MOTT MACDONALD

IED Permit Application
Main Supporting Document

Eign STC

December 2022

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
01	22/11/22	Grace Peel	Shannon Stone	Anita Manns	First Draft
02	30/11/22	Grace Peel	Shannon Stone	Anita Manns	Final

Document reference: B16564-0AG964-ZZ-XX-DM-ZA-DH0019_MSD_EIG

Information class: Standard

Contents

Tables

1 Executive summary

1.1 Overview of site and activities

Eign Sludge Treatment Centre (STC) is located within Dwr Cymru's (Welsh Water's) Eign Wastewater Treatment Works (WwTW). The address for the site is Outfall Works Road, Hereford, Herefordshire, HR1 1RY (NGR SO52045 38816).

The WwTW is operated under the Urban Wastewater Treatment Regulations (UWwTR) and has a standalone Water Discharge Activity Environmental Permit. This will remain an independent permitted activity.

The site currently has one Environmental Permit in operation. The existing Combined Heat and Power (CHP) plant is a non-hazardous waste activity which is currently carried out under a waste operation permit EPR/UP3735GH. The existing STC activities and infrastructure on site are not currently permitted and will be added as part of a variation. The waste activities at the site comprises of imports, physio-chemical and anaerobic digestion (AD) treatment, and the storage of waste, all for recovery purposes. The STC solely handles waste derived from the wastewater treatment process, either indigenously produced on-site or imported. The Site undertakes AD of sewage sludge from WwTW's only; it does not accept any liquid wastes or sludges from commercial or industrial operations. The site will continue this operation under a bespoke Industrial Emissions Directive (IED) Installation Environmental Permit.

Dŵr Cymru Welsh Water (DCWW) ('the Operator') are applying to vary Permit EPR/ UP3735GH V002 in order to satisfy the requirements of the Industrial Emissions Directive (IED) and Environmental Permitting Regulations (EPR) 2016.

The primary permitted installation activity will be the AD treatment Site. The AD site will treat indigenously produced and imported sludges. Permitted Directly Associated Activities (DAAs) will be:

- Physio-chemical treatment of indigenously produced and imported sludges.
- Storage of indigenously produced sludges and the sludge cake from the AD Site.
- Storage of biogas derived from the AD treatment of waste.
- Combustion of biogas in an on-site CHP and boilers as per EPR/UP3735GH.
- Combustion of excess biogas via two on-site flare stack.

The sludge cake will be exported for use as a fertiliser.

The Eign STC IED permit will include:

- 2 No. Digesters (2,354m^3 each)
- 1 No. Digestor feed tanks/thickening sludge tank (478m^3)
- 1 No. Digestate/digested sludge tank (1,564m^3)
- 1 No. Belt press (18-30m^3/hr)
- 1 No. Drum press (18-30m^3/hr)
- 1 No. Centrifuges (50m^3/hr each)
- 1 No. Cake silo (240m^3)
- 1 No. Emergency cake bay (200m^3)
- 2 No. Raw sludge tank/screened sludge tank (1,000m^3 each)
- 1 No. Odour Control Unit (OCU)

- 2 No. Boilers (input of 570kW and 400kW)
- 2 No. Boiler exhaust stack
- 2 No. CHP engines (thermal rated input of 1.725MW each)
- 2 No. Biogas flare stack
- 1 No. Gas holder

2 Introduction

2.1 Overview

This document has been prepared to support the application to vary the existing bespoke waste Environmental Permit to an Installation Environmental Permit (hereafter referred to as 'the Permit'), EPR/ UP3735GH, for the Eign Sludge Treatment Centre (STC) ('the Site') on behalf of Dŵr Cymru Welsh Water (DCWW) ('the Operator').

Following the joint Environment Agency and 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 and proposed permitted activities and Directly Associated Activities (DAAs), an assessment of the possible effects of these activities and responses to questions in Parts A, C2, C3, C6 and F1 of the application documentation (plus supporting information where required). Completed forms Part A, C2, C3, C6 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 stand-alone documents:

- Part A: About You (B16564-0AG964-ZZ-XX-FT-ZA-DH0025_PartA_EIG)
- Part C2: Variation to bespoke permit (B16564-0AG964-ZZ-XX-FT-ZA-DH0026_PartC2_EIG)
- Part C3: Variation to installation permit (B16564-0AG964-ZZ-XX-FT-ZA-DH0027_PartC3_EIG)
- Part C6: Variation to a water discharge activity, groundwater activity, or point source emission to water from an installation (B16564-0AG964-ZZ-XX-FT-ZA-DH0028_PartC6_EIG)
- Part F1: Charges and declarations (B16564-0AG964-ZZ-XX-FT-ZA-DH0029_PartF1_EIG)

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

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

- Chapter 5 provides the general information required to inform Form C2 relating to a new bespoke installation permit; and
- Chapter 6 provides the more detailed information required to inform Form C3 relating to a new bespoke installation permit.
- Chapter 7 provides the more detailed information required to inform Form C6 relating to the discharge consent.

Form F1 covers the required financial information required for payment of the application fee.

Additional information included as part of this submission and not as stand-alone documents, are found in the following appendices:

- Appendix A – European Waste Catalogue (EWC) Codes

Stand-alone documents included as part of this submission, are detailed below:

- Main Supporting Document (B16564-0AG964-ZZ-XX-DM-ZA-DH0019_MSD_EIG)
- Environmental Risk Assessment (B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_EIG)
  - Environmental Constraints Maps (B16564-0AG964-ZZ-XX-PL-ZA-DH0013_ERA_ContraintMaps_EIG)
- Site Condition Report (B16564-0AG964-ZZ-XX-DM-ZA-DH0031_SCR_EIG)
- BAT Analysis (B16564-0AG964-ZZ-XX-DM-ZA-DH0012_BAT_EIG)
- Site Location, Layout, Emissions and Drainage Plan (B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG)
- Process Flow Diagram (B16564-0AG964-ZZ-XX-DR-ZA-DH0022_MSD_ProcessFlow_EIG)
- Relevant Offences (B16564-0AG964-ZZ-XX-DM-ZA-DH0023_RelevantOffences_EIG)
- Details of Directors (B16564-0AG964-ZZ-XX-DM-ZA-DH0018_Directors_EIG)
- CMS Agreement (B16564-0AG964-ZZ-XX-DM-ZA-DH0017_MSD_CMS_EIG)
- Environmental Management System certification (B16564-0AG964-ZZ-XX-DM-ZA-DH0020_MSD_ISO14001_EIG)
- Accident Management Plan Summary (B16564-0AG964-ZZ-XX-DM-ZA-DH0011_AMP_EIG)
- Noise Assessment (B16564-0AG964-ZZ-XX-DM-ZA-DH0014_ERA_Noise_EIG)
- Odour impact assessment (B16564-0AG964-ZZ-XX-DM-ZA-DH0021_ERA_OIA_EIG)
- Odour management plan (B16564-0AG964-ZZ-XX-DM-ZA-DH0015_ERA_OMP_EIG)
- Authorisation (B16564-0AG964-ZZ-XX-CN-ZA-DH0016_MSD_AuthorisationLetter_EIG)
- Responses to C6 form (B16564-0AG964-ZZ-XX-DM-ZA-DH0024_App_Form_C6_EIG)
- WO(3)19 Domestic Waste Imports (B16564-0AG964-ZZ-XX-DM-ZA-DH0033_DoC_EIG)

3 Process Description

The combined indigenous and imported sludge held in the Screened Sludge Tank is thickened to approximately 7-8% dry solids. The thickening process can be carried out using either a Simon Hartley Belt Thickener or an Alfa Laval Drum Thickener. Both of the thickening machines are located within the sludge processing building and the selection of the duty machine is made manually.

The thickened combination of indigenous and imported sludge held within the site Thickened Sludge Storage Tank is fed to the Anaerobic Sludge Digesters for full treatment.

Indigenous sludge is pumped from the wastewater treatment works primary settlement tanks to 2 No. covered raw sludge holding tanks which also receive imported sludge via road tankers. The sludge is screened in 2 No. strain presses and thickened by either a drum or belt thickener, prior to pumping to a covered thickened sludge tank. Digestion is conducted in 2 No. Digestors for 10 to 14 days. The sludge is then discharged to a digestate tank prior to dewatering and export offsite.

The digestion system constantly produces biogas from the primary digester from where it is piped to the works gas holder, which has a capacity of 400m^3. The gas holder and gas system is maintained at a constant pressure by the Duty/Standby air blowers, which maintain the outer membrane of the gas holder at a design pressure of 200mm water gauge. The Primary Digester contents are maintained at a constant temperature by the circulation of digesting sludge through the three spiral heat exchangers, which operate on a Duty/Duty/ Standby regime. The heat exchangers have four feed pumps, two dedicated to each Primary Digester and they operate on a Duty/Standby basis. The heat exchangers are fed with hot water / cold water direct from the works two dual fuel boilers (operational by either Biogas or Gas Oil). Mixing in the Primary Digesters is carried out using biogas injected under pressure into a distribution network of nozzles located within the digester. The biogas is pressurised using 6 No. gas compressors. Any Biogas that is produced that is in excess of that required to operate the boilers and supply the mixing system is burned using the site waste gas burner.

Gas is utilised in 2 No. spark ignition CHP units rated at 1.725MW thermal input each with an electrical generating capacity of 0.716MW each and a thermal generating capacity of 0.722MW. There are also 2 No. dual fuel hot water boilers with 570kW thermal input and 400kW output on standby to provide standby heat and utilisation capacity when a CHP is not in operation. In the absence of sufficient levels of biogas to run the boilers, the boilers can use diesel as a fuel to generate the steam for the digesters. There are also two low level gas flares capable of burning biogas at a rate of 200 Nm^3/hr and 400 Nm^3/hr respectively.

The primary digested sludge that is displaced by the incoming raw sludge overflows into the Centrifuge Feed Tank, where it is allowed to cool and is mixed using an external mixer ready for further processing in the Centrifuge Building.

Each Alfa Laval Decanter Centrifuge is designed to raise the percentage of dry solids in the sludge from approximately 3.5-5% to approximately 25%. The Centrifuge, by means of a rapidly rotating centrifuge bowl, removes additional water from the sludge before continuously discharging the processed sludge into an inclined Screw Discharge.

The Potable Water Storage Tanks and Transfer Set provide water to the Centrifuge Polymer Make Up and Dosing Plant located in the Thickeners Building which supplies diluted polymer for injection into the Centrifuge inlets to aid dewatering. Also connected to the Centrifuge inlet is the washwater connection.

The preparation and dosing of the polyelectrolyte is fully automated using equipment supplied by the suppliers of the polyelectrolyte.

An antifoaming agent is introduced to the centrate discharge underneath the Centrifuges.

A by-pass facility enables raw sludge to be pumped directly from the Screened Sludge Tank to the dedicated Centrifuge for dewatering. The second Centrifuge processes digested sludge from the Final Sludge Holding Tanks.

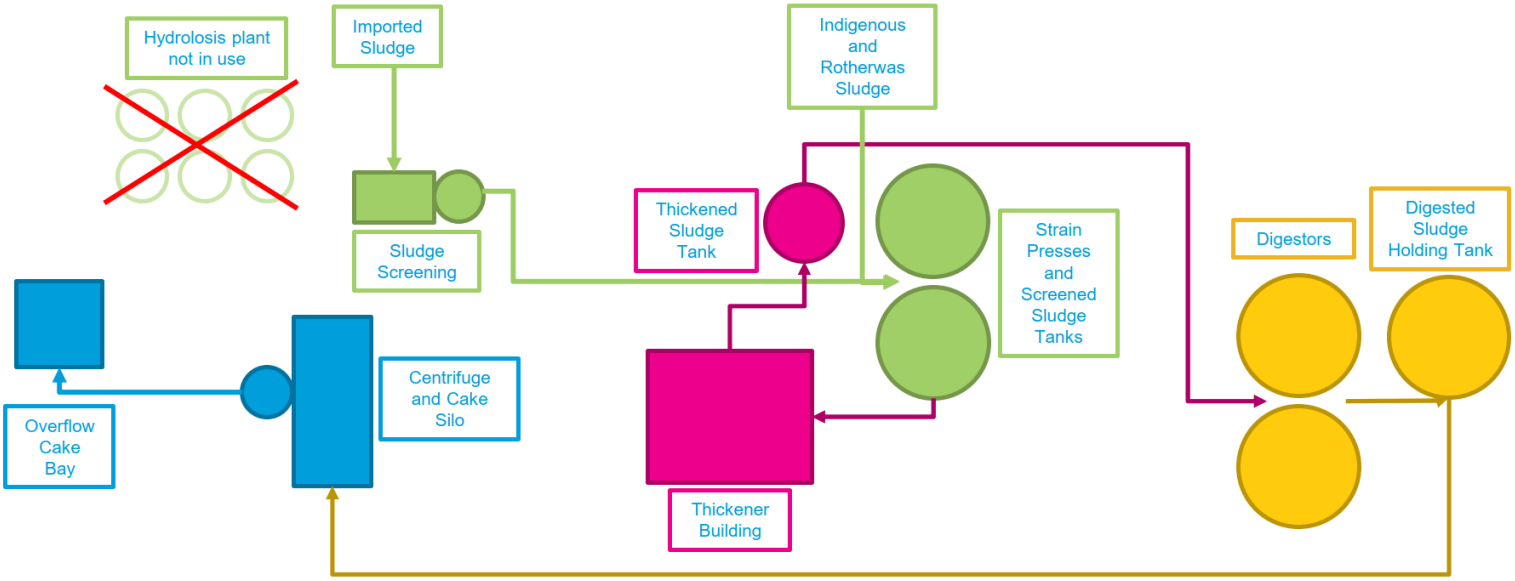
After the dewatering process, the centrate discharges into drainage pipes feeding the Centrate Diversion Chamber. This diverts the flow to the Centrate Collection PS, pumped to the SBR Balance Tank.

A single Odour Control Unit (OCU) is installed at the site which is designed to extract odours from the 2 No. Raw Sludge Holding Tanks and Sludge Thickening Building. The OCU comprises a biofilter as a first treatment stage followed by a polishing carbon filter, and a 4 m discharge stack. The biofilter removes odorous components from the airstream by a process of absorption and microbial breakdown. The carbon filter then removes residual odorous components by a process of adsorption onto the activated carbon media.

The biofilter is continuously irrigated using final effluent which is recirculated through the media with a partial bleed off to waste. The system is fitted with duty and standby fans which draw air through the biofilter and carbon filter. By-pass provisions are in place to enable both stages to be isolated for maintenance. Following treatment, the treated air is discharged through a 4m height stack.

Figure 3.1 illustrates the operational process at Eign STC. A comprehensive process flow diagram is included in document reference B16564-0AG964-ZZ-XX-DR-ZA-DH0022_MSD_ProcessFlow_EIG.

Figure 3.1: STC Process Diagram



4 Part A – About you

4.1 Question 5c: Details of directors

Details of directors are provided in stand-alone document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0018_MSD_Directors_EIG.

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: Shannon Stone

Address: Mott MacDonald, Floor 4, Mountbatten House, Grosvenor Square, Southampton, SO15 2JU.

Phone number: 023 8062 8538

Email: shannon.stone@mottmac.com

Name: Grace Peel

Address: Mott MacDonald, Floor 3, 1 Whitehall Riverside, Leeds, LS1 4BN.

Phone number: 0113 394 6728

Email: grace.peel@mottmac.com

5 Part C2 – General – Varying a bespoke permit

5.1 Questions 3a: Relevant offences

Details of the relevant convictions are provided in the document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0023_MSD_RelevantOffences_EIG.

5.2 Questions 3b: Technical ability

DCWW have relevant technical competence to operate the activities at the Site, in the form of a Competency Management System (see document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0017_MSD_CMS_EIG for applicable evidence).

All TCM's covering the Site will sign in and out of the site diary to confirm attendance in accordance with the minimum 20% requirement.

Future 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
- 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.

All DCWW Wastewater Treatment Works Operators are put through rigorous training to ensure competence for the role. Initially all operatives will complete a Level 2 Wastewater Treatment Processes Programme which is 9-days' duration. This consists of units from the Certification and Assessment Board for the Water Industry (CABWI) Diploma in Water Engineering with written assessments and covers all basic aspects of the wastewater process. Six to twelve months later, the Operators will complete the Level 3 Competent Operator Programme.

An "Advanced Digestion – Technical Operator" Knowledge and Skills Framework has been developed to identify all the relevant training required for the role. Through monthly one to ones with line managers and the annual Performance Management Review Process it is ensured that operations staff can demonstrate the knowledge and skills identified or are put forward for further training to develop the competency, if needed.

5.2.1 DCWW future technical competence

Future 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
- 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.

DCWW is currently working on an accredited Competency Management System under the Competent Operator Scheme to replace the need to have WAMITAB qualified staff to cover the technical competent management requirements. DCWW hopes to have this completed in the next 6 months. The Scheme will develop technical competency courses and skills to demonstrate that personnel have the appropriate technical skills and knowledge to manage the activities undertaken. This has been independently certificated and audited, through a third-party certification body (LRQA) in October 2022 to ensure it meets the requirements of the Version 5 Competence Management System Standard, developed by Energy & Utility Skills. The Competence Management System (CMS) will enable 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.

A signed contract between DCWW and LQRA is presented in B16564-0AG964-ZZ-XX-DM-ZA-DH0017_MSD_CMS_EIG.

5.3 Questions 3c: Finances

No relevant persons within DCWW have current or past bankruptcy or insolvency proceedings against them.

5.4 Question 3d: Management Systems

5.4.1 Environmental Management System summary

DCWW has an ISO14001 accreditation applicable to the Site at Eign, as well as an Environmental Management System (EMS) Policy. The EMS certificate can be found in (B16564-0AG964-ZZ-XX-DM-ZA-DH0020_MSD_ISO14001_EIG).

In line with the EMS Policy, the Eign STC will be operated in accordance with the DCWW Quality Management System (IMS) and the EMS. The IMS was last audited in 2014 and passed with no non-conformities.

DCWW have established and maintained documentation that defines and describes how the IMS is established, implemented, and maintained in accordance with ISO 9001:2008 and ISO/IEC 17025:2005 and monitoring emissions to air, land and water (MCERTS) Standards.

The system is structured on the organisation's strategic business areas, business processes and customer requirements.

The EMS is not integrated with the IMS at present. However, certain system procedures and operating procedures are shared by both systems.

Demonstrable procedures are outlined in the DCWW Environmental Policy dates April 2020 and the Site Operating Manual and IMS.

Scope of the Environmental Management System

The SP (1) 01 - Master Asset List contains all IMS sites and shows all certified Environmental (ISO 14001) sites.

Environmental Procedures Overview

EN (3) 02 – Waste Management

This procedure defines waste management principles and guidance for the legal disposal of waste. This procedure goes into specific detail of the handling of Hazardous and Non-Hazardous Waste including the use of a Hazardous Internal Waste Transfer Form – ENF005 and the reporting of Fly Tipped Waste.

EN (3) 03 – Delivery Handling and Storage of Oils and Chemicals

This procedure defines in general terms the duties and responsibilities involved with the receipt and handling of chemicals, oils and fuels. This procedure goes into detail about the normal and abnormal operations of the delivery/receipt/handling of chemicals and oils and states the requirements of regulations around the storage of fuel and oil, both for fixed tanks and mobile bowsers.

EN (3) 04 – Environmental Incidents – Near Miss

This procedure defines the requirements necessary to deal with and report environmental incidents and must be used in conjunction with the DCWW Emergency Incident Response Handbook available from Senior Managers. This procedure gives examples of possible causes of incidents and explains the appropriate corrective and preventative actions to be taken.

EN (3) 05 – EMS Sites Only

This procedure applies to sites that hold ISO 14001 certification. However, the procedure itself will be extended to apply to all IED permitted sites, whether or not they are accredited under ISO 14001. It details what is included with a Site Initial Environmental Review and Local Site Environmental Management Plans, along with waste management, role responsibilities and information on the Annual Review – ENF 008.

In addition, 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

An overall review of the IMS takes place every 12 months, and on other occasions as required, by senior management. There is a regular programme of audits covering all aspects of the IMS and EMS; they are included on the Internal Audit Programme operated by the Business Assurance team and audited by the Environment Agency on a frequent basis. In addition, the EMS and IMS are subject to audit by the inspection and certification company SGS (for accreditation purposes) every six months.

DCWW produces an annual report on environmental performance and where required attend local action group meetings.

One of the key tasks for DCWW during the permit determination process is the development of the management system arrangements for the STC Site to cover all STC operations as well as the quality and environmental aspects.

In 2020, DCWW updated their Asset Management Policy Statement, Environmental Policy Statement, Health Safety and Wellbeing Policy Statement, Information Security Policy Statement, and Quality Policy Statement.

5.4.2 Accident Management Plan Summary

The Site operates under a set of site-specific Emergency Procedures which is incorporated into DCWW's Environmental Management System (where applicable) to prevent and manage environmental related accidents. The Emergency Procedures 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, national and regional (where appropriate) contact details of emergency services and environmental regulators. The Emergency Procedures are distributed to key staff, to supervise the implementation of the Plan, and shared with external contacts (emergency services and the NRW). The Emergency Procedures are 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 Emergency Procedures reference 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
- Record keeping procedures for the recording of incidents, accidents and near misses
- Emergency procedures to notify relevant authorities, emergency services and neighbours

The AMP also includes details of the DSEAR Zoning plans, material safety data sheets and document EN (2) 01 Environmental Aspects.

The Accident Management Plan can be found in document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0011_ERA_AMP_EIG.

5.4.3 Climate change resilience

In order to manage climate change resilience, the Site will apply the measures outlined in Table 5.1 as part of the site's EMS. As well as the measures listed, DCWW's asset management plan will outline a regime of inspections and maintenance for the condition of assets, structures, site condition and external factors. Repairs and replacements will be granted as required to ensure longevity of the plant.

Table 5.1: Measures to manage climate change resilience

Impact	Potential impacts	Mitigation measures
Increase in summer temperatures	Structural damage	Materials specification for future temperature ranges and maximums and a design basis temperature range of [-10 to 40°C] Thermal protection such as painting or inclusion of natural ventilation / air conditioning options within buildings and outdoor shading, which will be utilised, where appropriate, during upgrades, replacement or refurbishment.
	Mechanical and electrical equipment failure	The detailed design specification for the electrical and communications equipment includes contingency for a combination of extreme weather events, in particular for safety critical functions such as fire alarms. The design of the Site allows for the installation of further equipment or systems if required in future in response to changing climatic conditions.
	Reduced efficiency of energy plant (boilers, and CHP unit)	Monitoring of ambient temperatures and air pressure as well as processing efficiency of the treatment mechanical equipment, CHP, and boiler.
	Increased risk of septicity in process plant and tunnels	Design for low flows and for an operating temperature of the WWTP process plant between air temperatures of -10 and +40 °C.
	Reduced anaerobic digestion efficiency	Utilise additional capacity incorporated into the design for the installation of additional cooling plant and reduction in insulation as required. Future-fitting cooling equipment to the digesters should this be required, or for capacity to install digesters with additional cooling capacity during future replacements and upgrades.
Decrease in winter temperatures	Energy plant infrastructure unable to operate	Materials specification for future temperature ranges and maximums and a design basis temperature range of [-10 to 40°C] which should provide mitigation against virtually all future winter temperatures.
	Increased risk of ice-related incidents for staff and visitors	Gritting of access routes to protect against slips and accidents
	Increased risk of pipe bursts and freezing of pressure / vacuum valves	Design basis temperature range of [-10 to 40°C] for hardstanding which should provide mitigation for the risk of reduced winter temperatures.
Changes in daily extreme rainfall	Structural damage and flooding at the Site	The surface water drainage design has been prepared in accordance with the surface water design specification and has included an uplift of 25%* to account for additional extreme rainfall and surface flooding risk associated with climate change.
	Insufficient stormwater storage / management processes	Storm storage has been designed to include allowances for future climate change under maximum design envelope parameters. This amount of storm storage is in line with Environment Agency allowances and the Storm Management approach has been agreed with the Environment Agency. For individual flood events, The Operator's asset management plan outlines the use of available early warning systems such as Met Office weather forecasts and Environment Agency flood warnings to inform and alert key staff as part of flood management procedures.
Changes in winter average rainfall	Structural damage and flooding at the Site	Specifications will include appropriate consideration for water proofing, including consideration for increased winter precipitation and intensity of summer and winter rainfall events, to avoid water ingress or egress. Hardstanding areas will also be designed to include consideration of climate and will be well constructed to minimise scour and cracking.

Impact	Potential impacts	Mitigation measures
	Increased winter rainfall, heavy rainfall events and summer droughts: pipework siltation	Pipework design includes consideration to manage siltation levels within flows. Furthermore, at the terminal pumping station there is capacity for additional inlet channel and screenings and grit handling.
	Increased risk of ground movement	Ground movement is unlikely to affect the majority of the site infrastructure. For parts of pipes, air valves and shafts that are near the surface and at risk of subsidence, flexible HDPE (high-density polyethylene plastic) will be used, allowing the pipes to withstand the majority of ground movements.
Drier summers	River Wye water quality	Regulatory compliance monitoring and Environment Agency ongoing assessment of permit conditions will prevent deterioration of water quality within the River Wye, as compared to the theoretical indicative permitted scenario. The WWTP has been designed to be flexible and accommodate changes based on regulatory requirements.
	Increased risk of ground movement	See above
Changes in river flow	River Wye flooding	The reduced ability to manage the site due to seasonal flooding is recognised and included within the site's management system. The site's management system also identifies and minimises the risks of pollution arising from, among other matters, incidents.
	River Wye quality	See above

*Taken from the DCWW Sewerage Modelling Manual, Table 17 - Climate Change uplift values derived from UKWIR rainfall intensity

5.4.4 Leak Detection and Repair Plan Summary

The generation of odour from the processing of sewage is primarily associated with the release of odorous Volatile Organic Compounds (VOCs) that are generated as a result of the anaerobic breakdown of organic matter by micro-organisms. Since the main source of VOCs is the solid organic matter, the majority is generated from the operations involving the handling of sludge i.e. the processes applied to dewater, treat and store raw sludge. These processes are generally considered to present the greatest risk of fugitive air emissions unless adequate controls are put in place.

In order to mitigate fugitive emissions to air, such as VOCs and methane, from treatment plants and associated infrastructure including pipework, combustion plants, conveyors and tanks, a leak detection and repair (LDAR) plan will be in place for the Queensferry STC with an Industrial Emissions Directive (IED) permit for biological treatment of waste, to comply with the Best Available Techniques (BAT) requirements.

The plan will act to improve safety for site operatives, decrease exposure of local sensitive receptors to VOCs, bioaerosols and odour, as well as to reduce product losses.

An LDAR plan consists of five basic elements:

- identifying and recording the location key components
- leak detection
- monitoring components
- repairing or replacing components
- recordkeeping

The plan includes the following to identify leaks and carry out repairs or replacement of plant and equipment:

- methods for locating unknown emission sources

- programme of work for monitoring and controlling emissions
- leak mitigation measures
- maintenance and repair programme

The LDAR plan will be written in accordance with Environment Agency's 'Appropriate measures for the biological treatment of waste'. Each applicable site will be covered by an overarching LDAR plan, with site-specific aspects appended to identify where processes, equipment or procedures may vary. Other site-specific information includes maps to identify the known locations (point and area sources) for potential fugitive emissions to air, and descriptions of any site-specific additional measures where applicable. The LDAR plan will form part of DCWW's existing Environmental Management System. For the majority of DCWW's sites, the pipe network is mostly underground (although there are some exceptions). Leaks are most likely to occur at the points of weakness, namely connections, interconnection, joins and bends. The potential sources are identified on site-specific LDAR maps and includes (as a minimum and where applicable):

- double membrane roofs (air blower vent)
- roof and cover fixings
- pressure relief valves and vents
- feeding and digestate separation units
- gas pipework
- conveyors and presses
- combined heat and power plant (methane slippage)
- reception storage
- digestate storage
- biogas holder
- condensate pits and other sumps
- building containment

The LDAR plan will consolidates both existing and new measures and procedures undertaken by DCWW in regard to leak prevention, detection and repair including:

- Site-specific Odour Management Plan
- Operation and Maintenance (O&M) Manuals
- Maintenance Manual – featuring procedures for inspecting for leaks, corrosion, damage, tightness of connections and valves, condition and security of mechanical components, fittings and structures. Remedial actions are raised if need for further maintenance is required or faults are identified.
- Existing Environmental Management System operational procedures:

During routine maintenance visual daily walkover surveys for pipework, tanks, ancillary plants etc is conducted to check for integrity, corrosions and leaks. The operator will also listen out for escape of gas from whessoe valves as part of this daily walkover. Any leaks from these valves are indicated by a hissing noise. A 'sniff test' is also undertaken in accordance with the sites' Odour Management Plan to further monitor fugitive emissions of potential sources of odour and bioaerosols. Leak detection (methane gas analyser) is also installed on biogas holder/s to ensure any leaks from the inner bag are detected. Any leaks detected on the biogas system would always be fixed immediately by DCWW due to the process safety risk of posed by biogas.

All sludge treatment processes are covered or enclosed and odorous gases from tanks and treatment areas will be channelled to the odour control treatment units, therefore, the presence

of odour from odour-controlled assets may indicate a leak. Whereby a leak is detected or suspected it is recorded in the Site Diary to be investigated.

Once a leak is located site operatives will check whether a problem can be resolved immediately, for example closing or tightening hatches, valves or other loose connections. Technicians can raise a job for maintenance or for issues that require further investigation and possible capital intervention. Smaller maintenance issues are sorted in house and any major repairs are organised by a contractor eg pipe repair. Any remedial work required on the site would be completed in accordance with the water industry specifications. Prioritisation for maintenance and repairs (and requirement for monitoring of fugitive emissions) is identified on a risk based LDAR programme of work:

- The high-risk assets are informed by the DSEAR and will be given first priority for monitoring and repair as they pose the greatest risk of explosions, e.g. digesters
- Level of risk decreases with estimated volumes and emission type:
  - Assets containing post-digested sludge (e.g. reception storage) pose a great risk of VOCs and bioaerosols
  - Post-digested sludge in digester storage, in cake silos etc have decreased levels of VOCs and bioaerosols
  - Methane slippage from combined heat and power plants are a lower risk with regard to sensitivity to receptors

Minor repairs and routine maintenance work are carried out continuously throughout the year during the working day, avoiding evenings and weekends, except in emergencies. Where possible, more major maintenance tasks are carried out in a planned manner according to priority and resources.

Odour and VOCs sensitive major maintenance tasks will be aimed to be undertaken during the winter period (between October and April), where appropriate. The emphasis in planning this maintenance is to minimise the time required to carry out the work, ensuring as far as possible, that odours and VOCs are contained or abated during the work and to deploy alternative odour suppression systems, if required.

Where a maintenance operation is likely to release quantities of odour likely to be detectable off-site, the relevant authorities would be informed in advance.

For high-risk assets, such as pressure vessels, these are already covered by a formal inspection regime under the Pressure Regulations. This work includes an annual inspection and working test, and a thorough exam that includes non-destructive testing of the pressure vessels. The working test and thorough exam are currently carried out in alternate years.

Following the identification of a leak that requires major repairs the following mitigation measures are implemented whilst awaiting emergency gas maintenance contactors to carry out remedial works:

- sludge processing on-site is minimised and diverted to a controlled release point via the combined vacuum and pressure release valve
- the leak source is surrounded with portable odour sprays as appropriate.
- biogas is diverted to the CHP plant or gas burner
- reported to the NRW, where appropriate or required by the permit.

5.4.5 Complaints

All written complaints are covered by the Quality Manual QM(1) 01 and handled according to procedures (DG7 Process Reports). The implementation of the complaints procedure is detailed

in CC(3) series procedures. Compliance with these procedures is part of the overall assessment of DCWW's performance by OFWAT and there are penalties for poor performance. Telephone complaints are logged onto the DCWW SAP system and actions recorded by the DCWW operation and control centre (Linea). All complaints are analysed for root cause in order to prevent recurrence of the problem and assist with continuous improvement processes.

Complaints about pollution are dealt with the NO(03) 3 series procedures, and there are different procedures according to who reports the pollution. Pollutions may be reported via a number of routes including: general public, local authority, internally, contractor or formally via the Environment Agency. All pollution incident calls, or emails are input into DCWWs online control system (SAP) by a Pollution Incident Advisor (PIA). This is then sent to the Wastewater Scheduling Team who allocates a Network Crew or contractor to respond to the incident; they have 4 hours to respond. After attending the incident, the operational crew provide feedback via SAP; the pollution incident details along with remedial actions taken or required are also verbally communicated to the Responsible Officer (RO). The SAP incident remains open until all follow-up work has been completed.

Following each incident, the relevant Pollution technician/Environmental Performance Officer reviews the findings and investigates details of the incident. If the root cause of the incident is identified the appropriate remedial action is undertaken and the job is closed on SAP. If the root cause is not obvious, an enhanced investigation is instigated, and the findings reviewed for appropriate remedial action. Every category 1 and 2 pollution incidents are formally reviewed by the Head of Wastewater (Network).

5.5 Question 5a: Site layout plan and process diagram

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

- B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG
- B16564-0AG964-ZZ-XX-DR-ZA-DH0022_MSD_ProcessFlow_EIG

5.6 Question 5b and 5c: Site condition report

In accordance with Environment Agency guidance, 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's template[1]):

- 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 B16564-0AG964-ZZ-XX-DM-ZA-DH0031_SCR_EIG.

5.7 Question 6a: 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 EPR Guidance (H1)[2].

[1] Natural Resources Wales (2014). Environmental permitting: H5 Site condition report. Available online at: https://cdn.cyfoethnaturiol.cymru/media/1213/site-condition-report-template.pdf?mode=pad&rnd=130989730490000000

[2] Environment Agency (2020) Risk assessments for your environmental permit. Available online at: https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

The 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 B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_EIG.

6 Part C3 – Variation to a bespoke installation permit

6.1 Question 1a: Activities applied for

Table 6.1: Part C3, Question 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
Eign STC	S5.4, Part A (1), (b) and (i)	Anaerobic digestion	200 Wet Tonnes per day	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 activity is anaerobic digestion. R3 - Recycling/ reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) R13 - Storage of waste pending any of the operations numbered R1 to R12.	0	200 Wet Tonnes per day
	Section 1.1 A(1) (b) (iii)	Combustion of biogas in a CHP unit to produce steam and electricity in an appliance with rated thermal input capacity of 3.45MW and a thermal generating capacity of 1.4MW.				

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
		Combustion of biogas or gas oil to generate steam and hot water in hot water boilers with rated thermal input of 1.14MW.				
Directly associated activities						
	Physical treatment of waste	Recycling/ reclamation of organic substances which are not used as solvents.		R3		
	Waste reception	Import of sludge from satellite sites				
	Use of biogas	Use principally as a fuel or other means to generate energy (CHP units, as per EPR/ UP3735GH)		R1		
	Standby boilers	For supplementary firing, As per EPR/ UP3735GH		D10		
	Operation of a biogas flare	As per EPR/ UP3735GH		D10		
	Use of pressure release valves	Release of pressure from digesters				
	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, diesel, gas oil, activated carbon.				

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
	Discharge of condensate	Condensate from the CHP exhaust, flare gas and pipelines. From collection to the point of discharge at the adjacent WwTW.				
	Surface water collection and drainage	Discharge of site surface water to Eign WwTW				
	Water treatment and conditioning	Boiler water treatment and conditioning, from receipt of raw materials to discharge of effluent to Eign WwTW				
For installations that take waste	Total storage capacity	2345m^3 x 2 tanks (digesters) 1540m^3 x 1 tank (digested sludge holding tank) 1000m^3 x 2 tank (screened sludge) 500m^3 x 1 tank (thickened sludge tank) 200m^3 x 1 cake silo 240m^3 x 1 emergency cake bay Total volume 9,170m^3 available on site				
	Annual throughput	The combined annual throughput for Eign STC is 73,000 Wet Tonnes				

6.2 Question 1b: Types of wastes accepted

Appendix A lists the waste types to be accepted. The combined annual throughput for Eign STC is of 73,000 Wet Tonnes.

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

6.3.1 Emissions to air

There are a number of point source emissions to air. A list of the point source emissions to air are included as Table 6.2.

Table 6.2: Part C3, Question 2, Table 2: Point source emissions to air

Emission point reference and location	Source	Parameter	Quantity	Unit
CHP 1 (NGR SO 5208 3887) As per EPR/UP3735GH Emission point A1	CHP engine exhaust stack burning biogas	Oxides of Nitrogen (as NO_2)	500	mg/Nm^3
		Carbon Monoxide	1400	mg/Nm^3
		Sulphur Dioxide	339	mg/Nm^3

CHP 2 (NGR SO 5208 3887) As per EPR/UP3735GH Emission point A2	CHP engine exhaust stack burning biogas	Oxides of Nitrogen (as NO_2)	500	mg/Nm^3
		Carbon Monoxide	1400	mg/Nm^3
		Sulphur Dioxide	339	mg/Nm^3
Biogas flare stack 1 (NGR SO 5211 3884) As per EPR/UP3735GH Emission point A5	Waste biogas burner (flare stack)	Oxides of Nitrogen (as NO_2)	150	mg/Nm^3
		Carbon Monoxide	50	mg/Nm^3
		Sulphur Dioxide	339	mg/Nm^3
Biogas flare stack 2 (NGR SO 5211 3883) As per EPR/UP3735GH Emission point A6	Waste biogas burner (flare stack)	Oxides of Nitrogen (as NO_2)	150	mg/Nm^3
		Carbon Monoxide	50	mg/Nm^3
		Sulphur Dioxide	339	mg/Nm^3
Hot Water Boiler Unit 1 (NGR SO 5205 3883) As per EPR/UP3735GH Emission point A3	Boiler exhaust stack – operating on Biogas, oil and diesel.	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	170	mg/Nm^3
		Carbon Monoxide	75	mg/Nm^3
		Sulphur Dioxide	160	mg/Nm^3
Hot Water Boiler Unit 2 (NGR SO 5205 3883) As per EPR/UP3735GH Emission point A4	Boiler exhaust stack – operating on Biogas, oil and diesel.	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	170	mg/Nm^3
		Carbon Monoxide	75	mg/Nm^3
		Sulphur Dioxide	160	mg/Nm^3
Odour control unit (NGR SO 5208 3880) Emission point A9	Channelled emissions to air as identified on site plan. Use of biofilter.	Ammonia	20	Mg/m^3
		H_2S	No limit specified	
		Odour concentration	1000	Oue/Nm^3
Pressure relief valves – Digester No.1 (NGR SO 5210 3879) Emission point A10	Biogas release and operational events	Operational hours Recorded duration and frequency.	No limits set	
Pressure relief valves – Digester No.2 (NGR SO 5211 3880) Emission point A11	Biogas release and operational events	Operational hours Recorded duration and frequency.	No limits set	
Standby Generator 1 (NGR SO 5208 3886) Emission point A7	Diesel generator exhaust stack	Operational hours Recorded duration and frequency.	No limits set	
Standby Generator 2 (NGR SO 5207 3887) Emission point A8	Diesel generator exhaust stack	Operational hours Recorded duration and frequency.	No limits set	
Pressure relief valves – Gas Holder (NGR SO 5210 3882) Emission point A12	Biogas release and operational events	Operational hours Recorded duration and frequency.	No limits set	

The emission points are shown in drawing reference B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG.

6.3.2 Emissions to water (other than sewers)

The drainage network sends water to the head of the works for treatment. There will be no point sources emissions from the Site. This includes condensate from the flare, CHP which is

captured and is returned to the drainage system and sent back to the head of works. The condensate will be clean, uncontaminated and discharges expected to be small in volume.

There will be no direct discharges of wastewater to controlled waters.

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. All spillages are recorded in the site diary including actions taken.

6.3.3 Emissions to sewers, effluent treatment plants or other transfers off Site

There will be no point source emissions or direct discharges to controlled waters or public sewers, as part of the permit operation. All condensate from the CHP exhausts, flare stacks and biogas along with any other liquid waste will be discharged to the liquor return tank and back to the adjacent Eign WwTW and will undergo treatment through the works before being discharged under an existing water discharge permit. On-site WwTW 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 or captured and rerouted to the adjacent WwTW.

On-site WwTW 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 WwTW.

All drainage (surface water or foul water) will be captured by the on-site drainage system and returned to the head of the WwTW. A drainage plan of the Site is provided with the application, document reference B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG.

The stormwater drainage of potentially contaminated areas from within the Site boundary will be routed back to the head of the works.

Due to the anticipated very low levels of contamination of the water and the volumes involved, no monitoring of its composition is proposed prior to discharge to the WwTW.

Any areas of the Site, where there is a risk of contamination of surface water, groundwater or discharge of process waters are located on impermeable concrete surface. All surface water from these areas drain to the WwTW internal drainage system and are returned to the head of the works for treatment prior to discharge as final effluent. A list of the point source emissions to sewers, effluent treatment plants and other transfers off Site is included as Table 6.3.

Table 6.3: Point source emissions to sewers, effluent treatment plants or other transfers off-site

Emission point reference	Source	Characteristics	Frequency	Monitoring / mitigation measures prior to final discharge and emission point discharge.
Discharged to Eign WwTW (NGR SO 5204 3885) As per EPR/UP3735GH	Condensate from the gas pipelines and gas holder	Condensate with slightly elevated levels of H_2S dissolved from the biogas, resulting in a low level of acidity	Negligible	Rerouted to adjacent WwTW.

Emission point W1 (W6 on new plan)				
Discharged to Eign WwTW (NGR SO 5204 3885) As per EPR/UP3735GH Emission point W1 (W6 on new plan)	Boiler blow down to minimise damage from high mineral content water.	High purity water with traces of chemicals (used for boiler dosing).	Infrequent and negligible	Rerouted to adjacent WwTW.
Discharged to Eign WwTW (NGR SO 5202 3887) Emission point W1 on new plan	Centrifuge Centrate	Unknown currently – monitoring and sampling to be undertaken to establish characteristics	Frequent	Rerouted to adjacent WwTW.
Discharged to Eign WwTW (NGR SO 5207 3885) Emission point W2 on new plan	Sludge Thickening Liquors	Unknown currently – monitoring and sampling to be undertaken to establish characteristics	Frequent	Rerouted to adjacent WwTW.
Discharged to Eign WwTW (NGR SO 5204 3885) Emission point W3 on new plan	Storm run-off (outside containment bund)	Clean rainwater from runoff	Infrequent	Rerouted to adjacent WwTW.
Discharged to Eign WwTW (NGR SO 5211 3875) Emission point W4 on new plan	SBR Treated effluent	Unknown currently – monitoring and sampling to be undertaken to establish characteristics	Frequent	Rerouted to adjacent WwTW.
Discharged to Eign WwTW (NGR SO 5214 3872) Emission point W5 on new plan	Digester bund run-off	Unknown currently – monitoring and sampling to be undertaken to establish characteristics	Infrequent	Rerouted to adjacent WwTW.
Discharged to Eign WwTW (NGR SO 5199 3882) Emission point W6 on new plan	Foul drainage	Unknown currently – collection from various site processes	Frequent	Rerouted to adjacent WwTW.
Discharged to Eign WwTW (NGR SO 5199 3882) Emission point W7 on new plan	Storm returns from site surfaces	Unknown currently – collection from various site surfaces	Infrequent	Rerouted to adjacent WwTW.
Discharged to Eign WwTW	Drain down of plant - Occurs	High purity water with traces of	Infrequent	Rerouted to adjacent WwTW.

(NGR SO 5204 3885) As per EPR/UP3735GH Emission point W1 (W6 on new plan)	during maintenance when it is necessary to drain down the feed water, hot well or boiler shell.	chemicals (used for boiler dosing).		
Discharged to Eign WwTW (NGR SO 5204 3885) As per EPR/UP3735GH Emission point W1 (W6 on new plan)	Rainwater - Uncontaminated roof water from buildings.	Clean rainwater from building roofs only.		Rerouted to adjacent WwTW.
Discharged to Eign WwTW (NGR SO 5204 3885) As per EPR/UP3735GH Emission point W1 (W6 on new plan)	Rainwater - Run off from impervious surfaces	Clean rainwater from runoff		Rerouted to adjacent WwTW
Discharged to Eign WwTW (NGR SO 5204 3885) As per EPR/UP3735GH Emission point W1 (W6 on new plan)	Sanitary Water - Domestic facilities.	Foul waste.	Negligible	Rerouted to adjacent WwTW.

Please refer to the ERA (document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_EIG) on the environmental risk the water emissions pose and how these are mitigated, where relevant.

6.3.4 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 are collected in separate skips and removed off-site by road vehicle and transported to a suitably Permitted facility.

Grit and screenings generated are collected in separate skips and removed off-site by road vehicle and transported to a suitably permitted facility.

Please refer to the ERA (doc ref B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_EIG) on the environmental risk the water emissions pose and how these are mitigated, where relevant.

6.4 Question 3: 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 3a 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 DCWW Eign Site 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 6.4: Part C3, Question 3a, Table 3: Technical standards

Installation name	Eign STC	
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	How to Comply with Your Environmental Permit Additional Guidance for Anaerobic Digestion Best available techniques (BAT) conclusions, for the recovery and disposal of hazardous and non-hazardous waste (SGN S5.06) Appropriate measures for the biological treatment of waste	https://www.wiseenvironment.co.uk/wp-content/uploads/2020/07/How-to-Comply-with-Your-Environmental-Permit-Additional-Guidance-for-Anaerobic-Digestion.pdf http://eippcb.jrc.ec.europa.eu/reference/BREF/BATC_CWW.pdf https://www.gov.uk/government/publications/sector-guidancenote-s506-recovery-anddisposal-of-hazardous-and-nonhazardous-waste https://www.gov.uk/guidance/biological-waste-treatment-appropriate-measures-for-permitted-facilities
General	How to comply with your environmental permit Monitoring stack emissions: technical guidance for selecting a monitoring approach M1 sampling requirements for stack emission monitoring M9 environmental monitoring of bioaerosols at regulated facilities Environmental permitting guidance, including: H1 - Risk assessments for your environmental permit H2 Energy efficiency (Energy efficiency for combustion and energy from waste power plants) H3 Noise assessment and control H4 Odour management	https://www.gov.uk/government/publications/how-to-comply-withyour-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/government/publications/m9-environmental-monitoring-of-bioaerosols-at-regulated-facilities https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit https://www.gov.uk/government/publications/energy-efficiencyfor-combustion-and-energyfrom-waste-power-plants

Installation name	Eign STC	
Description of the schedule 1 activity or directly associated activity	**Best available technique (BATC, BREF or TGN reference)**	**Document reference**
	H5 Site condition report Control and monitor emissions for your environmental permit	https://www.gov.uk/government/publications/environmentalpermitting-h3-part-2-noiseassessment-and-control https://www.gov.uk/government/publications/environmentalpermitting-h4-odourmanagement https://cdn.cyfoethnaturiol.cymru/media/1213/site-condition-report-template.pdf?mode=pad&rnd=130989730490000000 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 B16564-0AG964-ZZ-XX-DR-ZA-DH0022_MSD_ProcessFlow_EIG.

6.5 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 the Eign site, and the outcome of these conclusions can be found in document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0012_BAT_EIG.

A proposal to achieve compliance with BAT14 and 19 for Eign STC has been presented to and discussed with the Environment Agency (1st November 2022) prior to implementation. It is therefore, considered that this will be added as Improvement Conditions to the permit. The proposal considers credible failure modes of assets and incorporates measures for the STC to comply with best practice guidance outlined in CIRIA 736, Containment Systems for the Prevention of Pollution, for existing sites. The source, pathway, receptor risk assessment methodology outlined in CIRIA 736 was used to help understand current risks and develop the proposal which broadly includes:

- Installing localised containment features around above ground sludge storage tanks using kerbs, road humps or shallow concrete walls.
- Replacing permeable features with impermeable surfaces within bunded areas or underneath above ground transfer pipework.
- Verifying the condition of the existing drainage system and upgrading it where necessary to accommodate the additional surface water run-off from impermeable surfaces.
- Enhancing visibility of sludge storage and transfer assets where required by using level and pressure instruments and incorporating early warning alarms on telemetry.

The solution is presented in the document Eign IED – EA Presentation 1 Nov 22

A Leak Detection a Repair Plan (LDAR) will be prepared prior to operation of the site to comply with BAT 14, a summary of the proposed structure and contents is provided in section 5.4.4.

Supplementary documents for the BAT assessment are provided:

- Description of the Duty of Care procedures provided in WO(3)19 Domestic Waste Imports (document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0033_DoC_EIG).

6.6 Question 3b: General requirements

6.6.1 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, in accordance with the H1 ERA Guidance and is provided with the application (Document reference: B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_EIG). The response to this question relates to Table 4 in the Part C3 form.

6.6.2 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 DCWW follow with regards to the control of mud and debris and potentially polluting leaks and spillages are addressed in the EMS.

As combustion activities are not being changed on Site as a result of the proposal, it is not anticipated that Air Quality Dispersion Modelling is required to address the emissions of the CHP units. This is because the CHP units are already licensed under the existing permit number EPR/ UP3735GH.

Additional emissions from the Site include:

- Water vapour from the blowdown vessel. There is a vent to atmosphere on the hot water storage tanks to ensure the tank is never pressurised;
- Pressure relief valves and devices are located on the steam system, boilers and on the gas holder. These are vented to atmosphere;
- There are a number of potential emissions from the biogas condensate pots; however, low level alarms have been fitted to notify the operator if the seal has been broken.
- The additional emissions identified are considered to represent a negligible amount to the overall emissions of the Site and are not considered to contain pollutants considered detrimental to the environment.

Pressure relief valves (PRVs) are inspected daily.

The gas holder is equipped with a level transmitter which is used to determine the volume of biogas in the gas holder, where the level of the gas holder is a low or a high level, an alarm is raised on the SCADA system.

Pressure relief valves will be used in emergencies only, and are not part of normal operation, all PRVs and breather vents are fitted in appropriate locations.

6.6.3 Odour

The site is bounded by a meander in the River Wye from north-east. Public footpaths run parallel to the River Wye. Past this bounding, there are residential areas to the north and south. To the west and east there are grasslands.

The nearest sensitive receptors to the site are residential developments which are located approximately 430m to the northeast of the site and 650m to the northwest. The nearest commercial/industrial facilities are located approximately 370m to the southeast of the Site.

River Wye is both a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) and lies approximately 5m from the site. A Site of Importance for Nature Conservation (SINC) is located adjacent to the site.

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.

Odour control assets implemented at the STC are as follows:

This is a two-stage treatment system, with a biofilte as the first stage and carbon polishing filter as the second stage. The system also has duty and standby fans with a design flow rate of 1.5m^3/s. The OCU extracts from the sludge thickening building and sludge balance tanks. Media life and condition is reviewed on a regular basis although it is anticipated that media should last a minimum of two years.

- The site also has one odour control units (OCUs) to mitigate the risk of odour. OCU 1 extracts from the from the sludge thickening building and sludge balance tanks, using a two stage biofilter and carbon polish system.
- Leak detection (methane gas analyser) is installed on the biogas holder to ensure any leaks from the inner bag are detected. Any leaks detected on the biogas system would always be fixed immediately by DCWW due to the process safety risk of posed by biogas.

Since the level of odour risk from the Site is considered to be low, as shown in Appendix B of the ERA document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_EIG.

Olfasense have undertaken a site visit to conduct a quantitative odour impact assessment and produced an updated report for the STC (document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0019_MSD_OIA_EIG).

DCWW, with support from Olfasense, have developed the odour management plan (OMP), based on the outcome of this assessment, in accordance with the H4 guidance (document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0015_MSD_OMP_EIG).

In addition, DCWW have requested Olfasense to support site operation teams to undertake regular checks on the OCU's for the first six months, so they understand what checks and reporting is required in the future.

6.6.4 Noise

Initial screening has been carried out for the Site. The Site has not received any noise complaints and 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 in 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.

Since the level of noise risk from the Site is considered to be low, as shown in Appendix B of the ERA document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_EIG.

The potential noise impacts of the Eign STC will be in a high level assessed by way of a comparison of:

- Predictions of noise impact based on reference measurements of the same types of equipment installed at similar facilities and a simple propagation model; and
- Representative baseline noise levels obtained from published strategic noise maps

The high-level noise assessment will be provided in document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0014_ERA_Noise_EIG.

6.6.5 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 B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_EIG.

6.6.6 Bio-aerosols

A bio-aerosols risk assessment was not required to be undertaken for the STC Site as part of this permit variation as there are no sensitive human receptors within 250m of the boundary. However, one has been conducted, as there are sensitive receptors close to the 250m boundary limit (document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0030 _ERA_BioA_EIG).

Monitoring of bio-aerosols required will be undertaken, where appropriate, in accordance with the Environment Agency's M9 guidance on environmental monitoring of bioaerosols at regulated facilities. For any sampling and analysis undertaken as part of permit compliance DCWW is committed to ensuring that those undertaking the sampling and analysis will be by accredited to MCERTs, or equivalent standards.

6.6.7 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. There is appropriate containment for the control of liquid wastes put in place to minimise any potential releases, as identified in the EMS.

6.6.8 Control of fugitive emissions to land

Solid waste

Waste generated on the Site includes the following:

Table 6.5: Waste recovery of different waste streams

Activity	Waste stream	Waste recovery/disposal
Sludge screening	Screenings	Organic screenings sent to composting facilities. Grit screenings are taken to a designated landfill site.
Sludge thickening and sludge dewatering	Filtrate / Centrate	Returned to the WwTW for treatment
Anaerobic digestion	Biogas	Transferred to CHP unit for electricity and heat production and boilers for heating process water.
Maturation stage	Biosolids	Compliant biosolids are recycled in agriculture (as soil conditioner)
Waste generated from other Site activities (i.e. offices)	General waste	Recycled where possible at a materials recycling Site. Non-recyclable waste is disposed of to a designated landfill site.
	Scrap metal	Recycled at scrap metal recycling facilities
	WEEE	Recycled at WEEE recycling facilities
Sludge thickening	Odour Treatment (OCU)	Replacement Carbon filters on the OCU

To reduce volumes of waste:

- All materials and consumables delivered to Site are inspected to ensure that they are fit-for-purpose. Damaged items are refused and returned to the supplier.
- Sewage sludge is thickened at the works to be treated at the site. Treated sludge is de-watered and then stored in a cake silo.

- The biogas from the AD process is burned either in a CHP engine or boilers, to provide power or heat for the Site processes.
- The biogas is also connected to a flare stack and excess biogas is burnt under normal operating conditions.
- The condensate overflow is contained and returned to treatment via condensate lines and does not spill to land.
- Polymer intermediate bulk containers (IBCs) are sent back to the supplier for re-use.

Eign has a labelled WEEE store, a general waste skip and screenings skips.

All skips and containers are located on a hardstanding to prevent leaching into the ground. Skips and containers are clearly labelled.

If a complaint is made with respect to litter the complaints procedure will be followed. 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 and actions taken to resolve the issue will be recorded in the Site Diary and the complaints register.

As part of the quarterly health and safety checklist the site is screened for general litter, mud, and debris both within and outside site boundaries.

6.6.9 Site security

Activities are managed and operated in accordance with the EMS. Access to the Site is restricted by a 2.4m mesh fence and a second 1.8m chain link fence. Access to the site is through a 3m cantilever mesh which requires authorised key cards to open and is fitted with an intercom system for visitor access. The Site also benefits from a CCTV system, and intruder detection alarms which covers the Site entrance and access road.

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.

Other risks relating to human health and the environment is presented in Appendix B of the ERA, document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_EIG.

6.6.10 Complaints procedure

Direct from DCWW policy:

“According to the Consumer Council for Water (CCW), a complaint is any inbound contact from a customer not eligible to switch retail provider or customer’s representative that expresses or implies dissatisfaction with the charges, service or functions provided by the company. Dissatisfaction should be identified in the body or title of the written correspondence/ contact or the customer’s sentiment at the close of a telephone/web chat/visit contact. Subsequent contacts about the same issue from the same customer should be reported as a complaint unless it falls under any of the exemptions.

We must accurately report all complaints for both Household and Non-Household. This information is used for:

- Household complaints reporting for CMEX in England and Wales
- Household and non-household complaints for CCW reporting
- Non - household complaints for Ofwat benchmarking.

We make a commitment to our customers that if they're unhappy with the outcome of their first complaint and write to us again, it will be reviewed by another person / case handler before making recommendations to a Director.

Written Complaint Stages

We make a commitment to our customers that if they're unhappy with the outcome of their first complaint and write to us again, it will be reviewed by another person / case handler before making recommendations to a Director.

Stage 1 complaint received from a customer or their representative

The classification of a Stage 1 Complaint can be one of the following:

- A complaint with no history of previous complaints on the same subject
- A second complaint about the same issue, but where we haven't had chance to answer within 10 working days from the original complaint.
- A follow-on written contact - If the new information relates to the original complaint but is substantial enough to change the outcome, then the company may report it as a stage 1, even if it the company reviews the complaint and decides no further action is necessary
- The new issue (s) are not connected to the original complaint, and, could or would change the outcome of the original complaint (whether it ultimately does or not), or, the original complaint has been resolved to the customer's satisfaction.

Examples of these may include:

- Attitude of company staff.
- The date or timescale to resolve the issue (perhaps due to operational works); and
- Recompense for the original service failure if it isn't mentioned in the customer's first contact or is not part of the resolution of the initial complaint.

NB: In cases where there is nothing further that can be done, a Director may consider the Stage 1 response to be the final stage. In these instances, we will advise customers that we've completed the company complaints procedure (including Directors review) and signpost them to CCW.

Follow on complaints about the same matter or outcome would fall under exclusions as 'continued correspondence' and report as a stage 3. But only after Stage 1 when we've explained there is nothing else, we can do and fully reviewed the complaint.

Stage 2 (escalated complaint)

The classification of a Stage 2 Complaint is one of the following:

- A second written complaint from a customer relating to the same issue, following our response to the initial Stage 1 complaint
- New information (provided by the customer) which is something we should have been aware of, such as our own literature, action, works or contacts to the customer

Note: If the second complaint is received more than 12 months after the initial response, then this will be treated as a new Stage 1.

Stage 2 Repeat

After the Stage 2, if we receive further correspondence about the same issue and we consider an alternative course of action, then these complaints should be categorised as a Stage 2 repeat complaint.

Stage 3 (exhausted complaint)

The classification of a Stage 3 is as follows:

A further written complaint from a customer relating to the same issue; where the customer has already been advised that we have completed the company complaints procedure and they can, if they wish, contact CCW.

If a customer continues to correspond after this stage, unless there are new issues or new information, these will be categorised as a Stage 3.

Telephone, SMS, Web Chat, Visit and Social Media Complaints

This section is new and gives information on how we now need to report when dealing with customer complaints in real time.

First customer contact through telephone, SMS, web chat, social media or visit.

All contacts through the above channels should be reported as a complaint based on the customer sentiment at the conclusion of the first contact or visit. If, at the end of the contact the customer is or appears satisfied or considers the matter resolved without complaint, we do not need to mark this contact as a complaint.

Examples of when we need to classify inbound contacts as complaints include:

- Customer disagreement or challenge even when we've explained our policy or procedure.
- Early termination of the contact by a customer whereby the end sentiment is negative (but not from loss of connection).
- Customer asks for their query to be escalated.
- Customer's tone or mood is negative.

If in doubt, we can ask the customer if they are satisfied with our explanation and proposed next steps at the close of the contact but this must be done with no pressure on customers to agree. If we choose not to ask and are in doubt of the customer's sentiment, this will need to be classified as a complaint. It's really important we only consider the customer sentiment at the end of the first contact.

If a customer expresses satisfaction, for example, an agreed action, gratitude or says that we don't need to do anything further then the contact should not be reported as a complaint. Similarly, if we are unable to answer the customer's points then where possible it should offer the customer a handover to another member of staff. In this event the customer sentiment should be based on the conclusion of the contact. If the customer requests a call back, or if we initiates the call back, it should be treated as the continuation of the initial contact. The customer sentiment should be considered at the conclusion of the first call back only and not subsequent contacts.

Call back for web chat and social media

For webchat and social media contacts, in the event we ask customers provide their telephone number for them to contact them over any issue, then our call back should be treated as an inbound contact. If the customer sentiment is negative at the end of the contact then it should be reported as a complaint. Complaints should be reported by the initial method of customer contact.

Complaints via social media

Ofwat's final Methodology for the 2019 Price Review states companies should offer at least five communication channels, including at least three online channels for receiving customer

contacts and complaints. In line with this guidance, we may offer a route for customers to complain via social media. We now need to report complaints through all social media channels we offer as contacts to customers.

In line with the inbound principle, we should only report complaints through social media where the customer contacts us directly, either through a visitor post on the company page or site or direct/personal message (and the company can identify the customer).

Customer comments about another customer posting should not be reported as a complaint.

When we are not available to respond immediately but feel a response is warranted, we need to contact the customer and conclude the contact within 24 hours. Any contact that continues beyond 24 hours should be reported as a complaint. To gauge a level of proportion, we need to report to CCW where possible the numbers of contacts via social media which went beyond the 24-hour timescale.

Again, we need to consider the customer sentiment at the end of the contact and where the customer is dissatisfied or there is implied dissatisfaction then the contact should be reported as a complaint.

Engagement with customers via social media

Customers who comment of our posts via social media should be responded to at our discretion. Where we feel a response isn't warranted then we do not need to report this as a complaint. Where we choose to respond directly to a customer from a post, such as if the customer is asking for further information or has been affected by the subject of the post then we should report the contact as a complaint if at the close of the contact the customer is dissatisfied or implies dissatisfaction unless an exemption applies.

Vexatious Complaints

A small number of customers make vexatious complaints such as:

- Persistent/obsessive/repetitive complaints without sufficient or reasonable grounds/evidence;
- Repeated complaints about the same matter (and/or with minimal changes to the subject matter) together with a refusal to accept decisions;
- Refusal to co-operate with our complaints procedure;
- Any other complaint or behaviour that has been identified as having the potential to adversely affect the health or wellbeing of our colleagues.

Our Vexatious Customer Register enables us to identify and record customers who have made vexatious complaints. The complaints team manager is responsible for holding, updating and reviewing the Register. For further information please read the Vexatious Customer Policy or contact our Head of Customer Service and/or the Legal Team.

General Correspondence

General Correspondence is any other correspondence that isn't a complaint. Everyone who handles correspondence is responsible for ensuring that it is classified correctly.

The process for logging on/responding/logging off General Correspondence is the same as for written complaints. However, the response for General Correspondence does not need to include information on our complaints procedure.

Data Protection Act

To ensure Welsh Water's compliance with the Data Protection Act 2018 we must only disclose a customer's personal data to a third party (including someone calling on behalf of the customer such as their partner or parent and/or an AM/MP), if we have satisfied ourselves that the third party has the customer's consent to receive the information"

6.7 Question 3c: Types and amounts of raw materials

The list of types and amounts of raw materials for the Site is presented in Table 6.6.

Table 6.6: Types and amounts of raw materials used on

Schedule 1 activity	Description of raw material and composition	Maximum amount (tonnes)	Annual throughput (tonnes each year)	Description of the use of the raw material including any main hazards
5.4, Part A (1), (b) and (i)	Diesel	2,500 Litres	500 Litres	Used in standby generators during emergencies, however it is a rare occurrence. Ordered on an ad hoc basis.
	Polyelectrolyte FloPam FO4698SSH FloPam FO4490VHM FloPam FO4440	 0.6 Tonnes 1.5 Tonnes 0.1 Tonne	 20 Tonnes 10 Tonnes 15 Tonnes	Used as flocculant to enhance thickening and dewatering processes. Amount ordered depends on centrifuge use.
	Antifoam	1 Tonne	1 Tonnes	Used in centrifuge to prevent foaming
	Polyaluminium chloride PAX XL60 - LQ7.5%AL MB PAX ZL60 – LQ7.5%AL MB	 25 Tonnes 7 Tonnes	 668.5 Tonnes 40.3 Tonnes	Used to remove phosphate.
	Aluminium sulphate (when PAX not available) ALSLQ 4.3%	4 Tonnes	20,100 Tonnes	Used to remove phosphate when PAX not available.
	Activated carbon	11m^3	11m^3	Used in the odour control unit

6.8 Question 4: Monitoring

6.8.1 Monitoring of emissions to air

Odour modelling is to be undertaken at the Site and it is expected to be reported in August 2022. Where the modelling identifies risk to any of the receptors an OMP will be developed. The OMP will be developed in accordance with H4 Odour Management guidance[3].

As per the Works Operating Manual (WOMs) and the Hazard Analysis and Critical Control Point (HACCP) plans maintenance of specialised equipment is carried out in accordance with the specific manufacturers' handbooks, which are held in the operations office.

Monitoring of the digester level is undertaken using three level instruments on each digester, two hydrostatic pressure instruments, and one radar instrument.

The gas holder is equipped with a gas leakage detector for monitoring the methane concentration in the cavity between the inner and outer membranes. If the methane

[3] H4 Odour Management, How to comply with your environmental permit, Environment Agency, 2011. Available online How to comply (publishing.service.gov.uk)

concentration exceeds a pre-set value, an alarm shall be raised and the gas holder shall be isolated.

There are two instruments on the common biogas line to the CHPs/boilers which measure gas quality. One instrument continuously monitors the hydrogen sulphide concentration in the biogas, and the other instrument continuously monitors the methane concentration in the biogas.

Boiler water quality will be monitored regularly, including:

- Frequent monitoring of feed water quality;
- TDS blowdown – Continuous monitoring of TDS with automatic operation of top blow down system as required. A high-high TDS concentration shall raise an alarm and shut down the boiler;
- Automatic (timer controlled) bottom blowdown system;
- Manual blowdown system

Continuous monitoring of the pressure, retention time and ultraviolet dose rate will be monitored continuously. Sampling is undertaken either at the start up, or when the process significantly changes and is repeated every 10 years.

Sampling of the digested sludge cake is undertaken in accordance with the BAS Sampling Programme, monthly for six months after validation or significant deterioration in quality or change in treatment process and then every three months.

This section provides a summary of the proposed monitoring at the Site for the additional infrastructure and land area associated with the permit variation. Reference to the existing permitted CHP has not been included.

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.

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 CHPs 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 6.7: Monitoring of air emissions

Emission point type	Parameter	Reference period	Monitoring frequency	Monitoring standard or method
CHP, boilers, and flare	As per existing permit	As per existing permit	As per existing permit	As per existing permit
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

DCWW will commit to ensure that bioaerosols produced as part of the regulated activities from the STC are monitored in accordance with the M9: environmental monitoring of bioaerosols are regulated facilities.

6.8.2 Monitoring of emissions to water

DCWW do not currently sample or analyse the effluent discharged from the STC into the adjacent WwTW. Some sampling for pH, BOD, COD and ammonia is sampled on a monthly basis for operational and optimisation purposes only.

It is expected monitoring of sludge liquors that are returned to the inlet works will be imposed within a permit, or at least monitoring procedures to be produced for review as an improvement condition of a permit to later be imposed as an operational technique. DCWW will need to consider what to monitor (key parameters) and how, and include as training requirements, laboratory fees and implementing into the EMS and other operational instructions.

The substances applicable to biological treatment and for indirect emissions to receiving water bodies (aka not through a wastewater treatment plant) have identified only two substances that may require measurement - Perfluorooctanoic acid and Perfluorooctane Sulfonate. These will only need to be monitored if found to be relevant to discharges to the inlet works from the STC. Table 6.8 below identifies the monitoring requirements and parameters for liquor sampling.

Effluent liquors ("returned liquors") from STCs are pumped to the site's HoW and are treated alongside the crude sewage influent in the WwTW.

The sampling should ideally include the parameters in the table below.

Table 6.8: Parameters for liquor sampling

CRUDE	LIQUOR RETURN
Ammonia	Ammonia
Settled BOD	Settled BOD
COD	COD
Total Solids	Total Solids
	PFOS
	PFOA
	Total Nitrogen
	Total Organic Carbon
	Total Phosphate

Raw sludges from the on-site WwTW enter the STC for biological treatment. The STC receives sludges for treatment in two forms; liquid sludge production from the host WwTW, which is deemed indigenous sludge and liquid sludge imports, by road tanker, (liquid import).

The sludges entering the STC are further screened to remove any remaining grit and screenings from the feed. A number of parameters are measured through the Sludge Treatment process (on the blend tank, digester feed, on the digester and post digestion, see below) on a regular basis in order to ensure that DCWW understand its process and are able to maintain healthy and efficient digestion, gas production and green energy production. DCWW aim to monitor daily but have the target of a 90-95% completion rate, which allows for operational issues when sampling or data is not submitted.

Sample parameters are in the table below. These tables are not exhaustive but indicate the samples undertaken at the STCs. The daily or monthly monitoring is listed in the Table 6.9 below.

Table 6.9: Daily or monthly monitoring

	DIGESTER FEED
Digester Feed Thickness	Digester Feed Thickness Dry Solids (%)
Feed Volume	Actual Feed Volume (m³/day) Previous 24 hours
Feed Rate	Solids Feed Rate (tDS/day)
.	**INDIVIUDAL DIGESTERS**
Analysis of Digester 1 Sludge	Dry Solids (%),
Digester 1 Temperature	Temperature (°C)
Digester 1 Feed Volume	Actual Feed Volume (m³/day)
Digester 1 Feed Actual Feed Rate	Solids Feed Rate (tDS/day)
Digester 1 Feed Actual Feed Rate	Digester retention time
	DEWATERING
Cake Silo Level	Silo Fill Volume (%)
Centrifuge 1 Cake Dry Solids	Centrifuge 1 Cake Dry solids (%)
Centrifuge 2 Cake Dry Solids	Centrifuge 2 Cake Dry solids (%)
Average Cake Dry Solids	Avrg. dry solids (%)
	BIOGAS
Biogas Quality	Methane content (%)
Biogas Quality	Oxygen content (%)
Biogas Quality	Hydrogen Sulphide (ppm)
Biogas Flared Volume	Actual to Waste Gas Burner (m³/day) Previous 24 hours
	POLY STOCK
Powder Poly Silo Centrifuge	Powder Poly Silo (%)
Powder Poly Silo Drum & Belt	Powder Poly Silo (%)
	CHP
CHP Gross Meter Read	CHP Gross Meter Read (m^3/hr)

DCWW are committed to undertaking the sampling and analysis in line with BAT requirements predominantly relating to BAT 3, BAT 6, BAT 7 and BAT 20, where appropriate and reasonable. DCWW is committed to undertaking a full characterisation of the sludge received at the Eign site and will amend any pre-acceptance procedures to take this into account.

For any sampling and analysis undertaken as part of permit compliance DCWW is committed to ensure that those undertaking the sampling and analysis will be by accredited to MCERTs, or equivalent standards.

6.8.3 Assessment of sampling locations

DCWW will bring in sub-contractors accredited to MCERTS to monitor the emissions points in accordance with the permit requirements. An assessment of sampling locations is, therefore, not appropriate as this will be the responsibility of the sub-contractors.

6.8.4 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.

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

All condensate discharges back to the head of the works of the adjacent Eign WwTW. 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 sewer. Other transfers off-site of emissions arising from the STC are discussed in section 6.3.3.

6.8.6 Emissions to land

There are no direct releases to land of emissions arising from the STC. As required by the DCWW 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 DCWW 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 will be reported to the regulator as required by the EPR permit.

6.9 Question 5: 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

DCWW 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;
- Ventilation and odour control/abatement systems

Biogas is used to provide energy, produced by burning in a CHP engine, for the Site's processes. Diesel is used for the heating buildings or running the standby generator, where required.

6.11 Question 6a: Basic measures of improving energy efficiency

Biogas is a renewable gas, produced from organic waste and is reused on Site to power its energy requirements. A key objective of the DCWW EMS is to reduce energy consumption from the grid. Procedure EMP003 specifically contains objectives for the Reduction of Energy Consumption Programme; this includes the commitment to produce monthly usage energy reports that are to be sent to Senior and Operational management and obtaining detailed electricity usage information via metering of specific areas of plant.

DCWW recognise that target setting for, and measurement of, energy and carbon reduction is pivotal to reducing energy use and carbon emissions in new and existing installations.

DCWW is dealing with the measurement and reporting of operational carbon emissions in existing installations through:

- Monitoring of energy use from electricity meters
- Quarterly estimation and reporting of operational carbon emissions for internal reporting purposes
- Annual estimation and reporting of operational carbon emissions for regulatory reporting (Ofwat and CRC)
- Energy efficiency measures implemented at the Site include (but not limited to) the following:
- The combustion temperature is maintained relatively constant for reduced Nox emissions and increased efficiency.
- The 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; and
- 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
- CHP

There are limited opportunities for energy efficiency requirements as the buildings are not heated. Energy efficient lighting will be used throughout such buildings.

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 DCWW Environmental Policy and EMS.

In addition, DCWW 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.

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

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

6.13 Question 6c: Climate change levy agreement

DCWW is not a participant to the Climate Change Levy (CCL) agreement.

6.14 Question 6c: Specific measures for improving energy efficiency

When equipment is replaced, energy efficient plant will be utilised in replacement. No other specific measures.

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

The raw materials required to operate the installation are identified in section 6.7. This list will be maintained and updated throughout the lifetime of the permit and updated within the Site Operating Manual.

All materials will be handled and stored in such a way are to ensure containment. Fugitive emissions to the environment are therefore negligible.

Biogas is the primary raw material. Its consumption will be monitored. The use of biogas as the fuel source offers the best environmental option and there is therefore no environmental incentive to reduce biogas consumption and consider an alternative source of fuel.

Biogas is stored within 1 No. gas holder, which is resistant to UV and microbial degradation. The base of the holder is constructed from reinforced concrete treated to withstand the potentially acidic conditions within the holder. The gas holder is completely enclosed so the gas is not in contact with the concrete.

Secondary raw materials include chemicals used in processes such as water treatment, polymer and diesel for the boilers. Their consumption will be monitored, based on purchase records. Natural gas is not stored on Site, but taken direct from the mains supply.

Water treatment chemicals are stored within on impermeable surfaces in a contained area. Polymer is stored in sealed IBC/bags located on bunded areas.

The DCWW purchasing procedures are included in EMS. The procedures ensure purchased items conform to specified requirements, including quality parameters, and review suitability for use, including efficiency and minimisation of use of raw materials.

All substances are assessed for COSHH (Control of Substances Hazardous to Health) compliance, where relevant. Material safety data sheets for all materials used and kept on Site will be maintained on the Site.

All raw materials are handled and stored within the confines of the buildings on Site, or in IBCs in bunded areas, with the exception of biogas which is contained within the gas handling system.

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

Potable water usage on Site include:

- Poly make up - concerns over the impact of using final effluent for this purpose
- Eye baths and safety showers - potable water essential
- Office messing facilities - kitchen, washing and welfare facilities etc

To ensure appropriate use of raw materials to prevent releases of substances to the environment and limit environmental impact DCWW will follow quality assurance procedures for the purchasing of materials. The raw materials will be selected from specialist suppliers

determined by their to pre-established material specifications; these are to include environmental considerations. Priority choice of purchased raw material will be given to those with the least environmentally harmful chemicals compared to their alternatives, wherever practicable.

Resource efficiency will be achieved through the minimum use of raw materials and water (where possible), and DCWW will undertake the following:

- Maintain records of raw materials and water used;
- Routine resource efficiency audits;
- Review the feasibility of alternative materials that could reduce environmental impact or provide further opportunities to improve resources efficiency at least once every four years; and;
- Implement further appropriate measures identified from a review.

6.16 Question 6e: Reducing production of waste

DCWW manages its waste in accordance with the Council Directive 2008/98/EC on waste (the Waste Framework Directive), legal requirements and its EMS, by maximising materials re-use, prevent waste, minimise waste generation and maximise recycling and recovery of waste generated from the operation of the Site. There will be a Waste Management Plan that includes details of the types of waste produced at site, how wastes are segregated, stored and removed from site. Only minimal volumes of waste shall be generated at the STC, with waste streams segregated and recovered for recycling where possible. All waste streams shall be managed in accordance with existing EMSs, with any final off-site disposal to be carried out by licensed waste contractors in accordance with Duty of Care requirements, and the application of the waste hierarchy is central to any decision-making process.

Implementation of EMS procedures and the current Environmental Policy ensures optimum disposal of the wastes produced. Submission of a detailed assessment is not considered necessary due to the minimal quantity of waste produced.

Further consultation with waste contractors will ensure that all waste streams have been considered. The sampling and characterisation of wastes will be covered under the requirements of Duty of Care. The wastes are handled to a minimum and are stored in suitably designed containers prior to being removed from Site, to minimise releases of pollutants to the environment.

The main wastes produced by the installation are waste oils and filters associated with the operation and maintenance of the engines. Other wastes include from Site office (paper, packaging etc), waste collected from general housekeeping across the Site (debris, litter), scrap metals and waste electronic and electrical equipment (WEEE, such as computer equipment, printers etc).

Waste generation from the operation of the plant is minimal and limited only to essential maintenance fluids and materials. Waste streams are segregated and recovered for recycling where possible. General waste is sent for recycling, where possible, scrap metal is sent to metal merchants for recycling and WEEE sent to specialist WEEE recycling facilities. DCWW apply a Duty of Care by ensuring waste is removed by a suitable licenced waster carrier.

The sampling and characterisation of wastes and the final off-Site transport of waste is carried out by licensed waste contractors in accordance with Duty of Care requirements. The implementation of EMS procedures and the current Environmental Policy ensures optimum disposal of the wastes produced.

6.17 Question 7 and Question 8: Combustion plant

The two existing CHP units and boilers on-site were understood to be installed before 2018 and are fuelled by biogas. The CHPs (thermal rated input of 1.725MW each) and boilers (thermal rated input of 570kW and 400kW) currently operate under EPR/ UP3735GH. Therefore, the Site does not need to be permitted under the scope of the Medium Combustion Plant Directive (MCPD) until 1 January 2029 because each medium combustion plant is less than 5MWth.

7 Part C6 – Variation to a bespoke water discharge activity

Eign STC discharges effluent from centrate returns, cake storage and sludge thickening process into the adjacent Eight WwTW. A composition analysis has not yet been conducted and therefore the parameters of the water discharged it currently unknown. Final effluent monitoring undertaken is in line with permit conditions.

Monitoring will be carried out in line with Environment Agency approved monitoring certification scheme (MCERTS). This includes conducting samples which test for:

- biochemical oxygen demand (BOD-ATU)
- chemical oxygen demand (COD)
- total phosphorus (P)
- total nitrogen (N)

The analysis will be done by a laboratory with appropriate MCERTS accreditation for the performance standard for organisations undertaking sampling and chemical testing of water.

Further responses to the questions in the Part C6 form can be found in document reference B16564-0AG964-ZZ-XX-DM-ZA-DH0024_App_Form_C6_EIG.

8 Part F1 – Charges and declarations

8.1 Question 1: Working out charges

Table 1 of the F1 form has been completed.

8.2 Question 3: Payment

Payment will be made by BACS.

8.3 Question 4: Confidentiality and National security

DCWW do not wish to claim confidentiality with this application.

8.4 Question 6: Application checklist

Table 8.1 provides a list of documents included in the application. Table 8.1 below has been used to only provide the references to standalone documents. References to all other questions are found in the MSD which makes reference to the question. Specific sections to the MSD are identified in the relevant forms.

Table 8.1: Standalone document references

Question reference	Document title	Document reference
Part A – Q5a	Details of Directors	B16564-0AG964-ZZ-XX-DM-ZA-DH0018_MSD_Directors_EIG
Part C2 – Q2b, 3d, Part C3 – Q1a, 1b, 2, 3a, 3b, 3c, 4, 6, Part F1 – Q6	Main Supporting Document	B16564-0AG964-ZZ-XX-DM-ZA-DH0019_MSD_ EIG
Part C2 – Q3a	List of Relevant Offences	B16564-0AG964-ZZ-XX-DM-ZA-DH0023_MSD_RelevantOffences_ EIG
Part C2 – Q3b	Technical Competency/CMS agreement	B16564-0AG964-ZZ-XX-DM-ZA-DH0017_MSD_CMS_ EIG
Part C2 – Q5a,	Site Location Pan	B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG
	Site Layout Plan	B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG
	Drainage Plan	B16564-0AG964-ZZ-XX-DR-ZA-DH0010_LayoutEmissionDrainagePlan_EIG
Part C2 – Q5b, Q5c	Site Condition Report	B16564-0AG964-ZZ-XX-DM-ZA-DH0031_SCR_ EIG
Part C2 – Q6	Environmental Risk Assessment	B16564-0AG964-ZZ-XX-DM-ZA-DH0032_ERA_ EIG
	Environmental Constraints Maps	B16564-0AG964-ZZ-XX-PL-ZA-DH0013_ERA_ContraintMaps_ EIG
Part C2 – 3d	Environmental management System certificate	B16564-0AG964-ZZ-XX-DM-ZA-DH0020_MSD_ISO14001_ EIG
	Accident Management Plan	B16564-0AG964-ZZ-XX-DM-ZA-DH0011_AMP_ EIG
Part C3 – Q3	BAT assessment	B16564-0AG964-ZZ-XX-DM-ZA-DH0012_ERA_BAT_ EIG
Part C3 – Q3a	Process Flow Diagram	B16564-0AG964-ZZ-XX-DR-ZA-DH0022_MSD_ProcessFlow_ EIG
Part C6 – Q1b, Q7e, Q8e	Part C6 Application Form	B16564-0AG964-ZZ-XX-FT-ZA-DH0028 _App_PartC6_EIG

Part F1	Authorisation	B16564-0AG964-ZZ-XX-CN-ZA-DH0016_MSD_AuthorisationLetter_ EIG

A.Waste Codes

EWC Code	Description
16	**Other wastes from industrial processes**
16 10	Aqueous liquid wastes defined for off-site treatment
16 10 02[4]	Aqueous liquid wastes other than those mentioned in 16 10 01, including cesspit and sewage sludge
19	**Wastes from waste management facilities, off-site wastewater treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 02	Description wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)
19 02 06	Sludges from physico-chemical treatment other than those mentioned in 19 02 05 (sewage sludge only)
19 05	Description non-composted fraction of municipal and similar wastes
19 05 03	Off-specification compost (sewage sludge only), Sewage sludge composted with biodegradable non-wastes only
19 06	Description digestate from anaerobic treatment of animal and vegetable waste
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste (sewage sludge only).
19 08	Wastes from wastewater treatment plants not otherwise specified
19 08 05	Sludges from treatment of urban wastewater
19 08 99[5]	Wastes not otherwise specified (biological waste from Integrated Constructed Wetlands only)
19 09	Wastes from the preparation of water intended for human consumption or water for industrial use
19 09 02	Sludges from water clarification
19 09 03	Sludges from decarbonation
19 09 06	Solutions and sludges from regeneration of ion exchangers
19 12	Wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 12	Wastes from mechanical treatment of wastes other than those mentioned in 19 12 11 (sewage sludge only)

[4] *wastes accepted under 16 10 02:

· sludge from production of edible fats and oils, seasoning residues, molasses residues, residues from production of potato, corn or rice starch only, not containing substances at levels that will inhibit biological treatment

· waste effluents from the baking and confectionery industry, sludges from cleaning, flushing of equipment. Aqueous process waters and washwaters not containing substances at levels that will inhibit biological treatment

· aqueous process waters and washwaters from the leather, fur and textile industries; not containing substances at levels that will inhibit biological treatment

· wastes effluents/liquors from the MFSU of fertilisers including lagoon leachate, effluent and run -off; not containing substances at levels that will inhibit biological treatment

· waste biodegradable liquors/effluents from MFSU of basic organic chemicals. Aqueous process waters and washwaters not containing substances at levels that will inhibit biological treatment

· biodegradable effluent/liquors from the MFSU of pharmaceuticals. Aqueous process waters and, washwaters not containing substances at levels that will inhibit biological treatment

· biodegradable effluent/liquors from the MFSU of detergents, disinfectants and cosmetics. Aqueous process waters and washwaters not containing substances at levels that will inhibit biological treatment

· waste effluents, liquors, sludges from the MFSU of fine chemicals and chemical products not otherwise specified. Aqueous process waters and washwaters not containing substances at levels that will inhibit biological treatment

· waste effluents, liquors arising from the washing, rising of material from the steel and iron industry. Aqueous process waters and washwaters not containing substances at levels that will inhibit biological treatment

· waste waters/effluents from the cleaning and pressure testing of storage tanks and barrels. Washwaters not containing substances at levels that will inhibit biological treatment

· liquor/leachate from an aerobic composting process that accepts municipal, animal and vegetable wastes

· run-off liquors, leachates that arise from the aerobic treatment of municipal, vegetable waste types.

· liquor/leachates from an anaerobic composting process that accepts municipal, animal and vegetable wastes

· centrate liquor from waste water treatment only. Aqueous process waters and washwaters not containing substances at levels that will inhibit biological treatment

· chemical toilet waste

[5] EWC 19 08 99 DCWW may wish to anaerobically digest, sludge from their own integrated constructed wetlands - the 'gardened' plant matter; the sludge from the lagoons and mycelium filters. All 'wastes from wastewater treatment plants' but clearly 'wastes not otherwise specified'.

EWC Code	Description
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 03	Other municipal wastes
20 03 04	Septic tank sludge
20 03 06	Waste from sewage cleaning

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