra land.

5c Provide a non- technical summary of your application

Please see Section 1.1 in this document.

5d Risk of fire from sites storing combustible waste

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

No – the site handles and treats wastes using processes that fall outside the scope of the FPP guidance. Note that the site primarily handles liquids or pumpable sludges which do not pose a fire risk.

5e Will your variation increase the risk of a fire occurring or increase the environmental risk if a fire occurs?

N / A

5f Adding an installation

If you are applying to add an installation, tick the box to confirm that you have sent in a baseline report and provide a reference.

Severn Trent Water have chosen not to provide a baseline report for the site. The site has operated as a sewage treatment works for a significant period of time and there are no proposals to close or relocated the site. Due to the site history and difficulties in obtaining representative samples from land below existing infrastructure, in accordance with current Environment Agency guidance, no baseline data is provided. The surrender risk this poses is acknowledged.

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.

An environmental screening assessment is provided in Table C2-5. To inform the screening assessment, a review of the sensitivity of the site setting has been undertaken.

Data taken from the MAGIC.gov.uk website, accessed 18th April 2024 is presented in Table C2-4 below. For habitat sites, the relevant distances for consideration are: international designations (SAC, MPA, SPA and Ramsar - 10km); national designations (SSSI – 2km) and local nature reserves (2km).

Table C2-4 – Proximity of nature conservation sites

Site Name	Designation	Distance	Direction
The Sanctuary	LNR	1,000m	West
Elvaston	LNR	1,500m	Southeast
West Park Meadow	LNR	1,300m	North
Elm Wood	LNR	3,000m	Southwest
Boulton Marshes	SSSI	2,900m	South

The site has 15 Local wildlife sites (LWS) within 2km

Site Name	Designation
Elvaston Castle Country Park	LWS
Elvaston Castle LNR (Part of)	LWS
Orchard, Coleman Street	LWS
Alvaston Scrub	LWS
River Derwent	LWS
Acordis effluent beds	LWS
Former Spondon power station meadow	LWS
Sewage farm lagoons	LWS

Site Name	Designation
Acordis lagoons	LWS
Former Shardlow sewage works	LWS
Gas works tip	LWS
Meadow Lane bank	LWS
West Park Meadows LNR	LWS
Chaddesden Brook and Mossey Yard plantation	LWS
Royal Hill Road hedge	LWS

The site does not have any LNR or SSSI within 2km of the site. There are no SAC; SPA; or RAMSAR sites within 10km of the site. The River Derwent surrounding the site is designated for a protected species, the European Eel.

The site sits entirely within an area benefitting from flood defences, which is classified as flood zone 2 (with defences), indicating that it has between1:100 and 1:1000 probability of flooding in any year. The site sits outside any designated source protection zone (SPZ) for groundwater, but is within a drinking water protected area and safeguard zone, with respect to surface water The site is not within an Air Quality Management Area.

Table C2-5 Environmental Screening Assessment

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 nearest commercial and industrial premises are within 130m of the site to the west and north, with a waste transfer station within 250m of the site to the south. The closest residential properties are approximately 600m to the north and south, and over 1km to the west. To the east, the closest residential properties are approximately 2km away. Ecological receptors - international designated habitats sites within 10km, nationally designated sites within 2km, locally designated sites within 2km.	The wastes handled at the site are primarily liquids and sludges, along with UWWTD derived material delivered by sewer. 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**

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
	There are no SAC/SPA/RAMSAR sites or SSSI within the designated distances. There are 3 LNR and 15 LWS within 2km.		
Dust and bioaserosols	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. The cake pad at the site is approx. 130 metres from the nearest offsite receptor	The wastes handled at the site are liquids, sewage sludges and sewage cake, along with UWWTD derived material delivered by sewer. The site will not be handling inherently dusty or powdery wastes. Sewage cake retains a high moisture content and is not dusty. Roads will be maintained to avoid the production of dust. Produce sewage cake has sufficient moisture content to ensure it does not give rise to dust and is located on the eastern side of the site, away from sensitive receptors. Severn Trent has undertaken bioaerosol monitoring at this site and found they were below industry standard thresholds.	X
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 installation has three biogas fuelled CHP engines and three dual fuel biogas and gas oil boilers, for which ADMS modelling indicates emissions are unlikely to result in unacceptable impacts on air quality. The emergency flare is used only during periods when there is a larger volume of biogas than the CHP engine or boilers are able to manage or are offline. Fugitive emissions to air are assessed separately.	X
Assessment of point source and fugitive emissions to water	The River Derwent surrounds the island the site is located on, with the wider sewage works being on the northern and eastern sides of the facility. The site sits entirely within an area benefitting from flood defences, which is classified as flood zone 2 (with defences), indicating that it has between1:100 and 1:1000 probability of flooding in any year. The site sits outside any designated source protection zone (SPZ) for groundwater, but is within a	The main product of the process is a sewage cake, which is stored within flood zone 2, on a concrete pad equipped with drainage. Other aqueous discharges generated by the process are limited (comprising dewatering liquors, biogas condensate, and surface water run off). These sources are discharged to the on-site drainage system where they	X

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
	drinking water protected area and safeguard zone, with respect to surface water Surface water drainage within the site drains to the inlet of the adjacent sewage treatment works for full treatment prior to discharge.	are transferred to the main sewage works inlet. Due to the nature and small quantity of these emissions no further assessment of point source emissions is deemed necessary.	
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 site has an odour management plan in place. This includes management systems, procedures and monitoring to control fugitive emissions of odour at the plant. Waste inputs to the site are of a similar nature to indigenous waste streams and as such there is no change in odour profile at the site. There is no history of odour complaints associated with the site.	X
Energy	Global atmosphere (direct and indirect emissions)	Biogas generated by the facility is utilised to generate electrical power for the site and exported to the grid; thus increasing renewable energy supplies. Waste heat from the CHP engines is utilised to control primary digester temperature when required and reduce demand on the auxiliary boilers.	X
Land and disposal of waste to other processes	Rivers and streams – see Assessment of point source and fugitive emissions to water above. Drainage systems/sewers. The site sits outside any total catchment zone or source protection zone (SPZ). According to the BGS, the overlying geology is a secondary A aquifer, underlain with bedrock of a secondary B aquifer, designated as minor aquifers with intermediate vulnerability.	All waste streams disposed of off-site will continue to be 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 nearest commercial and industrial premises are within 130m of the site to the west and north, with a waste transfer	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	X

Consideration	Receptors	Discussion	Detailed Environmental Risk Assessment?
	station within 250m of the site to the south. The closest residential properties are approximately 600m to the north and south, and over 1km to the west. To the east, the closest residential properties are approximately 2km away. There are no SAC/SPA/RAMSAR sites or SSSI within the designated distances. There are 3 LNR and 15 LWS within 2km.	preventative maintenance programme. There are no sources of vibration within the facility.	
Other issues (including visual impact)	The River Derwent is designated for a protected species, the European Eel	There are no direct discharges to the river from the permitted activities, and all releases are treated via the adjacent sewage treatment works	X
Climate Change	Risks of increased temperature impacts resulting in digesters heating beyond optimal operating temperature and increased odour from sewage 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 gas engine that is appropriately sized to utilise additional biogas. However, the CHP engines will need to be replaced prior to 2050 when they reach the end of their operational lifespans.	X
	Risks of increased storm events that causes surface water runoff exceeds capacity of site drainage system, or additional dewatering operations due to rainwater ingress, or caused bunds to infill. Increased precipitation may increase flooding on agricultural land, decreasing ability to spread digested sludge cake to land. For water environment receptors, see notes for Assessment of point source and fugitive emissions to water above	The STW design may require expansion or additional storm capacity; however, this would apply to UWWTD operations at the site rather than permitted activities. May need to increase bund or containment volume for sewage treatment works or individual assets. Land spreading activities could be prevented during very wet, winter months. Although the site has a large cake pad which would allow digested sludge cake to be stored prior to application, contingency plans to move digested sludge cake to other sites may be required.	X

4.2 Form C3

1 What activities are you applying to vary?

Table C3-1a

Schedule 1 listed activities						
Installation name	**Schedule 1 references**	**Description of the Activity**	**Activity capacity**	**Annex I (D codes) and Annex II (R codes) and descriptions**	**Hazardous waste treatment capacity (if this applies)**	**Non-hazardous waste treatment capacity (if this applies)**
Derby STW Bioresources	S5.4A1(b)(i) Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 100 tonnes per day involving one or more of the following activities, and excluding activities covered by Council Directive 91/271/EEC— (i) biological treatment by anaerobic digestion	From receipt of permitted waste through to digestion and recovery of by-products (digestate).	897 m^3 per day (input) 6,279 m^3 per week (input) 6,279 wet tonnes per week	R3 Recycling / reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) R13 Storage of waste pending any of the operations numbered R1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced)	None	897 m^3 per day (897 wet tonnes per day)

Name of DAA	Description of the DAA
AR2	Imports of sewage sludge, cess and septic tank wastes, and digested sludge
AR3	Blending of imported wastes prior to treatment

Name of DAA	Description of the DAA
AR4	Storage of imported digested cake for treatment elsewhere;
AR5	Storage of digestate prior to dewatering
AR6	Dewatering of digested sewage sludge
AR7	Operation of acid phase digestion (APD)
AR8	Transfer of centrate back to the head of the sewage treatment works
AR9	Storage of dewatered digested sludge cake prior to offsite recovery
AR10	Storage of biogas
AR11	**Combustion of biogas in an MCPD and Specified Generator (SG) compliant biogas CHP and boiler units**
AR12	**Emergency flare**
AR13	Storage of raw materials
AR14	**Combustion of gas oil in three standby dual fuel boilers**
AR15	**Storage and handling of waste including waste oils**
AR16	**Surface water collection and drainage system**
AR17	**Carbon filtration of biogas fuel prior to CHP engines**
Total storage capacity (tonnes)	10,759m^3
Annual throughput (tonnes each year)	327,500 wet tonnes

Waste Activities

Name of Waste Activity	Annex I (D codes) and Annex II (R codes) and descriptions	Description of Waste Activity and Throughput
AR18 Direct transfer and blending of waste into head of works.	D13: Blending or mixing prior to submission to any of the operations numbered D1 to D12.	Import of tankered waste to the head of the works for direct treatment through the UWWTD route 100,000 m^3 per annum (100,000 wet tonnes per annum) 350 wet tonnes per day maximum

Name of Waste Activity	Annex I (D codes) and Annex II (R codes) and descriptions	Description of Waste Activity and Throughput
	D15: Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where the waste is produced)	
AR19 Import of digested sludge for dewatering	R3 Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) R 13 Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where the waste is produced)	Import of digested sludge for dewatering 10,000 wet tonnes per annum 250 wet tonnes per day maximum

Currently permitted DAAs are highlighted in **bold.**

Types of waste accepted

Table C3-1b – Wastes for waste activity – Deposit in works inlet ONLY

Waste Code	Description
02	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing**
02 02	**wastes from the preparation and processing of meat, fish and other foods of animal origin**
02 02 01	Sludges from washing and cleaning
02 03	**wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation**
02 03 01	Sludges from washing, cleaning, peeling, centrifuging and separation
02 03 02	wastes from preserving agents
02 03 03	wastes from solvent extraction
02 03 04	materials unsuitable for consumption or processing
02 03 05	Sludges from on-site effluent treatment
02 04	**wastes from sugar processing**
02 04 01	Soil from cleaning and washing beet
02 04 02	off-specification calcium carbonate
02 04 03	Sludges from on-site effluent treatment
02 05	**wastes from the dairy products industry**
02 05 01	materials unsuitable for consumption or processing
02 05 02	Sludges from on-site effluent treatment
02 06	**wastes from the baking and confectionery industry**
02 06 01	materials unsuitable for consumption or processing
02 06 02	wastes from preserving agents
02 06 03	Sludges from on-site effluent treatment
02 07	**wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)**
02 07 01	wastes from washing, cleaning and mechanical reduction of raw materials
02 07 02	wastes from spirits distillation
02 07 03	wastes from chemical treatment
02 07 04	materials unsuitable for consumption or processing
02 07 05	Sludges from on-site effluent treatment
03	**Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard**
03 03	**wastes from pulp, paper and cardboard production and processing**
03 03 11	Sludges from on-site effluent treatment other than those mentioned in

	03 03 10
04	**Wastes from the leather, fur and textile industries**
04 01	**wastes from the leather and fur industry**
04 01 05	tanning liquor free of chromium
04 01 07	Sludges, in particular from on-site effluent treatment free of chromium
04 01 09	wastes from dressing and finishing
04 02	**wastes from the textile industry**
04 02 10	organic matter from natural products (for example grease, wax)
04 02 17	dyestuffs and pigments other than those mentioned in 04 02 16
04 02 20	Sludges from on-site effluent treatment other than those mentioned in 04 02 19
07	**Wastes from organic chemical processes**
07 01	**wastes from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals**
07 01 12	Sludges from on-site effluent treatment other than those mentioned in 07 01 11
07 02	**wastes from the MFSU of plastics, synthetic rubber and man-made fibres**
07 02 12	Sludges from on-site effluent treatment other than those mentioned in 07 02 11
16	**Wastes not otherwise specified in the list**
16 03	**off-specification batches and unused products**
16 03 06	organic liquid wastes other than those mentioned in 16 03 05
16 10	**aqueous liquid wastes destined for off-site treatment**
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01 (see footnote 1)
16 10 04	aqueous concentrates other than those mentioned in 16 10 03
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 05	**wastes from aerobic treatment of solid wastes**
19 05 03	off-specification liquid compost that arise from treatment of municipal, vegetable waste types.
19 06	**wastes from anaerobic treatment of waste**
19 06 03	Liquor from anaerobic treatment of municipal waste
19 06 04	Digestate from anaerobic treatment of source segregated biodegradable waste
19 06 05	Liquor from anaerobic treatment of animal and vegetable waste
19 07	**landfill leachate**
19 07 03	landfill leachate other than those mentioned in 19 07 02
19 08	**wastes from waste water treatment plants not otherwise specified**
19 08 02	waste from desanding

19 08 09	grease and oil mixture from oil/water separation containing only edible oil and fats
19 08 12	Sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11
19 08 14	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13
19 09	**wastes from the preparation of water intended for human consumption or water for industrial use**
19 09 02	Sludges from water clarification
19 09 03	Sludges from decarbonation
19 09 06	solutions and sludges from regeneration of ion exchangers
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 01	**separately collected fractions (except 15 01)**
20 01 08	biodegradable kitchen and canteen waste
20 01 25	edible oil and fat
20 01 30	detergents other than those mentioned in 20 01 29
20 02	**garden and park wastes (including cemetery waste)**
20 02 01	liquid wastes and mixed concentrates of biodegradable waste
20 03	**other municipal wastes**
20 03 03	street-cleaning residues
20 03 06	waste from sewage cleaning

Table C3-1b – Waste accepted for installation ONLY

16	**Wastes not otherwise specified in the list**
16 10	**aqueous liquid wastes destined for off-site treatment**
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01 (see footnote 1)
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 02	**wastes from physico/chemical treatment of waste (including dechromatation, decyanidation, neutralisation)**
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)
19 06	**wastes from anaerobic treatment of waste**
19 06 06	digestate from anaerobic treatment of animal and vegetable waste (digested sewage sludge only)
19 08	**wastes from waste water treatment plants not otherwise specified**
19 08 05	sludges from the treatment of urban waste water
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**

20 03	other municipal wastes
20 03 04	septic tank sludge

Table C3-1c – Wastes for dewatering waste activity ONLY

19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use
19 06	wastes from anaerobic treatment of waste
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste (digested sewage sludge only)

2 Point source emissions to air, water and land

Table C3-2 Emissions to Air

Emission point reference and location (NGR/Latitude & Longitude)	Source	Parameter	Concentration	Units
A1 (SK 38915 34626)	CHP engine 1 – Jenbacher 1	NOx	500	mg/m^3
		CO	1400	mg/m^3
		TVOC	1000	mg/m^3
		NMVOC	75	mg/m^3
		SO_2	-	mg/m^3
A2 (SK 38930 34625)	CHP engine 2 – Jenbacher 2	NOx	500	mg/m^3
		CO	1400	mg/m^3
		TVOC	1000	mg/m^3
		NMVOC	75	mg/m^3
		SO_2	-	mg/m^3
A3 (SK 38877 34625)	CHP engine 3 – Perkins	NOx	500	mg/m^3
		CO	1400	mg/m^3
		TVOC	1000	mg/m^3
		NMVOC	75	mg/m^3
		SO_2	-	mg/m^3
A4 (SK 38900 34636)	Standby Hot Water Boiler 1 – Beel 1	NOx	-	-
		TVOC	-	-
		CO	-	-
A5 (SK 38898 34637)	Standby Hot Water Boiler 2 – Beel 2	NOx	-	-
		TVOC	-	-

		CO	-	-
A6 (SK 38894 34638)	Standby Hot Water Boiler 3 – Eurograde	NOx	-	-
		TVOC	-	-
		CO	-	-
A7 (SK 38853 34634)	Gas holder PRV	No parameters set	-	-
A8 (SK 38920 34592)	Flare stack	No parameters set	-	-
A9 (SK 38902 34610)	Vent on gas oil storage tank	No parameters set	-	-
A10 (SK 38825 34616)	Digester tanks pressure relief valves	No parameters set	-	-
A11 (SK 38873 34602)	Digester tanks pressure relief valves	No parameters set	-	-
A12 (SK 38893 34596)	Digester tanks pressure relief valves	No parameters set	-	-
A13 (SK 38824 34633)	APD pressure relief valve	No parameters set	-	-
A14 (SK 38828 34649)	APD pressure relief valve	No parameters set	-	-
A15 (SK 38877 34730)	Sludge reception building OCU	No parameters set	-	-
A16 (SK 38815 34696)	Sludge Blending OCU	No parameters set	-	-
A17 (SK 38918 34686)	Sludge import area OCU	No parameters set	-	-
A18 (SK 38915 34626)	Replacement CHP engine 1	See A1		
A19 (SK 38930 34625)	Replacement CHP engine 2	See A2		
A20 (SK 38877 34625)	Replacement CHP engine 3	See A3		

Note that upon completion of the proposed pre-operational condition, points A1; A2 and A3, will become points A18; A19 and A20, when the three new engines are commissioned. These emission limits will become those in MCPD for new biogas engines.

Table C3-2 Transfer points to wider STW

Emission point reference and location (NGR/Latitude & Longitude)	Source	Parameter	Concentration	Units
T1 (SK 38903 34901)	Dewatering liquors, boiler blowdown, biogas condensate and all surface water drainage not captured by point T2	-	-	-
T2 (SK 38973 34681)	Sludge thickening building (SAS) and surface drainage around this area and the blending tank	-	-	-
T3 (SK 38967 34982)	Transfer point for inlet imports			

Table C3-3 Sample point(s)

Sampling point reference and location	Sources
S1 (SK 38921 34959)	Dewatering centrate
S2 (SK 38817 34635)	Primary filtrate
S3 (SK 38912 34655)	SAS filtrate
S4 (SK 38970 34989)	Inlet imports

3 Operating techniques

3a Technical standards

Table C3-3 Technical standards

Schedule 1 activity or DAA	Best available technique	Document reference
Other biological treatment of waste: deposit of imported non-hazardous waste for treatment through a wastewater treatment works.	Biological waste treatment: appropriate measures for permitted facilities	Updated 6th July 2023

3a1 Does your permit have references to any of your own documents or parts of documents submitted as part of a previous application for this site?

Yes – remain as per previously permitted CHP operations.

3b General requirements

Table C3-4 General requirements

Name of the installation: Derby STW Bioresources	Document references
If the technical guidance or your risk assessment shows that emissions of substances not controlled by emission limits are an important issue, send us your plan for managing them.	N/A – see Table C2-6 above
If the technical guidance or your risk assessment shows that odours are an important issue, send us your plan for managing them.	See Odour Management Plan Appendix E
If the technical guidance or your risk assessment shows that noise or vibration are important issues, send us your noise or vibration plan (or both).	N/A – see Table C2-6 above

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. An assessment of fugitive emissions has been undertaken using the following methodology. The risk assessment is presented in Tables C3-3b(i) to (iV).

Risk Matrix and Terminology for Accident for Risk Assessment

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

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

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

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

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Emissions to air of NOx, SO_2, CO_2 and VOCs	Normal	Emissions to air and dispersion leading to inhalation by local human and animal receptors	High	Low	Medium	Activities are managed and operated in accordance with the site management system (including inspection and maintenance of equipment, including engine management systems), and an LDAR plan. Point source emissions to air (CHP engines, boiler and emergency flare stack) have emission limits for NOx, CO_2, SO_2. Flare stack height approx. 5m, CHP stack approx. 7m and boiler flue approx.10 m.	Low
Gas transfer systems, gas storage tank, gas engines, flares or PRVs failure causing emissions of biogas	Abnormal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global warming potential. Risk of fire and explosion	Low	Medium	Low	The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge. The gas system utilised is subject to regular preventative maintenance including an 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.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						Personnel on site wear portable gas detectors in order to alert staff to presence of biogas. A waste gas burner (emergency flare) is utilised for the safe disposal of surplus gas in the event of plant breakdown, or a surplus of gas above the level that can be safely stored or utilised. Use of emergency flare is recorded. PRVs are in place on the gas holder to be operated in the event of failure of the emergency flare to prevent overpressurisation and catastrophic failure.	
Catastrophic loss of biogas emissions from gas transfer systems, gas storage tank, gas engines, flares or PRVs	Abnormal	Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global warming potential. Risk of significant fire and explosion	Low	High	Medium	The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge. The gas system utilised is subject to regular preventative maintenance including an 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. A waste gas burner (emergency flare) is utilised for the safe disposal of surplus gas in the event of plant breakdown, or a surplus of gas above	Medium

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						the level that can be safely stored or utilised. Use of emergency flare is recorded. PRVs are in place on the gas holder to be operated in the event of failure of the emergency flare to prevent over pressurisation and catastrophic failure.	
Combustion of biogas within CHP engine and emergency flare. Combustion of biogas or natural gas 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 gas. Combustion plant operates within permitted ELVs subject to routine monitoring against permit compliance. CHP engines and emergency flare are located away from the nearest residential properties which are over 650m from the CHP engines north east, the nearest commercial buildings are approx. 500m West.	Low
Release of bioaerosols and dust from storage or spillage	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	Medium	There is a low risk of bioaerosol and dust as the cake pad is approximately 120m from commercial buildings, although there are no residential properties within 250m. Severn Trent carried out a monitoring exercise at this site and upwind and downwind locations results remained below the industry standard threshold values of 500cfu/m^3 for Aspergillus Fumigatus. Upwind and downwind locations	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						results remained below the industry standard threshold values of 1000cfu/m^3 for Total Bacteria. Roads are made from concrete/asphalt and not prone to the generation of dust. Staff responsible for site housekeeping and cleaning of spillages in a timely manner.	
Spillage of liquids, including chemicals and oils.	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality Emissions to ground and ground water.	Low	Medium	Low	The closest surface water body surrounds the site, closets to the northern and eastern boundaries. Chemicals and oils all stored within suitably bunded tanks and IBCs with rainwater removed as required to maintain 110% capacities. Penstock valves available within chemical delivery areas to contain large spillages Handling and use of chemicals and oils is carried out by trained personnel. COSHH data sheets available. Spill kits available on site. There are no point source emissions to water with drainage system pumping back to works inlet.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Spillage from storage and digestion tanks, overtopping of tanks, leakage from same tanks and from buried pipes	Abnormal	Emissions to surface waters close to and downstream of site. Acute effect resulting in loss of flora and fauna. Chronic effect resulting in deterioration of water quality Emissions to ground and ground water.	Medium	Medium	Medium	The site lies outside any Groundwater Source Protection Zone. Provision of suitably structurally integral tanks constructed from pre-conditioned concrete, and, steel and glass reinforced plastic/insulation (where needed). All tanks are subject to asset inspection and proactive maintenance programme including regular visual inspection for cracks or weeping. Leak detection systems, visual checks during regular day-to-day operations and scheduled preventative maintenance of equipment, such as pumps, pipes, joins etc Biogas condensate discharged back to the works inlet through site drainage system. Spill kits available on site. There are no point source emissions to water with drainage system pumping back to works inlet.	Low
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.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						Waste is stored securely for collection by appropriately licensed approved contractors. Litter picking activities are completed as required.	

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

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

Table C3-3b(ii) Odour risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
H_2S/biogas emissions from uncovered tanks	Normal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	High	Low	Medium	Biogas will principally be generated in the three primary digestion tanks which are covered with fixed roofs. The nearest residential properties approx. 600m south from the digesters and nearest commercial buildings approx. 300 m West. Small amounts of biogas may also be generated within pathogen kill tanks which are located closer to the commercial properties but still over 200m away.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						H_2S production is controlled through the digestion process which can be manually overridden if required.	
Loss of containment from biogas holder and biogas pipework	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors Loss of amenity from odour nuisance	Low	Medium	Low	Biogas is principally stored within a floating roof gas holder which is suitably sized to manage biogas generation. The gas system utilised is subject to regular preventative maintenance to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected. Personnel on site wear portable gas detectors in order to alert staff to presence of biogas. Physical protection measures in place for biogas holder, including kerbing and pipework is guarded. PRVs available to safely manage pressures within the biogas holder and prevent under or over pressurization.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
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. PRVs subject to monitoring via SCADA and visual checks by site personnel. Biogas is principally stored within the site gas holder which is suitably sized to manage biogas generation and act as buffer storage for biogas. Site has three CHP engines, three boilers and one flare which are used in order of preference to maximise recovery of energy. CHP engines and boilers are subject to regular maintenance to maintain maximum use of outlets, with flare maintained in good working order should it need to be used. The nearest residential properties approx. 600m south from the digesters and nearest commercial buildings approx. 300 m West	Low
H_2S/biogas emitted when biogas cannot be combusted in engine, boilers or flare	Abnormal	Emissions to air and dispersion leading to inhalation by local human receptors	Low	Low	Low	Biogas is principally stored within the floating roof gas holder which is suitably sized to manage biogas generation and act as buffer storage when biogas cannot be combusted. Site has three CHP engines, three boilers and one flare giving multiple outlets for biogas.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
		Loss of amenity from odour nuisance				The nearest residential properties approx. 600m south from the digesters and nearest commercial buildings approx. 300 m West CHP engines and boilers are subject to regular maintenance to maintain maximum use of outlets, with flare maintained in good working order should it need to be used.	
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 on an engineered hardstanding cake pad which is connected to the site drainage system on the western part of the site and is inherently low odour material. Should any odorous sludge cake be produced, this will be subject to process checks undertaken to identify root cause of production and removed from site expediently.	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 in line with the manufacturer's recommendations	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
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. Note there is no history of substantiated noise complaints relating to the site:

Table C3-3b(iii) Noise risk assessment

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Operation of CHP engines	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	The two Jenbacher CHP engines are acoustically baffled, self-contained and designed for external applications therefore noise emissions are already low. The Perkins engine is located within a building CHP engines are located away from the nearest residential properties which are 600m south of the engines with the nearest commercial buildings approx. 350m West. Good	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
						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.	
Operation of fans on air cooled radiators	Normal	Generation of noise with air transportation, causing loss of amenity to local human receptors	High	Low	Medium	Air cooled radiators do not give rise to high levels of noise and are only used as required. They are located away from sensitive human receptors. The nearest residential properties which are 600m south of the engines with the nearest commercial buildings approx. 350m West. 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,	High	Medium	High	Vehicle movements across the site subject to speed limit and one-way system to reduce generation of noise. Reversing obligations minimised by site layout. Tanker deliveries limited to daytime only.	Low

Activity/Hazard	Normal or Abnormal	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
		causing loss of amenity to local human receptors.					
Operation of emergency flare	Abnormal	Generation of noise with air transportation, causing loss of amenity to local human receptors.	High	Low	Medium	Use of the emergency flares is minimized by prioritizing use of the CHP and boilers with use of the flare recorded. Emergency flare is located a similar distance to the engines from sensitive receptors.	Low

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

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Major fire and/or explosion causing the release of polluting materials to air, water or land.	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna	Low	High	Medium	Follow site Incident Response Plan and inform relevant authorities. Management systems requires DSEAR assessment which is adhered to by site operations. Designated ATEX zones on site and lightning protection system in place around biogas holder. Fire alarm systems installed and maintained. Biogas contained within a closed system and monitored for safety. Automatic cut off valve to	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	and chronic effect on water quality. Injury to staff, fire fighters or arsonists/vandals.				biogas supply to stop gas flows, electric temperature sensor, pressure monitors, flame arrestors, etc. Warning signs clearly displayed and staff wear gas alarms to alert to the presence of biogas. All visitors subject to site inductions and accompanied. Permit-to-work system in place. Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively. Smoking only permitted in designated areas of site.	
Minor fire causing the release of polluting materials to air, water or land	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality. Injury to staff, fire fighters or arsonists/vandals.	Low	Medium	Low	Follow site Incident Response Plan and inform relevant authorities. Management systems requires DSEAR assessment which is adhered to by site operations. Designated ATEX zones on site and lightning protection system in place around biogas holder. Fire alarm systems installed and maintained. Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop gas flows, electric temperature sensor, pressure monitors, flame arrestors, etc. Warning signs clearly displayed and staff wear gas alarms to alert to the presence of biogas. All visitors	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					subject to site inductions and accompanied. Permit-to-work system in place. Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively. Smoking only permitted in designated areas of site.	
Failure to contain firefighting water	Emissions to ground and ground water of contaminated firefighting water entering soil and/or groundwater. Run-off from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality	Low	Medium	Low	Likelihood of firefighting water being generated is low as the risk of fire is low. Follow site Incident Response Plan and inform relevant authorities. Spill kits provided around the site can be used to direct run-off towards site drainage. Site drainage returns to works inlet providing containment and treatment process for fire water. Arrange for off-site tankering of firefighting water, if required.	Low
Accidental explosion of biogas	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population. Injury to staff, fire fighters or arsonists/vandals.	Low	High	Medium	Follow site Incident Response Plan and inform relevant authorities. Management systems requires DSEAR assessment which is adhered to by site operations.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	Pollution of water or land				Designated ATEX zones on site and lightning protection system in place around biogas holder. Fire alarm systems installed and maintained. Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop gas flows, electric temperature sensor, pressure monitors, flame arrestors, etc. Lightning protection system installed. Likelihood reduced by availability of multiple on site uses of biogas (CHP, boilers and emergency flare) and use of pressure release valves as a safety measure.	
Significant leak of biogas to atmosphere	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population. Global warming potential of greenhouse gases.	Low	High	Medium	Site assets are protected by physical means to prevent vehicle strike and exposed pipework is guarded. Regular proactive and preventative maintenance and regular visual checks. Pressure relief valves are present to avoid over pressurisation of biogas system. Gas detectors are in place between the two layers of biogas membranes which will raise the alarm should a leak of biogas be detected.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Leaks of emission to air, but principally NOx.	Emissions to air and dispersion leading to harm to protected nature conservation sites – SSSIs, SAC and SPA. Harm to protected site through toxic contamination, nutrient enrichment, disturbance etc.	Medium	Medium	Medium	The nearest designated protected habitat is a SSSI 3km from the site. Emissions modelling shows that deposition and impacts on habitats sites are acceptable. Site operations will be subject to emission limits under current Regulations with infrastructure designed to minimise uncontrolled releases. Checks, monitoring and preventative maintenance will further minimise fugitive emissions.	Low
Spillage of raw materials during (e.g. diesel, polymer,) during use, transfer and disposal operations.	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality	Low	Medium	Low	Raw materials are stored on made ground, within bunded containers or on bunds to contain spillages of 110% of the volume. Contents of bunds are regularly checked during environmental audits and after periods of heavy rainfall and emptied as required. In event of a spillage, follow site spillage response plan and inform relevant site personnel. COSHH data sheets available. Deliveries to site are made by approved suppliers. Use of raw materials is carried out by trained personnel or automatically controlled processes. Penstock valves available within chemical delivery areas to contain large spillages. In the event of a minor spillage, spill kits are provided around the site	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					which can be used to contain a spillage and direct it towards site drainage if suitable. Site drainage returns to works inlet providing treatment process for suitable materials, or arrange off-site tankering of waste, if required.	
Spillage of sludges (e.g. raw sludge, digested sludge) during processing and transfer operations e.g. tank overtopping, pipework leaks	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality	Low	Low	Low	Processing and transfer operations of waste materials is largely an automatic process controlled by the Process Controllers and parameters set within the SCADA system. Storage and digestion tanks are fitted with sensors to monitor levels within a tank and can inhibit additional pumping if high alarms activate. Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively and minimise the risk of spillages. In event of a spillage, follow site spillage response plan and inform relevant site personnel and relevant authorities. Spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage. Site drainage returns to works inlet providing treatment process for sludge or arrange off-site tankering of waste to another site. Sludge is relatively viscous and not highly mobile.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Failure of sludge storage tanks / digester tanks	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality.	Low	High	Medium	Follow site Incident Response Plan and inform relevant authorities. Regular infrastructure inspections for tanks and pipework and planned preventive maintenance system in place. Regular visual inspections for tanks and pipework and reactive maintenance. In-line flow monitoring in key locations and tank level monitoring would identify losses and enable a quick response. Tanks are found on unmade ground but are connected to site drainage which returns to works inlet. Sludge is relatively viscous and not highly mobile limiting the distance it can spread in a short time period.	Medium
All on-site hazards: machinery	Direct physical contact with human population and /or livestock after gaining unauthorised access to the installation. Bodily injury	Low	High	Medium	Direct physical contact is minimised by activity being carried out within enclosed digesters. Site activities are managed and operated in accordance with a management system. Site physical security measures to prevent unauthorised access. Assets are protected by various physical means including fencing, kerbing and bollards to prevent vehicle strikes.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					Site has a one-way traffic management system to minimise the need to reverse. Use of banksmen as appropriate. Vehicles equipped with reversing alarms.	
Vandalism causing the release of polluting materials to air (smoke or fumes), water or land.	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality. Injury to staff, fire fighters or arsonists/vandals.	Low	High	Medium	Unauthorised access is unlikely to happen and minimised by physical site security measures and effective management systems. Site has access controlled barrier entry for all vehicular access. Fence runs the perimeter of the site. Additional security fences around some assets and other assets are kept within locked containers or buildings. Warning signs are displayed.	Low
Flooding from rivers, streams and groundwater	Emissions to surface water course and harm to aquatic flora and fauna. Infiltration to ground and groundwater. Harm to aquatic flora and fauna and chronic effect on water quality.	Medium	Low	Low	The site sits entirely within an area benefitting from flood defences, which is classified as flood zone 2 (with defences), indicating that it has between1:100 and 1:1000 probability of flooding in any year.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					General wider works designed to minimise risk of localised works flooding due to storm surges. Follow site Incident Response Plan and inform relevant authorities. Take appropriate corrective and preventative actions to minimise environmental impact	
Flooding due to drain blockages and/or excessive rainfall causing localised on-site surface water flooding	Emissions to surface water course and harm to aquatic flora and fauna. Infiltration to ground and groundwater. Harm to aquatic flora and fauna and chronic effect on water quality.	Medium	Low	Low	Site wide drainage system linked to main sewage works, which includes additional capacity in storm tanks within the works to manage additional flows. Follow site Incident Response Plan and inform relevant authorities. Take appropriate corrective and preventative actions to minimise environmental impact	Low
Loss of mains power leading to failure of pumps / control systems and possible leaks and escape of sludge	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna.	Low	Medium	Low	Site CHP engine is able to supply electricity to the site using biogas supplies on site. Standby generators provide back-up power / contingency plans to provide power to critical operations in the event of an electrical outage. Failsafe systems in place to ensure sludge remains in situ in the event of a loss of power and that systems are promptly returned into operation.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					Site wide drainage system linked to main sewage works in the event of a spillage.	

3c –Types and amounts of raw materials

Table C3-5 Types and amounts of raw materials

Description of raw material and composition	Maximum storage amount (tonnes or as stated)	Annual throughput (tonnes per annum or as stated)	Description of the use of the raw material including any main hazards (include safety data sheets	Alternatives
Anti foam – Burst 5400, Burst 5005	1 IBC (1000 liters each)	5 IBCs/year	Added to primary digesters to reduce foaming, as required	Standard product used for this purpose within the industry
Fuel oil/Diesel/LFO - Watson Auto diesel	As required	As required	Back-up fuel for use within boilers and or back-up generators	No viable alternative. Used as a backup only.
Lubricating oils – Shell Mysella S5 N 40	205 litres	5,000 litres	Equipment lubricant	None available
Glycol coolant – MEG Antifreeze	205 litres	500 litres	CHP engine coolant	None available
Dry chemical scrubber material	None - not stored on site	Replaced as required on return basis to manufacturer	Dry chemical pellets impregnated with stabilized chlorine dioxide in first stage. Second stage utilizes countervalient pelleters	None as unit designed to use this media for chemical scrubbing
Siloxane media – Carbon	None – not stored on site	Replaced as required	Silica removal	None available
Water treatment chemicals	Not stored on site	Replaced as required	Water treatment for the boilers	None available
Biogas	1,500m^3	536,000,000 Nm^3 (approx.)	Primary fuel for the CHP	Best available practice.
Polymer – Flopam EM 640 HIB	25 tonnes	500 tonnes	Digested sludge thickening	None available

4 Monitoring

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

The existing air emission points A1 – A3 (CHPs), A4 – A6 (Boilers) will be monitored in accordance with the current permit, MCPD and EA guidance, along with points A18 and A19 when the pre-operational condition is met.

Hours of operation of the flare, A8, will be monitored and logged. In the unlikely event that the total annual hours of operation exceed 10% of the hours in a year (876 hours), emissions from the flare would be subject to monitoring in accordance with EA guidance.

For releases of process effluents back to the works inlet, via the site drainage system, points T1 and T2 will be monitored on a monthly basis for BOD, ammonia and suspended solids, and every six months for PFOS/PFOA, with all samples sent to an MCERTS or UKAS accredited laboratory.

Sampling point S1 will be monitored in accordance with the agreed liquor return monitoring proposal scope.

4b Point source emissions to air only

The site has a number of emission points to air. Points which are subject to gas monitoring in accordance with the requirements of the current environmental permit, MCPD and EA guidance.

Hours of operation of the flare, A8, to be monitored and logged. In the unlikely event that the total annual hours of operation exceed 10% of the hours in a year (876 hours), emissions from the flare would be subject to monitoring in accordance with EA guidance.

There is no routine monitoring proposed for points for PRVs (A7, A9 – A14) OCU's (A15 – A17) other than recommended by the manufacturer to achieve effective operational conditions.

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?

Yes

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?

Yes

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 permitted site with the combustion assets, sampling locations and sampling ports may not meet all of the requirements for BS EN 15259, but monitoring has been carried out over a number of years in accordance with the permit requirements with the installed ports. Due to the nature of the ducting access, it is not possible to conduct a full velocity profile, however, no particulate sampling is required for biogas fuelled units, and all gaseous species are considered to be mixed sufficiently for the purposes of monitoring. There is no requirement to undertake a homogeneity test as per BS EN 15259 and as such the location cannot be compared against that or the criteria in M1. The sampling location is as previously approved for use by the Environment Agency.

Due to the size of the CHP and boilers, a permanent sampling platform is not provided, however, a temporary sampling platform is utilised to provide sufficient space, in accordance with standard industry practice.

Air emission points A1-A6 will be subject to periodic monitoring in accordance with the requirements of the Medium Combustion Plant Directive (EU2015/2193). Air emission points A18 and A19 will be subject to periodic monitoring when the pre-operational condition is met.

5 Environmental impact assessment

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

No

6 Resource efficiency and climate change

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

The installation is designed to treat thickened sewage sludge to enable its recycling to land as a fertiliser, and to capture and utilise biogas to generate green electricity.

The plant has been designed from first principles to be energy efficient. Gravity is used as far as practicable for the transfer of sludge and liquids within the installation in order to minimise energy requirements. Biogas is captured and used within the CHP engine in the first instance to generate both electricity for use within the wider site and for export to the electrical grid as appropriate. Waste heat from the CHP engine is utilised to ensure that the primary digesters operate within the optimum temperature range for the anaerobic digestion process to be undertaken. The digester vessels are insulated to retain this additional heating, and boilers which are fuelled by biogas, are utilised in particularly cold periods to supplement the digester heating. Flaring is minimised.

Lighting has been optimised for low energy use and all pumps and other mechanical and electrical plant subject to regular, routine, preventative maintenance to minimise losses.

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

The main site energy sources are electricity from the public supply and biogas generated by the anaerobic digester which is combusted in the CHP engine to generate electricity and heat on site. The change being applied for will not result in a change in the site's energy use as the indigenous sludge is already treated on site.

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.

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

See response to question 3c above. The change being applied for will not result in an increase in the site's raw materials use as the indigenous sludge is already treated on site.

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 waste. 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.

4.3 Form C4

1 What waste operations are you applying to vary?

Types of Waste accepted.

See Table C3-1b in Section 3.3 above.

EWC codes as listed previously.

1c Deposit for recovery purposes

Are you applying for a waste recovery activity involving the permanent deposition of waste on land for construction or land reclamation (including landfill restoration)?

No

2 Point source emissions to air, water and land

See Table C3-2 – Emissions

3 Operating techniques

3a Technical standards

Table C4-3a – Technical standards

Description of waste operation	Appropriate measure (TGN reference)	Document reference (if appropriate)
Other biological treatment of waste: deposit of imported non-hazardous waste for treatment through a wastewater treatment works.	Biological waste treatment: appropriate measures for permitted facilities	Updated 6th July 2023

In all cases, describe the type of facility or operation you are applying for and provide site infrastructure plans, location plans and process flow diagrams or block diagrams to help describe the operations and processes undertaken.

3b – General requirements

Table C4-3b General requirements

Name of the waste operation	Document references
If the technical guidance or your risk assessment shows that emissions of substances not controlled by emission limits are an important issue, send us your plan for managing them.	N/A

Name of the waste operation	Document references
If the technical guidance or your risk assessment shows that odours are an important issue, send us your plan for managing them.	Odour Management Plan
If the technical guidance or your risk assessment shows that noise or vibration are important issues, send us your noise or vibration plan (or both).	N/A

3c Information for specific sectors

N/A

4 Monitoring

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

See response for Form C3 previously.

4b Point source emissions to air only.

See response for Form C3 previously.

4.4 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.

From Point T1 – release via the site drainage system

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.

Lower volume constituents will include rainfall; biogas condensate; boiler blowdown water; 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, with lower volumes of cess, septic tank and similar sewage related arisings delivered by third parties.

Point T2 – release via the site drainage system

This effluent is primarily thickening liquors from the thickening of SAS at the site, and surface water drainage from around the sludge thickening building and the thickening sludge blending tank.

Point T3 – release via the site drainage system

This is the point where tanker imports for the inlet leave the permit boundary to transfer to the works inlet.

1b Give this effluent a unique name.

T1 - Liquor returns 1.

T2 – Liquor returns 2.

T3 – Tanker imports.

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?

897 cubic metres

3c What is the maximum rate of discharge?

10.4 litres / second

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

897 cubic metres

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

Q3b – based on the maximum daily site input of 897 tonnes, assuming 1 tonne = 1 cubic metre. The liquor arisings must come from the installation inputs as there is limited additional water inputs. Actual discharge will be slightly lower as no allowance has been made for water entrained in the produced sewage cake, but there will be lower volumes inputs like biogas condensate.

Q3c – this is based on ($897m^3$ / 86400) x1000. Arisings from sources such as dewatering are constant as the plant runs continuously. This gives a value of 10.3819 litres, rounded up to 10.4 litres per second.

Q3d – based on the maximum daily site input of 897 tonnes, assuming 1 tonne = 1 cubic metre. The liquor arisings must come from the installation inputs as there is limited additional water inputs. This is primarily the outputs from the dewatering plant, which assumes all materials input to the primary digesters end up in the dewatering plant. Actual discharge will be slightly lower as no allowance has been made for water entrained in the produced sewage cake, but there will be lower volumes inputs like biogas condensate.

4 No questions

5 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.

6 How will the effluent be treated?

6a Do you treat your effluent?

Waste waters generated within the installation are not subject to pre-treatment.

The combined effluent generated by the process of treating sewage and sewage related arisings within the installation is returned to the inlet of the wider sewage treatment works, where it is subject to aerobic treatment in a mixture with UWWTD related waste waters.

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

Table C6-6b – (Table 2) Treatments carried out on your effluent

Order of Treatment	Code Number	Description
First	09	Primary settlement within sewage works
Second	31	Activated sludge process
Third	03	Tertiary biological treatment

7 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?

BAT 6&7 sampling returns:

There are no direct emissions to water from the sludge treatment facility. The only indirect emission is of the sludge liquors and surface waters, which are returned to the wastewater treatment works for aerobic treatment under Urban Wastewater regulations. The liquors returned from the sludge treatment facility have originated from wastewater treatment works that are also under the control of Severn Trent Water.

Severn Trent Water have always undertaken periodical sampling of ammonia on the centrate returns with regard to loading impacting the operation of the treatment works. We are currently shadow sampling twice monthly for Ammonia, Soluble BOD, Total BOD, Orthophosphates and Suspended Solids on the dewatering centrate at Derby using the sample points noted in the table C3-3. Direct regular sampling of these returns is a fairly recent addition to our processes so our understanding of the variance in these returns is developing. COD, BOD, Total Nitrogen, TOC, Ammoniacal Nitrogen, total Phosphorous, suspended solids and pH are directly available at our UKAS accredited contract laboratory and we will begin sampling for these determinands. Not all processes have flow meters on the return lines, assumptions will be made from the throughput of the asset. Temperature would be a field-based measurement, currently this is not measured. STW will aim to sample for PFOS and PFOA on a six-monthly basis to build up a data set, but due to the two weeks analysis turn around, these are not of use to the live operational process.

The data obtained from the return sampling will then be used to optimise the process and STW will carry out root cause investigations with the process support teams to understand what changed on site and ensure that we can reduce the risk to the inlet. If any abnormalities are identified in the sample data following root cause investigations, the Process Team will collaborate with wider site based teams and the Catchment team to ascertain the root cause.

As part of the new IED permit and in line with BAT 3, we commit to carrying out further chemical analysis of the waste water, testing for all pollutants expected to be present in the discharge. We are currently in discussion with UKAS accredited laboratories to see what analysis is possible on our leachate returns, and what 'minimum reporting value' is appropriate. This review will be undertaken in line with EA guidance, for example 'Surface Water Pollution Risk Assessment for your environmental permit', and 'Monitoring Discharges to Water'. The sampling will be undertaken by our suitably trained internal teams that already undertake compliance sampling for EA discharge permits to MCERTS standards. Analysis will be contracted to UKAS accredited laboratories.

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?

Please see previous answer.

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 within the effluent.

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.

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. Discussions are being held with the local catchment team, to identify any known sources of these materials within the sewage works catchment area.

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

8 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, due to a lack of quality data and confirmation of flows. 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.

9 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?

Current sampling occurs at the final effluent point: SK 39360 34490

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.

10 Where will the effluent discharge to?

10a Where the effluent discharges to

Non-tidal river, stream or canal

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

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

Final Effluent Outlet

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

SK 39360 34490

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

River Derwent

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

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

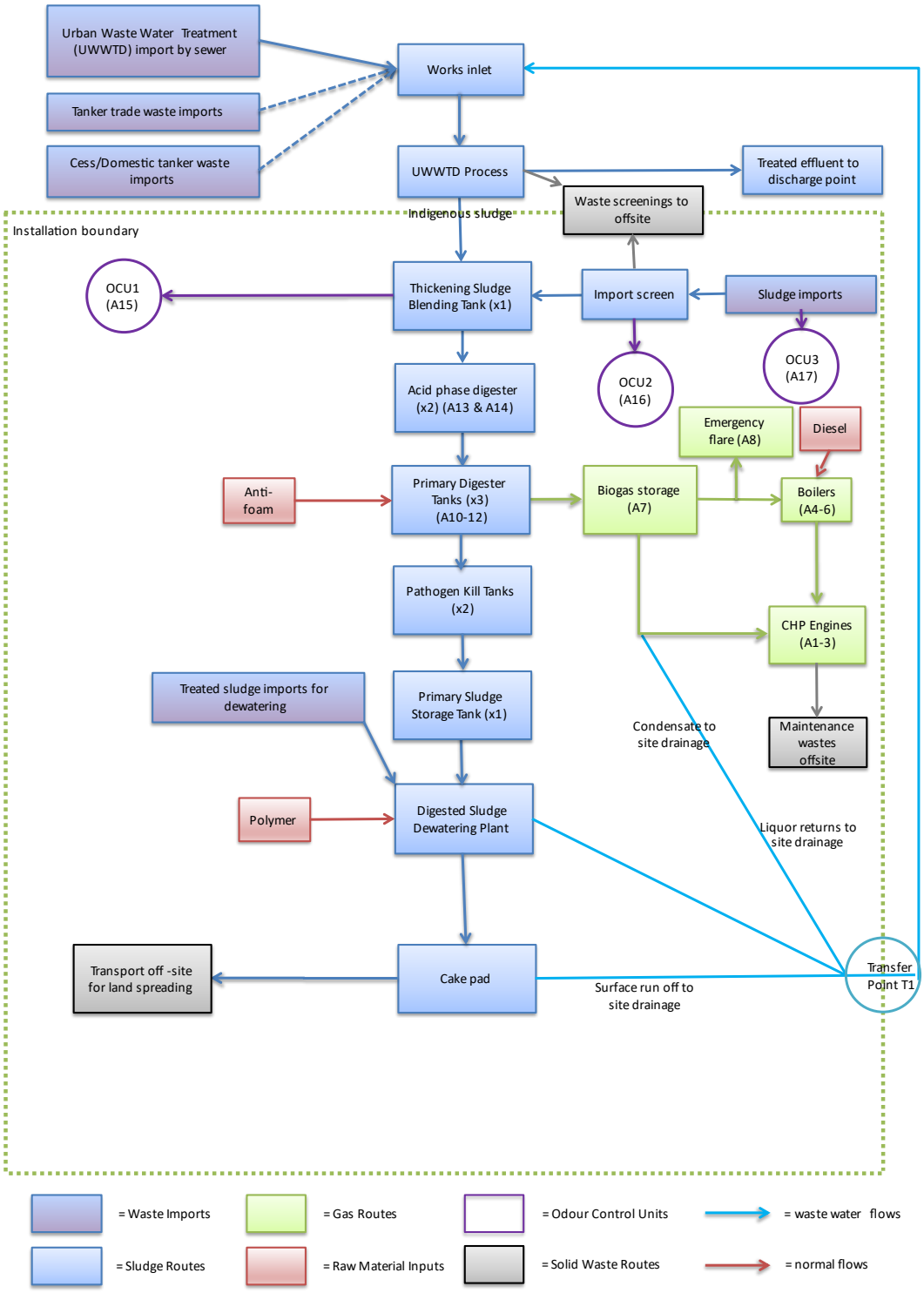
Appendix A. Figures

A.1.1 Site Location Plan

A.1.2 Installation Boundary and Air Emission Points

A.1.3 Site Drainage Plan

A.1.4 Process Flow Diagram



* Points A1; A2 and A3 to be replaced with points A18; A19 and A20 when the pre-operational condition is met

Appendix B. Certificates

Appendix C. BAT Assessment

Please see appended spreadsheet

Appendix D. Site condition report

Appendix E. Odour Management Plan

Appendix F. Site Spill Risk Assessment and Containment Report

Appendix G. Leak Detection and Repair (LDAR) Plan