Notice of variation and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Thames Water Utilities Limited

Crossness Sludge Treatment Centre
Crossness Sewage Treatment Works
Belvedere Road
Thamesmead
London
SE2 9AQ

Variation application number

EPR/PB3239AW/V005

Permit number

EPR/PB3239AW

Crossness Sludge Treatment Centre
Permit number EPR/PB3239AW

Introductory note

This introductory note does not form a part of the permit

Under the Environmental Permitting (England & Wales) Regulations 2016 (schedule 5, part 1, paragraph 19) a variation may comprise a consolidated permit reflecting the variations and a notice specifying the variations included in that consolidated permit.

Schedule 1 of the notice specifies the conditions that have been varied and schedule 2 comprises a consolidated permit which reflects the variations being made. All the conditions of the permit have been varied and are subject to the right of appeal.

Current permitted activities

The current permit allows for the operation of a Section 1.1 A (1) (a) Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts. The total sites capacity is 57 MWth.

This includes:

- 3 x existing CHP engines with a net rated thermal input of 4.68 MW each, fired on biogas generated on site.
- 2 x existing auxiliary boilers with a net rated thermal input of 4.749 MW each, fired on biogas generated on site or natural gas.

Emergency standby diesel generators (emergency plant), including the following equipment:

- 4 x existing Man Paxman engines with a net rated thermal input 5.2 MW each.
- 2 x existing MTU engines with a net rated thermal input 5.6 MW each.

Combustion equipment with net rated thermal input of less than 1 MW each that are aggregated to a net rated thermal input of approximately 1.2 MW.

Changes introduced by this variation

The Industrial Emissions Directive (IED) came into force on 7 January 2014 with the requirement to implement all relevant Best Available Techniques (BAT) Conclusions as described in the Commission Implementing Decision. The schedule of waste management activities includes the recovery of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving biological treatment, but excludes activities covered by the Urban Waste Water Treatment Regulations (UWWTR). However, UK environmental regulators concluded that the biological treatment of waste sewage sludge is not an activity covered by the UWWTR and is therefore within the scope of the IED. The BAT Conclusions for Waste Treatment (the BREF) was published on 17 August 2018 following a European Union wide review of BAT, implementing decision (EU) 2018/1147 of 10 August 2018. BAT applies to new waste sewage sludge treatment not covered by the UWWTR. The operations at Crossness Sludge Treatment Centre (STC) are existing but will be brought into environmental regulation for the first time and are required to operate using BAT.

Changes introduced by this variation made by the operator

This variation amends the permit to add a Section 5.4 Part A (1)(b)(i) scheduled activity and two waste activities to become to a multi regime permit. This variation also includes an increase to the site boundary to accommodate the assets associated with the sludge Anaerobic Digestion (AD) operation, the waste operation for the import of waste to the head of works, and the waste operation for import of digested sludge for storage only.

The permit has been reviewed against the requirements of the Medium Combustion Plant Directive for 2025 and 2030 and relevant conditions and monitoring requirements have been added.

Brief description of the process

Crossness STC is located in an industrialised area of South-East London. It is situated within an Air Quality Management Area for PM10 and oxides of nitrogen. The facility is in the grounds of the wider Crossness Wastewater Treatment Works (WwTW) which do not form part of this permit.

The site will accept up to 7,530,000 tonnes per annum of indigenous and imported waste sludge.

Sewage sludge produced at Crossness WwTW (indigenous sludge) can be received via two routes. The first is at one of six picket fence thickeners (PFTs), the second is at the primary sludge thickening plant. From these processes sludge is thickened and then transferred to the primary sludge blending tank for mixing with imported sludge.

Imported sludge is received at two locations into one of twelve sludge buffer tanks. At location one sludge is pumped into the Primary Sludge Blending Tank where imported and indigenous sludges are combined. Liquor produced in the thickening process is returned via Liquor Return Pumping Station 2 to the head of works for treatment at the WwTW (which does not form part of the permit boundary) by emission point T2 and sampled at point S2. At location 2 sludge is passed to the SAS blending tank before being transferred to the Thermal Hydraylisis process. Liquor produced in the thickening process is returned via Liquor Return Pumping Station 1 to the head of works for treatment at the WwTW (which does not form part of the permit boundary) by emission point T1 and sampled at point S1

Surplus Activated Sludge (SAS) is received at the SAS buffer tank (which does not form part of the permit boundary) before being transferred to the SAS thickening plant where polymer is added. Thickened SAS is then passed to the SAS blending tank before being transferred to the Thermal Hydrolysis process. (THP). Alternatively, SAS blended tank sludge can be transferred to one of the sludge buffer tanks for storage. Liquor produced in the thickening process is returned via Liquor Return Pumping Station 1 to the head of works for treatment at the WwTW (which does not form part of the permit boundary) by emission point T1 and sampled at point S1

Once the sludge has been thickened and excess liquor removed it is passed to a THP. The THP consists of a high energy blending tank, two blended sludge tanks, sludge screens, two pre- dewatering feed tanks, a dewatering plant, two feed silos, four reactor tanks, one flash tank and a pulper tank.

Once sludge has undergone the THP process it is transferred into one of eight primary digesters where it then undergoes biological treatment in the form of anaerobic digestion (AD). The treatment of sludge in a biological AD process is a Section 5.4 Part A (1)(b)(i) scheduled activity of the above regulations. This variation adds the section 5.4 activity to the permit and consolidates the waste activity.

Biogas produced as part of the AD process is stored in the roof of the primary digesters and eight biogas storage holders prior to being used for combustion in three combined heat and power (CHP) engines (with a thermal input of 4.68 MWth each), and two boilers (with a thermal input of 4.749 MWth each).The electrical energy and heat produced, is used to power on-site processes and provide heat to the digestion process.

In the event of emergency, biogas is flared in one of two waste gas burners.

Biogas condensate is produced from the CHP and boilers is discharged to site drainage system and returned to Crossness Wastewater Treatment Works (WwTW) via emission point T1 and sampled at point S1.

Following AD treatment, sludge is transferred to two digested sludge buffer tanks and then to the digested sludge dewatering plant to produce cake. Cake is stored on an impermeable surface within the cake barn before being exported offsite for land spreading under the Sludge (Use in Agriculture) Regulations (SUiAR) and undergoes quality assurance under the Biosolids Assurance Scheme (BAS). Liquor produced from the dewatering of sludge is discharged to the WwTW (which does not form part of the permit boundary) by emission point T1 and sampled at point S1.

The site also operates 8 odour control units (OCUs) these consist of:

- OCU 1 at emission point A26 consisting of a bio-trickling filter and two carbon filters serving the Liquor Return Pumping Station 2 (PFT and supernatant well)
- OCU 4 at emission point A27 consisting of a biofilter and carbon filter serving the primary sludge thickening plant.
- OCU 5 at emission point A28 consists of a biofilter serving the PFTs.
- OCU 8 at emission point A29 consists of two stage biofilter serving the primary sludge blending tank and SAS blending tank
- OCU 9 at emission point A30 consisting of a two stage biofilter serving the sludge buffer tanks
- OCU 10 at emission point A31 consisting of a two stage biofilter and carbon filter serving the primary Sludge Buffer Tanks, THP related tanks, digested sludge buffer tanks, sludge dewatering presses and return liquor pumping station 3.
- OCU 11 at emission point A34 consisting of a biofilter and dry scrubber serving liquor return pumping station 1.
- OCU 12 at emission point A35 consisting of a biofilter and dry scrubber serving the liquor return pumping station 2.

Waste waters produced from OCU 1, 5 and 12 are discharged to the liquor return pumping station 2 for treatment at the WwTW (which does not form part of the permit boundary) by emission point T2 and sampled at point S2. OCU 9 waste waters are discharged by emission point T3 for treatment at the WwTW and sampled by emission point S3. Condensate produced from OCUs 4, 8, 10 and 11 is discharged to the liquor return pumping station 1 for treatment at the WwTW (which does not form part of the permit boundary) by emission point T1 and sampled at point S1.

This permit also allows a further two waste operations relating to the import of liquid waste to the head of works, and temporary storage of cake not produced on site.

For the head of works activity, effluents and waste waters in the form of sludge and liquid only, will be delivered by tanker to the head of the works for treatment under the UWWTR. This activity involves the storage of liquid wastes and discharge to the main WwTW. The discharge is classed as an indirect emission to water. In this case, the River Thames. We have imposed improvement conditions in the permit to determine the impact on the River Thames from the tankered wastes imported and subsequently discharged to the WwTW.

For the temporary storage of cake, digested cake produced at other Thames Water sites will be stored separately to indigenous cake in designated area on the cake pad prior to transfer off site. Cake that is temporarily stored on site will not undergo any treatment and must be kept separate from any cake produced as a result of activity AR2 and directly associated activities referenced in table S1.1.

There is one Site of Special Scientific Interest (SSSI) Abbey Wood which is 1.5km away from the site. As well as fifteen Local Wildlife Sites, one Ancient Woodland and four Local Nature Reserves within relevant screening distances of the installation.

The status log of the permit sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	**Date**	**Comments**
Application EPR/PB3239AW/A001	Duly made 12/04/2013	Application for Combined Heat Power facility.
Additional information received	24/09/2013	Confirmation of site boundary.
Permit determined	15/10/2013	Permit issued to Thames Water Utilities Limited.
Application variation EPR/PB3239AW/V002	Duly made 30/11/2017	Application to vary the permit
Variation determined	18/12/2017	Varied permit issued
Application variation EPR/PB3239AW/V003	Duly made 27/02/2020	Application to vary the permit from waste operation to an EPR Schedule 1, S1.1 Part A1 (a) combustion installation.

Status log of the permit		
Description	**Date**	**Comments**
Additional information EPR/PB3239AW/V003	23/10/2020	Amended application documents excluding elective operation of standby diesel generators from the scope of the application.
Response to Schedule 5 Notice issued 18/09/2020 EPR/PB3239AW/V003	Received 23/10/2020	Additional information on drainage and containment infrastructure, demineralisation plant, operating scenarios for emergency standby generators, and impact assessment on non-statutory ecological receptors.
Additional information EPR/PB3239AW/V003	Received 20/11/2020	Additional information on drainage and containment infrastructure.
Variation determined EPR/PB3239AW (Billing Ref. No. BP3937QT)	23/02/2021	Varied permit issued.
Application variation EPR/PB3239AW/V004	10/06/2022	Application withdrawn
Application variation EPR/PB3239AW/V005	Duly made 20/03/2024	Application to vary the permit add a section 5.4 A (1)(b)(i) installation activity and two waste operations.
Additional information received	06/06/2024	In response to Schedule 5 Notice dated 09/05/2024
Variation and consolidation determined EPR/PB3239AW/V005	18/11/2024	Variation and consolidation issued to Thames Water Utilities Limited.

End of introductory note

Notice of variation and consolidation

The Environmental Permitting (England and Wales) Regulations 2016

The Environment Agency in exercise of its powers under regulations 20 of the Environmental Permitting (England and Wales) Regulations 2016 varies and consolidates environmental permits

Permit number

EPR/PB3239AW

Issued to

Thames Water Utilities Limited ("the operator")

whose registered office is

Clearwater Court
Vastern Road
Reading
Berkshire
RG1 8DB

company registration number 02366661

to operate a regulated facility at

Crossness Sludge Treatment Centre
Crossness Sewage Treatment Works
Belvedere Road
Thamesmead
London
SE2 9AQ

to the extent set out in the schedules.

The notice shall take effect from 18/11/2024

Name	Date
Rebecca Warren	**18/11/2024**

Authorised on behalf of the Environment Agency

Schedule 1 – changes in the permit

Note: All conditions have been varied by the consolidated and varied permit as a result of the application made by the operator.

Schedule 2 – consolidated permit

Consolidated permit issued as a separate document.

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/PB3239AW

The Environment Agency hereby authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2016

Thames Water Utilities Limited ("the operator"),

whose registered office is

Clearwater Court
Vastern Road
Reading
Berkshire
RG1 8DB

company registration number 02366661

to operate an installation and waste operations at

Crossness Sludge Treatment Centre
Crossness Sewage Treatment Works
Belvedere Road
Thamesmead
London
SE2 9AQ

to the extent authorised by and subject to the conditions of this permit.

Name	Date
Rebecca Warren	**18/11/2024**

Authorised on behalf of the Environment Agency

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.1.4 The operator shall comply with the requirements of an approved competence scheme.

1.2 Energy efficiency

1.2.1 For the following activities referenced in schedule 1, table S1.1 (AR1 to AR12), the operator shall:

(a) take appropriate measures to ensure that energy is used efficiently in the activities;

(b) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and

(c) take any further appropriate measures identified by a review.

1.3 Efficient use of raw materials

1.3.1 For the following activities referenced in schedule 1, table S1.1 (AR1 to AR12), the operator shall:

(a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;

(b) maintain records of raw materials and water used in the activities;

(c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and

(d) take any further appropriate measures identified by a review.

1.4 Avoidance, recovery and disposal of wastes produced by the activities

1.4.1 The operator shall take appropriate measures to ensure that:

(a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and

(b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and

(c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.

1.4.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.

2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the "activities").

2.1.2 For the following activities referenced in schedule 1, table S1.1 (AR1 to AR12), the activities shall be undertaken in accordance with best available techniques.

2.1.3 All process plant and equipment shall be commissioned, operated and maintained and shall be fully documented and recorded in accordance with the manufacturer's recommendations.

2.1.4 For the following activities referenced in schedule 1, table S1.1 (AR1 to AR12), waste authorised by this permit shall be clearly distinguished from any other waste on the site.

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

2.3.1 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.

2.3.2 If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan or other documentation ("plan") specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.

2.3.3 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.

2.3.4 Waste shall only be accepted if:

(a) it is of a type and quantity listed in schedule 2 table S2.2, S2.3 and S2.4; and

(b) it conforms to the description in the documentation supplied by the producer and holder.

(c) the facility has sufficient free capacity to store and treat the waste.

2.3.5 The operator shall ensure that where waste produced by the activities is sent to a relevant waste operation, that operation is provided with the following information, prior to the receipt of the waste:

(a) the nature of the process producing the waste;

(b) the composition of the waste;

(c) the handling requirements of the waste;

(d) the hazardous property associated with the waste, if applicable; and

(e) the waste code of the waste.

2.3.6 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.

2.3.7 For the following activities referenced in schedule 1, table S1.1 (AR1 to AR12), waste pre-acceptance and acceptance procedures shall be undertaken in accordance with best available techniques.

2.3.8 For the following activities referenced in schedule 1, table S1.1: Standby diesel generators may be used but for no more than 500 hours per year.

2.3.9 For the following activities referenced in schedule 1, table S1.1 (AR1):

(a) each MCP must be operated in accordance with the manufacturer's instructions and records must be made and retained to demonstrate this.

(b) the operator must keep periods of start-up and shut-down of each combustion plant as short as possible.

(c) there must be no persistent emission of 'dark smoke' as defined in section 3(1) of the Clean Air Act 1993.

2.4 Improvement programme

2.4.1 The operator shall complete the improvements specified in schedule 1 table S1.3 by the date specified in that table unless otherwise agreed in writing by the Environment Agency.

2.4.2 Except in the case of an improvement which consists only of a submission to the Environment Agency, the operator shall notify the Environment Agency within 14 days of completion of each improvement.

2.5 Pre-operational conditions

2.5.1 The operations specified in schedule 1 table S1.4 shall not commence until the measures specified in that table have been completed.

3 Emissions and monitoring

3.1 Emissions to water, air or land

3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1 and S3.2.

3.1.2 The limits given in schedule 3 shall not be exceeded.

3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination.

3.2 Emissions of substances not controlled by emission limits

3.2.1 Emissions of substances not controlled by emission limits (excluding odour, but including ammonia) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

3.2.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan

which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;

(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.2.3 Subject to condition 3.2.4, below, all liquids in containers, whose emission to water or land could cause pollution, shall be provided with adequate secondary containment, unless other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container have been agreed in writing with the Environment Agency.

3.2.4 Condition 3.2.3, above, shall apply unless the operator strictly complies in full with IC3 below.

3.2.5 Subject to condition 3.2.6, below, the operator shall use buffer storage to store waste water and digestate to prevent waste water or digestate being discharged off site during the receiving waste water treatment works storm overflow operating, unless other appropriate measures to prevent or where that is not practicable, to minimise, emissions during waste water treatment works storm overflow operation, have been agreed in writing with the Environment Agency.

3.2.6 Condition 3.2.5, above, shall apply unless the operator strictly complies in full with IC4 below.

3.2.7 The operator shall implement a leak detection and repair (LDAR) programme to detect and mitigate the release of volatile organic compounds, including methane from diffuse sources.

3.3 Odour

3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.4 Noise and vibration

3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.4.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.5 Monitoring

3.5.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring specified in the following tables in schedule 3 to this permit:

(a) point source emissions specified in tables S3.1 and S3.2;

(b) process monitoring specified in tables S3.3 and S3.4;

3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.5.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by the Environment Agency.

3.5.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1, S3.2, S3.3, S3.4, and S3.5 unless otherwise agreed in writing by the Environment Agency.

3.5.5 For the following activities referenced in Schedule 1 Table S1.1 (AR1):

(a) For existing MCP Monitoring measurements shall be carried out within four months of the issue date of this notice.

(b) For existing MCP Monitoring measurements shall be carried out before the relevant compliance date or within four months of the issue date of the permit whichever is the later.

3.5.6 Monitoring shall not take place during periods of start up or shut down.

3.6 Pests

3.6.1 The activities shall not give rise to the presence of pests which are likely to cause pollution, hazard or annoyance outside the boundary of the site. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved pests management plan, have been taken to prevent or where that is not practicable, to minimise the presence of pests on the site.

3.6.2 The operator shall:

(a) only use approved products for pest control;

(b) treat pest infestations promptly;

(c) reject pest-infected incoming waste;

(d) if notified by the Environment Agency, submit to the Environment Agency for approval within the period specified, a pests management plan which identifies and minimises risks of pollution from pests;

(e) implement the pests management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.7 Fire prevention

3.7.1 The operator shall take all appropriate measures to prevent fires on site and minimise the risk of pollution from them including, but not limited to, those specified in any approved fire prevention plan.

3.7.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to a risk of fire, submit to the Environment Agency for approval within the period specified, a fire prevention plan which prevents fires and minimises the risk of pollution from fires;

(b) implement the fire prevention plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.7.3 The operator shall undertake a DSEAR assessment and maintain an accident management plan.

4 Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:

(i) off-site environmental effects; and

(ii) matters which affect the condition of the land and groundwater.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

4.1.3 The operator shall maintain a record of the type and quantity of fuel used and the total annual hours of operation of each MCP.

4.2 Reporting

4.2.1 The operator shall send all reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

4.2.2 For the following activities referenced in schedule 1, table S1.1 (AR1 to AR12), a report or reports on the performance of the activities over the previous year shall be submitted to the Environment Agency by 31 January (or other date agreed in writing by the Environment Agency) each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;

(b) the annual production/treatment data set out in schedule 4 table S4.2; and

(c) the performance parameters set out in schedule 4 table S4.3 using the forms specified in table S4.4 of that schedule.

4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:

(a) in respect of the parameters and emission points specified in schedule 4 table S4.1;

(b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.4; and

(c) giving the information from such results and assessments as may be required by the forms specified in those tables.

4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

4.2.5 Within 1 month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.

4.2.6 The operator shall keep records of non-waste materials leaving the site, including the type of material, the batch number, the date of export off-site and the tonnage exported on that date. These records shall be maintained for at least 2 years.

4.2.7 The operator shall submit an annual report detailing the efficiency of removal of non-digestible materials from feedstock prior to processing and the level of contamination in the final recovered digestate.

4.2.8 The operator shall notify the Environment Agency, as soon as is practicable, in writing of any change of MCP at the specified location.

4.3 Notifications

4.3.1 In the event:

(a) that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—

(i) inform the Environment Agency,

(ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and

(iii) take the measures necessary to prevent further possible incidents or accidents;

(b) of a breach of any permit condition the operator must immediately—

(i) inform the Environment Agency, and

(ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;

(c) of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

4.3.2 Any information provided under condition 4.3.1 (a)(i), or 4.3.1 (b)(i) where the information relates to the breach of a limit specified in the permit, shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 Following the detection of an issue listed in condition 4.3.1, the operator shall review and revise the management system and implement any changes as necessary to minimise the risk of re-occurrence of the issue.

4.3.4 Where the Environment Agency has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform the Environment Agency when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to the Environment Agency at least 14 days before the date the monitoring is to be undertaken.

4.3.5 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

In any other case:

(a) the death of any of the named operators (where the operator consists of more than one named individual);

(b) any change in the operator's name or address; and

(c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.6 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) the Environment Agency shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

4.3.7 The Environment Agency shall be given at least 14 days' notice before implementation of any part of the site closure plan.

4.3.8 The operator shall notify the Environment Agency as soon as is practicable, in writing of any change of medium combustion plant.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "immediately", in which case it may be provided by telephone.

Schedule 1 – Operations

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity and WFD Annex I and II operations**	**Limits of specified activity and waste types**
AR1	Section 1.1 A (1) (a): Burning any fuel in an appliance with a rated thermal input of 50 megawatts or more.	Combustion activity with an aggregated thermal input of 56.738 MW comprising of the following plant: Combined Heat and Power (CHP) plant including the following equipment: - 3 x CHP engines, net rated thermal input of 4.68 MWth each, fired on biogas generated on site. Existing MCP. - 2 x auxiliary boilers, net rated thermal input of 4.749 MWth each, fired on biogas generated on site or natural gas. Existing MCP.	From the receipt of biogas produced at the on-site anaerobic digestion process to combustion with the release of combustion gases. Combustion of biogas in three combined heat and power (CHP) engines with an aggregated thermal input of 14.04 MWth. Combustion of biogas or natural gas in two auxiliary boilers with an aggregated thermal input of 9.498 MWth. Operation of the boiler shall be limited to less than 500 hours per year as a 5-year rolling average when operating on natural gas. Permitted waste shall comprise biogas from sewage sludge digesters.
		Emergency standby diesel generators (emergency plant), including the following equipment: - 4 x Man Paxman engines, net rated thermal input 5.2 MWth each. Existing MCP. - 2 x MTU engines, net rated thermal input 5.6 MWth each. Existing MCP.	From receipt of diesel oil to discharge of exhaust gases through emission points A8 to A13, for maintenance testing operations and the generation of electricity during emergency power outages. The operational hours in emergency use of this activity shall not exceed the specifications set out in condition 2.3.8. Maintenance testing operations shall not exceed 50 hours per year per generator and shall comply with the testing schedule described in the operating techniques documents referred to in table S1.2.
		Combustion equipment with net rated thermal input less than 1 MW each, aggregated net rated thermal input approx. 1.2 MW.	From receipt of diesel oil to discharge of exhaust gases through emission points A14 to A17, and the generation of electricity and hot water.

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity and WFD Annex I and II operations**	**Limits of specified activity and waste types**
AR2	S5.4 A(1) (b) (i) Recovery or a mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day (or 100 tonnes per day if the only waste treatment activity is anaerobic digestion) involving biological treatment	R3: Recycling/reclamation of organic substances which are not used as solvents	From receipt of waste through to digestion and recovery of by-products (waste treated by anaerobic digestion). Anaerobic digestion of waste in eight tanks followed by burning of biogas produced from the process. Anaerobic digestion shall be limited to 2,466 tonnes per day. Waste types suitable for acceptance are limited to those specified in Table S2.2.
Directly Associated Activity			
AR3	Storage of waste pending recovery or disposal	R13: Storage of waste pending the operations numbered R1 and R3 (excluding temporary storage, pending collection, on the site where it is produced)	Undertaken in relation to Activity AR2. From the receipt of permitted waste to pre-treatment and despatch for anaerobic digestion on site. Storage of residual wastes from pre-treatment to despatch off-site for recovery. Storage of waste in enclosed equipment and tanks fitted with appropriate odour abatement and on an impermeable surface with a sealed drainage system. Waste types suitable for acceptance are limited to those specified in Table S2.2.
AR4	Physical treatment for the purpose of recycling	R3: Recycling/reclamation of organic substances which are not used as solvents	Undertaken in relation to Activity AR2. From the receipt of waste to despatch for anaerobic digestion or despatch off site for recovery. Dilution of incoming wastes using final waste waters from the wastewater treatment works to aid pre-treatment and digestion only. Pre-treatment of waste in enclosed equipment and tanks fitted with

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity and WFD Annex I and II operations**	**Limits of specified activity and waste types**
			appropriate odour abatement and on an impermeable surface with a sealed drainage system, including shredding, sorting, screening, compaction, baling, mixing and maceration. Heat treatment (thermal hydrolysis) of waste in 11 tanks for the purpose of recovery. Tanks are comprised of high energy blending tank. Blended sludge tanks, feed silos, pulper tank, reactor tanks, flash tank. Post-treatment of digestate in enclosed equipment and tanks fitted with appropriate odour abatement and on an impermeable surface with a sealed drainage system, including separation, screening to remove contraries, centrifuge or pressing and addition of thickening agents (polymers) or drying for use as a fertiliser or soil conditioner (drying for the purpose of use as a fuel is not permitted). Gas cleaning by biological or physical (carbon filtration) or chemical scrubbing. Waste types suitable for acceptance are limited to those specified in Table S2.2.
AR5	Emergency flare operation	D10: Incineration on land	Undertaken in relation to Activity AR1 and AR2. From the receipt of biogas produced at the on-site anaerobic digestion process to incineration with the release of combustion gases. There shall be no venting or flaring of gas for disposal. Use of two auxiliary flares required only during periods of breakdown or maintenance of the CHP engines, and/or auxiliary boilers.

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity and WFD Annex I and II operations**	**Limits of specified activity and waste types**
AR6	Raw material storage	Storage of raw materials including lubrication oil, antifreeze, activated carbon, diesel.	Undertaken in relation to Activity AR1 and AR2. From the receipt of raw materials to despatch for use within the facility.
AR7	Gas storage	R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	Undertaken in relation to Activity AR1 and AR2. Storage of biogas produced from on-site anaerobic digestion of permitted waste in eight stand alone tanks or roof space of digesters. From the receipt of biogas produced at the on-site anaerobic digestion process to despatch for use within the facility. Emissions of unburnt biogas shall be minimised.
AR8	Digestate storage	R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)	Undertaken in relation to Activity AR2. From the receipt of processed digestate produced from the on-site anaerobic digestion process to despatch for use off-site. Storage of processed liquid digestate in two storage tanks Storage of processed solid digestate in Cake Barn and on an impermeable surface with sealed drainage system.
AR9	Surface water collection and storage	Collection and storage of uncontaminated roof and site surface water	Undertaken in relation to Activity AR1 and AR2 From the collection of uncontaminated roof and site surface water from non-operational areas only to re-use within the facility or discharge off-site.
AR10	Air abatement	Collection and treatment of air from the buildings or plant using abatement system – (biofilters, carbon filters, wet scrubbers and as implemented in line with IC8	Undertaken in relation to Activity AR2 From the collection of air from site processes to treatment and release of treated air to atmosphere.

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity and WFD Annex I and II operations**	**Limits of specified activity and waste types**
		and IC10) prior to release to atmosphere.	Collection and treatment of air from the buildings, tanks or plant using abatement system – [11 x biofilters, 5 x carbon filters, 2 x scrubbers]
AR11	Oil Storage	Storage of oil from receipt onto site, storage in oil storage tanks, oil dump tanks and transfer through oil pipelines	Undertaken in relation to Activity AR1 and AR2 From receipt of raw materials to dispatch for use.
AR12	Water Treatment	Demineralisation plant	Undertaken in relation to Activity AR1. From supply of raw water to production of demineralised boiler feed water for steam production, including discharge of effluents to the site drainage system (emission point S4).
Activity reference	**Description of activities for waste operations**		**Limits of activities**
AR13 – Blending of waste prior to discharge to the WwTW	D13: D13 Blending or mixing prior to submission to any of the operations numbered D1 to D12		From the receipt of waste sludges and waste liquids via tanker at the *head of the works* for treatment. Treatment operations shall be limited to the blending and mixing of waste without significantly altering the nature of the waste. Blending and mixing shall not be undertaken to achieve a reaction or a dilution of contaminants. Discharge of waste on an impermeable surface with a sealed drainage system. Waste types as specified in Table S2.3.
AR14 – Temporary storage of digested cake	R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)		From the receipt of waste sludges for temporary storage prior to transfer off site. There shall be no treatment of incoming wastes. Blending and mixing shall not be undertaken to achieve a reaction or a dilution of contaminants.

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity and WFD Annex I and II operations**	**Limits of specified activity and waste types**
			Subject to any other requirements of this permit wastes shall be stored for no longer than 1 year prior to disposal. Storage of waste shall take place on an impermeable surface with a sealed drainage system. Waste types as specified in Table S2.4.

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application EPR/PB3239AW/A001	Part B4 of the application form, Sections 3 in response to section 3a – technical standards.	31/05/2013
Application EPR/PB3239AW/V002	Supporting Information Document RT/EW1/DH17/1256/01.00 Dated 09/06/2017 Site Condition Report 9 June 2017 Application form dated 25/5/2017	13/06/2017
Application EPR/PB3239AW/V003	Application document titled: 'Crossness Combustion Facility Environmental Permit Variation Application - Application Supporting Information', revised version dated 19/10/2020.	23/10/2020
Additional information EPR/PB3239AW/V003	Revised application document titled 'Crossness Combustion Facility Air quality assessment', dated 22/10/2020.	23/10/2020
Schedule 5 Notice request dated 18/09/2020 EPR/PB3239AW/V003	Schedule 5 Notice request dated 18/09/2020 including additional information on drainage and containment infrastructure, demineralisation plant, operating scenarios for emergency standby generators including testing schedule, and impact assessment on non-statutory ecological receptors.	23/10/2020
Additional information request dated 02/11/2020 EPR/PB3239AW/V003	Response to request for additional information, email received on 20/11/2020 and associated attachments providing additional information on drainage and containment infrastructure (drainage plans and storage tanks inspections reports).	20/11/2020
Application EPR/P3239AW/V004	Sections 1.2, 1.4, 1.6 and 1.8 of the application document in response to section 3a – technical standards, Part B of the application form Best available techniques as described in the BAT Reference Document for Waste Treatment (the BREF) and BAT conclusions. Crossness Sludge Treatment Centre Environmental Permit Site Condition Report, dated December 2023. ADBA assessment tool. Accident Prevention and Management Plan: Crossness STW, dated December 2023 Raw Materials, Water and waste Residue Efficiency Management Plan: Crossness STW, dated December 2023 Figure 3 – Site Areas within Installation Boundary, Rev P03 Leak Detection and Repair Plan (LDAR) – Crossness, dated 11/12/2023. Crossness STC – Containment Options Report, dated December 2023	20/12/2023
Response to Schedule 5 Notice dated 09/05/2024	Appendix A.2, Installation Boundary and Air Emission Points 'B22849AM-JAC-CNS-DR-0002' Appendix A.5, Process Flow diagram 'B22849AZ-JA-CROSS1ZZ-LSX-DR-P-0002' Crossness Odour Management Plan: 'AM-OMP Crossness STW', dated June 2025, [excluding OCU monitoring frequency specified in section 5.1– For agency approved monitoring frequency refer to the process monitoring table S3.4]	06/06/2024

Further information provided by e-mail	Acceptance of Third-Party Waste Imports, dated 14/11/2023. Acceptance of TWUL Inter-Site Sludge, Cake and Sludge Liquors, dated 26/11/2023.	**31/07/2024**

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	The Operator shall submit a plan for approval to the Environment Agency, proposing improvements to the site's primary and secondary containment infrastructure for the storage of diesel oil fuel. The plan shall propose improvements to address the gaps, non-compliances, observations and recommendations described in the inspection reports submitted to the Environment Agency on 20/11/2020, as part of variation application EPR/PB3239AW/V003. The operator shall implement the agreed improvement plan within the timescales agreed with the Environment Agency.	6 months of permit issue or such other date as agreed in writing with the Environment Agency
IC2	The Operator shall carry out a review of the underground piping for the transport of the diesel fuel oil and submit for approval to the Environment Agency a report summarising the results of this review. The report shall include, but not limited to: a) Results of recent inspections of the underground piping, supported by inspection reports; b) A detailed description of the materials of construction and construction standards of the underground pipeline addressing whether: they consist of double-skinned pipes; interstitial monitoring is installed; the design is such to avoid using joints, bends and fittings that can be mechanically dismantled; any joints are accessible for inspection; c) A review of the adequateness of the underground pipeline taking into account applicable standards, guidelines and legal requirements; d) The review's findings and recommendations; e) Proposals for the implementation of recommended improvements; f) Timescales for implementation of improvements. The Operator shall implement the recommended improvements within the timescales agreed with the Environment Agency.	6 months of permit issue or such other date as agreed in writing with the Environment Agency
Improvement condition for secondary containment design		
IC3	The operator shall submit a written 'secondary containment implementation plan' and shall obtain the Environment Agency's written approval to it. The plan shall contain the finalised designs and an implementation schedule for the identified secondary containment systems proposed in the document 'Crossness STC – Containment Options Report, dated December 2023'. The finalised designs and specifications shall be produced by appropriate competent individuals (qualified civil or structural engineer), in accordance with the risk assessment methodology detailed within CIRIA C736 (2014) guidance. The plan shall include but not be limited to the following components:	6 months of permit issue or such other date as agreed in writing with the Environment Agency Implementation of all required and approved

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	• An updated BAT assessment with specific regard to BAT 19 of the Waste Treatment BREF to demonstrate how the finalised designs based on the proposed secondary containment in the document 'Crossness STC – Containment Options Report, dated December 2023' meets BAT 19. • An assessment of the suitability for providing containment when subjected to the dynamic and static loads caused by catastrophic tank failure. • Finalised designs and specifications of the proposed secondary containment proposal completed by appropriate competent individuals. • A program of works with timescales for the commissioning of the secondary containment systems to comply with CIRIA C736 (2014) guidance, or equivalent. • An updated site and infrastructure plan. • A preventative maintenance and inspection regime. The plan shall be implemented in accordance with the Environment Agency's prior written approval.	containment improvements must be completed by 31/03/2025.
Improvement conditions for primary containment tanks		
IC4	The operator shall submit a written 'primary containment plan' and shall obtain the Environment Agency's written approval to it. The plan shall contain the results of an inspection and program of works undertaken by an appropriately qualified engineer and shall assess the extent, design specification and condition of primary containment systems (including associated pipework) where polluting liquids and solids are being stored, treated, and/or handled. The plan shall include, but not be limited to: • An assessment of the physical condition of all primary containment systems (storage and treatment vessels and associated pipework) using a Written Scheme of Examination and their suitability for providing primary containment when subjected to dynamic and static loads. • A program of works with timescales for the implementation of individual improvement measures necessary to demonstrate that the primary containment is fit for purpose or alternative appropriate measures to ensure all polluting materials will be contained on site. • A preventative maintenance and inspection regime. The plan shall be implemented in accordance with the Environment Agency's written approval.	12 months of permit issue or such other date as agreed in writing with the Environment Agency.
Improvement conditions for operational storage buffer capacity		
IC5	The operator shall submit a written "waste water and digestate buffer storage plan" and shall obtain the Environment Agency's written	6 months of permit issue or such other date

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	approval to it. The plan shall contain the results of a review of the current storage of waste water and digestate produced from site operations. The review shall propose and describe site contingency arrangements to provide appropriate storage capacity or other appropriate measures to prevent or minimise emissions of waste water or digestate being discharged off site during any occasions when the receiving wastewater treatment works is in storm overflow operating conditions. The storage plan shall include but not be limited to: • Proposals for additional storage capacity with secondary containment within the site boundary for wastewater and/or other digestate during any occasions when the receiving wastewater treatment works is in storm overflow operating conditions. • Procedures to cease discharges during these conditions. • Calculation of a reasonable contingency capacity of waste water and/or other digestate during any occasions when the receiving wastewater treatment works is in storm overflow operating conditions. • A description and design specification of the buffer storage infrastructure and secondary containment measures. The design shall be completed by an appropriately qualified engineer and secondary containment shall be designed in line with CIRIA C736. • A program of works with timescales for the implementation and construction of the buffer storage. • A preventative maintenance and inspection regime. The plan shall be implemented in accordance with the Environment Agency's prior written approval.	as agreed in writing with the Environment Agency Implementation of all required containment improvements must be completed by 31/03/2025
Improvement conditions for establishing an inventory of liquid waste water discharged from anaerobic digestion and associated activities (AR2 – AR12)		
IC6a	The operator shall submit a sampling programme in relation to waste water streams and shall obtain the Environment Agency's written approval to it. The sampling programme shall be designed to fully characterise the waste waters discharged to Crossness WwTW from emission points T1, T2 and T3 and sampled at points S1, S2, S3 in (table S3.2 of this permit). The programme shall include but not be limited to a methodology for a minimum of one 24-hour flow proportional sample a month, for each emission point, for a period of 12 months. The programme shall detail the sampling methods/standards used. Sampling methods shall be in accordance with BAT conclusion 20 of the Waste Treatment BREF. The programme shall include the National Grid Reference (NGR) of the sampling point locations. The programme shall establish the characteristics of the liquid waste water streams and shall include as a minimum for each emission point:	Within 2 months of issue of this permit

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	• Average values and variability of flow, pH, temperature and conductivity. • Average concentration and load values of all relevant substances and their variability. • Data on bioeliminability. The programme shall sample for all relevant substances and must include: • Hydrocarbon oil index (HOI) (mg/l) • Free cyanide (CN^-) (mg/l) • Adsorbable organically bound halogens (AOX) (mg/l) • Metals and metalloids; arsenic (expressed as As), cadmium (expressed as Cd), chromium (expressed as Cr), hexavalent chromium (expressed as Cr(VI)), copper (expressed as Cu), lead (expressed as Pb), nickel (expressed as Ni), mercury (expressed as Hg), zinc (expressed as Zn) (µg/l) The operator shall submit the collected monitoring data in writing to the Environment Agency according to agreed reporting periods. The sampling programme shall be produced in accordance with Environment Agency guidance: • Specific substances and priority hazardous substances – *Surface water pollution risk for your environmental permit* Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk). • *Monitoring discharges to water: guidance on selecting a monitoring approach* Monitoring discharges to water: guidance on selecting a monitoring approach - GOV.UK (www.gov.uk) The monitoring programme shall be carried out and the monitoring data submitted in accordance with the Environment Agency's written approval.	
Improvement conditions for indirect discharges to water discharged from anaerobic digestion and associated activities (AR2 – AR12)		
IC6b	The operator shall submit a report for approval by the Environment Agency, following completion of the sampling programme approved under IC6a. The report shall include but not be limited to; a summary of the sample results, a completed H1 risk assessment and modelling outputs where appropriate. The operator shall provide conclusions on whether the waste waters discharged from T1, T2 and T3 and sampled at points S1, S2, S3 will have any adverse impact on the receiving waters once discharged from Crossness WwTW. An assessment shall be made against the parameters specified in the relevant environmental standards as specified within Environment Agency guidance as follows: • Specific substances and priority hazardous substances – *Surface water pollution risk for your environmental permit*	Within 15 months of the Environment Agency's written approval of the sampling programme submitted under IC6a or such other date as agreed in writing with the Environment Agency

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk). • Sanitary substances – *H1 annex D2: assessment of sanitary and other pollutants in surface water discharges* 1076_14 H1 Annex D2 - Assessment of sanitary and other pollutants within Surface Water Discharges (publishing.service.gov.uk) The report shall include any proposals and/or additional measures required to prevent or minimise any significant emissions from the installation along with timescales for implementation.	
IC6c	The operator shall implement any improvements identified within the report approved under IC6b in accordance with the Environment Agency's written approval and provide written confirmation to the Environment Agency that the improvements have been completed. (Note, approval of reports under this improvement condition does not preclude the need for permit variation application(s) to operate the improvements identified in the report and/or include any necessary emission limit values).	Within 6 months of the report in relation to IC6b being approved by the Environment Agency or such other date as agreed in writing with the Environment Agency
Improvement condition to address methane slip emissions from gas engines burning biogas		
IC7	The operator shall submit a written plan for approval by the Environment Agency which establishes the methane emissions in the exhaust gas from engines burning biogas and or biomethane and compare these to the manufacturer's specification and benchmark levels. The plan shall develop proposals to assess the potential for methane slip and take corrective actions where emissions of methane above the manufacturer's specification are identified. The operator shall establish methane emissions in the exhaust gas and methane slip using the following standards: • EN ISO 25139 • EN ISO 25140	Within 6 months of issue of this permit or as agreed in writing with the Environment Agency
Improvement condition for review of effectiveness of abatement plant		
IC8	The operator shall carry out a review of the abatement plant at emission points A26, A27, A28, A29, A30, A31, A33, A34 and A35 on site, to determine whether the measures have been effective and adequate to prevent and where not possible minimise emissions released to air including but not limited to odour, ammonia Hydrogen chloride (HCl), and TVOC. The operator shall submit a written report to the Environment Agency following this review for assessment and approval. The report shall include but not be limited to the following aspects: • Full investigation and characterisation of the waste gas streams.	6 months of permit issue for emission points A26, A27, A28, A29, A30. A31, A34, A35 and 6 months of completion of IC10 for emission point A33 or such other date as agreed in writing with the

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	• Evidence that the pollutants of the waste gas stream will be controlled and/or abated either by the abatement plant or by the proposed abatement systems. • Abatement stack monitoring results (including but not limited to odour, ammonia, HCl, and TVOC) • Abatement process monitoring results (including but not limited to odour, ammonia, HCl, and TVOC). • Details of air quality quantitative impact assessment including modelling and a proposal for site-specific "action levels" (including but not limited to odour concentration, hydrogen sulphide, ammonia, HCI and TVOC). • Odour monitoring results at the site boundary. • Records of odour complaints and odour related incidents. • Recommendations for improvement including the replacement or upgrading of the abatement plant. • Timescales for implementation of improvements to the abatement plant. The operator shall implement the improvements in line with the timescales as approved by the Environment Agency. (Note that approval of reports under this improvement condition does not preclude the need for permit variation applications to implement the improvements identified in the report. Any variation may include the insertion of necessary emission limit values).	Environment Agency
Improvement condition for establishing an inventory of liquid/sludge waste discharged from the Head of works waste operation activity (AR13)		
IC9a	The operator shall submit a sampling programme in relation to liquid/sludge waste streams that are to be discharged to emission point T4 and shall obtain the Environment Agency's written approval to it. The sampling programme shall be designed to fully characterise the liquid/sludge waste discharged to Crossness WwTW from emission point T4 in table S3.2 of the permit. The programme shall include but not be limited to a methodology for gathering a representative chemical pollutant suite of analysis of all incoming wastes, that will be discharged to emission point T4, for a minimum period of 12 months. A minimum of 12 spot samples from each waste producer shall be taken, provided the liquid/sludge waste is appropriately mixed, homogeneous, and is representative of the specific waste stream being discharged. The programme shall detail the sampling methods/standards and limits of detection (LOD)/minimum reporting values (MRV) used. Waste Characterisation sampling methods shall be in accordance with	Within 15 months of issue of this permit or such other date as agreed in writing with the Environment Agency

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	guidance, *Non-hazardous and inert waste: appropriate measures for permitted facilities* and *Biological waste treatment: appropriate measures for permitted facilities,* and shall fully characterise the liquid/sludge waste streams, including as a minimum for each waste stream the: • Maximum, minimum and average values and variability of flow, pH, temperature and conductivity. Flow rates shall be based upon the capability of the discharging tanker. • Chemical names, the units of measurement, maximum, minimum and average concentration and load values of all substances that have an environmental quality standard (EQS) or ecotoxic properties, and their variability. • Total and dissolved metals data • Data on bioeliminability. • Information on the liquid/sludge waste stream source • National Grid Reference (NGR) of the sampling point The sampling programme shall be produced in accordance with the following Environment Agency guidance: • Section 3 (Waste pre-acceptance, acceptance and tracking) of guidance *Non-hazardous and inert waste: appropriate measures for permitted facilities* • Section 6 (Waste pre-acceptance, acceptance and tracking) of guidance *Biological waste treatment: appropriate measures for permitted facilities* • Specific substances and priority hazardous substances – *Surface water pollution risk for your environmental permit* Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk). • *Monitoring discharges to water: guidance on selecting a monitoring approach* Monitoring discharges to water: guidance on selecting a monitoring approach - GOV.UK (www.gov.uk) • *Monitoring discharges to water: CEN and ISO monitoring methods* Monitoring discharges to water: CEN and ISO monitoring methods - GOV.UK (www.gov.uk) The sampling programme shall be carried out as approved by the Environment Agency and the sampling data shall be submitted in accordance with the Environment Agency's written approval.	
Improvement conditions for indirect discharges to water discharged from the Head of works waste operation activity (AR13)		
IC9b	The operator shall submit a report for audit and approval by the Environment Agency, following completion of the sampling programme referred to in IC9a. The report shall include but shall not be limited to: • the raw data used to undertake the screening, • a summary of the sample results,	Within 6 months of the Environment Agency's written approval of the sampling programme

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	• a completed H1 risk assessment or equivalent risk assessments and • modelling outputs where appropriate, in order to assess the impact from each individual liquid/sludge waste stream discharged to point T4. The operator shall provide conclusions on whether the liquid/sludge wastes discharged to T4 will have any adverse impact on the receiving waters once discharged from Crossness WwTW. An assessment shall be made against the parameters identified in IC9a and against the relevant environmental quality standards (EQS – or Predicted No Effect Concentrations (PNECs) for substances that have ecotoxic properties but no established EQS) as specified within Environment Agency guidance as follows: • Specific substances and priority hazardous substances – *Surface water pollution risk for your environmental permit* Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk). • Sanitary substances – *H1 annex D2: assessment of sanitary and other pollutants in surface water discharges* 1076_14 H1 Annex D2 - Assessment of sanitary and other pollutants within Surface Water Discharges (publishing.service.gov.uk). • H1 risk assessment tool ADMLC https://admlc.com/h1-tool/ The report shall include proposals for any additional measures/abatement required to prevent or minimise any significant emissions from the waste operation. The operator shall implement the proposals in the report in accordance with the timescales as approved in writing by the Environment Agency.	submitted under IC9a or such other date as may be agreed in writing with the Environment Agency
IC9c	The operator shall submit a report that provides written confirmation to the Environment Agency that the proposed improvements identified within the report approved under IC9b have been implemented and completed in accordance with the Environment Agency's written approval. (Note, approval of reports under this improvement condition does not preclude the need for permit variation application(s) to operate the improvements identified in the report and/or include any necessary emission limit values).	Within 6 months of the report in relation to IC9b being submitted to the Environment Agency or such other date as may be agreed in writing with the Environment Agency
Improvement condition for the abatement of dispersion stack at emission point A33		
IC10	The operator shall submit a written 'abatement plan' and obtain the Environment Agency's written approval to it. The plan shall contain the final designs and an implementation schedule for the installation of abatement plant at emission point A33 that meets the requirements of	Within 6 months of issue of this permit or as agreed in writing with the

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
	BAT 34 and BAT 53 of the Waste Treatment BREF. That plan shall also contain but not be limited to: • The plan shall include a demonstration (whether by a detailed review of technical papers or by trial results) that all odorous chemical compounds and their loading rates expected in the relevant air streams have been considered in the design; and supporting evidence that the odorous compounds will be controlled and/or abated either by operating techniques or by the proposed abatement systems. • Evidence that the abatement plant will be designed and installed in accordance with guidance, *Biological waste treatment: appropriate measures for permitted facilities.* • A program of works with timescales for the commissioning of the abatement plant infrastructure. The operator shall install and commission the abatement plant in line with the timescales as approved by the Environment Agency.	Environment Agency
Improvement condition for monitoring digestate stability		
IC11	The operator shall submit a written report, with supporting evidence, on the stability of whole digestate, (i.e. prior to dewatering), and obtain the Environment Agency's written approval to it. The report shall assess whether biogas emissions from post digestion storage or treatment of digestate is likely to have been minimised. The report shall include but not be limited to: • An assessment of residual biogas potential in accordance with the OFW004-005 [N6] methodology specified by *BSI PAS 110: Producing Quality Anaerobic Digestate* or an equivalent methodology for assessing residual biogas potential of the digestate.	6 months of permit issue or such other date as agreed in writing with the Environment Agency

Table S1.4 Pre-operational measures		
Reference	**Operation**	**Pre-operational measures**
Pre-operational condition to submit an assessment of the fate and impact of new waste streams not previously accepted, and that change the risk of the waste stream to be discharged under existing waste codes as specified in Table S2.3		
PO1	AR13	Prior to accepting new waste streams under activity AR13 existing permitted waste codes identified in table S2.3 for discharge into the head of works (emission point T4), the operator shall undertake an assessment of the fate and impact on the receiving waters by updating the environmental risk assessment established in IC9b, the additional measures/abatement implementation plan as approved under IC9b and in accordance with the sampling plan as approved under IC9a.

Table S1.4 Pre-operational measures		
Reference	**Operation**	**Pre-operational measures**
		Acceptance of the new liquid/sludge waste streams under existing waste codes shall only commence following submission of the above risk assessment and any recommendations for additional measure/abatement considered to be required, written approval from the Environment Agency and the submission of written confirmation to the Environment Agency that any additional measures/abatement considered to be required have been implemented and completed as approved.

Schedule 2 – Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels	
Raw materials and fuel description	**Specification**
Diesel oil	Not exceeding 0.1% w/w sulphur content
--	--

Table S2.2 Permitted waste types and quantities for anaerobic digestion (AR2 – AR12)	
Maximum quantity	**Annual throughput shall not exceed 7,530,000 tonnes**
Exclusions	Wastes having any of the following characteristics shall not be accepted: • Biodegradable wastes that is significantly contaminated with non-compostable or digestible contaminants, in particular plastic and litter shall be no more than 5% w/w and shall be as low as reasonably practicable by 31 December 2025. • Wastes containing wood-preserving agents or other biocides and post-consumer wood. • Wastes containing persistent organic pollutants. • Wastes containing Japanese Knotweed or other invasive plant species listed in the Invasive Species (Amendment etc.) (EU Exit) Regulations 2019. • Manures, slurries and spoiled bedding and straw from farms where animals have notifiable diseases as stipulated in the Animal By-Products (Enforcement) (England) Regulations 2013. • Pest infested waste.
Waste code	**Description**
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 treatments 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
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 (sewage sludge only) subjected to mechanical treatment only from a process that treats waste which are listed in this table, Table S2.2

Table S2.3 Permitted waste types and quantities for non-hazardous waste storage and treatment (Head of Works) (AR13)	
Maximum quantity	**Annual throughput shall not exceed 25,000 tonnes**
Exclusions	Wastes having any of the following characteristics shall not be accepted: • Wastes containing persistent organic pollutants. • Wastes containing Japanese Knotweed or other invasive plant species listed in the Invasive Species (Amendment etc.) (EU Exit) Regulations 2019. • Manures, slurries and spoiled bedding and straw from farms where animals have notifiable diseases as stipulated in the Animal By-Products (Enforcement) (England) Regulations 2013. • Pest infested waste. • Hazardous waste. • Solid wastes (only wastes of liquid free flowing form shall be accepted).
Waste code	**Description**
16	**WASTES NOT OTHERWISE SPECIFIED IN THE LIST**
16 10	**16 10 aqueous liquid wastes destined for off-site treatment**
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01

Table S2.4 Permitted waste types and quantities for for non-hazardous waste storage (cakepad) (AR14)	
Maximum quantity	**Annual throughput shall not exceed 2,000 tonnes**
Exclusions	Wastes having any of the following characteristics shall not be accepted: • Wastes containing persistent organic pollutants. • Wastes containing Japanese Knotweed or other invasive plant species listed in the Invasive Species (Amendment etc.) (EU Exit) Regulations 2019. • Manures, slurries and spoiled bedding and straw from farms where animals have notifiable diseases as stipulated in the Animal By-Products (Enforcement) (England) Regulations 2013. • Pest infested waste. • **Waste containing Hazardous substances (as defined in Environment Permitting Regulations 2016).**
Waste code	**Description**
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)

Schedule 3 – Emissions and monitoring

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
Existing medium combustion plant which are engines fuelled on biogas (1 MW to 5 MW)						
Point A1 on site plan in schedule 7	CHP 1 – 4.68 MWth Spark ignition engine fired on biogas [note 1]	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	500 mg/m^3	Hourly average	Annual	BS EN 14792
		Sulphur dioxide	350 mg/m^3 [note 2]			BS EN 14791 or CEN TS 17021 or by calculation based on fuel sulphur
		Sulphur dioxide	162 mg/m^3 [note 3]			
		Carbon monoxide	1400 mg/m^3			BS EN 15058
		Total VOCs	No limit set	--	--	BS EN 12619
Point A2 on site plan in schedule 7	CHP 2 – 4.68 MWth Spark ignition engine fired on biogas [note 1]	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	500 mg/m^3	Hourly average	Annual	BS EN 14792
		Sulphur dioxide	350 mg/m^3 [note 2]			BS EN 14791 or CEN TS 17021 or by calculation based on fuel sulphur
		Sulphur dioxide	162 mg/m^3 [note 3]			
		Carbon monoxide	1400 mg/m^3			BS EN 15058
		Total VOCs	No limit set	--	--	BS EN 12619
Point A3 on site plan in schedule 7	CHP 3 – 4.68 MWth Spark ignition engine fired on biogas [note 1]	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	500 mg/m^3	Hourly average	Annual	BS EN 14792
		Sulphur dioxide	350 mg/m^3 [note 2]			BS EN 14791

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
		Sulphur dioxide	162 mg/m^3 [note 3]			or CEN TS 17021 or by calculation based on fuel sulphur
		Carbon monoxide	1400 mg/m^3			BS EN 15058
		Total VOCs	No limit set	--	--	BS EN 12619
Existing medium combustion plant other than engines fuelled on biogas (1 MW to 5 MW)						
Point A4 on site plan in schedule 7	Boiler 1 – 4.749 MWth fuelled on biogas [note 1]	Oxides of Nitrogen (NO and NO^2 expressed as NO^2)	250 mg/m^3 [note 3]	Average over sample period	Annual	BS EN 14792
		Carbon Monoxide	No limit set			--
		Sulphur dioxide	200 mg/m^3 [note 3]			BS EN 14791 or CEN TS 17021 or by calculation based on fuel sulphur
Point A5 on site plan in schedule 7	Boiler 2 – 4.749 MWth fuelled on biogas [note 1]	Oxides of Nitrogen (NO and NO^2 expressed as NO^2)	250 mg/m^3 [note 3]	Average over sample period	Annual	BS EN 14792
		Carbon Monoxide	No limit set			--
		Sulphur dioxide	200 mg/m^3 [note 3]			BS EN 14791 or CEN TS 17021 or by calculation based on fuel sulphur
Existing medium combustion plant other than engines fuelled on natural gas (1 MW to 5 MW)						

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
Point A4 on site plan in schedule 7	Boiler 1 – 4.749 MWth fuelled on natural gas [note 1]	--	--	--	- -	--
Point A5 on site plan in schedule 7	Boiler 2 – 4.749 MWth fuelled on natural gas [note 1]	--	--	--	--	--
Point A6 on site plan in schedule 7	Emergency Flare stack 1 [note 1]	Oxides of Nitrogen (NO and NO2 expressed as NO2)	150 mg/m3	Average over sample period	[note 4]	BS EN 14792
		Carbon Monoxide	50 mg/m3			BS EN 15058
		Total VOCs	10 mg/m3			BS EN 12619
Point A7 on site plan in schedule 7	Emergency Flare stack 2 [note 1]	Oxides of Nitrogen (NO and NO2 expressed as NO2)	150 mg/m3	Average over sample period	[note 4]	BS EN 14792
		Carbon Monoxide	50 mg/m3			BS EN 15058
		Total VOCs	10 mg/m3			BS EN 12619
Existing medium combustion plant over 5 MWth operating for less than 50 hours per year						
Points A8 on site plan in Schedule 7	Paxman engine 1 -5.2 MWth diesel fired (Emergency standby)	--	--	--	--	--
Points A9 on site plan in Schedule 7	Paxman engine 2 - 5.2 MWth diesel fired (Emergency standby)	--	--	--	--	--

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
Points A10 on site plan in Schedule 7	Paxman engine 3 - 5.2 MWth diesel fired (Emergency standby)	--	--	--	--	--
Points A11 on site plan in Schedule 7	Paxman engine 4 - 5.2 MWth diesel fired (Emergency standby)	--	--	--	--	--
Points A12 on site plan in Schedule 7	MTU engine 1 – 5.6 MWth diesel fired (Emergency standby)	--	--	--	--	--
Points A13 on site plan in Schedule 7	MTU engine 2 – 5.6 MWth diesel fired (Emergency standby)	--	--	--	--	--
Existing combustion plant (less than 1 MW)						
Point A14 on site plan in Schedule 7	Powerhouse emergency lighting diesel generator	--	--	--	--	--
Points A15 on site plan in Schedule 7	hot water boiler 1 (Webster House)	--	--	--	--	--
Points A16 on site plan in Schedule 7	hot water boiler 2 (Webster House)	--	--	--	--	--
Point A17 on site plan in Schedule 7	SPG standby diesel generator	--	--	--	--	--
Pressure relief valves [Points A18 – A25 on site plan in Schedule 7]	Biogas holders	Biogas release and operational events	No limit set	Recorded duration and frequency	Daily inspection	--
Point A26 on site plan in schedule 7	Channelled emissions such as odour abatement	Hydrogen sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for sampling NIOSH 6013 for analysis

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
	stack or vent(s) [note 5]	Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
		Odour concentration	No limit set	--	Once every 6 months	BS EN 13725
Point A26 on site plan in schedule 7	Channelled emissions to air from treatment of water-based liquid waste	Hydrogen chloride (HCl)	5 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 1911
		TVOC	20 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 12619
Point A27 on site plan in schedule 7	Channelled emissions such as odour abatement stack or vent(s) [note 5]	Hydrogen sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for sampling NIOSH 6013 for analysis
		Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
		Odour concentration	No limit set	--	Once every 6 months	BS EN 13725
Point A27 on site plan in schedule 7	Channelled emissions to air from treatment of water-based liquid waste	Hydrogen chloride (HCl)	5 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 1911
		TVOC	20 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 12619
Point A28 on site plan in schedule 7	Channelled emissions such as odour abatement stack or vent(s) [note 5]	Hydrogen sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for sampling NIOSH 6013 for analysis
		Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
		Odour concentration	No limit set	--	Once every 6 months	BS EN 13725
Point A28 on site plan in schedule 7	Channelled emissions to air from treatment of water-based liquid waste	Hydrogen chloride (HCl)	5 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 1911
		TVOC	20 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 12619
Point A29 on site plan in schedule 7	Channelled emissions such as odour abatement	Hydrogen sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for sampling NIOSH 6013 for analysis

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
	stack or vent(s) [note 5]	Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
		Odour concentration	No limit set	--	Once every 6 months	BS EN 13725
Point A29 on site plan in schedule 7	Channelled emissions to air from treatment of water-based liquid waste	Hydrogen chloride (HCl)	5 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 1911
		TVOC	20 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 12619
Point A30 on site plan in schedule 7	Channelled emissions such as odour abatement stack or vent(s) [note 5]	Hydrogen sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for sampling NIOSH 6013 for analysis
		Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
		Odour concentration	No limit set	--	Once every 6 months	BS EN 13725
Point A30 on site plan in schedule 7	Channelled emissions to air from treatment of water-based liquid waste	Hydrogen chloride (HCl)	5 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 1911
		TVOC	20 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 12619
Point A31 on site plan in schedule 7	Channelled emissions such as odour abatement stack or vent(s) [note 5]	Hydrogen sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for sampling NIOSH 6013 for analysis
		Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
		Odour concentration	No limit set	--	Once every 6 months	BS EN 13725
Point A31 on site plan in schedule 7	Channelled emissions to air from treatment of water-based liquid waste	Hydrogen chloride (HCl)	5 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 1911
		TVOC	20 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 12619
Pressure relief valves [Point A32 on site plan	THP tanks	Biogas release and operational events	No limit set	Recorded duration and frequency	Daily inspection	--

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
in Schedule 7]						
Point A33 on site plan in schedule 7	Channelled emissions via an odour abatement stack or vent as implemented in line with IC8 and IC10	Hydrogen sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for sampling NIOSH 6013 for analysis
		Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
		Odour concentration	1,000 ou_E/m^3 [note 7]	Average over sample period	Once every 6 months	BS EN 13725
Point A33 on site plan in schedule 7	Channelled emissions to air from treatment of water-based liquid waste	Hydrogen chloride (HCl)	5 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 1911
		TVOC	20 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 12619
Point A34 on site plan in schedule 7	Channelled emissions such as odour abatement stack or vent(s) [note 5]	Hydrogen sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for sampling NIOSH 6013 for analysis
		Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
		Odour concentration	No limit set	--	Once every 6 months	BS EN 13725
Point A34 on site plan in schedule 7	Channelled emissions to air from treatment of water-based liquid waste	Hydrogen chloride (HCl)	5 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 1911
		TVOC	20 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 12619
Point A35 on site plan in schedule 7	Channelled emissions such as odour abatement stack or vent(s) [note 5]	Hydrogen sulphide	No limit set	Average over sample period	Once every 6 months	CEN TS 13649 for sampling NIOSH 6013 for analysis
		Ammonia	20 mg/m^3	Average over sample period	Once every 6 months	EN ISO 21877
		Odour concentration	No limit set	--	Once every 6 months	BS EN 13725
Point A35 on site plan	Channelled emissions to air from	Hydrogen chloride (HCl)	5 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 1911

Table S3.1 Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
in schedule 7	treatment of water-based liquid waste	TVOC	20 mg/m^3 [note 6]	Average over sample period	Once every 6 months	EN 12619

Note 1 – These emission limits are based on normal operating conditions and load - temperature 0°C (273 K); pressure 101.3 kPa and oxygen 5% (for gas engines burning biogas) and oxygen 3% (for emergency flares and medium combustion plants other than engines and gas turbines burning biogas such as boilers).

Note 2 – This emission limit applies until 31 December 2029, unless the gas engine is replaced.

Note 3 – This emission limit applies from 1 January 2030, unless otherwise advised by the Environment Agency.

Note 4 – Monitoring to be undertaken in the event the emergency flare has been operational for more than 10 per cent of a year (876 hours). Record of operating hours to be submitted annually to the Environment Agency.

Note 5 – The monitoring of NH_3 and H_2S can be used as an alternative to the monitoring of the odour concentration subject to the outcome of IC8.

Note 6 – Monitoring and limits only apply where the substance concerned is identified as relevant in the waste gas inventory IC8.

Note 7 – This emission limit applies upon the completion of IC8 and IC10.

Table S3.2 Point source emissions to sewer, effluent treatment plant or other transfers off-site – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter [Note 1]**	**Limit (incl. unit) [Note 1]**	**Reference Period**	**Monitoring frequency [Note 2]**	**Monitoring standard or method**
S1 on site plan in schedule 7 emission to River Thames via Crossness Waste Water Treatment Works	Gravity Belt Thickener Liquors, SAS Thickening Belt Liquors, THP Centrifuge Liquors, Boiler Blowdown, Digested Sludge Dewatering Liquors, OCU Waste Waters, Surface Water Run Off	Oil and grease	No visible oil or grease	--	Weekly	Visual assessment
		Benzene, toluene, ethylbenzene, xylene (BTEX)	--	Spot sample or flow-proportional composite sample	Once every month	EN ISO 15680
		Hydrocarbon oil index (HOI)	10 mg/l		Once every day	EN ISO 9377-2
		Free cyanide (CN^-)	0.1 mg/l			EN ISO 14403-1 or EN ISO 14403-2
		Adsorbable organically bound halogens (AOX)	1 mg/l			EN ISO 9562
		Arsenic (As)	0.1 mg/l	Spot sample or flow-proportional composite sample	Once every day	EN ISO 11885, EN ISO 17294-2 or EN ISO 15586
		Cadmium (Cd)	0.1 mg/l			
		Chromium (Cr)	0.3 mg/l			
		Copper (Cu)	0.5 mg/l			
		Lead (Pb)	0.3 mg/l			
		Nickel (Ni)	1 mg/l			

Table S3.2 Point source emissions to sewer, effluent treatment plant or other transfers off-site – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter [Note 1]**	**Limit (incl. unit) [Note 1]**	**Reference Period**	**Monitoring frequency [Note 2]**	**Monitoring standard or method**
		Zinc (Zn)	2 mg/l			
		Mercury (Hg)	10 µg/l	Spot sample or flow-proportional composite sample	Once every day	EN ISO 17852 or EN ISO 12846
		Manganese (Mn)	--			EN ISO 11885, EN ISO 17294-2 or EN ISO 15586
		Hexavalent chromium (Cr(VI))	0.1 mg/l			EN ISO 10304-3 or EN ISO 23913
		PFOA and PFOS	--		Once every six months	--
S2 on site plan in schedule 7 emission to River Thames via Crossness Waste Water Treatment Works	Picket Fence Thickening Liquor, OCU Waste Water	Oil and grease	No visible oil or grease	--	Weekly	Visual assessment
		Benzene, toluene, ethylbenzene, xylene (BTEX)	--	Spot sample or flow-proportional composite sample	Once every month	EN ISO 15680
		Hydrocarbon oil index (HOI)	10 mg/l		Once every day	EN ISO 9377-2
		Free cyanide (CN^-)	0.1 mg/l			EN ISO 14403-1 or EN ISO 14403-2
		Adsorbable organically bound halogens (AOX)	1 mg/l			EN ISO 9562
		Arsenic (As)	0.1 mg/l	Spot sample or flow-proportional composite sample	Once every day	EN ISO 11885, EN ISO 17294-2 or EN ISO 15586
		Cadmium (Cd)	0.1 mg/l			
		Chromium (Cr)	0.3 mg/l			
		Copper (Cu)	0.5 mg/l			
		Lead (Pb)	0.3 mg/l			
		Nickel (Ni)	1 mg/l			
		Zinc (Zn)	2 mg/l			
		Mercury (Hg)	10 µg/l	Spot sample or	Once every day	EN ISO 17852 or

Table S3.2 Point source emissions to sewer, effluent treatment plant or other transfers off-site – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter [Note 1]**	**Limit (incl. unit) [Note 1]**	**Reference Period**	**Monitoring frequency [Note 2]**	**Monitoring standard or method**
				flow-proportional composite sample		EN ISO 12846
		Manganese (Mn)	--			EN ISO 11885, EN ISO 17294-2 or EN ISO 15586
		Hexavalent chromium (Cr(VI))	0.1 mg/l			EN ISO 10304-3 or EN ISO 23913
		PFOA and PFOS	--		Once every six months	--
S3 on site plan in schedule 7 emission to River Thames via Crossness Waste Water Treatment Works	OCU Waste Water	Oil and grease	No visible oil or grease	--	Weekly	Visual assessment
		Benzene, toluene, ethylbenzene, xylene (BTEX)	--	Spot sample or flow-proportional composite sample	Once every month	EN ISO 15680
		Hydrocarbon oil index (HOI)	10 mg/l		Once every day	EN ISO 9377-2
		Free cyanide (CN^-)	0.1 mg/l			EN ISO 14403-1 or EN ISO 14403-2
		Adsorbable organically bound halogens (AOX)	1 mg/l			EN ISO 9562
		Arsenic (As)	0.1 mg/l	Spot sample or flow-proportional composite sample	Once every day	EN ISO 11885, EN ISO 17294-2 or EN ISO 15586
		Cadmium (Cd)	0.1 mg/l			
		Chromium (Cr)	0.3 mg/l			
		Copper (Cu)	0.5 mg/l			
		Lead (Pb)	0.3 mg/l			
		Nickel (Ni)	1 mg/l			
		Zinc (Zn)	2 mg/l			
		Mercury (Hg)	10 µg/l	Spot sample or flow-proportional	Once every day	EN ISO 17852 or EN ISO 12846

Table S3.2 Point source emissions to sewer, effluent treatment plant or other transfers off-site – emission limits and monitoring requirements						
Emission point ref. & location	**Source**	**Parameter [Note 1]**	**Limit (incl. unit) [Note 1]**	**Reference Period**	**Monitoring frequency [Note 2]**	**Monitoring standard or method**
		Manganese (Mn)	--	composite sample		EN ISO 11885, EN ISO 17294-2 or EN ISO 15586
		Hexavalent chromium (Cr(VI))	0.1 mg/l			EN ISO 10304-3 or EN ISO 23913
		PFOA and PFOS	--		Once every six months	--
T4 on site plan in schedule 7 emission to River Thames via Crossness Waste Water Treatment	Discharge of tankered waste to the head of works	-- [Note 3]	-- [Note 3]	-- [Note 3]	-- [Note 3]	-- [Note 3]
Note 1 – Monitoring and limits only apply where the substance concerned is identified as relevant in the waste water inventory as determined by improvement condition IC6a and IC6b Note 2 – Monitoring frequency as specified unless the Environment Agency has agreed in writing other alternative appropriate monitoring frequencies. Note 3 – Emission limits and monitoring requirements to be set following completion of IC9a, IC9b.						

Table S3.3 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Digester feed (digestion process)	pH	As described in site operating techniques	As described in site operating techniques	Process monitoring to be recorded using a SCADA system where relevant.
	Alkalinity			
	Temperature			
	Hydraulic loading rate			
	Organic loading rate			
	Volatile fatty acids concentration			
	Ammonia			
	Liquid /foam level			
Biogas in digester [& biogas storage holders]	Flow	Continuous	In accordance with EU weights and measures Regulations	Process monitoring to be recorded using a SCADA system where relevant. Gas monitors to be calibrated every 6 months or in accordance with the manufacturer's recommendations.
	Methane	Continuous	None specified	
	CO_2	Continuous	None specified	
	O_2	Continuous	None specified	
	Hydrogen sulphide	Daily	None specified	
	Pressure	Continuous	None specified	
Digestate batch	Volatile fatty acids concentration	One sample at the end of each batch (hydraulic retention time) cycle.	As described in site operating techniques	--
	Ammonia			
Digesters and storage tanks	Integrity checks	Weekly	Visual assessment	In accordance with design specification and tank integrity checks.
Digesters	Agitation /mixing	Continuous	Systems controls	Records maintained in daily operational records.
	Tank capacity and sediment assessment	Once every 5 years from date of commission	Non-destructive pressure testing integrity assessment every 5 years or as specified	In accordance with design specification and tank integrity checks.

Table S3.3 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
			by manufacturers technical specification.	
Waste reception building or area; Digesters and storage tanks	Odour	Daily	Olfactory monitoring	Odour detection at the site boundary.
Diffuse emissions from all sources identified in the Leak Detection and Repair (LDAR) programme	VOCs including methane	Every 6 months or otherwise agreed in accordance with the LDAR programme	'Sniffing' and/or Optical Gas Imaging techniques in accordance with BS EN 15446 & BS EN 17628	Monitoring points as specified in a DSEAR risk assessment and LDAR programme. Limit as agreed with the Environment Agency as a percentage of the overall gas production.
CHP engine stacks	VOCs including methane	Annually	BS EN 12619	Total annual VOCs emissions from the CHP engine(s) to be calculated and submitted to the Environment Agency.
	Exhaust gas temperature		Traceable to National Standards	--
	Exhaust gas pressure		Traceable to National Standards	--
	Exhaust gas water vapour content		BS EN 14790-1	Unless gas is dried before analysis of emissions.
	Exhaust gas oxygen		BS EN 14789	--
	Exhaust gas flow		BS EN 16911-1	--
Meteorological conditions	Wind speed, air temperature, wind direction	Continuous	Method as specified in management system	Conditions to be recorded in operational diary and records. Equipment shall be calibrated on a 4 monthly basis,

Table S3.3 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
				in accordance with manufacturer's recommendations or as agreed in writing by the Environment Agency.
Emergency flare	Operating hours	Continuous	Recorded duration and frequency. Recording using a SCADA system or similar system	Date, time and duration of use of auxiliary flare shall be recorded.
	Quantity of gas sent to emergency flare			Quantity can be estimated from gas flow composition, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions.
Pressure relief valves and vacuum systems	Gas pressure	Continuous	Recording using a SCADA system	Continuous gas pressure shall be monitored.
	Re-seating	Weekly inspection	Visual	Operator must ensure that valves are re-seated after release in accordance with the manufacturer's design.
	Inspection, maintenance, calibration, repair and validation	Following foaming or overtopping or at 3 yearly intervals whichever is sooner	Written scheme of examination in accordance with condition 1.1.1	After a foaming event or sticking, build-up of debris, obstructions or damage, operator must ensure that pressure relief valve function remains within designed gas pressure in accordance with the manufacturer's design by suitably trained and qualified personnel.

Table S3.3 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
	Inspection, calibration and validation report	In accordance with design and construction specifications or after over topping or foaming event	Written scheme of examination in accordance with condition 1.1.1	Operator must ensure that valves are re-seated after release, after a foaming event or sticking, build-up of debris, obstructions or damage. Operator must ensure that PRV function remains within designed operation gas pressure in accordance with the manufacturer's design by suitably trained/qualified personnel. Inspection, calibration and validation report. In accordance with industry Approved Code of Practice
Storage and storage tanks	Volume	Daily	Visual or flow meter measurement	Records of volume must be maintained.

Table S3.4 Process monitoring requirements – odour abatement				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Odour abatement plant				
Closed biofilters				
Biofilters at emission points: • A26 (OCU 1), • A27 (OCU 4), A28 (OCU 5), A29 (OCU 8), A30 (OCU 9), A31 (OCU 10), A34 (OCU 11),	Gas temperature – inlet and outlet	Daily	Temperature probe / Traceable to national standards	Odour abatement plant shall be regularly checked and maintained to ensure appropriate temperature and moisture content.
	Biofilter media moisture	Daily	Moisture meter, Grab test, oven drying or recognised	

Table S3.4 Process monitoring requirements – odour abatement				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
and A35 (OCU 12) on site plan in Schedule 7 Emission point A33 - Action levels to be agreed on completion of IC10 as approved in writing by the Environment Agency.			industry method	Odour abatement plant shall be managed in accordance with permit condition 3.3, the odour management plan and manufacturer's recommendations. Equipment shall be calibrated on a 4 monthly basis, or as agreed in writing by the Environment Agency.
	Thatching /compaction	Weekly	Back pressure	
	Gas flow rate – inlet and outlet	Continuous	Gas flow meter	
	pH (biofilter drainage effluent)	Daily	pH metre or litmus paper	
	Efficiency assessment	Annual	Media health, air-flow distribution and emission removal efficiency (BS EN 13725 for odour removal)	
	Hydrogen sulphide – inlet and outlet gas stream	Every 6 months or as agreed in writing by the Environment Agency.	CEN TS 13649 for sampling NIOSH 6013 for analysis	Action levels to be agreed on completion of IC8 as approved in writing by the Environment Agency. Action levels to be achieved in accordance with permit condition 3.2 and the odour management plan.
	Ammonia – inlet	Every 6 months or as agreed in writing by the Environment Agency.	EN ISO 21877	Action levels to be agreed on completion of IC8 as approved in writing by the Environment Agency. Action levels to be achieved in accordance with permit condition 3.2 and the odour management plan.

Table S3.4 Process monitoring requirements – odour abatement				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
	Odour concentration – inlet and outlet gas stream	Every 6 months or as agreed in writing by the Environment Agency.	BS EN 13725	Action levels to be agreed on completion of IC6 as approved in writing by the Environment Agency. Action levels to be achieved in accordance with permit condition 3.2 and the odour management plan.
Scrubbers (water/chemical/dry)				
Scrubbers A34 (OCU 11) & A35 (OCU 12) on site plan in Schedule 7. Emission point A33 - Action levels to be agreed on completion of IC10 as approved in writing by the Environment Agency.	Gas temperature – inlet and outlet	Continuous	Temperature probe / Traceable to national standards	Odour abatement plant shall be regularly checked and maintained to ensure appropriate temperature and moisture content. Odour abatement plant shall be managed in accordance with permit condition 3.3, the odour management plan and manufacturer's recommendations. Equipment shall be calibrated on a 4 monthly basis, or as agreed in writing by the Environment Agency.
	Gas flow rate – inlet and outlet	Continuous	Gas flow meter	
	Moisture content or humidity – inlet and outlet (for dry scrubbers only)	Daily	Moisture meter	
	Moisture content or humidity – outlet (for wet scrubbers if used before other abatement systems)	Daily	Moisture meter	
	Back pressure	Weekly	Pressure differential using sensors	
	Efficiency assessment	Annual	Emission removal efficiency (BS EN 13725 for odour removal)	
	pH scrubber solution (pre-abatement)	Continuous	pH meter	
	pH scrubber solution (post-abatement)	Continuous	pH meter	

Table S3.4 Process monitoring requirements – odour abatement				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
	Hydrogen sulphide – inlet and outlet gas stream	Every 6 months or as agreed in writing by the Environment Agency.	CEN TS 13649 for sampling NIOSH 6013 for analysis	Action levels to be agreed on completion of IC8 as approved in writing by the Environment Agency. Action levels to be achieved in accordance with permit condition 3.2 and the odour management plan.
	Ammonia – inlet	Every 6 months or as agreed in writing by the Environment Agency.	EN ISO 21877	Action levels to be agreed on completion of IC8 as approved in writing by the Environment Agency. Action levels to be achieved in accordance with permit condition 3.2 and the odour management plan.
Carbon filters				
Carbon filter 1 A26 (OCU 1), A27 (OCU 4) and A31 (OCU 10) on site plan in Schedule 7. Emission point A33 - Action levels to be agreed on completion of IC10 as approved in writing by the Environment Agency.	Carbon bed temperature – inlet and outlet	Continuous	Temperature probe	Odour abatement plant shall be managed in accordance with permit condition 3.3, the odour management plan and manufacturer's recommendations. Carbon filters to be replaced in accordance with manufacturer's recommendations. Equipment shall be calibrated on a
	Gas flow rate – inlet and outlet	Continuous	Gas flow meter	
	Moisture or humidity	Daily	Moisture meter	
	Back pressure	Weekly	Recognised industry method	
	Efficiency assessment	Annual	Emission removal efficiency (BS EN 13725 for odour removal)	

Table S3.4 Process monitoring requirements – odour abatement				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
				4 monthly basis, or as agreed in writing by the Environment Agency.
	Hydrogen sulphide – inlet and outlet gas stream	Every 6 months or as agreed in writing by the Environment Agency.	CEN TS 13649 for sampling NIOSH 6013 for analysis	Action levels to be agreed on completion of IC8 as approved in writing by the Environment Agency. Action levels to be achieved in accordance with permit condition 3.2 and the odour management plan.
	Ammonia – inlet	Every 6 months or as agreed in writing by the Environment Agency.	EN ISO 21877	Action levels to be agreed on completion of IC8 as approved in writing by the Environment Agency. Action levels to be achieved in accordance with permit condition 3.2 and the odour management plan.
	Odour concentration – inlet and outlet gas stream	Every 6 months or as agreed in writing by the Environment Agency.	BS EN 13725	Action levels to be agreed on completion of IC8 as approved in writing by the Environment Agency. Action levels to be achieved in accordance with permit condition 3.2 and the odour

Table S3.4 Process monitoring requirements – odour abatement				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
				management plan.

Table S3.5 Emissions to sewer, effluent treatment plant or other transfers off-site – Monitoring points			
Effluent(s) and discharge point(s)	**Monitoring type**	**Monitoring point NGR**	**Monitoring point reference**
T1 on site plan in schedule 7 emission to River Thames. Discharged from Gravity Belt Thickener Liquors, SAS Thickening Belt Liquors, THP Centrifuge Liquors, Boiler Blowdown, Digested Sludge Dewatering Liquors, OCU Waste Waters, Biogas Condensate, Demineralisation Plant Effluent and Surface Water Run Off	Effluent monitoring	TQ 48591 80882	Point S1 (discharge to WwTW) in Schedule 7
T2 on site plan in schedule 7 emission to River Thames. Discharged from Picket Fence Thickening Liquor and OCU Waste Water	Effluent monitoring	TQ 48807 80710	Point S2 (discharge to WwTW) in Schedule 7
T3 on site plan in schedule 7 emission to River Thames. Discharged from OCU waste waters.	Effluent monitoring	TQ 48991 80715	Point S3 (discharge to WwTW) in Schedule 7
T4 on site plan in schedule 7 emission to River Thames	Effluent monitoring	TQ 48129 80768	Point T4 (discharge to WwTW) in Schedule 7

Schedule 4 – Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Emissions to air from CHP engines and boilers Parameters as required by condition 3.5.1.	A1, A2, A3, A4 and A5.	Every 12 months	1 January
Emissions to air from odour abatement plant Parameters as required by condition 3.5.1.	A26, A27, A28, A29, A30, A31, A34, A35	Every 6 months	1 January, 1 July
Emissions to air from abatement systems for waste gas treatment plant Reporting only applies where the substance concerned is identified as relevant in the waste gas inventory IC8 Parameters as required by condition 3.5.1.	A26, A27, A28, A29, A30, A31, A33, A34, A35	Every 6 months A33 Upon completion of IC8 and IC10.	1 January, 1 July
Emissions to sewer Parameters as required by condition 3.5.1	S1, S2, S3 and T4	Upon completion of IC6a, IC6b, IC9a and IC9b	Upon completion of IC6a, IC6b, IC9a and IC9b
Process monitoring – digester tank integrity Parameters as required by condition 3.5.1	As specified in schedule 3 table S3.3	Every 5 years from the date of commissioning or as per the manufacturer's recommendation, whichever is sooner	1 January
Process monitoring – under and over pressure relief systems Parameters as required by condition 3.5.1	As specified in schedule 3 table S3.3	Every 12 months Yearly summary report of over-pressure and under-pressure events detailing mass balance release	1 January
Process monitoring – pressure relief systems - leak detection and repair (inspection, calibration and maintenance) Parameters as required by condition 3.5.1	As specified in schedule 3 table S3.3	Every 3 years	1 January
Process monitoring – leak detection and repair surveys Parameters as required by condition 3.5.1	As specified in schedule 3 table S3.3	Every 12 months LDAR report to be submitted annually	1 January

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Process monitoring – use of emergency flare Parameters as required by condition 3.5.1	As specified in schedule 3 table S3.3	Every 12 months	1 January
Non-compostable contamination removal efficiency Parameters as required by conditions 2.3.4 and 2.3.7	--	Every 12 months Yearly report of detailing contamination removal efficiency and progress with plastic reduction contamination	1 January
Total annual VOCs emissions from gas engines (calculated)	As specified in schedule 3 table S3.3	Every 12 months	1 January

Table S4.2 Annual production/treatment	
Parameter	**Units**
Electricity generated	MWh
Liquid digestate	m^3
Solid digestate	tonnes
Recovered outputs	tonnes or m^3

Table S4.3 Performance parameters		
Parameter	**Frequency of assessment**	**Units**
Water usage	Annually	tonnes or m^3
Energy usage	Annually	MWh
Raw material usage	Annually	tonnes or m^3
Emergency flare operation	Annually	hours
Electricity exported	Annually	MWh
CHP engine usage	Annually	hours
CHP engine efficiency	Annually	%
Auxiliary boiler usage	Annually	hours

Table S4.4 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Air	Form air 1 or other form as agreed in writing by the Environment Agency	18/11/2024
Process monitoring	Form process 1 or other form as agreed in writing by the Environment Agency	18/11/2024
Sewer	Form sewer 1 or other form as agreed in writing by the Environment Agency	18/11/2024

Table S4.4 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Water usage	Form water usage 1 or other form as agreed in writing by the Environment Agency	18/11/2024
Energy usage	Form energy 1 or other form as agreed in writing by the Environment Agency	18/11/2024
Other performance indicators	Form performance 1 or other form as agreed in writing by the Environment Agency	18/11/2024
Waste returns	E-waste Return Form or other form as agreed in writing by the Environment Agency	--

Schedule 5 – Notification

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	
Name of operator	
Location of Facility	
Time and date of the detection	

(a) Notification requirements for any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution	
To be notified within 24 hours of detection	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	**Notification period**

(c) Notification requirements for the detection of any significant adverse environmental effect	
To be notified within 24 hours of detection	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B – to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 – Interpretation

“accident” means an accident that may result in pollution.

“anaerobic digestion” means a process of controlled decomposition of biodegradable materials under managed conditions where free oxygen is absent, at temperatures suitable for naturally occurring mesophilic or thermophilic anaerobes and facultative anaerobe bacteria species, which convert the inputs to a methane-rich biogas and whole digestate.

“animal waste” means any waste consisting of animal matter that has not been processed into food for human consumption.

“application” means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

“appropriate abatement system” means the appropriate treatment technique for channelled emissions to air defined in 6.6.1 ‘Channelled emissions to air’ from the ‘Best Available Techniques (BAT) Reference Document for Waste Treatment’.

“authorised officer” means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

“Best available techniques” means the most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for emission limit values and other permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole:

(a) ‘techniques’ includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned;

(b) ‘available techniques’ means those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator;

(c) ‘best’ means most effective in achieving a high general level of protection of the environment as a whole.

“Biodegradable” means a material is capable of undergoing biological anaerobic or aerobic degradation leading to the production of CO_2, H_2O, methane, biomass, and mineral salts, depending on the environmental conditions of the process.

“building” means a construction that has the objective of providing sheltering cover and minimising emissions of noise, particulate matter, odour and litter.

“BREF” means Best Available Techniques (BAT) Reference Document.

“Capacity” means the potential capacity and not historical or actual production levels or throughput. This means that the designed capacity is the maximum rate at which the site can operate. Biological treatment of waste usually takes place over more than one day, so the physical daily capacity can be calculated by dividing the maximum quantity of waste that could be subject to biological treatment at any one time by the minimum residence time. For in-vessel composting, the residence time for sanitisation should be calculated separately and then aggregated to the complete composting time. Further guidance ‘RGN2: Understanding the meaning of regulated facility Definition of regulated facility’ is available.

“channelled emissions” means the emissions of pollutants into the environment through any kind of duct, pipe, stack, etc. This also includes emissions from open top biofilters.

“combined heat and power” (CHP) or Cogeneration means the simultaneous generation in one process of thermal energy and electrical or mechanical energy.

“competent persons and resources” means that a technically competent person accredited to a relevant scheme must attend site and record their attendance, and that all roles and responsibilities are clearly stated in the management systems along with records of operatives’ training. See the guidance on the level of competence and duration of attendance

“compliance date” means 01/01/2025 for existing MCPs with net rated thermal input of greater than 5MWth or 01/01/2030 for existing MCPs with a net rated thermal input of less than or equal to 5MWth.

“compost” means solid particulate material that is the result of composting, which has been sanitised and stabilised, and which confers beneficial effects when added to soil, used as a component of growing media or used in another way in conjunction with plants.

“composting” means the managed biological decomposition of biodegradable waste organic materials, under conditions that are predominantly aerobic and that allow the development of thermophilic temperatures as a result of biologically produced heat and that result in compost.

“composting batch” means an identifiable quantity of material that progresses through the composting system and when fully processed has similar characteristics throughout. For composting systems that operate on a continuous- or plug-flow basis, batches will be taken to mean a series of “portions of production”.

“direct discharge” means discharge to a receiving water body.

“diffuse emissions” mean non-channelled emissions (e.g. of dust, organic compounds, odour) which can result in ‘area’ sources (e.g. tanks) or ‘point’ sources (e.g. pipe flanges). This also includes emissions from open-air windrow composting.

“digestate” means material resulting from an anaerobic digestion process.

“disposal” means any of the operations provided for in Annex I to Directive 2008/98/EC of the European Parliament and of the Council on waste.

“DSEAR” means the Dangerous Substances and Explosive Atmospheres Regulations 2002.

“emissions of substances not controlled by emission limits” means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission limit.

“emissions to land” includes emissions to groundwater.

“EP Regulations” means The Environmental Permitting (England and Wales) Regulations SI 2016 No.1154 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

“existing medium combustion plant” means an MCP which was put into operation before 20 December 2018.

“gas oil’ means: includes diesel and is defined in Article 3(19) of the MCPD.

“generator” means any combustion plant which is used to generate electricity, excluding mobile, unless it is connected to the national grid.

“groundwater” means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

“head of works” means the discharge location where imported wastes are discharged into the WwTW. The waste operations associated with the head of works is either via the direct discharge of tankered waste into the WwTW or the temporary storage of waste in a storage tank before discharge of waste into the WwTW. The waste water treatment works are operated under the requirements of the Urban Waste Water Treatment Directive.

“impermeable surface” means a surface or pavement constructed and maintained to a standard sufficient to prevent the transmission of liquids beyond the pavement surface.

“Indirect discharge” means a discharge to a sewer or off-site waste water treatment plant.

“Industrial Emissions Directive” and/or “IED” means DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions, as read in accordance with Schedule 1A to the Environmental Permitting (England and Wales) Regulations 2016.

“Leak detection and repair (LDAR) programme’’ means a structured approach to reduce fugitive emissions of organic compounds by detection and subsequent repair or replacement of leaking components. Currently, sniffing (described by EN 15446) and optical gas imaging methods are available for the identification of leaks as set out in BAT 14 and section 6.6.2 of the Waste Treatment BAT Conclusions.

“limited operating hours MCP” means an MCP that meets the requirements of paragraph 8 of Part 2 of Schedule 25A of the Environmental Permitting Regulations.

“MCERTS” means the Environment Agency’s Monitoring Certification Scheme.

“medium combustion plant” or ”MCP” means a combustion plant with a rated thermal input equal to or greater than 1 MW but less than 50 MW.

“Medium Combustion Plant Directive” or “MCPD” means Directive 2015/2193/EU of the European Parliament and of the Council on the limitation of emissions of certain pollutants into the air from medium combustion plants, as read in accordance with Schedule 1A to the Environmental Permitting (England and Wales) Regulations 2016.

“new medium combustion plant” means an MCP which was put into operation after 20 December 2018. This includes replacement MCP and Generators.

“operating hours” means the time, expressed in hours, during which a combustion plant is operating and discharging emissions into the air, excluding start-up and shut-down periods

“operational area” means any part of a facility used for the handling, storing and treatment of waste.

“operator” means in relation to a regulated facility:

(a) the person who has control over the operation of the regulated facility,

(b) if the regulated facility has not yet been put into operation, the person who will have control over the regulated facility when it is put into operation, or

(c) if a regulated facility authorised by an environmental permit ceases to be in operation, the person who holds the environmental permit

“pests” means Birds, Vermin and Insects.

“PFOA” means Perfluorooctanoic acid.

“PFOS” means Perfluorooctanesulphonic acid.

“pollution” means emissions as a result of human activity which may—

(a) be harmful to human health or the quality of the environment,

(b) cause offence to a human sense,

(c) result in damage to material property, or

(d) impair or interfere with amenities and other legitimate uses of the environment.

“quarter” means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

“recovery” means any of the operations provided for in Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.

“Representative internal” – means representative monitoring at a point internally of the windrows that will give a representative assessment of temperature. Note: Larger windrows will require more bespoke temperature equipment to adequate assess temperature profiles accurately.

“sanitisation” means the actively managed and intensive stage of composting, lasting for at least 5 days, characterised by high oxygen demand and temperatures of over 55^0C, during which biological processes,

together with conditions in the composting mass, eradicate human and animal pathogens or reduce them to acceptably low levels. The operator also needs to meet ABPR requirements.

“sealed drainage system” in relation to an impermeable surface, means a drainage system with impermeable components which does not leak and which will ensure that:

- no liquids will run off the surface otherwise than via the system
- all liquids entering the system are collected in a sealed sump, except where liquids may be lawfully discharged to foul sewer.

“specified generator” means a group of generators other than excluded between 1 and 50 megawatts or less than 50 megawatts as defined in Schedule 25B(2) of SI 2018 No.110 of the EPR.

“stable” and/or “stabilised” means the degree of processing and biodegradation at which the rate of biological activity has slowed to an acceptably low and consistent level and will not significantly increase under favourable, altered conditions.

“VOC” means Volatile organic compounds as defined in Article 3(45) of Directive 2010/75/EU – ‘volatile organic compound’ means any organic compound as well as the fraction of creosote, having at 293.15K a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular conditions of use.

“Waste code” means the six-digit code referable to a type of waste in accordance with the List of Wastes (England)Regulations 2005, or List of Wastes (Wales) Regulations 2005, as appropriate, and in relation to hazardous waste, includes the asterisk.

“Waste Framework Directive” and/or “WFD” means Waste Framework Directive 2008/98/EC of the European Parliament and of the Council on waste, as read in accordance with Schedule 1A to the Environmental Permitting (England and Wales) Regulations 2016.

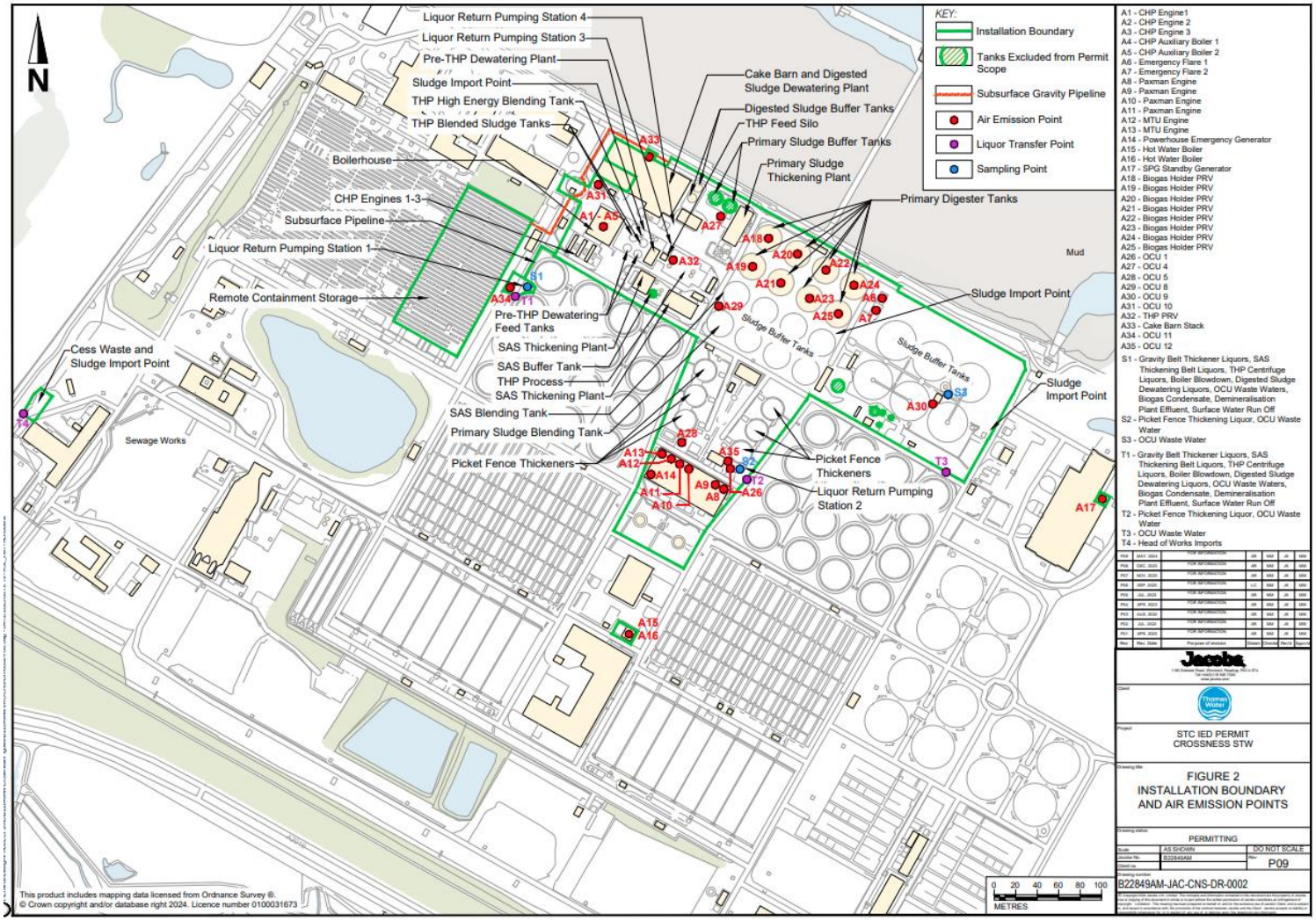
Where a minimum limit is set for any emission parameter, for example pH, reference to exceeding the limit shall mean that the parameter shall not be less than that limit.

Unless otherwise stated, any references in this permit to concentrations of substances in emissions into air means:

- in relation to emissions from combustion processes, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 3% dry for liquid fuels and gaseous fuels, 6% dry for solid fuels; and/or
- in relation to emissions from non-combustion sources, the concentration at a temperature of 273K and at a pressure of 101.3 kPa, with no correction for water vapour content.

“year” means a calendar year ending on 31 December.

Schedule 7 – Site plan



Annex 1 of MCP

1. Rated thermal input (MW) of the medium combustion plant.	3 x CHP engines – 4.68 MWth each 2 x Auxiliary boilers – 4.749 MWth each 4 x Man Paxman engines – 5.2 MWth each 2 x MTU engines – 5.6 MWth each
2. Type of the medium combustion plant (diesel engine, gas turbine, dual fuel engine, other engine or other medium combustion plant).	3 x CHP engines – biogas 2 x Auxiliary boilers – biogas 4 x Man Paxman engines – diesel 2 x MTU engines – diesel
3. Type and share of fuels used according to the fuel categories laid down in Annex II.	3 x CHP engines – Gaseous fuels other than natural gas 2 x Auxiliary boilers – Gaseous fuels other than natural gas and natural gas. Operating hours - 500 hours when run on natural gas; above this threshold informing the need for emissions testing. 4 x Man Paxman engines – Diesel/Gas oil 2 x MTU engines – Diesel/Gas oil
4. Date of the start of the operation of the medium combustion plant or, where the exact date of the start of the operation is unknown, proof of the fact that the operation started before 20 December 2018.	3 x CHP engines, 2 x Auxiliary boilers, 4 x Man Paxman engines, 2 x MTU engines all operated prior to 20 December 2018
5. Sector of activity of the medium combustion plant or the facility in which it is applied (NACE code.	37.00
6. Expected number of annual operating hours of the medium combustion plant and average load in use.	3 x CHP engines – 8,760 2 x Auxiliary boilers – 8,760 on biogas and 500 when run on natural gas 4 x Man Paxman engines – No more than 50hrs per year 2 x MTU engines – No more than 50hrs per year
7. Where the option of exemption under Article 6(3) or Article 6(8) is used, a declaration signed by the operator that the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs.	N/A
8. Name and registered office of the operator and, in the case of stationary medium	Company name and registered office: Thames Water Utilities Limited

combustion plants, the address where the plant is located.	Clearwater Court Vastern Road Reading Berkshire RG1 8DB Address where the plant is located: Crossness Sludge Treatment Centre Crossness Sewage Treatment Works Belvedere Road Thamesmead London SE2 9AQ

END OF PERMIT