MOTT MACDONALD

Gravesend Sludge Treatment Centre Environmental Permit Application

Main Supporting Document

December 2024

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	September 2021	Natalia Cunningham	Shannon Stone	Anita Manns	Draft
B	November 2021	Natalia Cunningham	Shannon Stone	Anita Manns	Second draft
C	December 2021	Natalia Cunningham	Shannon Stone	Anita Manns	Third issue for application submission
D	February 2024	Isobel Moss Shannon Stone	David Dray	Anita Manns	Revision for client comment
E	February 2024	Isobel Moss	Shannon Stone	Anita Manns	For submission
F	December 2024	Anita Manns	Claire Cowdrey	Anita Manns	Updated for NDM RfI Response Dec 24

Document reference: 790101_MSD_Main_GRA December 2024

Information class: Standard

Contents

Tables

1 Non-technical summary

1.1 Overview of the Site and activities

Gravesend is a Sludge Treatment Centre (STC) (also known as the “Site”) and an associated Wastewater Treatment Works (WTW), located at Dering Way, Gravesend, Kent, DA12 2QF (National Grid Reference TQ 66711 73969).

The WTW is operated under the Urban Wastewater Treatment (England and Wales) Regulations 1994 and has a standalone Water Discharge Activity Environmental Permit which will remain an independent permitted activity.

The waste activity comprises imports, physio-chemical and anaerobic digestion treatment and the storage of waste, all for recovery purposes. The STC handles waste derived from the wastewater treatment process, either indigenously produced on-site or imported from other Southern Water-owned assets.

The Site has a Medium Combustion Plant/Specified Generator (MCP/SG) permit ref EPR/QP3337QC, for the operation of one biogas fuelled Combined Heat and Power (CHP) Engine.

The STC operation is a non-hazardous waste activity which is currently carried out under a registered T21 exemption. The Site also has an S1 and U6 exemption, which are separate to the IED permit activity and will not be included in the permit variation.

Southern Water are applying to vary EPR/QP3337QC to incorporate anaerobic digestion to meet the IED.

It is intended that:

- Anaerobic digestion of sludge
- Acceptance of digested cake for temporary storage.

Will be separately listed activities on a single consolidated Installation permit

Anaerobic digestion of sludge

As advised by the Environment Agency through consultation at the WaterUK Waste & Recycling Network and a letter sent to all Water and Sewage Companies at director level in July 2019, Southern Water is applying to vary the above mentioned permit EPR/QP3337QC into a Bespoke Installation Permit for the STC waste activity following a joint decision made by Environment Agency and Department for Environment, Food and Rural Affairs (DEFRA) that AD treatment facilities at WTW STCs are covered by the Industrial Emissions Directive and can no longer operate under standard environmental permits or exemptions.

The primary permitted installation activity will be the AD treatment facility. The AD facility will treat indigenously produced and imported sludges. Permitted Directly Associated Activities will be the import of waste from other WTW assets; the physio-chemical treatment of imported and indigenously produced sludges; the storage of indigenously produced sludges, imported sludges and the sludge cake from the AD facility; the storage of biogas derived from the AD treatment of waste and the combustion of biogas in an on-site Combined Heat and Power plant (CHP). In the event the CHP cannot run in an emergency or due to operational issues, biogas will be combusted via an on-site flare stack and/or back-up boiler system.

Temporary storage of imported cake (digested)

Digested cake can be stored to allow for extended maturation where capacity is not available elsewhere. The imported, digested cake will be planned, to ensure the Site has capacity to accept it. It is mentioned in the OMP, that the process scientist will undertake a risk assessment to ensure that odours can be appropriately mitigated for the short time the cake is stored on Site.

The alternative cake bay is predominantly designated for imported, digested cake, however, when unavailable, or full, an available bay elsewhere on Site will be used. The bays are thoroughly washdown to prevent cross contamination. The bays are identified using appropriate signage.

The total tonnage for the temporary storage on site is 1,000tpa. The cake can be stored across 1 of 7 bays with a total storage capacity at any one time of 6200 tonnes. No other activity such as blending, or liming, is undertaken on this imported, digested cake.

1.2 Overview of the STC process

Currently the Site accepts indigenous sludge, imported liquid sludge and imported cake. Sludge is imported from Northfleet, as well as from Oxted, Tonbridge, Whitewall Creek and Stoke and Grain. On average the Site accepts four tankers per day of liquid sludge imports arriving at the Site. This Site does not accept imported domestic waste or tankered trade waste from either SWS delivered waste or third-party producers.

Imported liquid sludge, other than that from Northfleet, is received in a sludge reception tank (720m^3). Both indigenous and imported sludge (other than that from Northfleet) are pumped through 2 No. duty/standby strain presses. Screened imported sludge is stored in 1 No. sludge holding tank (290m^3) before being thickened by 2 No. drum thickeners.

Surplus Activated Sludge (SAS) is stored in 1 No. SAS balance tank (290m^3) and then thickened by 2 No. drum thickeners (28m^3/hour capacity).

Thickened raw sludge from the drum thickeners and thickened SAS, plus imported, screened and thickened liquid sludge from Northfleet, are mixed in 1 No. combined thickened sludge storage tank (280m^3).

Combined thickened sludge is fed to 1 No. anaerobic digester (2580m^3) followed by a post digestion storage tank (370m^3).

Digested sludge is dewatered by 1 No. centrifuge (60m^3/hour). The 1 No. alternative sludge storage tank (2,300m^3) is used to provide capacity to the centrifuge used on the Site. If the centrifuge was to breakdown or be taken offline for maintenance, then the sludge would be stored in the tank until the centrifuge is repaired and brought back online.

Dewatered digested sludge cake is then stored in one of seven cake storage bays before being recycled to farmland.

Biogas is collected in a gas holder (925m^3) and utilised to generate electricity via 1 No. combined heat and power (CHP) engine (1.23MWth input) as well as supplying 2 No. dual fuel boilers (1.1MWth input and 0.494MWth input) for digester heating.

Sludge liquors from the drum thickeners and centrifuge are first pumped to 2 No. liquor balancing tanks (280m^3) before joining with primary settlement tank (PST) effluent and return activated sludge (RAS) at the head of the aeration lanes.

The specifications of the combustion plant are presented in Table 1.1.

Table 1.1: Combustion plant details

	CHP1	Boiler 1	Boiler 2
Make/Model Number	LH A412	Beeston	Remeha – P420-9
Date that MCP became operational/was commissioned	December 2016	1998	December 2023
Thermal Input (MWth)	1.23	1.1 MWth	0.494Wth
Stack height (m)	10	9	9
Fuel used (biogas, diesel etc)	Biogas	Biogas / Light oil (Therma 35)	Biogas / Light oil (Therma 35)
Estimated total hours of operation per year	8147	Unknown as no counter installed - Two boilers operate as duty / standby	Unknown – Operational since December 2023
MCPD and SG Regs status	Existing MCP Tranche B (permitted)	Existing MCP	Excluded from MCPD (>1MWth)

The IED permit will include:

- 1 No. Sludge reception tank (720m^3) (covered)
- 2 No. Strain presses
- 1 No. Sludge holding tank (290m^3) (covered)
- Drum thickeners 4 No.
  - 2 No. for indigenous and imported sludge
  - 2 No. for SAS
- 1 No. SAS storage tank (290m^3) (covered)
- 1 No. Combined thickened sludge storage tank (280m^3) (covered)
- 1 No. Anaerobic digester (2580m^3) (covered)
- 1 No. Post digestion storage tank (370m^3) (covered)
- 1 No. Alternative sludge storage tank (2300m^3) (covered)
- 1 No. Centrifuge
- 7 No. Cake bays (<6000m^3 total) (open)
- 1 No. Gasholder (925m^3)
- 1 No. CHP engine (1.23MWth), powered by biogas
- 2 No. Boilers powered by biogas/gas oil (Boiler 1 – 1.1MWth and Boiler 2 – 0.494MWth input rated)
- 2 No. Liquor balancing tanks (280m^3 each)
- 1 No. Biogas burner (flare)
- 1 No. Odour control unit (OCU) – Biofilter (woodchip media) plus carbon filter, connected to alternative sludge storage tank, SAS storage tank, combined thickened sludge storage tank, sludge reception tank, centrifuge and drum thickeners.

1.3 Summary of key technical standards

Table 1.1 lists the technical guidance notes (TGNs) used to inform the techniques and measures proposed to prevent and reduce waste arising and emissions of substances,

including during periods of start-up and shut down, momentary stoppage and malfunction, and leaks.

Table 1.2: Part C3, Question 3a, Table 3a: Technical standards

Installation name	**Gravesend STC**	
C3 – Installation		
Description of the schedule 1 activity or directly associated activity	**Best available technique (BATC, BREF or TGN reference)**	**Document reference**
Section 5.4 non-hazardous waste installation - anaerobic digestion installation regulated under the Industrial Emissions Directive, utilisation biogas for energy	• Biological waste treatment: appropriate measures for permitted facilities • Non-hazardous and inert waste: appropriate measures for permitted facilities	• https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply • https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities
B4 – Waste activities		
Description of the waste operation	**Appropriate measure (TGN reference)**	**Document reference**
Acceptance of waste for temporary storage (digested cake)	• Non-hazardous and inert waste: appropriate measures for permitted facilities • Biological waste treatment: appropriate measures for permitted facilities	• https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities • https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply
General		
All activities	**Guidance**	**Document reference**
	• Monitoring stack emissions: technical guidance for selecting a monitoring approach • M1 sampling requirements for stack emission monitoring • Environment Agency environmental permitting guidance, including: • Risk assessments for your environmental permit • Energy efficiency (Energy efficiency for combustion and energy from waste power plants) • Noise assessment and control • H4 Odour management • H5 Site condition report • Control and monitor emissions for your environmental permit	• https://www.gov.uk/guidance/monitoring-stack-emissions-technical-guidance-for-selecting-a-monitoring-approach • https://www.gov.uk/government/publications/m1-sampling-requirements-for-stack-emission-monitoring • https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit • https://www.gov.uk/guidance/energy-efficiency-standards-for-industrial-plants-to-get-environmental-permits • https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits • https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management • https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report • https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit

Source: Mott MacDonald

1.4 Revisions since 2021 application submission

The application was first submitted in December 2021. This Main Supporting Document includes details that have been updated following feedback received over the past two years in relation to IED permit applications for the anaerobic digestion of sewage sludge. Table 1.3 provides a summary of the standalone documents included as part of this application, and the amendments where applicable. Where a document has not been amended, due to it still being

applicable, the original reference number remains unchanged. Where a document has been updated, this document will supersede any previous versions.

Table 1.3: Summary of revisions

Document name	Latest document reference	Summary of amendments
Main supporting document	790101_MSD_Main_GRA December 2024	Resubmitted – updated to include wider feedback from the Environment Agency.
Environmental Risk Assessment	790101_ERA_ GRA December 2024	Resubmitted – updated to include complaints recorded since 2020
Environmental Constraints Maps	790101_ERA_Maps_GRA February 2024	Resubmitted. Human receptor map screening distance increased to 2km
Bio-aerosol Risk Assessment	790101_ERA_BioaRA_GRA February 2024	Resubmitted – updated to include bio-aerosol monitoring proposals and new wind rose.
Odour Management Plan	790101_ERA_OdourMP_GRA December 2024	Resubmitted – updated to include new windrose, updated complaints recorded since 2020 and feedback from the Environment Agency. Removed reference to WWTW, added in 2km human receptor map, updated mitigation measures following feedback, and NDM RfI response Dec 24.
Climate Change Risk Assessment	790101_ERA_CCRA_GRA	No change. To be included as part of the management system for the site.
Site Condition Report	790101_MSD_SCR_GRA December 2024	Resubmitted - Updated in response to Request for Information December 2024.
BAT analysis	790101_MSD_BAT_GRA December 2024	Resubmitted – updated to include changes by Southern Water and wider feedback from the Environment Agency in response to Request for Information December 2024.
Site Layout and Location Plan	790101_MSD_SiteLayoutPlan_GRA December 2024	Resubmitted – updated to reflect proposed secondary containment area, emission points and sampling points.
Drainage Plan	790101_MSD_DrainagePlan_GRA November 2021	No change
Schematics	790101_MSD_Schematics_GRA December 2024	Updated to include separation of AD and wastewater activities in response to Request for Information December 2024
Environmental Management System Certificate	790101_MSD_EMS December 2023	Resubmitted. Certificate has been renewed.
Relevant Offences	790101_MSD_RelevantOffences December 2023	Updated to 2023.
Details of Directors	790101_MSD_Directors February 2024	Updated to time of resubmission
Competency assessment certificates	790101_MSD_CompetencyAssessmentCertificates_GRA	Retracted, and replaced with Competency Management System.
Competency Management System	790101_MSD_CMS December 2023	Substitutes CoTC assessment certificates
Material Safety Data Sheets	790101_MSD_MSDS_GRA February 2024	Updated to time of resubmission
Leak Detection and Repair Plan	790101_MSD_LDAR_GRA February 2024	Additional document.

Table 1.3: Summary of revisions

Document name	Latest document reference	Summary of amendments
Duty of Care	790101_MSD_DutyofCare_GRA February 2024	Additional document but superseded by the Waste Acceptance document listed below.
Waste acceptance	790101_WasteAcceptance+GRA December 2024	Additional document superseded Duty of Care document – produced as part of response to NDM RfI December 2024
CIRIA assessment and modelling	790101-MMD-IED-GRA-CA-C-001-IED ADBA tool P04	Additional document - updated as part of response to NDM RfI December 2024 Supersedes: 790101-MSD-IED-GRA-SIM-M-104 790101-MMD-IED-GRA-SIM-M-101 (Tank failure base run) 790101-MMD-IED-GRA-SIM-M-102 (Rainfall base run) 790101-MMD-IED-GRA-SIM-M-103 (Rainfall included)(Scenario 1) 790101-MMD-IED-GRA-SIM-M-104 Option1 (Tank failure base run) Scenario 1 790101-MMD-IED-GRA-SIM-M-105 (Rainfall included) (Scenario 2) 790101-MMD-IED-GRA-SIM-M-106 Option2 (Tank Failure Only) Scenario 2
Residue Management Plan	790101_MSD_RMP_GRA December 2024	Additional document - updated as part of response to NDM RfI December 2024
Accident Management Plan	790101_MSD_AMP_GRA February 2024	Additional document.
Implementation Plan	790101_MSD_ImplemenationPlan December 2023	Additional document
Form Part A	790101_App_PartA_GRA	No change
Form Part C2	790101_App_PartB2_GRA	No change
Form Part C2.5	790101_App_PartC2.5_GRA December 2024	Additional document - in response to NDM RfI December 2024
Form Part C3	790101_App_PartB3_GRA	No change
Form Part B6	790101_App_PartB6_GRA	Additional document (not previously required)
Form Part E2	790101_App_Part_E2_GRA December 2024	Additional document - in response to NDM RfI December 2024
Form Part F1	790101_App_PartF1_GRA	No change
Envirocheck Report	790101_MSD_SCR_GRA_AppB_Envirocheck	Additional document - in response to NDM RfI December 2024
Waste transfer notes	790101_WasteTransferNotes_GRA December 2024	Additional document - in response to NDM RfI December 2024
Sampling proposal	790101_Sampling proposal_GRA December 2024	Additional document - in response to NDM RfI December 2024
Appropriate Measures Assessment	790101_Appropriate Measures_GRA December 2024	Additional document - in response to NDM RfI December 2024

2 Introduction

2.1 Overview

This document has been prepared to support the application to vary the existing Medium Combustion Plant/Specified Generator (MCP/SG) permit into a bespoke installation Environmental Permit (hereafter referred to as 'the Permit'), reference EPR/QP3337QC, for the Gravesend Wastewater Treatment Works (WTW) and Sludge Treatment Centre (STC) ('the Site') on behalf of Southern Water Services Ltd ('Southern Water') or 'the Operator'.

Following the joint Environment Agency and Department for Environment, Food and Rural Affairs (DEFRA) decision that AD treatment facilities at WTWs and STCs are covered by the Industrial Emissions Directive (IED) the intent of the application is to ensure the Site is permitted in line with the IED and the EPR 2016, as amended.

This document contains a description of the Site, the proposed permitted activities and Directly Associated Activities (DAAs), an assessment of the possible effects of these activities and responses to questions in Parts A, B4, C2, C2.5 C3, B6, E2 and F1 of the application documentation (plus supporting information where required). Completed forms Part A, B4, C2, C2.5 C3, B6, E2 and F1 are included as separate documents.

2.2 Document content and structure

The following application forms have been completed to support the application and have been submitted as standalone documents:

- Part A: About You (Document reference 790101_App_PartA_GRA)
- Part B4: New bespoke waste operation (Document reference 790101_App_PartB4_GRA December 2024
- Part C2: Varying a bespoke permit (Document reference 790101_App_PartC2_GRA)
- Part C2.5: Application for an environmental permit Part C2.5 – Variation to a bespoke permit to add or vary a MCP/SG permitted activity at an installation or to vary an existing MCP/SG standalone permit (Document reference 790101_App_PartC2.5_GRA December 2024)
- Part C3: Variation to a bespoke installation permit (Document reference 790101_App_PartC3_GRA)
- Part B6: New bespoke water discharge activity or groundwater activity (point source discharge) or point source emission to water from an installation (Document reference 790101_App_PartB6_GRA February 2024)
- Part E2: Surrender application (installations, waste operations, mining waste operations, medium combustion plant/specified generator and mobile plant only) (Document reference 790101_App_Part_E2_GRA December 2024)
- Part F1: Charges and declarations (Document reference 790101_App_PartF1_GRA)

The main body of the Permit application document ('the Main Supporting Document') includes all the supplementary information required in response to relevant questions within Part A, Part B4, Part C2, Part C2.5, Part C3, Part C6, Part E2 and Part F1 application forms for which there was insufficient space on the forms to answer the questions in full.

The Environmental Permit variation application document ('the Main Supporting Document') consists of two main parts:

- Chapter 5 provides the general information required to inform Part C2 relating to the variation of a bespoke permit; and

- Chapter 6 provides the more detailed information required to inform Part C2.5, Part C3, Part B4 and Part E2 relating to the variation of a bespoke installation permit.
- Chapter 7 provides the more detailed information required to inform Part B6.

Part F1 covers the required financial information required for payment of the application fee. Additional information included as part of this submission and not as standalone documents, are found in the following appendix:

- Appendix A – European Waste Catalogue (EWC) Codes

3 Process Description

3.1 Wastewater Treatment Works

This subsection has been provided for context only.

Gravesend catchment serves the town of Gravesend. It is on the south bank of River Thames neighbouring Northfleet Catchment to the west. The south boundary of the catchment is along A2 with a small section on the south side of the motorway. Sewage is collected by gravity sewers with wastewater pumping stations followed by short rising mains. All sewage is transferred to the treatment works by 2 No. gravity interceptor sewers along the River Thames. A 1000 mm diameter sewer serves the west part of the catchment and the other 560 mm diameter sewer serves the east part of the catchment.

All sewage received from Gravesend WTW from 2 No. gravity sewers enters the inlet pumping station. Sewage is pumped by 4 No. inlet pumps, rated between 249 l/s and 292 l/s each, to 2 No. 6 mm, 2D, duty, assist escalator inlet screen rated at 537 l/s each with a 10 mm, 1D bypass screen rated at 894 l/s. Screened sewage passes through 1 No. detritor for grit removal.

Following screening and grit removal ferric chloride is dosed into the sewage to reduce H2S in the biogas for the CHP.

Flows more than 442 l/s, controlled by the storm separation penstock, overflow from the storm weir to 2 No. storm tanks. Settled storm sewage is either returned to treatment ahead of the primary tanks by storm return pumps or discharged to the outfall via the tidal lift pumping station.

Flows up to 442 l/s gravitates to the primary tanks distribution chamber and is split equally to 2 No. primary settlement tanks. Settled sewage enters the intermediate pumping station. Flows more than 281 l/s are discharged to the outfall via tidal lift pumping station.

Flows up to 281 l/s is mixed with RAS and pumped by the intermediate pumping station to 4 No. aeration lanes of the activated sludge plant. The aeration lanes have fine bubble aeration served by 6 No. blowers (3 No. duty, standby pairs, which could potentially run as 3 duty, 2 assist and 1 standby). Mixed liquor is settled in 3 No. circular final settlement tanks.

Treated effluent is discharged to the Tidal River Thames either directly from the outfall chamber or is pumped to the outfall via the tidal lift pumping station to under high tide conditions.

3.2 Sludge Treatment Centre

The site also serves as a regional sludge treatment centre. Currently, the Site accepts indigenous sludge and imported liquid sludge. Sludge is imported from Northfleet, as well as from Oxted, Tonbridge, Whitewall Creek and Stoke and Grain.

Primary tanks are auto-desludged by actuated values and de-sludge pumps and is transferred to 1 No. picket fence thickener (no longer has thickening function).

Imported liquid sludge, other than that from Norfleet, is received in 1 No. sludge reception tank (720m^3). Both Indigenous and imported sludge (other than that from Northfleet) is pumped through 2 No. duty, standby strain presses. Screened imported sludge is stored in 1 No. sludge holding tanks (290m^3) before being thickened by 2 No drum thickeners. SAS is stored in 1 No. SAS balance tank (290m^3) and then thickened by 2 No. drum thickeners.

Thickened raw sludge from drum thickener and thickened SAS plus imported liquid sludge from Northfleet are mixed in 1 No. combined thickened sludge storage tank (280m^3). Combined thickened sludge is fed to 1 No. anaerobic digester (2580m^3) followed by 1 No. post digestion storage tank (370m3). Digested sludge is dewatered by 1 No. centrifuges. Dewatered digested sludge cake is stored in 7 No. cake storage bays (<6,000m^3) before being recycled to farmland. Biogas is collected in 1 No. gas holder (925m^3) and used to generate electricity via 1 No. CHP engine as well as supplying the boilers for digester heating.

Sludge liquors from the drum thickeners and centrifuge are first pumped to 2 No. liquor balancing tanks (280m^3) before joining with PST effluent and RAS at the head of the aeration lanes.

4 Part A – About you

4.1 Question 5c: details of directors

Details of directors are provided in standalone document reference 790101_MSD_Directors February 2024.

4.2 Question 7: Contact details

Whereby the contact disclosed in 7a (Anita Manns, Mott MacDonald) is not available the Environment Agency should contact one of the secondary contacts:

Name: Claire Cowdrey

Address: Mott Macdonald, Mountbatten House, Grosvenor Square, Southampton, S015 2JU

Phone number: 023 8062 8523

Email: claire.cowdrey@mottmac.com

5 Part C2 – General – varying a bespoke permit

5.1 Question 2 – Table 1: Changes to existing activities

The variation is to:

- add the scheduled activity for Anaerobic Digestion to the existing Specified Generator activity as authorised under permit reference EPR/QP3337QC.
- add a waste operation activity for the acceptance of imported digested cake for temporary storage.

These will be separately listed activities on a single consolidated installation permit.

5.2 Question 3a: Relevant offences

Details of the relevant convictions are provided in the document reference 790101_MSD_RelevantOffences December 2023 (produced by Southern Water).

5.3 Question 3b: Technical ability

Operational management is provided by qualified individuals and considered to be technically competent. All staff on-site are trained to manage and operate activities without causing pollution.

The Site will have one Certificate of Technical Competence (CoTC) holder, Neil Semple, who is assigned as Field Performance Manager and will be the primary CoTC holder for Gravesend STC.

Environmental permit number and site address for all other waste activities that Neil Semple provides technical competence for:

- Permit No: EPR/DP3998HH; Site Address: Aylesford WTW, Bull Lane, Aylesford, Kent; Post Code: ME20 7DA
- Permit No: EPR/DP3498HP; Site Address: Ham Hill WTW, Brook Lane, Ham Hill, Kent; Post Code: ME6 5JX

Competency in terms of the requirements of the environmental permit will be ensured through the appropriate training of all staff, covering:

- Awareness of the regulatory implications of the Permit for the permitted activity and their own work activities;
- Awareness of all potential environmental effects from operation under normal and abnormal circumstances;
- Awareness of the need to report any deviation from the Permit; and
- Prevention of accidental emissions, and action to be taken when accidental emissions occur.

All staff are aware of the implications of activities undertaken including the operation of the Site. Skills and competencies necessary to work on-site are documented and records of training needs and training received for these posts are maintained.

Southern Water is currently working on an accredited Competency Management System (CMS) under the Competent Operator Scheme, based on the Anglian Water Services-developed technical competency course to demonstrate that personnel have the appropriate technical

skills and knowledge to manage the activities undertaken. This will be independently certificated and audited, through a third-party certification body to ensure it meets the requirements of the Competence Management System Standard, developed by Energy & Utility Skills[1]. The CMS enables Operators to demonstrate technically competent management on the basis of corporate competence and employees' individual competence. Individual competence remains a key component with each employee having the relevant technical competences required to carry out their role.

An e-learning course is being developed and certification is due to be undertaken by LRQA (see document reference 790101_MSD_CMS December 2023). The CMS is to be certified within the first 12 months from issue of a permit for the STC.

5.4 Question 3c: Finances

No relevant persons with Southern Water have current or past bankruptcy or insolvency proceedings against them.

5.5 Question 3d: Management System

The Site operates under the company-wide Environmental Management System (EMS 684981), which is certified to ISO 14001:2015 and is applicable to water supply and wastewater treatment assets at operational sites (wastewater treatment works, water supply works and water booster stations). The EMS is effective for three years from July 2023, until July 2026. The EMS is accredited by the British Standards Institution (BSI).

Demonstrable procedures are outlined in the Site Process Activity Manual (SPAM) and Operating Plan. Where suitable and available, any monitoring of emissions to air, land and water is undertaken according to Monitoring Certification Scheme (MCERTS) Standards where the permit requires it.

As a part of the EMS the Operator has an internal audit programme that takes places every 12 months. During this annual programme operational sites are selected as a subsample and audited. Suppliers and business areas are also audited. An annual report is produced as part of the management review, and this is signed off by Senior Management. In addition, the EMS is subject to audit by the inspection and certification company BSI (for accreditation purposes) each year, and a full certification audit is conducted every three years.

The EMS addresses the following to ensure staff understand their roles and responsibilities to comply with environmental legislation and protect the environment and human health:

- Resources, roles, responsibility and authority
- Legal and other requirements in protecting the environment and human health
- Competence, training and awareness requirements
- Explanation of the Non-Conformance, Corrective and Preventative Action procedures
- Details of the significance of Environmental Aspects and Impacts
- EMS Review and auditing procedure and requirements
- Monitoring and measurement requirements
- Record keeping procedures

[1] Energy and Utility Skills (2021) Competence Management System. Available online at: https://www.euskills.co.uk/about/our-industries/waste-management/competence-management-system/

To accompany the Permit the Site will have its own Management System in line with the Environment Agency guidance. This identifies all the applicable procedures under the accredited EMS but includes additional site-specific information and procedures.

One of the key tasks for Southern Water during the permit determination process is the development of the management system arrangements to cover additional requirements in relation to the permitted operations. This may include the Climate Change Risk Assessment (CCRA) document reference 790101_ERA_CCRA_GRA to address measures to adapt to predicted additional pressure from changes in external operational conditions (such as weather and flooding), if required. Climate change and climate resilience will be included in the ongoing future updates to the EMS.

In addition to the environmental elements of the management system, Southern Water also has a health and safety management system which includes relevant procedures to follow with regards to accidents and the reporting of incidents and near misses. The health and safety manual is designed to comply with the Health and Safety Executive's (HSE) Managing for health and safety guide (HSG65)[2].

5.5.1 Accident Management Plan

In addition to the environmental elements of the management system, Southern Water also has a health and safety management system which includes relevant procedures to follow with regards to accidents and the reporting of incidents and near misses. The health and safety manual is designed to comply with the Health and Safety Executive's (HSE) Managing for health and safety guide (HSG65)[3].

The Site operates under an Incident Management Plan which is incorporated into Southern Water's Environmental Management System to prevent and manage environmental related accidents. The IMP includes an inventory of substances stored at the site, details on storage facilities, inventory of pollution prevention equipment (spill kits and fire extinguishers), inventory of waste and storage capacities, contact details of internal contacts (Site manager, Environmental Governance Manager and key HSE staff), national and regional (where appropriate) contact details of emergency services and environmental regulators. The IMP is distributed to key staff, to supervise the implementation of the Plan, and shared with external contacts (emergency services and the Environment Agency). The IMP is accompanied by a site plan that identifies the locations of designated storage areas (and their maximum storage capacity), location of spill kits and fire extinguisher and storage locations and hazards posed by chemical substances.

The IMP references procedures to comply with environmental legislation and protect the environment and human health in regard to potential accidents:

- Spill prevention and management, and operation of safety valves
- Procedure for recovering spilled product
- Procedures for the prevention of overfilling vessels, management of plant and equipment failures
- Fire prevention and responses to fires, including fire water containment procedures
- Security measures to prevent unauthorised access, arson and vandalism
- Competence, training and awareness requirements
- Monitoring and measurement requirements

[2] Health and Safety Executive (2013), Managing for health and safety (HSG65). Available online at: https://www.hse.gov.uk/pubns/books/hsg65.htm.

[3] Health and Safety Executive (2013), Managing for health and safety (HSG65). Available online at: https://www.hse.gov.uk/pubns/books/hsg65.htm.

- Record keeping procedures for the recording of incidents, accidents and near misses
- Emergency procedures to notify relevant authorities, emergency services and neighbours

There are several different document types referenced in the IMP. These have been listed below:

- EMS – Environmental Management System
- FEC – Field Event Co-ordinator's Manual
- IMP – Incident Management Plan
- BCP – Business Continuity Plan
- CCM – Control Centre Manual
- SIB – Safety Instruction Book
- CAT – Catastrophe Plans

Table 5.1 below provides a list along with a brief description of each of the procedures which form part of the IMP.

Table 5.1: Incident Management Plan procedures

SUPPORTING EMERGENCY PROCEDURES – IMP	
Procedure Reference	**Brief summary**
EMS 234 Chemical and Oil Storage	Specifies the standard for storage of chemicals and oils. Outlines the amounts of substances that can be stored on site without consent from the Local Authority, and details how these substances should be safely stored. Also includes Information on the auditing, training requirements and any associated documents.
EMS 260 Pollution Prevention (standard)	Specifies the standard for managing and reducing the risk of land contamination. Outlines the tasks a manager should complete i.e., ensuring spill kits are available, and who to contact in the event of an incident. The document also lists the measures that Southern Water should take to prevent pollution incidents. Also includes Information on the auditing, training requirements and any associated documents.
EMS 265 Discharges (Standard)	Sets the minimum standard of operation in managing effluent and potable water process discharges. Details definitions which relate to the procedure and outlines the standard. Also includes Information on the auditing, training requirements and any associated documents.
EMS 360 Pollution Prevention Procedure	Outlines the responsibilities of staff in relation to the procedure. The Procedure includes details on items such as site drainage, working on or near watercourses and excavations. As well as addressing different spill types; chemical, oil and sludge/sewage. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 361 Chemical Risk Assessment (Procedure)	Defines the procedure for assessing the environmental risk rom bulk chemicals. Outlines the procedure for undertaking a risk assessment, and where required which EMS procedures need to be followed. Also addresses risk mitigation and employee awareness as well as the auditing, training requirements, reporting forms and any associated documents.
EMS 362 Environmental Fire Risk Assessment Procedure	Specifies the procedure for minimising the environmental consequence of a fire. Outlines the responsibilities of staff in relation to the procedure and provides a procedure for an Environmental Fire Risk Assessment. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 363 Procedure for Managing oil spills on sites	Outlines the responsibilities of staff in relation to the procedure. The procedure details how to determine the

SUPPORTING EMERGENCY PROCEDURES – IMP

Procedure Reference	Brief summary
	severity of the spill for different scenarios; land, inland waters and coastal waters/beaches, and how to prevent, control and remediate the environmental damage caused by spillages from the site. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 364 Lime Spill Management Procedure	Outlines the procedure for managing lime chemical spills at STCs. Defines the responsibilities of staff, and the procedure for managing the spill including the spill assessment and notification and escalation. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 365 Discharges Procedure	Defines the procedure that must be adopted when managing intermittent discharges. Outlines the responsibilities of staff in relation to the procedure and outlines the procedure where an emergency discharge is foreseeable for both emergency and stormwater and potable water. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 381 Operational Waste Procedures	Specifies the procedure for managing wastes. The procedure addresses the definitions of different waste types and outlines a general procedure for managing waste. Identifies where further procedures should also be followed for specific waste types e.g., asbestos, WEEE and waste oils. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 382 Hazardous Waste Procedures	Specifies the procedure for moving hazardous waste between different sites. The procedure addresses identifying hazardous waste, storage of hazardous waste, consignment notes and record keeping. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 461 Chemical Risk Assessment (Form)	A template for a chemical risk assessment including the following: • Site details • Chemical details • Chemical classification • Risk activity • Risks for health, fire/dsear and environment • Handling, usage and storage requirements • Management of spills • Disposal • Safety data sheet.
EMS 480 Waste Descriptions	Provides written descriptions of different waste types covering the following: • Process giving rise to the waste, • Waste characteristics, • Handling advice, • Containment • Disposal. • Name of waste • Waste classification • Producer and registered office details • EWC • Controlled Waste Regulations 2012 description • Waste type • Form

SUPPORTING EMERGENCY PROCEDURES – IMP

Procedure Reference	Brief summary
	• Temperature; and • SIC code. • Information on the auditing, training requirements, reporting forms and any associated documents.
FEC 307 Reporting of Unauthorised Access, Including Loss, Theft and Vandalism	Outlines the responsibilities of staff in relations to the reporting these incidents, and the procedure to be followed. Also includes Information on the auditing, training requirements and any associated documents.
FEC 320 Process Related Incidents	Specifies the procedures to follow in responding to process-related pollution incidents. Responsibilities of staff are outlined in the procedure, as well as contacting the FEC, FEC actions and reporting procedures. Information on the auditing, training requirements, reporting forms and any associated documents.
FEC 322 – Spillage Procedure	Outlines the responsibilities of staff in relation to the procedure. The procedure outlines the process for handling spillages on site including: • Spillage assessment • Notifications and Escalation • Containment • Awareness and Training • Information on the auditing, training requirements, reporting forms and any associated documents.
IMPO_101 – Overview of the Incident Management Plan	This document sets out the overall structure of the Incident Management Plans and provides a short overview of each of the main plans.
IMP 217 and IMP 218 Team Roles – Objectives and Responsibilities	Sets out the Objectives and Responsibilities for roles within the Incident Management Team and provides guidance for the ELT Representative. IMP 217 identifies when Southern Water should contact the Environment Agency, and IMP 218 identifies the process for contacting other authorities.
BCP 415 Guidance on Reporting Potential Media Interest	Sets out the types of incidents to be reported back by Field Operations Staff & Contract staff working on behalf of Southern Water that will potentially attract media interest, including contact numbers.
CCM 302 Procedure Following the Receipt of a Fire Alarm	Provides a consistent regional approach to dealing with any formal notification of a fire alarm within the Company. Outlines the responsibilities of staff, the procedure for when a fire alarm notification is received, inspections/audits, training and any associated documents.
SIB 603 Risk Assessment and Safety Instructions for Fire Awareness	Covers the following: • Training needs of staff and fire wardens • What Managers must provide (i.e. fire safety meetings, plans) • Inspections • Safety instructions for occupied sites, unoccupied sites, and company vehicles • Firefighting procedure • Records to be completed
CAT 303 Actions Following Severe Weather or Flood Warnings	Outlines the plan of actions that should be undertaken following severe weather or floor warnings and the responsibilities of the staff under these circumstances. The procedure details checklists for the following scenarios: impending severe weather, flood watch, flood warning, severe flood warning, and an all clear checklist. Also includes Information on the auditing, training requirements and any associated documents.

SUPPORTING EMERGENCY PROCEDURES – IMP

Procedure Reference	Brief summary
Environmental Emergencies Poster (EMS)	A poster which should be displayed on all sites. The poster lists the type of emergency (fires, spills etc) and both the action which should be undertaken the contact phone number which should be called. The poster also highlights a list of things which should be checked prior to work starting such as the H&S notice boards, environmental notice boards and continuity plans.
Pollution 30 Minute Plan	Outlines a five-step plan for responding to a pollution incident in 30 minutes and outlines what should be done at each of the five stages.
Site Chemical Risk Register	Southern Water electronic database containing an inventory of hazardous substances used and stored by Southern Water and those relevant to individual sites, helping Southern Water to control substance use and comply with the COSHH regulations.
Alternative Response Coordinators Booklet	These documents provide flowcharts and a step-by-step guide for completing the Alternative Response tasks.

The EMS certification can be found in Document reference 790101_MSD_EMS December 2023.

5.6 Question 5a: Site layout plan and process diagram

Plans provided, to satisfy question 5a, can be found in the following standalone documents:

- Site Layout and Location Plan - Document reference 790101_MSD_SiteLayoutPlan_GRA December 2024
- Drainage Plan - Document reference 790101_MSD_DrainagePlan_GRA November 2021
- Schematics - Document reference 790101_MSD_Schematics_GRA December 2024

5.7 Question 5b: Site condition report

In accordance with Environment Agency requirements, a Site Condition Report (SCR) has been produced to demonstrate the condition of the land and groundwater at the Site on issue of the proposed permit. The SCR includes the following details (section 1 to 4 of the Environment Agency template[4]):

- Site details;
- Condition of the land at permit issue;
- Permitted activities; and
- Changes to the activity.
- A copy of the SCR can be found as document reference 790101_MSD_SCR_GRA December 2024.

5.8 Question 6: Environmental risk assessment

As part of the application for an environmental permit, operators must assess the risk to the environment and human health from the activities that they propose to undertake, using the methodology outlined in the Environment Agency's 'Risk assessments for your environmental permit'[5].

[4] Environment Agency (2013). Environmental permitting: H5 Site condition report. Available online at: https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report

[5] Environment Agency (2023) Risk assessments for your environmental permit. Available online at: https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

The Environmental Risk Assessment (ERA) sets the requirements for the management of the permitted area, emission control measures etc. It assesses the risks to the environment, amenity and human health. All control measures within the rules must be adhered to in order to obtain the permit.

The ERA assesses the impacts from the following environmental concerns:

- Point source and fugitive emissions to air;
- Point source and fugitive emissions to water and land;
- Noise and vibration;
- Odour;
- Litter, mud and debris;
- Vermin and insects (pests);
- Human health and environment safety (i.e. visual impacts, site security, flood risk); and
- Natural habitats and ecology.

Where emissions result in insignificant effects these have been screened out and where further detailed assessments of potential environmental impacts are required this is noted.

A copy of the ERA can be found as document reference 790101_ERA_GRA December 2024. Constraints maps have been updated to demonstrate human receptors to a radius of 2km, as shown in document reference 790101_ERA_Maps_GRA February 2024.

6 Part C3 – Variation to a bespoke installation permit

6.1 Question 1: Table 1a: Activities applied for

Table 6.1: Question 1, Table 1a: Activities applied for

Installation name	Schedule 1 or other references	Description of the Activity	Activity capacity	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity	Non-hazardous waste treatment capacity
Gravesend STC	S5.4, Part A (1), (b) and (i)	Anaerobic digestion	Annual: 306,482m^3 Daily: 840m^3	Recovery or a mix of recovery and disposal of non-hazardous waste with a biological treatment capacity exceeding 100 tonnes per day if the only waste treatment is anaerobic digestions. R3 – Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) R13 – Storage of waste pending any of the operations numbered R 1 to R 12.	0	Annual: 306482m^3 Daily: 840m^3
	Schedule 25B – Specified generator	CHP Biogas/gas oil Generator	As per EPR/QP3337QC (no changes are proposed)			
Directly associated activities						
	Physical treatment of waste	Recycling/reclamation of organic substances which are not used as solvents		R3		
	Waste reception	Import of liquid sludge and cake		R3 D9		
	Use of biogas	Use principally as fuel or other means to generate energy		R1		

Installation name	Schedule 1 or other references	Description of the Activity	Activity capacity	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity	Non-hazardous waste treatment capacity
	Standby boilers	Used for emergency only		R1		
	Use of pressure release valves	Used for emergency only, do not export electricity to the grid.				
	Storage	Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the Site where it is produced)		R13		
	Raw material storage	Storage of raw materials including chemicals, lubrication oil, antifreeze, diesel, activated carbon		R05		
	Liming	Used to stabilise indigenous, digested sludge in bay		R05		
	Discharge of condensate	Condensate from CHP exhaust, flare gas pipelines and gas storage bag from collection to the point of discharge at the adjacent WTW.				
For installations that take waste	Total storage capacity	13,390m^3				
	Annual throughput	200,742 wet tonnes for indigenous 70,461 wet tonnes for imported liquid sludge 35,279 additional capacity 67,273 digester feed				

Table 6.2: B4 Table 1a: Activities applied for (waste operation activity)

Name of waste operation	Description of the waste operation	Annex I (D codes) and Annex II (R codes) and descriptions	Hazardous waste treatment capacity	Non-hazardous waste treatment capacity
Temporary storage of imported cake	Storage pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where the waste is produced)	R13	N/A	Daily: <50 tonnes
For all waste operations	Total storage capacity	Temporary storage of imported cake: 6,000m^3		
	Annual throughput (tonnes each year)	Temporary storage of imported cake: 1,000 tonnes		

The variation to the permit is to add the scheduled activity for Anaerobic Digestion and the DAAs to the existing permit reference EPR/QP3337QC which is currently an MCP/SG permit.

6.1.1 Question 1: Table 1b: Types of waste accepted

Southern Water requires the permit for Gravesend STC to be authorised to accept sludge waste to undergo anaerobic digestion to comply with the Industrial Emissions Directive. It is requested that the annual quantity of indigenous sludge and liquid imports to be accepted is 306,482m^3 (200,742m^3 indigenous sludge, and 70,461m^3 liquid imports). None of the requested wastes are hazardous. The types of waste accepted are shown in Appendix A.

There are no tankered trade or domestic waste (cess or chemical toilet waste) accepted at the head of the works. However, there is a possibility that tankers have been discharging liquid waste from the network to the head of works on an emergency basis, for example, if a pumping station goes down or there is a burst rising main, the waste would be transferred via tanker to the Site and only from assets that would already discharge to the Site (indigenous). This liquid waste is by-passing the pumping station, whilst it is being brought back online. This waste stream is accepted under the Urban Wastewater Treatment Directive under normal operations.

6.2 Question 2: Point of source emissions to air, water and land

6.2.1 Emissions to air

Table 6.3: Part C3, Question 2, Table 2: Point source emissions to air

Emission point reference and location	Source	Parameter	Quantity	Unit
Point source emissions to air				
CHP engine stack 1 TQ 66737 73998 (A01)	CHP engine exhaust stack burning biogas	As per EPR/QP3337QC		
Flare stack TQ 66751 73997 (A03)	Waste gas burner (flare stack)	Operational hours	No limit set	

Emission point reference and location	Source	Parameter	Quantity	Unit
Boiler stack 1 TQ 66730 74032 (A06)	Standby boilers Exhaust stacks – operating on Biogas or light oil	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	250	mg/Nm^3
Boiler stack 2 TQ 66727 74033 (A04)	Standby boilers Exhaust stacks – operating on Biogas or light oil	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	250	mg/Nm^3
Whessoe valve 3 TQ 66765 74014 (A09)	Gasholder pressure relief valves	Biogas release and operational events	No limit set	
Whessoe valve 2 TQ 66742 74010 (A08)	Biogas release and operational events	Biogas release and operational events	No limit set	
Whessoe valve 1 TQ 66718 73999 (A07)	Biogas release and operational events	Biogas release and operational events	No limit set	
OCU TQ 66666 74032 (A05)	Channelled emissions to air as identified on Site plan including tank vents biofilter and or/scrubbing system	Ammonia	20	mg/m^3
		H2S	No limit specified	
		Odour concentration	1000	Que/Nm^3

The emission points are shown in drawing reference 790101_MSD_SiteLayoutPlan_GRA December 2024.

6.2.2 Emissions to water (other than sewer)

The Site lies within an area of groundwater flooding capability with potential flooding to property situated below ground level and at the surface. There are no groundwater source protection zones (SPZ) 250m of the Site.

The drainage network sends water to the head of the works for treatment.

There will be no point source emissions from the Site and no direct discharge of wastewater to controlled waters from STC. There are no direct potentially contaminated discharges to groundwaters.

Accidental releases of materials to the environment are controlled through adequate containment measures and working procedures in accordance with the EMS. Spill procedures are in place under EMS363 and EMS364 as well as pollution prevention procedure EMS360. All spillages are recorded in the site diary including actions taken.

6.2.3 Emissions to sewers, effluent treatment plants or other transfers off-site

The release of liquors from the sludge treatment process is considered to be a point source emissions or direct discharges to controlled waters or public sewers, as part of the permit operation. The site layout plan, drawing reference 790101_MSD_SiteLayoutPlan_GRA December 2024, identifies the point at which liquors leave the site to enter the WTW at the inlet. A sampling location has also been identified on the site layout plan, although sampling will be undertaken as part of a wider implementation plan under BAT and IED. An implementation plan is shown in document reference 790101_MSD_ImplementationPlan December 2023. It is therefore, considered that this will be added as Improvement Conditions to the permit.

Any liquid waste will either be reused or discharged to the drainage system of the adjacent Gravesend WTW and will undergo treatment through the works before being discharged under the existing water discharge permit.

On-site WTW effluent will meet the requirements of the existing discharge consent. The water used at the Site will be contained in a closed circuit; all wastewater streams will either be recycled within the process of captured and rerouted to the adjacent WTW.

A drainage plan of the Site is presented in document reference 790101_MSD_DrainagePlan_GRA November 2021.

A list of the point source emissions to sewers, effluent treatment plants and other transfers off-site is included as Table 6.4.

Table 6.4: Part C3, Question 2, Table 2: Point source emissions to sewers, effluent treatment plants or other transfers off-site

Emission point reference and location	Source	Characteristics	Monitoring/mitigation measures prior to final discharge and emission point discharge
Discharged to Gravesend WTW TQ 66579 73887 W1 on the site layout plan	Condensate from the gas pipelines and gas storage bag	Condensate with slightly elevated levels of H_2S dissolved from the biogas, resulting in a low level of acidity	Rerouted to adjacent WTW (W1 – Inlet works TQ 66579 73887)
Drum thickeners TQ 66685 74009	Process liquors from drum thickeners	Variable from processes	Discharged to adjacent WTW (W1 – Inlet works TQ 66579 73887). Monitoring point for sampling as M3 on site layout plan (TQ 66661 74045)
Centrifuge TQ 66685 74009	Process liquors from centrifuges	Variable from processes	Discharged to adjacent WTW (W1 – Inlet works TQ 66579 73887). Monitoring point for sampling as M8 on site layout plan (TQ 66716 73972)
Bund rainwater TQ 66579 73887	Surface water from bund	Variable from processes	Rerouted to adjacent WTW (W1 – Inlet works TQ 66579 73887) Monitoring point for sampling as M6 on site layout plan (TQ 66706 73990)
Sludge reception 1 - TQ 66658 74000 2 - TQ 66710 74048	Tankered waste entering from reception point	Variable	Discharged to adjacent WTW (W1 – Inlet works TQ 66579 73887). Monitoring point for sampling as M2 (sludge reception 2) (TQ 66710 74048) and M5 (sludge reception point 1) (TQ 66658 74000)
Strainpress liquors	Process liquors from sludge strainpresses and screens	Variable from processes	Discharged to adjacent WTW (W1 – Inlet works TQ 66579 73887). Monitoring point for sampling as M9 on site layout plan (TQ 66678 73987)
Gas condensate TQ 66764 74018	Condensate from CHP	Condensate with slightly elevated levels of H2S dissolved from the biogas, resulting in a low level of acidity	Discharged to adjacent WTW (W1 – Inlet works TQ 66579 73887). Monitoring point for sampling as M7 on site layout plan (TQ 66764 74018)
Boiler Maintenance TQ 66579 73887	Boiler blow down to minimise damage from high mineral content water.	High purity water with traces of chemicals (used for boiler dosing).	Rerouted to adjacent WTW (W1 – Inlet works TQ 66579 73887) Monitoring point for sampling as M1 on site layout plan (TQ 66685 74009)

Emission point reference and location	Source	Characteristics	Monitoring/mitigation measures prior to final discharge and emission point discharge
Drain down of plant TQ 66579 73887	Occurs during maintenance when it is necessary to drain down the feed water, hot well or boiler shell.	High purity water with traces of chemicals (used for boiler dosing).	Rerouted to adjacent WTW (W1 – Inlet works TQ 66579 73887) Monitoring point for sampling as M1 on site layout plan (TQ 66685 74009)
Rainwater TQ 66579 73887	Uncontaminated roof water from buildings.	Clean rainwater from building roofs only.	Rerouted to adjacent WTW (W1 – Inlet works TQ 66579 73887) Monitoring point for sampling as M1 on site layout plan (TQ 66685 74009)
Rainwater TQ 66579 73887	Run off from impervious surfaces.	Clean rainwater from runoff	Routed to head of works via site drainage system. (W1 – Inlet works TQ 66579 73887) Monitoring point for sampling as M1 on site layout plan (TQ 66685 74009)
Washwater TQ 66579 73887	From the washing down of mechanical equipment during maintenance activities.	Variable	Rerouted to adjacent WTW (W1 – Inlet works TQ 66579 73887) Monitoring point for sampling as M1 on site layout plan (TQ 66685 74009)

Please refer to the ERA (document reference 790101_ERA_GRA December 2024) on the environmental risk the water emissions pose and how these are mitigated, where relevant.

6.2.3.1 Incidents of storming

The returns from the STC enter the WtW process downstream of the storm separation point. Therefore, all returns from the installation will go through the WtW treatment and cannot be directly discharged during storm conditions.

Southern Water will provide a wastewater and digestate buffer storage plan (listed in regard to BAT 4 in the Implementation Plan, document reference 790101_MSD_Implementation Plan December 2023). The Plan's purpose is to propose and describe site contingency arrangements to provide appropriate storage capacity or other appropriate measures to prevent or minimise emissions of wastewater or digestate being discharged off site during any occasions when the receiving wastewater treatment works is in storm overflow operating conditions. It is understood the Plan will be required to 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 wastewater 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.

6.2.4 Emissions to land

There will be no point source emissions to land as part of the activities carried out on-site.

Indigenous sewer grit and screenings and grit and screening from imported sludge are collected in separate skips and removed off-site by road vehicle and transported to a suitably permitted facility.

Discharges will be minimal, typically arising from periodic maintenance/cleaning operations, and is captured in spill trays.

Releases of raw materials to land are considered to be negligible due to adequate containment of the materials within suitable storage vessels, the provision of bunding and the presence of a contained drainage system.

Please refer to the ERA (doc ref 790101_ERA_GRA December 2024) on the environmental risk the water emissions pose and how these are mitigated, where relevant.

6.3 Question 3a: Operating techniques

This section provides a technical overview of the components, the proposed techniques and measures to prevent and reduce waste arising and emissions of substances and heat, including during periods of start-up or shut-down, momentary stoppage and malfunction, and leaks. Specifically, consideration is made of:

- The technology to be used;
- The process, in terms of how it will be operated and controlled;
- In-process controls and Best Available Techniques (BAT) Assessment; and
- Measures implemented to control emissions to air, water, sewer and land.

Table 6.5 lists the technical guidance notes (TGNs) used to inform the techniques and measures proposed to prevent and reduce waste arising and emissions of substances, including during periods of start-up and shut down, momentary stoppage and malfunction, and leaks.

The technical guidance and BAT requirements will also be addressed within Southern Water's Gravesend Working Plan, as part of the EMS, to be made available to staff to ensure compliance with a permit, which covers the following:

- Management of activities, including security and staffing
- Emissions and monitoring, including:
  - Point sources to air, water and land
  - Fugitive emissions
  - Site drainage
  - Storage of waste
  - Odour, noise and vibration
- Site record keeping

Table 6.5: Part C3, Question 3a, Table 3a: Technical standards

Installation name	Gravesend STC	
C3 – Installation		
Description of the schedule 1 activity or directly associated activity	**Best available technique (BATC, BREF or TGN reference)**	**Document reference**

Installation name	Gravesend STC	
Section 5.4 non-hazardous waste installation - anaerobic digestion installation regulated under the Industrial Emissions Directive, utilisation biogas for energy	• Biological waste treatment: appropriate measures for permitted facilities • Non-hazardous and inert waste: appropriate measures for permitted facilities	• https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply • https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities
B4 – Waste activities		
Description of the waste operation	**Appropriate measure (TGN reference)**	**Document reference**
Temporary storage of imported cake (digested)	• Non-hazardous and inert waste: appropriate measures for permitted facilities • Biological waste treatment: appropriate measures for permitted facilities	• https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities • https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities/1-when-appropriate-measures-apply
General		
All activities	**Guidance**	**Document reference**
	• Monitoring stack emissions: technical guidance for selecting a monitoring approach • M1 sampling requirements for stack emission monitoring • Environment Agency environmental permitting guidance, including: • Risk assessments for your environmental permit • Energy efficiency (Energy efficiency for combustion and energy from waste power plants) • Noise assessment and control • H4 Odour management • H5 Site condition report • Control and monitor emissions for your environmental permit	• https://www.gov.uk/guidance/monitoring-stack-emissions-technical-guidance-for-selecting-a-monitoring-approach • https://www.gov.uk/government/publications/m1-sampling-requirements-for-stack-emission-monitoring • https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit • https://www.gov.uk/guidance/energy-efficiency-standards-for-industrial-plants-to-get-environmental-permits • https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits • https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management • https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report • https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit

Source: Mott MacDonald

A copy of the schematics describing the operation and process can be found in document reference 790101_MSD_Schematics_GRA December 2024.

6.3.1 BAT Assessment

An assessment against the BAT Conclusions set out in the 2014/738/EU: Commission Implementing Decision of 9 October 2014 establishing best available techniques (BAT) conclusions, under the Industrial Emissions Directive 2010/75/EU has been undertaken for all the 16 sites, as a whole, and the outcome of these conclusions can be found in document reference 790101_MSD_BAT_GRA December 2024. This document reflects the existing arrangement at site and any commitments Southern Water has already made during the ongoing application process. It is acknowledged that it does not fully meet BAT in some instances. Changes to site will be undertaken and completed to meet BAT, where applicable. The changes required will be submitted to the Environment Agency, in plans to be submitted as

part of Improvement Conditions within the permit, for their agreement and Southern Water's subsequent implementation. An implementation plan has shown in document reference 790101_MSD_ImplementationPlan December 2023.

Included in the Implementation Plan is for the wastewater inventory monitoring to be undertaken as per BAT 2, and further information is addressed in Section 6.2.3. On-going monitoring is proposed to be in line with BAT AELs and monitoring frequencies are applicable to treatment of water-based liquid waste and biological treatment of waste, these are outlined in Table 6.1 and Table 6.2 of the BAT assessment.

The Odour Management Plan (document reference 790101_ERA_OdourMP_GRA February 2024) has also been prepared in accordance with the following BAT conclusions, in additional to the H4 guidance:

Supplementary documents for the BAT assessment are provided:

- BAT 1, 21 and 38: Accident Management Plan (AMP) is provided in 790101_MSD_AMP_GOD November 2024. Catastrophic failures, of tanks for example, will be included in the AMP once final designs are agreed based on the findings in CIRA/ABDA assessment.
- BAT 1, 11, 22 and 35: Residues Management Plan (RMP) is provided in 790101_MSD_ResidueMP_GRA December 2024.
- BAT 1, 8, 10, 12, 13, 14, 33, 34 and 52: Odour Management Plan (OMP) is provided in 790101_ERA_OdourMP_GRA December 2024.
- BAT 1: Environmental Management System is provided in 790101_EMS Certificate December 2023.
- BAT 2 and 52: Description of the waste acceptance and pre-acceptance procedures provided in 790101_WasteAcceptance_GRA December 2024.
- BAT 3, 6, 7 and 20: Sampling commitment and proposal for characterisation is provided in 790101_Sampling proposal_GRA December 2024.
- BAT 14: Leak Detection and Repair Plans (LDAR) are provided in 790101_MSD_LDAR_GRA February 2024.
- BAT 14: Bio-aerosols Risk Assessment (BRA) is provided in 790101_ERA_BioRA_GRA February 2024.
- BAT 17: Environmental Risk Assessment (ERA) is provided in 790101_ERA_GRA December 2024.
- BAT 19 and 38: ABDA Tool and proposed containment solution is provided in 790101-MMD-IED-GRA-CA-C-001 - ADBA Tool P04 and the site layout plan 790101_MSD_SitelayoutPlan_GRA December 2024.
- BAT 19: Covering of tanks is provided in the Implementation Plan, 790101_MSD_Implementation Plan December 2023.
- BAT 19: Drainage is provided in 790101_ERA_Drainage Plan_GRA November 2021.
- BAT 23: Energy Efficiency is provided in 790101_MSD_Main_GRA December 2024
- BAT 34: Reducing channelled emissions, addressed in the Odour Management Plan (OMP), provided in 790101_ERA_OdourMP_GRA December 2024.
- BAT 53: Reducing emission of hydrochloric acid (HCl), ammonia (NH_3) and organic compounds to air addressed in the Odour Management Plan (OMP), provided in 790101_ERA_OdourMP_GRA December 2024.

6.3.2 Appropriate measures assessment

In addition to the Bref and associated BATc, the appropriate measures will form part of the technical standards the Site operates:

- Non-hazardous and inert waste: appropriate measures for permitted facilities
- Biological waste treatment: appropriate measures for permitted facilities

As the Site is existing some aspects of the Appropriate Measures do not apply, as the Site was built and operated prior to the issue of the guidance. Southern Water are committed to develop the application of the key principles from the guidance into Site operation and associated management plans as soon as practicable, to ensure the following:

- Reducing or preventing contamination
- Preventing cross contamination by segregation
- Maintaining appropriate primary and secondary containment
- Ensure the Site does not exceed site capacity (design and permitting constraints)
- General management:
  - Operate with a Management System
  - Operate with applicable specific management plans (odour, accident and residue plans)
  - Inspection, maintenance and monitoring regimes
  - Maintaining and reviewing staff competency requirements
  - Maintaining appropriate security measures across the Site
  - Record keeping procedures
  - Contingency plans
- Maintaining appropriate waste storage and suitable segregation, to prevent environmental impacts. Includes tank inspection and maintenance regimes
- Operate and calibrate process monitoring systems
- Record keeping of process outputs, and appropriate handling of residues
- Emissions controls, including prepare an emissions inventory
- Apply process efficiency measures for energy, raw materials, water use and waste minimisation.

As per document reference 790101_Sampling proposal_GRA December 2024, sampling and analysis in relation to permitted waste operations, other than those related to Scheduled Activities, will be undertaken in line with ‘Non-hazardous and inert waste: appropriate measures for permitted facilities’ guidance text, using an MCERTS accredited, or equivalent, laboratory, where available. This commitment is related to the acceptance of imported wastes to the post digestion at the Site.

Temporary storage of imported cake (digested)

A high-level assessment against the appropriate measures for inert and non-hazardous waste has been undertaken and is presented in document reference 790101_Appropriate Measures_GRA December 2024.

6.4 Question 3b: General requirements

6.4.1 Overview

This section provides an overview of the measures in place at the Site for controlling fugitive emissions, noise and odour. An ERA has been completed and is provided with the application

(Document reference 790101_ERA_GRA December 2024). The response to this question relates to Table 4 in the Part C3 form.

6.4.2 Control of fugitive emissions to air

There are no significant fugitive emissions to air of gases, vapours, or particulates as part of normal Site operation.

Details of the procedures Southern Water follows with regards to the control of mud and debris and potentially polluting leaks and spillages are addressed in the EMS.

The Site was assessed for air emissions and requirement for Air Dispersion Modelling (ADM) when the Tranche B Specified Generator permit was granted in 2019. As combustion activities are not being changed on site as a result of permitting the AD plant and associated processes, it is not anticipated that ADM will be required to be updated at this time, for this permit application.

The existing approaches and relevant procedures presented in the EMS and operational procedures are considered to adequately address the emissions that may present a risk, and, therefore, an Emission Management Plan is not considered be required.

6.4.2.1 CHP and flare

Southern Water acknowledges that the flare is appropriate for emergency use (such as breakdown and maintenance). Southern Water confirms that they plan to retain the existing CHP and flare at Gravesend as it meets the requirements for biogas combustion. The flare has been tested and the emissions are compliant.

Gas modelling shows the site is not expected to flare outside of maintenance or emergency scenarios.

Additional work is required to ensure all BAT requirements are met (e.g. access platforms for testing, the required testing is fully adopted into BAU and related processes, ensure all required signals for data collation and reporting are provided, all specific requirements are met for MCerts and M1 & M2 guidance).

The detail of this is under review and any identified scope will be completed in AMP8.

The flare use data forms part of wider data collation and reporting (IT) system improvements planned to meet BAT 2c for inventory, BAT 11 energy and has an influence on BATs 15b, 16b and 21c for incident reporting (re. PVRVs and gas system management).

Further information is being collated in line with discussions with the SSD LIA (KS) on 3/12/24 and will be provided in due course (regarding asset replacement plans and timescales but will be provided for all sites even though no asset replacements are required here).

6.4.2.2 Odour

The Site is located within 250m of sensitive receptors and has received one odour complaint in the last five years, in 2019.

There are no proposed works to be undertaken on the Site in respect of this permit application, therefore, the activities on-site are not anticipated to increase the off-site impact or result in adverse impact upon nearby sensitive receptors or the amenity of the area surrounding the Site.

Most sources of odour on the Site are either covered or enclosed, except for the cake bays.

There is 1 No. OCU on Site located next to the sludge thickening building. The OCU is connected to the alternative sludge storage tank, SAS storage tank, combined thickened sludge

storage tank, sludge reception tank, centrifuge and drum thickeners. This OCU comprises of a bio-filter (woodchip media) and carbon filter. Treated air from both OCUs is released to the atmosphere.

The Site has an Odour Management Plan (OMP), reviewed and updated in February 2024, which identifies potential odour emissions from site operations and procedures to manage, control and minimise odour impacts. It sets out the procedures for engaging with neighbours and how the Operator will manage complaints, and the actions to be taken in the case of pollution events. The OMP also describes the monitoring and maintenance procedures to maintain the control measures. The EMS341 air quality and odour management also sets out the process for responding to odour complaints arising from customer contact.

The OMP was written in accordance with the Environment Agency's H4 Odour Management guidance (2011). The level of odour risk from the Site is considered to be Medium, as shown in Appendix B of the ERA (document reference 790101_ERA_GRA December 2024) and the OMP provides sufficient mitigation.

The Odour Management Plan can be found in document reference 790101_ERA_OdourMP_GRA December 2024.

6.4.2.3 Noise

Initial screening has been carried out for the Site. Since the Site is not undergoing changes to equipment and vehicle movements prior to application submission, a Noise Impact Assessment (NIA) is not considered to be required. Appropriate mitigation for noise and vibration impacts are provided by the ERA.

A Noise and Vibration Management Plan would be required whereby the NIA concludes that noise and vibration requires management, such as monitoring and maintaining abatement measures. Since noise and vibration impacts are considered to be appropriately mitigated in the ERA, a Noise and Vibration Management Plan is also not considered to be required.

The Site has received no noise complaints within the past five years (2019-2023).

6.4.2.4 Dust and Particulates

There are not considered to be any significant dust or particulate sources from the Site as identified in the ERA document reference 790101_ERA_GRA December 2024.

6.4.2.5 Bio-aerosols

A bio-aerosols risk assessment has been undertaken for the Site and considers there not to be any significant risks. The Bio-aerosol Risk Assessment can be found in document reference 790101_ERA_BioRA_GRA February 2024.

6.4.3 Control of fugitive emissions to surface water, sewer and groundwater

There are not considered to be any fugitive emissions to surface water, sewers or groundwater. According to the Operator's pollution incident register, in the past five years (2019-2023), there have been no pollution incidents to controlled waters, within 1km of the Site, that are confirmed or substantiated as being related to the STC.

The Site lies within an area of groundwater flooding capability with potential flooding to property situated below ground level and at the surface. There are no groundwater source protection zones (SPZ) 250m of the Site.

There are five groundwater abstractions within 250m of the Site, four of these licenses are operated by J Clubb Ltd and permits the use of water for mineral washing, these are located

98m and 125m northeast of the Site. The other is operated by Southern Water (abstraction licence 9/40/1/508G).

All drainage water including surface or foul water is captured by the drainage network which returns all water to the head of the works for treatment.

There will be no direct discharge of wastewater to controlled waters from the STC.

There are no direct potentially contaminated discharges to groundwaters. Condensate from the flare, CHP and the biogas is captured in condensate pots and is discharged to drainage and directed to the inlet works.

Accidental releases of materials to the environment are controlled through adequate containment measures and working procedures.

The existing approaches and relevant procedures presented in the EMS and operational procedures are considered to adequately address the emissions that may present a risk, and therefore, an EMP is not considered to be required.

6.4.4 Control of fugitive emissions to land

Details of waste generated at the site is demonstrated in document reference 790101_MSD_ResidueMP_GRA December 2024.

6.5 Site security

The outer gate at the front of the Site is kept closed using a removable pin for access by the residents of the two properties by the Site entry. There is a steel palisade inner front gate which is approximately 2.5m high. The inner gate has an Automatic Number Plate Recognition (AMPR) thermal and daytime camera facing it. Residents only have access through the outer gate to gain access to their properties, they cannot enter the inner Site gate which is for Southern Water access only.

Palisade fencing (approximately 2.5m high) borders the whole of the operational site except the area of the Site which is adjacent to the railway in the north, where there is chain link fencing with barbed wire (approximately 2m high) in place. There is a back gate which allows entry to the eastern undeveloped plot of land. There are a total of nine cameras on site at the inlet, bulk storage tanks and back gate. Lighting is provided around the site to give good visibility at all times of the day and night. The Site is staffed 7 days a week, from 7am to 6pm Monday to Friday and 7am to 3pm on Saturdays and Sundays. Regular inspections of the boundary fencing and buildings are undertaken to ensure that these have not been compromised and continue to prevent easy access to Site. Repairs are undertaken in accordance with the EMS requirements.

Other risks relating to human health and the environment are presented in the Appendix B of the ERA in document reference 790101_ERA_GRA December 2024.

6.6 Complaints procedure

All complaints received relating to any aspect of the Site and its activities will be recorded and acted upon. Complaints, and actions taken, will be either recorded in the Site Diary or on a complaints record form. If a Site receives a complaint, this form should be completed and shown to the Environment Agency when they next inspect the Site. The forms will be used as evidence that any complaints received have been taken seriously and that actions have been taken to rectify any problems identified.

Complaints will be investigated promptly and any appropriate remedial action taken. The complainant and anyone else likely to have been affected, should be informed about what has been found and actions taken in a timely manner. The details of the complaint and the actions taken will be recorded in the Site Diary or log.

The aim will be to undertake measures to prevent complaints from being raised. However, where this is not possible, proactive measures will be taken to prevent further complaints from being made. For example, if a complaint is made with respect to dust, the Site Manager will arrange for dust suppression equipment to be used. The Site Manager will assess whether further control measures will be required to ensure that the risk of recurrence is minimised. The details of the complaint will be recorded in the Site Diary and the complaints register. If a complaint is received Southern Water will be informed as soon as is practicable and the complaints procedure will be followed. Confirmation will be recorded in the Site Diary or inspection log. The Site Manager will inform the Environment Agency of the complaint, if appropriate.

Any drivers who regularly cause a dust or mud and debris nuisance as a result of mismanagement of their vehicles will be discussed and advice will be sought from the Site Manager, if relevant.

If a complaint is made with respect to insects the Site Manager will investigate whether any of the activities at the Site could be the source of the nuisance.

If a complaint is made with respect to litter the Site Manager will arrange for litter pickers to clear up as appropriate and will assess whether further control measures will be required to ensure that the risk of recurrence is minimised. The details of the complaint will be recorded in the Site Diary and the complaints register.

Any complaints relating to fugitive emissions and the actions taken will also be recorded in the Site Diary and copies of the incident reports (including those provided to the Environment Agency) retained on-Site.

If a complaint is made with respect to vermin or an infestation is suspected, where normal treatment activities appear to be unsuccessful, the Site Manager will discuss and agree any further measures required with the pest control firm. The complaint reporting procedure will be followed as described below.

If a complaint is made with respect to noise or vibration the Site Manager will assess the cause of the complaint and will report the findings. If the noise or vibration leading to the complaint has been caused by a continuing operation, additional noise or vibration surveys may be required to confirm the degree of impact upon the receptor. The Site Manager will make any recommendations for further noise or vibration control to the Management Team and shall inform the Environment Agency of the complaint as soon as it is practicable to do so.

In the unlikely event that a complaint is made with respect to odour the Site Manager will investigate the source of the odour and take steps to reduce its impact. If the source appears to come from the Site then appropriate actions to reduce the odour will be taken.

6.6.1 Complaints investigation procedure

In the event of any complaint, this section deals with the complaint assessment procedures. The primary role of this assessment will be to ascertain whether the complaint is associated with any Site operations and what action should be taken to prevent or minimise the probability of a recurrence.

It is important that any person acting on behalf of Southern Water is appropriately trained and that all steps and decisions are documented.

Step 1 – Complaint received

The Site operator or Environment Agency receives a complaint regarding the STC. Details logged within the Customer Services Management System (CSMS).

Step 2 – How to respond

Complainant is contacted to inform them the complaint has been received and request further information, where required.

The primary reasons for investigation of complaints are to identify the likely cause and source for the complaint and it is important to gather as much information about the complaint as possible. At the outset of any investigation, the Site Manager is to determine the priority for responding to the complaint.

If possible, someone from the Environment Agency will attend after a complaint has been made so that they can carry out an effective and subjective appraisal of the complaints and note any results into the CSMS.

Step 3 – Determine what to record and how

The complaint details and the investigation outcomes and actions taken are to be recorded in the CSMS. This information must be filled in on Site at the time of notification of the complaint.

Step 4 – Follow-up investigation

In order to resolve any problems successfully, it is essential to understand fully the source, reason and the operational conditions that led to the complaint. The first step in the investigation will be to select the most appropriate methodology for assessment. All the information collected should be filled in on the internal complaints form and a note made referencing this in the CSMS.

Step 5 – Communication with the complainant

The Site Manager or contractor tasked with addressing the complaint is responsible for collecting all the information and providing feedback to the complainant, or the Customer Contact Centre will contact the complainant. Wherever possible an explanation of the actions taken and the reasons for the decision should be made to the complainant.

If it is decided that there was no ground for the complaint this should be clearly explained to the complainant, along with information about what they should do if they are unhappy with the response.

Step 6 – Monthly complaints records

A full report of the complaints logged within the CSMS is produced to present to the relevant Technician to allow a review of potential trends.

6.7 Question 3c: Types and amounts of raw materials

Details of raw materials is demonstrated in document reference 790101_MSD_ResidueMP_GRA December 2024.

6.8 Question 4: Monitoring

This section provides a summary of the proposed monitoring at the Site.

6.8.1 Emissions to air

Stack emissions monitoring will be undertaken for each stack in accordance with M5 monitoring guidance, MCERTs, BS EN 14792 and the requirements of the environmental permit issued for the Site, where suitable and available.

Periodic monitoring will be undertaken on an annual basis as part of the routine maintenance programme. No abatement technology is required, and continuous monitoring is not considered necessary. Sample monitoring will be carried out after each maintenance period on the CHP and boilers, in order to ensure compliance with ELVs as required in the Environmental Permit.

Once permitted monitoring will be undertaken in accordance with the relevant standards. It is anticipated the monitoring standards required are as follows:

Table 6.6: Monitoring of air emissions

Emission point type	Parameter	Reference period	Monitoring frequency	Monitoring standard or method
Stacks on engines Burning biogas	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	periodic over minimum 1-hour period	Annual	In accordance with TGN M5 – Monitoring of stack emissions to air
	Carbon monoxide			
	Sulphur dioxide			
	Total volatile organic compounds including methane			
Boilers (dual fuel)	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	periodic over minimum 1 - hour period	Annual	In accordance with TGN M5 – Monitoring of stack emissions to air
Channelled emissions to air (biofilter and scrubbing system)	Ammonia	periodic over minimum 1 - hour period	Once every 6 months, or more frequent if stated in the permit	Emissions of pollutants into the environment through any kind of duct, pipe,stack, etc
	H_2S			
	Odour concentration		Once every 6 months, or more frequent if stated in the permit	BS EN 13725
Flare	Operational hours	Recorded duration and frequency.	Continuous	Operational record including date, time and duration of use shall be recorded
Pressure relief valves	Biogas release and operational events	Recorded duration and frequency.	Daily inspection	Operational record including date, time duration of pressure relief events and calculated annual mass release

Southern Water acknowledges that the auxiliary flare is appropriate for emergency use (such as breakdown and maintenance).

6.8.1.1 Assessment of the sampling locations

Version 13 of the Application Form C3 was made available on 7 December 2021, which includes a new question 4b point source emissions to air, that requires details of the design of

the sampling locations. The application to vary the permit has been prepared to meet the deadline set by the Environment Agency, however, the gathering of information to respond to C3 4b was not feasible. Southern Water will respond to the list of queries in C3 4b as soon as practicable following the submission.

Where suitable and available, any monitoring, sampling and analysis of emissions to air or water will be undertaken in accordance with MCERTS, or equivalent agreed standards, by relevant and appropriately accredited contractors, in accordance with permit requirements. An assessment of sampling locations is not appropriate as this will be the responsibility of the sub-contractors.

6.8.1.2 Sampling locations and BS EN 15259

Southern Water does not believe the BS EN 15259 applies at the Site due to the diameter of circular ducts. Under Environment Agency's Method Implementation Document for EN 15259:20072, circular ducts with diameters <1.13m are not required to meet BS EN 15259.

6.8.2 Emissions to water (other than sewers)

There are no direct releases to controlled waters of emissions arising from the STC. As such, no monitoring or reporting is required.

6.8.3 Emissions to sewers, effluent treatment plants or other transfers off-site

The release of liquors from the sludge treatment process is considered to be a point source emissions or direct discharges to sewers, as part of the permit operation. The site layout plan, drawing reference 790101_MSD_SiteLayoutPlan_GRA December 2024, identifies the point at which liquors leave the site to enter the WTW at the inlet. A sampling location has also been identified on the site layout plan, although sampling will be undertaken as part of a wider implementation plan under BAT and IED.

Southern Water confirms that it will undertake a chemical analysis of wastewater entering the adjacent WTW from the STC, which tests all pollutants expected to be found in the discharge to fully characterise the emissions to water. Southern Water proposes a minimum of 12 sampling runs over a 12-month period (1 full sampling spec per month) initially to establish a baseline, in accordance with the surface water pollution risk assessment guidance or other applicable guidance such as MCERTS or ISO standards, where appropriate. Southern Water will then take an informed viewpoint of the determinants the samples contain demonstrating those that are not in the sample.

An H1 assessment will be completed to screen out any that are not applicable or relevant. Sampling and analysis will be undertaken using a UKAS accredited, or equivalent, laboratory. This commitment falls within the Implementation Plan for meeting BAT and IED compliance. An implementation plan is shown in document reference 790101_MSD_ImplementationPlan December 2023. It is therefore, considered that this will be added as Improvement Conditions to the permit.

Condensate from the gas bag, flare, digester and CHP exhaust is routed to the head of the works of the adjacent Gravesend WTW and will undergo treatment through the works before being discharged under an existing environmental permit for discharge to water. This condensate is clean, uncontaminated water and occurs in small volumes. As such, no monitoring or reporting is required. There are no direct releases to public sewers, effluent treatment plants or other transfer off-site of emissions arising from the STC.

6.8.4 Emissions to land

There are no direct releases to land of emissions arising from the STC. As required by the Southern Water EMS, various housekeeping and waste management practices are in place to monitor waste emissions. These include segregation of wastes according to their classification and nature, labelling waste and using designated storage containers.

In accordance with the Southern Water EMS Policy solid waste is disposed of in accordance with 'Duty of Care' Regulations. The composition of the waste, its hazard characteristics and any relevant precautions are clearly stated on the transfer notes provided to licensed waste contractors removing waste from Site for recycling and/or disposal. Records are maintained on-site and reported to the regulator as required by the Permit.

6.9 Environmental impact assessment

The proposal is not subject to an environmental impact assessment under Council Directive 85/337/EEC of 27 June 1985 [Environmental Impact Assessment] (EIA).

6.10 Question 6: Resource efficiency and climate change

6.10.1 Basic energy requirements

Southern Water aims to maximise the efficiency of the energy flows from its processes ensuring that, where possible, heat is recovered, and energy is not wasted.

There are a number of pieces of infrastructure and equipment that use electrical energy supply including:

- Fans, coolers and heating;
- Motors and motor drivers and drive systems;
- Aeration;
- Pumps/boosters/conveyors;
- Facilities – heating and lighting;
- Sludge handling and management e.g. AD, dewatering and polymer dosing equipment; and
- Ventilation and odour control/abatement systems.

Biogas is used to provide energy, produced by burning in a CHP engine, for the Site's processes. Natural gas is used for heating the buildings. Biogas and gas oil are utilised for the boilers and generator when the CHP engine is not in use or is inefficient.

6.10.2 Question 6a: Basic measures for improving energy efficiency

Southern Water deals with the measurement and reporting of operational carbon emissions in existing installations through:

- Monitoring of energy use from electricity meters
- Annual estimation and reporting of operational carbon emissions for regulatory reporting (Southern Water Annual Report, Ofwat and SECR (Streamlined Energy & Carbon Reporting)
- ESOS audit reporting – the Energy Savings Opportunity Scheme (ESOS) is a regulatory requirement to undertake a company-wide audit of energy efficiency opportunities. This is approved by a Lead Assessor and completion is subsequently registered with the Environment Agency. Reporting is due every four years.

Energy efficiency measures implemented at the Site include (but not limited to) the following:

- The combustion temperature is optimised for reduced NOx emissions and increased efficiency.
- CHP engines are equipped with turbochargers, further increasing energy efficiency
- Ongoing monitoring of plant operating parameters is carried out to ensure process is operating optimally and to enable constant optimisation to increase the plant's efficiency
- Good housekeeping measures are employed, and regular preventative maintenance will ensure the operations, and therefore energy efficiency is optimised
- Low cost measures in place to avoid inefficiencies of excessive heating or cooling include:
  - Insulation of main hot water pipes
  - Insulation of heating equipment such as hot water heat exchanger, boiler feed water tank and boiler feed water pumps and pipework
- Utilising low energy equipment for lighting such as:
  - High frequency fluorescent lighting, high pressure sodium or LED
  - Allowing for local or modular switching, where appropriate
- Consideration of energy recovery and the deployment of renewable energy systems, including:
  - Micro-hydro applications
  - Advanced sludge digestion
  - CHP
  - Use of solar panels and wind generation
- Key energy consuming assets are monitored through a suite of dashboards and actions can be raised to resolve highlighted issues.
- Activated sludge plants (ASP) are audited for efficiency and actions raised accordingly. Outputs from the audits are used to inform future investment such as blower replacement.
- The Field Performance Manager can request advice from the Optimisation Team to improve efficiency of plant if required.

Biogas is a renewable gas, produced from organic waste. Heat generated from the CHP is used in the AD process. The energy created by burning of biogas in the CHP engine is used to supply the Site to reduce the need to import electricity from the grid.

The development of an energy efficiency plan will be considered once the Site is permitted; this will determine areas of improvement and will be developed under Southern Water Environmental Policy and EMS.

Southern Water carries out planned maintenance as a means to ensure operations are energy efficient. Overall, the energy use is relatively low and the purpose of the installation is to produce energy by supplying biogas, no further measures are identified at this stage to improve upon energy efficiency. Nevertheless, Southern Water will regularly review energy use and disclose potential opportunities to reduce energy consumption from the four-yearly (or more frequent) energy reviews as required by a varied permit. In addition, Southern Water implements optimisation measures across all its sites in a proactive approach to ensuring efficiency measures across all its Site operations meets optimal and efficient operating requirements.

6.10.3 Question 6b: Changes to energy the permitted activities use up and create

There will not be any changes to the energy that the permitted activities use or create.

6.10.4 Question 6b: Climate change levy agreement

There will not be any changes to the energy that the permitted activities use or create.

6.10.5 Question 6d: Raw and other materials, other substances and water use

Details of raw materials is demonstrated in document reference 790101_MSD_ResidueMP_GRA December 2024.

6.10.6 Question 6e: Reducing production of waste

Details of raw materials is demonstrated in document reference 790101_MSD_ResidueMP_GRA December 2024.

7 Part B6 – New bespoke water discharge activity or groundwater activity (point source discharge) or point source emission to water from an installation

The form responds to question listed in Table 1 of the B6 application form for the last listed option ‘Effluent and/or contaminated surface water run‐off arising from the operation of an installation.

Therefore, only the following questions have been responded to:

Type of effluent	Charge band	Please tick box	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Effluent and/or contaminated surface water run-off arising from the operation of an installation	No additional charge, as already included as part of the installation permit application charge	☑	a, b, d	c	b, c, d, f	--	a, b2	a, b, c	b, c, d, e, f, g	b, d, e, f	a, b, d, e, f, h, i	a, b, c

* Check the relevant question and our guidance notes on part B6 to see if you need to give an answer.

Note Question 6c is not within the application, despite being listed as being required by Table 1 of the application form.

7.1 Question 1 About the effluent

Effluent description: Return liquors from the STC process and condensate from the gas pipelines and gas storage bag.

Effluent name: STC return liquors.

7.2 Question 2 How long will you need to discharge for?

The discharge will not be time limited. It will take place all year and continuously (e.g. for more than six days in any year).

7.3 Question 3 How much do you want to discharge?

Southern Water is not aware of the quantity of water sent to the inlet works from the STC because it is not currently monitored, therefore no details have been provided for Question 3. An implementation plan (document reference 790101_MSD_ImplementationPlan December 2023) has been developed as part of the accompanying IED permit application.

7.4 Question 5 Should your discharge be made to the foul sewer?

The discharge point (inlet works, W1, (document reference 790101_MSD_SiteLayoutPlan_GRA December 2024) is located within the operator’s own wastewater treatment works, therefore, the distance to the nearest foul sewer is 0m and response to Question 5b2 is not applicable.

7.5 Question 6 How will the effluent be treated?

Effluent is not treated before reaching the inlet work because once leaving the inlet works the effluent will be treated through the Wastewater Treatment Works. The process description is

provided in Section 3. An implementation plan has been developed as part of the accompanying IED permit application. It is expected that Improvement Conditions in the IED permit will be provided, and Southern Water will identify how it will monitor and characterise the liquors returning to the head of the adjacent Gravesend WTW.

7.6 Question 7 What will be in the effluent?

Southern Water is not aware of the composition of the effluent discharged to the inlet works from the STC because it is not currently monitored, therefore, no details have been provided for Question 7.

The temperature of effluent is not known but since the water is not direct from processes it is expected to be ambient.

An implementation plan has been developed as part of the accompanying IED permit application. It is expected that Improvement Conditions in the IED permit will be provided, and Southern Water will identify how it will monitor and characterise the liquors returning to the head of the adjacent Gravesend WTW.

Where suitable and available, any monitoring, sampling and analysis of emissions to water is undertaken according to MCERTS, or equivalent standards, by MCERTs accredited contractors as set out in Southern Water's commitment in section 6.8.3.

7.7 Question 8 Environmental risk assessments and modelling

Discharges to tidal river, tidal stream, estuary, or coastal waters

Southern Water is not aware of the composition of the effluent discharged to the inlet works from the Site because it is not currently monitored, therefore, screening cannot be undertaken at this time.

An implementation plan has been developed as part of the accompanying IED permit application. It is expected that Improvement Conditions in the IED permit will be provided, and Southern Water will identify how it will monitor and characterise the liquors returning to the head of the adjacent Gravesend WTW.

Where suitable and available, any monitoring, sampling and analysis of emissions to water is undertaken according to MCERTS, or equivalent standards, by MCERTs accredited contractors as set out in Southern Water's commitment in section 6.8.3.

7.8 Question 9 Monitoring arrangements

Effluent monitoring will be in line with permit conditions. An implementation plan has been developed as part of the accompanying IED permit application. It is expected that Improvement Conditions in the IED permit will be provided, and Southern Water will identify how, and the final locations of where, it will monitor and characterise the liquors returning to the head of the adjacent Gravesend WwTW.

Where suitable and available, any monitoring, sampling and analysis of emissions to water is undertaken according to MCERTS, or equivalent standards, by MCERTs accredited contractors as set out in Southern Water's commitment in section 6.8.3.

7.9 Appendix 4 Discharges to tidal river, tidal stream, estuary or coastal waters

The discharge of treated sewage effluent, primary treated storm sewage and settled storm sewage are made via Outlet 1 to the Tidal River Thames at TQ 6693 7434 under water discharge activity permit Ref WR2969.

8 Part F1 – Charges and declarations

8.1 Question 1: Working out charges

Table 1, Table 2 and Table 3 and completed on the Part F1 form.

8.2 Question 2: Payment

Payment will be made by BACS.

8.3 Question 4: Confidentiality and National Security

Southern Water does not wish to claim confidentially with this application.

8.4 Question 6: Application checklist

Table 8.1 provides a list of section/document references included in the application.

Table 8.1: Part F, Question 6, Table 4: Application checklist

Question reference	Document title	Documents reference
Part A – Q5c Part A – Appendix 1 Part C2 – Appendix 2	Details of Directors	790101_MSD_Directors_February 2024
Part C2 – Q3a Part C2 – Appendix 2	List of Relevant Offences	790101_MSD_RelevantOffences_December 2023
Part C2 – Q3b	Competency Management System Agreement	790101_MSD_CMS December 2023
Part C2 – Q3d	Environmental Management System Certificate	790101_MSD_EMS December 2023
Part C2 – Q5a Part C2.5 – Q4b Part E2 – Q3a	Site Location Plan	790101_MSDS_SiteLayoutPlan_GRA December 2024
	Site Layout Plan	
	Drainage Plan	790101_MSD_DrainagePlan_GRA November 2021
Part C2 – Q5b Part E2 – Q4a	Site Condition Report	790101_SCR_GRA December 2024
Part C2 – Q6	Environmental Risk Assessment	790101_MSD_ERA_GRA December 2024 790101_MSD_Maps_GRA February 2024
	Climate Change Risk Assessment	790101_ERA_CCRA_GRA
Part C2.5 – Q2	Air Quality Risk Assessment	790101_AQRA_GRA February 2024
Part B4 – Q1b Part C3 – Q1b Part C4 – Q1b	Waste Codes	Appendix A of 790101_MSD_GRA December 2024
	Annual throughput data	790101_AnnualThroughput_GRA December 2024
	Waste Transfer Notes	790101_MSD_WasteTransferNotes_GRA December 2024
Part C3 – Q3a Part C3 – Q3c Part C4 – Q3a	Schematics	790101_MSD_Schematics_GRA December 2024
	BAT Analysis	790101_MSD_BAT_GRA December 2024
	Implementation Plan	790101_MSD_Implementation Plan December 2023
	Leak detection and repair Plan	790101_MSD_LDAR_GRA February 2024
	Residues Management Plan	790101_MSD_ResidueMP_GRA December 2024
	Accident Management Plan	790101_MSD_AMP_GRA February 2024

Question reference	Document title	Documents reference
	Duty of care (waste acceptance)	790101_MSD_WasteAcceptance_GRA December 2024
Part B4 – Q3b Part C3 – Q3b Part C4 – Q3b	Odour Management Plan	790101_ERA_OdourMP_GRA December 2024
	Bioaerosol Risk Assessment	790101_ERA_BioRA_GRA February 2024
Part B4 – Q4a	Monitoring	790101_Sampling proposal_GRA December 2024
Part C3 – Q3c, Table 5	Materials Safety Data Sheets	790101_MSD_MSDS_GRA February 2024
Part B6	Main Supporting Document Implementation Plan Site Layout Plan	Section 7 – 790101_MSD_Main_GRA December 2024 790101_PartB6_GRA 790101_MSD_SiteLayoutPlan_GRA December 2024 790101_MSD_ImplementationPlan December 2023
Part A – Q7 Part B4 – Q1,2,3 Part C2 – Q2,3,5,6 Part C2.5 – Q3,4 Part C3 – Q1,2,3,4,6 Part C4 – Q1,2,3,4 Part F1 – Q1,2,6	Main Supporting Document	790101_MSD_Main_GRA December 2024

A. Waste codes

A.1 Wastes imported for Anaerobic Digestion

It is requested that the annual quantity of indigenous sludge and liquid imports to be accepted is 306,482m^3.

EWC Code	Description	Where accepted	Indigenous or imported	Justification for 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)	AD	Indigenous/ Imported	Pre-AD
19 08	**wastes from waste water treatment plants not otherwise specified**			
19 08 05	sludges from treating urban wastewater	AD	Indigenous/ Imported	Pre-AD

A.2 Wastes received under the Controlled Waste Regulations 2012*

EWC Code	Description	Where accepted	Indigenous or imported	Justification for use
20 03	**Other municipal wastes**			
20 03 04	septic tank sludge	Head of works	Imported	
20 03 06	waste from sewage cleaning	Head of works	Imported	

*Southern Water acknowledge these waste codes will not be included in the permit

A.3 Part B4: Temporary storage of imported cake (raw or digested)

It is requested that the annual quantity of imported cake for temporary storage to be accepted is 1000 tonnes.

EWC Code	Description	Where accepted	Indigenous or imported	Justification for use
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**			
19 06 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)	Cake Bay – post digestion	Imported	Digested dewatered cake for temporary storage only.

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