AVONMOUTH BC (13013) IED PERMIT APPLICATION

RELEVANT PERMITS

EPR/UP3797EA (CONSOLIDATION)

EPR/PP3734LK (VARIATION)

TO MULTI OPERATOR STU (PP3734LK)

PERMIT VARIATION

JANUARY 2025

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Introduction

The initial application for Avonmouth BC (Bioresources Centre) was made in September 2022. In addition, part of the EPR/PP3734LK permit was subject to a Regulation 61 notice and the response to this was also submitted in September 2022.

We submitted more information in December 2023, further to Schedule 5 and RFI requests at other Wessex Water sites. The additional information requested was used to inform the gap submission in support of the original Avonmouth application. We now make a third application to allow for the inclusion of a separate waste operation, namely the food soup activity at the Bristol Food Waste Recycling Facility at Avonmouth BC. This application brings together all of the information required for the EA to assess and determine the permit application for:

- IED for the sludge AD,
- Reg 61 notice for the Food Waste AD
- Food Soup waste operation
- Consolidation of the sludge import activity under the UP3797EA permit

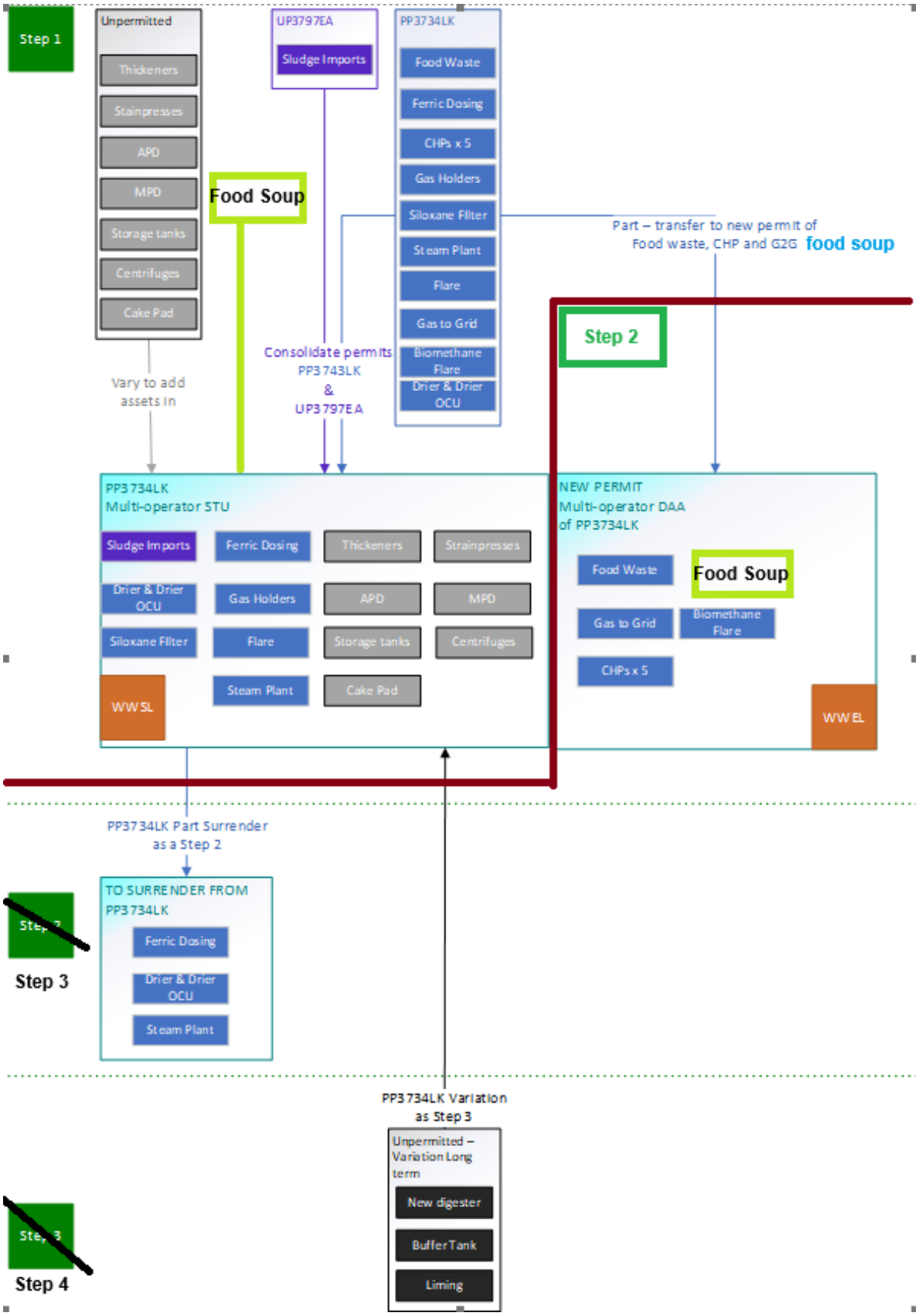
The permitting snapshot has changed since the original submission from September 2022 and gap submission of 2023. Further to enhanced pre app advice from the EA in November 2024, the activities will now be bought together under one operator in Step 1 as per the permitting snapshot from Tommy Wager below. Following successful permit determination, a second permit variation (step 2) will be submitted to separate the activities out into multi operator permits reflecting how they are operated and managed on site.

In order to follow this process and move to a permit under one operator as per Step 1, we have revised the relevant documents and forms submitted previously in 2022 and 2023.

This document is to be read in conjunction with the original application paperwork (2022), Reg 61 response (2022) and the gap submission documents and forms (2023). Any replacement diagrams, reports and forms included with this submission are to be taken as the latest reference document and the original versions disregarded.

Throughout this document, Sludge AD information is captured in black text, as per the response from 2023, and new information / food waste info has been added in blue text.

Permit & Activities Document Provided By Tommy Wager during Enhanced Pre App (November 2024)



Attachments List

Below are attachments sent in January 2025. For these files please disregard all previous versions sent in 2023/2022. If a document is not attached here, please refer to the most recent copy either from 2023, or 2022 which will be relevant and the most up to date.

Attachment no.	**Name / Area**	**File Name**
1	Installation Boundary Plan	Avonmouth BC Plans Pack
2	Asset Plan	Avonmouth BC Plans Pack
3	Emissions, Sampling and Transfer Plan	Avonmouth BC Plans Pack
4	Sludge Digestion Process Flow Diagram	Avonmouth BC Sludge Digestion PFD January 25
5	Biogas and Food Waste Process Flow Diagram	Biogas and FW PFD – Jan 25
6	Process Description	Avonmouth BC Process Description – Jan 25
7	The Digestion Process Monitoring Description (Food Waste)	The Digestion Process Monitoring Description (WWEL-596138940-5707)
8	Food Waste Pre Acceptance	GENWMG144 Pre-Acceptance and Waste Acceptance Criteria (PACWAC) Volume, Quality & Quantity.
9	Food Waste Acceptance	GENWMP152 Acceptance procedure – Food Waste Reception Hall and GENWMP158 Acceptance Procedure – BFWRF Liquid Tank.
10	Food Waste Rejection	GENWMP50 BFWRF Rejection Procedure
11	Sludge Digestion Odour Management Plan	Avonmouth BC Odour Management Plan Version 3 (TRTWP157)
12	RES Odour Management Plan	Avonmouth Renewable Energy Odour Management Plan Version 3 January 2025 (IMS029)
13	BAT Gap Analysis Food Waste (Reg 61)	Waste Treatment BAT Gap Analysis – Food Waste
14	Environmental Risk Assessment - Food Waste	Environmental Risk Assessment – Food Waste Soup
15	Part A – to be read in conjunction with original Part A from Sept 2022	Form Part A January 2025
16	Part C2 – to be read in conjunction with original Part C2 from Sept 2022	Form Part C2 January 2025
17	Part B4 - **new**	Form Part B4 – January 2025
18	Part F1 - to be read in conjunction with original Part F1 from Sept 2022	Form Part F1 January 2025
19	Polymer Zetag 8180	Safety Data Sheet Zetag 8180 Solenis
20	Polymer Zetag 9248 FS	Safety Data Sheet Zetag 9248
21	Antiprex Antifoam	Safety Data Sheet Antiprex BASF
22	FLOGAS Liquid Propane Gas	Safety Data Sheet Flogas Propane
23	Brenntag 15% Sodium Hypchlorite	Safety Data Sheet Brenntag SODIUM HYPOCHLORITE
	Sensitive Information – Appendix A	
Appendix A	Directors Details	Directors Details January 2025
Appendix A	Environmental Permit Authority Declarations (x2)	Environmental Permit Authority Declaration 1 & 2

Appendix A	LRQA Certificate of Approval - CMS	Certificate of Approval CMS
Appendix A	Payment References	Avonmouth payment references January 2025
Appendix A	Prosecutions against WWSL	Updated Prosecutions against WW

The list below are attachments sent in December 2023 – those **crossed out** please disregard (either no longer relevant or a more recent version is available)

Attachment no.	**Name / Area**	**File Name**
1	Permit technical questions July 2022	Avonmouth IED installation application - draft technical questions July 2022
~~2~~	~~Boundary Plan~~	~~Avonmouth BC Plans Pack~~
~~2~~	~~Asset Plan~~	~~Avonmouth BC Plans Pack~~
~~3~~	~~Avonmouth BC Process Flow Diagram WWSL~~	~~WWSL Process Flow Diagram December 2023~~
~~4~~	~~Avonmouth BC Process Flow Diagram WWEL~~	~~WWEL Process Flow Diagram December 2023~~
~~2~~	~~Emissions Plan~~	~~Avonmouth BC Plans Pack~~
~~2~~	~~Sampling Plan~~	~~Avonmouth BC Plans Pack~~
5	C6 form – vary a bespoke water discharge activity	Avonmouth BC C6 form.pdf
6	C6 form – additional responses	Avonmouth BC C6 Form – additional responses
~~7~~	~~Avonmouth Process Description~~	~~Avonmouth Process Description December 2023 V2~~
8	AERA report	Avonmouth Air Emissions Risk Assessment_v4
9	Air Emission modelling	
10	LDAR plan	TRTWP551 Avonmouth BC Fugitive emissions Leak Detection (LDAR plan) v 1 August 2023
11	Bioaerosol Monitoring Report	Avonmouth Bioaerosol Monitoring Report April 2023
12	Bioaerosol Site Specific Risk Assessment	SSBRA Avonmouth July 2023
13	Process Monitoring	Avonmouth BC Digestion Process Monitoring Description
14	Waste Pre-Acceptance, Acceptance and Rejection Procedure	TRTWP549 Waste Pre-Acceptance, Acceptance and Rejection Procedure
15	WRC pre-acceptance record form	BIOF037 WRC pre-acceptance record form
16	Residues Management Plan Avonmouth	Residues Plan – Avonmouth Bioresource Centre (TRTWP540)
17	Best Tanker Practice for Avonmouth (TRTWG744)	Best Tanker Practice for Avonmouth (TRTWG744)
18	Avoiding driving off whilst connected (TBT058)	Avoiding driving off whilst connected (TBT058)
19	Containment report	Avonmouth BC CIRIA 736 IED Report-Secondary Containment Assessment-Issue 2
~~20~~	~~Odour Management Plan~~	~~TRTWP157 Avonmouth BC OMP version 1.docx~~
21	Polymer Zetag 8160	ZETAG 8160 SSK 700KG SDS
22	Polymer Solenis 8187	Solenis 8187 flocculant
23	Antifoam Burst 5400	Antifoam Burst PF 13 T MSDS
24	CHP Oil	Premium Engine Oil 15W -40 MSDS
25	Antifoam Momentive	WWEL Momentive SAG 7133 Antifoam 10-9-2018
26	WWEL Carbon OCU MSDS A	WWEL Carbon MSDS SA70 06_20191

27	WWEL Carbon OCU MSDS B	WWEL CPL Filtracarb Rev7 Feb 20191
28	WWEL Antifreeze MSDS	WWEL Antifreeze Brenntag DOWCAL 100 16-6-2015
29	WWEL Odorant NB Robinson SDS	WWEL Odorant NB Robinson SDS
30	20% Sodium Hydroxide	20% sodium hydroxide MSDS
~~31~~	~~Transfer of indirect discharges to water risk assessment.~~	~~Transfer of indirect discharges to water risk assessment Avonmouth BC 11800~~
~~32~~	~~WWSL – WWEL Demarcation G2G plan A~~	~~Avonmouth BC WWSL – WWEL – Demarcation G2G plan A.pdf~~
~~33~~	~~WWSL – WWEL Demarcation G2G plan B~~	~~Avonmouth BC WWSL – WWEL – Demarcation G2G plan B.pdf~~
~~34~~	~~WWSL – WWEL CHP Demarcation~~	~~Avonmouth BC WWSL – WWEL CHP Demarcation~~

Non-Technical Description

This permit variation includes the addition of a new Waste Operation, which is the Transfer of Pre-Treated Waste (Food Soup) offsite. This section outlines the new waste operation for inclusion in the revised permit.

The reason that we are looking to add this activity is due to the ongoing refurbishment (decommission and recommission) of the 2 no. Anaerobic Digesters located within the food waste plant. Production of food soup does not require any new assets as it utilises existing assets.

The activity consists of the export of pre-treated food waste soup for off-site anaerobic digestion under EWC code 19 12 12.

This is to enable the food waste plant to continue recycling food waste from across Bristol Unitary Authority whilst Anaerobic Digestion (AD) cannot occur. This would enable Wessex Water to continue operating and provides a contingency option for when AD assets are offline for any reason.

Overview of Site Activities

Under the current permit conditions, the Bristol Food Waste Recycling Facility (BFWRF) recycles source segregated food waste (ABP Category 3) through anaerobic digestion. The activities taking place at the BFWRF can be summarised as follows:

1. Food Waste reception
2. Pre-treatment of food waste including de-packaging, blending and screening – **soup export (a)**
3. Pasteurisation – **soup export (b)**
4. Anaerobic Digestion
5. Digestate dewatering
6. Storage and maturation of digestate prior to transfer off site for land spreading

The new proposed activity would follow the same process as the current permitted food waste process however the export of soup would occur prior to the Anaerobic Digestion stage. There are two points where the soup could be exported, prior to pasteurisation, after Number 2 in the above steps, and post pasteurisation, after number 3 in the above steps. This is different to the usual food waste process due to the removal of the pre-treated food soup mid-way from the process, and prior to anaerobic digestion.

No new assets are proposed for this activity, however, pipework from the Hydrolysis Buffer Tank (HBT) to the Food Waste Reception Hall will be installed to abate any odour emissions from the tanker loading points. Any odours contained within the Hall are extracted and treated through an Odour Control Unit.

In addition, this new waste operation does not have any impact on the quantity of food waste imported to the site, as the process utilises the same waste and assets. Therefore the throughput of food waste remains as per the existing permit limit of 70,000 tonnes per year.

Please see the revised Process Description for more detail.

It is likely the following text or similar will be added to the permit to allow for this waste operation activity (Jim Wilkinson provided this via email on 12th July 2024 as an idea of what the permit would look like):

Description of activities for waste operations

AR11 Transfer of pre-treated waste off-site

R3: Recycling/reclamation of organic substances which are not used as solvents

R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)

Limits of activities

From the receipt of waste, transfer to tankers and despatch off site. Pre-treatment of waste in enclosed building and on impermeable surface with sealed drainage system including shredding, sorting, screening, compaction, mixing and maceration. Storage of waste in an enclosed building fitted with appropriate odour abatement and on an impermeable surface with sealed drainage.

Sludge AD revisions

This submission is laid out in key areas following sectioning in Poole's schedule 5 notices. References to attachments are made within each area along with an item number and are listed in the attachment list tables below.

The sludge treatment installation boundary has changed to accommodate the proposed containment area and there is a small change to incorporate the SAS balancing tank. Site change details are included in the Process Description section below.

As part of this response document, we've included an updated process description, revised diagrams for boundary, the emissions & sampling plans. There is also a revised Leak Detection and Repair plan, Odour Management Plans (OMP) and secondary containment report. The OMP for the Bioresources Centre (BC) covering the sludge assets and some gas assets has been changed for this submission as has the RES OMP. We have used the structure and content from the second Poole schedule 5 notice (April 2023) to inform the revisions.

The bioaerosols monitoring report and Site Specific Bioaerosols Risk Assessment (SSBRA) are also included. Finally, a form C6 is attached as requested in the early part of 2022 for Tranche 2 sites and onwards. We have completed as much as possible and is to be read in conjunction with our commitment to complete the BAT 3 inventory analysis and risk assessments.

The air emission attachments have been updated in line with the most recent RFI received for Poole on 17 August 2023. The Air Emissions Risk Assessment (AERA) has been updated with the additional pollutants Carbon Monoxide (CO), Particulates (PM10) and Total Volatile Organic Compounds (TVOCs). This replaces the original AERA submission made in September 2022.

Please note: there is no co-digestion conducted at Avonmouth BC. The sewage sludge and food waste are digested separately; with the only linkage being the biogas produced is mixed and utilised by the gas to grid plant or the CHPs.

Wessex Commitment Statements

Schedule 5 no.2 Q3 and 5
Regarding assets with the potential to produce biogas, biomethane and diffuse emissions, and in line with BAT 14d, provide the following information regarding the ALL open topped, floating roofed and stated enclosed assets
A written confirmation that you will fully enclose open tanks
A written description that demonstrates the tank enclosure/cover will be designed and installed in line with guidance, Biological waste treatment: appropriate measures for permitted facilities.
A written description outlining how combustible biogas produced from the primary and secondary digesters shall be utilised as a fuel or stored for utilisation off site and that there shall be no uncontrolled emissions of biogas to the environment from this asset (excluding the venting of biogas in an emergency as specified using pressure release valves) with a view to obtaining a written agreement from the Environment Agency.
Wessex Water commit to fully enclosing all secondary digesters at Avonmouth BC. All capital schemes will be designed and in line with BATc 14d and Section 7 of the Biological waste treatment: appropriate measures for permitted facilities.
Non-BAT Summary There are assets at Avonmouth BC which are not BAT compliant, the section below lists these and provides a description of the proposed solution; for these assets the improvement dates are to be finalised. Our strategy for remedial works, including the larger and more complicated items such as tank covering and secondary containment are closely tied in with process safety, resilience, landbank pressure and net zero. This will involve shutting down sites in a planned and ordered way to complete the work in an appropriate and safe manner. This strategy was detailed in our Chief Executive response (23/06/2023) to your IED compliance letter and we also outlined this approach in a recent meeting with the Wessex Area Director and local EA on 08/08/2023 in Bridgwater. Siloxane removal The Siloxane removal plant PP Tek unit with a channelled emission was switched off in 2017. The siloxane removal plant will be replaced with CC Jensen carbon unit as part of the longer term strategy and in the interim we take monthly biogas samples at six different locations from raw biogas to exported biomethane. Screening/Strainpress Skips Strainpress skips have a low odour risk, the skips are removed from site promptly and are not stored full anywhere else on site. We are looking to retro fit a curtain arrangement around the strainpress to reduce diffuse emissions as required by BAT 14.

Food Waste:

Liquid Tank
This asset is not currently in use, however it is going to be decommissioned. A capital project has been raised and that will include a decommissioning plan.

Post Digestion Storage Tank
This tank is not currently covered and extracted. A capital project will rectify this.

Odour Control Unit
The Food Waste Odour Control Unit is going to be upgraded to meet the requirements of BAT and Appropriate Measures.

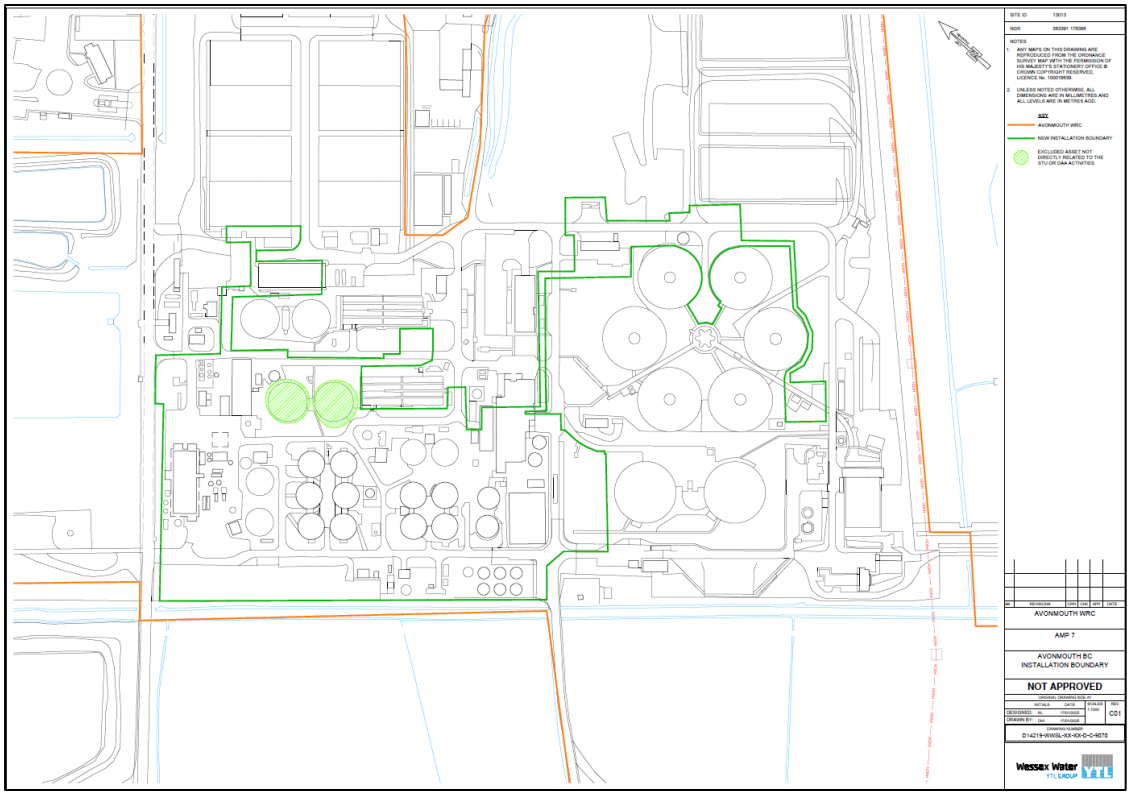
Schedule 5 no.2 Qu 3
Provide a written confirmation that you will undertake (using a UKAS accredited laboratory) a chemical analysis of the waste water which tests for ALL pollutants which you expect to find in the discharge (not just the limited data set as specified in response to question 13 of the previous schedule 5 notice) and that you will use an appropriate 'minimum reporting value' (MRV) (usually 10% of the environmental quality standards (EQS)). You will be able to gain an understanding of the expected pollutants by examining the likely pollutants in the input wastes, trade effluents and other sludge inputs which are combined for treatment at the installation.
Provide written confirmation that the sampling and chemical analysis will be undertaken in line with guidance Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk) and Monitoring discharges to water: guidance on selecting a monitoring approach - GOV.UK (www.gov.uk).
Provide a written statement with a commitment that those undertaking the sampling and analysis will be accredited to MCERTS or provide evidence of an equivalent standards.
Wessex Water are committed to providing information about the characteristics of the waste water streams being discharged at Avonmouth BC and will do so in line with BAT 3, 6 and 7. In addition, we will undertake sampling and analysis in line with Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk) and Monitoring discharges to water: guidance on selecting a monitoring approach - GOV.UK (www.gov.uk) Wessex Water will achieve this by using UKAS accredited laboratory/laboratories to carry out chemical analysis of waste water streams which will test for the pollutants as outlined in Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk). We will ensure these laboratories will be UKAS accredited laboratories to ISO17025 and use an appropriate 'minimum reporting value' (usually 10% of the environmental quality standard (EQS). The intention is that the analysis will be carried out between our Wessex Water UKAS accredited laboratory and an external UKAS accredited laboratory. We do still have a little uncertainty over whether suitable analytical methodologies are available at the external laboratories. Wessex Water will ensure staff undertaking the sampling and analysis will be accredited to MCERTS or equivalent standards, for which suitable evidence will be provided.

Process flow diagrams and Site Plans

Boundary Plan

A pdf copy of all plans is included in the attachment pack, Avonmouth BC Plans Pack (Item no 1).

Installation Boundary

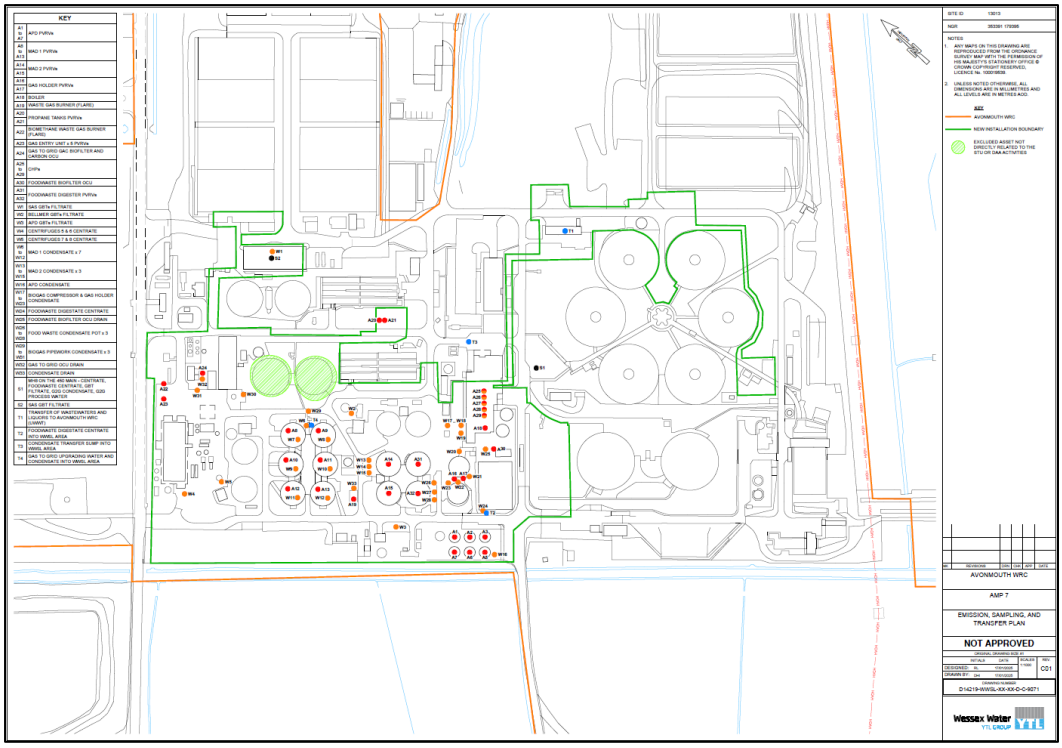


Asset Plan

Asset Plan (Attached item No 2)

Emission, Sampling and Transfer plan

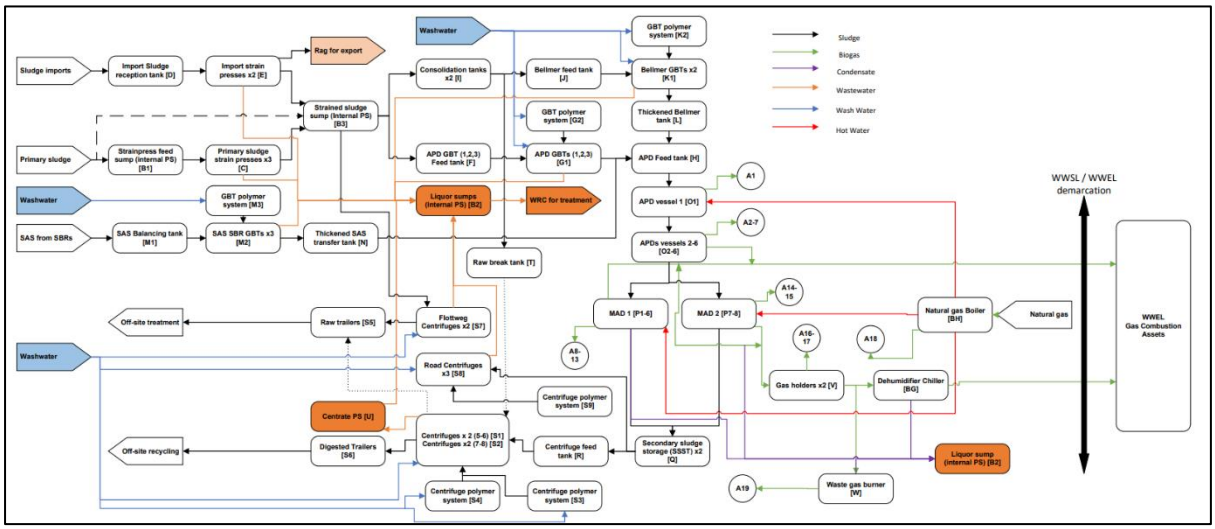
A pdf copy of the Emission, Sampling and Transfer Plan is included in the attachment pack (Item no 3). There are two sampling points as detailed in the question below. The two sampling points are labelled as S1 and S2.



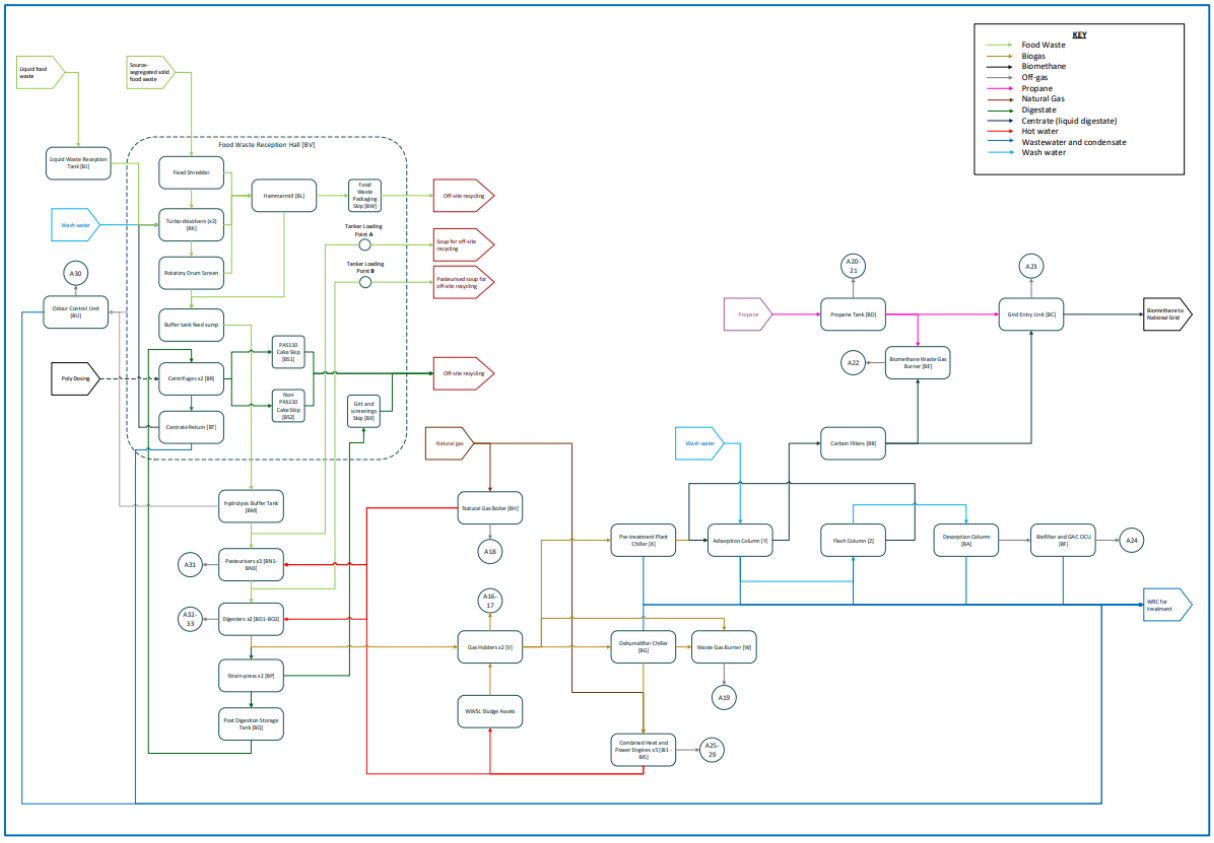
Process Flow Diagrams

A pdf copy of both diagrams is included in the attachment pack, Avonmouth BC Sludge Digestion and Biogas and Food Waste Process Flow Diagrams, item numbers 4 and 5.

Avonmouth BC Sludge Digestion Process Flow Diagram



Avonmouth BC Biogas and Food Waste Process Flow Diagram



Schedule 5 no. 2 Qu3

Submit a revised emissions point plan that shows the location of the sampling points for the identified waste water effluent streams.

See attached Emission, Sampling and Transfer plan = Avonmouth BC Plans Pack (Item no. 3)

Provide the grid references for the chosen sampling points.

The plan referenced above shows the sampling points for the wastewater emissions to water; we have allocated two sampling points.

This is for the combined wastewater streams from the Gravity Belt Thickeners, centrifuge liquors, gas to grid condensate and process water. There is a separate sampling point for the pre-digestion SAS sludge thickening liquors.

Name	***Waste type***	*Flow diagram location*	*Sampling point NGR*
Thickening & Dewatering Liquors, Food Waste Centrate & Condensate	**G**ravity Belt Thickeners liquors (filtrate) (excluding SAS GBT filtrate); sludge centrifuge liquors (centrate), food waste liquors (centrate), Gas to Grid condensate and process water, surface water, CHP condensate	*S1*	ST 5337079343
SAS Thickening liquors	SAS Gravity Belt Thickeners liquors (filtrate)	*S2*	ST 53316 79590

Form C6 completion

Application for an environmental permit Part C6 – Variation to a bespoke water discharge activity or groundwater activity (point source discharge) or point source emission to water from an installation. We have included the form C6, plus an additional responses document (item no.'s 5 and 6).

Process Description

A revised process description has been developed which expands on the one originally submitted in September 2022. We have focused on the dewatering assets, gas to grid and the Food Waste process which wasn't fully covered originally. A PDF copy of the Process Description (Avonmouth Process Description January 2025) is included in the attachment pack (item number 6).

The permit boundary now includes the SAS balance tank [M1], this tank holds surplus activated sludge from the SBR process in the adjacent Water Recycling Centre (WRC).

Two existing assets have been replaced; details are provided below.

Asset Name	Asset Reference	In service Date	Material	Open / closed	Volume (m3)
APD GBTs Feed Tank	F	December 2023	Stainless Steel	Closed	434
APD Feed Tank	H	September 2023	Stainless Steel	Closed	483

All three assets have been incorporated into revised containment report and OMP.

PVRV

These questions have now been answered for both digestion processes. Sludge AD is in black text, as per the response from 2023, and the food waste has been added in blue text.

Schedule 5 no.2 Qu6
Provide a written a statement explaining that pressure vacuum release valves (PVRVs) are installed on all tanks (including the enclosed secondary digesters) and all assets containing volatile materials where there is a risk of over or under pressurisation in line with section 8.11 of the Biological waste treatment: appropriate measures for permitted facilities guidance, BATc 14d and 38 ensuring you address the following aspects:
Schedule5 no.1 Qu20
Provide confirmation that the PVRVs are designed by appropriately qualified engineers and explain how they will be able to cope with the anticipated maximum gas production volumes.
PVRVs are installed, maintained, calibrated by a competent approved specialist contractor. The installation was carried out in accordance with the manufacturer's literature. All new installations will be tested for tightness and function via bench testing and receive an inspection before becoming a live asset. Following installation, a

conformance and function certificate will be provided. PVRVs are inspected annually by a competent person and calibrated to ensure the maximum set pressure remains correct and vacuum protection is maintained.

The gas system has been designed to prevent pressure fluctuations that could cause PVRV to release an emission to air under normal operation.

Provide details of all plant handling volatile materials and confirm whether they have PRVs installed.

Asset Name	***PVRV/ PRV fitted***	***Note***
APD vessels	*Yes*	*6 x Protego, 8 inch.*
MAD 1 stream (Mesophilic Digesters 5 to10)	*Yes*	*6 x Whessoe/Marvac, 6 inch*
MAD 2 stream (sludge mesophilic digesters 2 and 4) & (food digesters 1 and 3))	*Yes*	*4 x Whessoe/Motherwell 6 inch*
MAD 1 mixing compressor	*Yes*	*12 x mixing compressors Enclosed and release to biogas system; these do not release to air.*
MAD 2 mixing compressor	*Yes*	*12 x mixing compressors Enclosed and release to biogas system; these do not release to air.*
APD compressors	*Yes*	*3 x mixing and 1 x lifting Enclosed and release to biogas system; these do not release to air.*
Gas Bag	*Yes*	
Siloxane plant	*n/a*	*Not in use*
Boiler	*Yes*	
CHPs	*No*	
Waste Gas Burner (Flare)	*No*	
Gas to Grid plant	*Yes*	*Various types of devices fitted across the plant. Gas entry unit, Propane tank, Gas upgrading unit*
Biomethane Flare	*No*	

Schedule 5 no. 2 Qu 6 all remaining parts

ii) Explain how PRVs are designed by appropriately qualified engineers and can cope with the anticipated maximum gas production volumes.

Calculations are carried out at the design stage to determine the correct equipment to be used for safe operation; O&M manuals will show specifications.
An approved contractor is used for servicing and maintenance.

iii) Describe how you monitor gas production rates and organic loading to prevent excess pressure in tanks and vessels.

Operation of Avonmouth BC is governed by the mass flow calculation, design operating parameters and programmed setpoints to facilitate plant operation.

All work on site is detailed in the operating procedures schedule through the Work Management System (Dynamics). These procedures contain information to inform appropriate action in the event of a problem with the digestion.

All instrumentation displays instantaneous values, and all parameters are visible on SCADA (Supervisory Control and Data Acquisition), with programmed status alerts for readings outside the accepted range and telemetry alarms, configured appropriately. Data is collated in archive trends to allow increased monitoring and identification of process issues.

The SCADA system can be viewed from the control room, secure permitting room or remotely on site by specific levels of Operational staff.

Below are the activities and triggers that have been identified to reduce the risk.

Gas Production Rates

Gas production at Avonmouth WRC is monitored via the IFIX SCADA system, which shows the complete process from start to finish and assists the shift engineers and technicians to monitor any changes.

Gas production rates are monitored by a series of flow meters and pressure transducers which have alarm setpoints that are coded into various local HMI PLC's which are connected to SCADA, these figures are recorded daily and stored in the control room.

The biogas produced is stored in two gas holders, this gas is then supplied to GTG and 5 CHP generators.

Typical gas flow rates when the digesters are being fed from the APD at a rate of 1800m3 a day will vary depending on sludge thickness and feed rate, digesters 5-10 (MAD 1) and digesters 2 & 4 (MAD 2) are fed in batches to keep within the daily HACCP. Sludge samples are taken daily.

Typical gas flow rates when digesters 1 & 3 (MAD2) are fed with source segregated food waste at a rate of 120 m3 a day each is ~ 20,000 m3/d. Digestate samples are taken twice per week.

Gas produced from MAD1 & MAD2 is transferred via overhead gas lines which has a working pressure of 20 – 25 mbar, this value will increase as the level in the gas holders increases.

Gas management

Biogas pressure is measured at the APD and MAD 2 digesters. Pressure is also cross referenced to biogas production. In addition, the biogas holders have level measurement of gas levels. Gas volumes are measured by flowmeters by the consumers (CHP, G2G and Waste Gas Burner (Flare)).

For the PVRV's to release at the APD the pressure in the gas main will need to reach 32mbarg whereas for MAD 1&2, the PVRV's will release at 36mbar.

As the production of biogas increases above the rate of consumption, the volume in the gas holder will increase to a level such that the pressure in the system will not exceed the 36 mbarg PRV release point. When the gas holders level reaches 85%, the Waste Gas Burner (Flare) will be called to operate. This will decrease the pressure within the system.

Organic Loading

The sludge anaerobic digesters (MAD 1 and MAD2 digesters 2 & 4) each have a flow meter from APD reactor vessel 6. These flow meters are used to measure sludge feed volume, the maximum volume is derived by the mass flow and additionally the site HACCP (Hazard Analysis and Critical Control) plan. Additionally, there is flow measurement to record the volume delivered to APD reactor vessel 1 from the thickened sludge tank. Each flowmeter is calibrated annually.

The food waste digesters (MAD 2 digesters 1 & 3) have a common feed flow meter. This is normally used to detect any discrepancies in the flow. The food waste digesters are also fed in batches, but unlike the sludge digesters, batch volume does not depend on HACCP.

Site operational staff monitor %ds routinely as a key performance indicator (KPI); monitoring asset performance and carrying out onsite sampling to measure %ds.

The maximum feed rate for MAD 1 (anaerobic digesters 5 – 10) is 1400m3/ day, for MAD 2 (digesters 2 and 4) the max feed is 400m3/day, and for MAD 2 (digesters 1 and 3) is 240 m3/day. Additionally, the APD feed is limited to 1801m3 per 24 hour period. The maximum feed setpoint is locked within the control system (permitted +23m3 accounted for) to manage the organic loading and prevent a non-conformance of the site HACCP plan.

Once the 24 hour target feed total has been achieved, the digester will not introduce any further feedstock until the period resets. Weekly samples are submitted to Wessex Water's internal laboratory for analysis; in the event of a parameter exceedance, a daily exception report is generated from Wessex Water's lab sample system which is circulated to both the site scientist and site manager to prompt further investigation.

v) Explain how PVRVs are correctly installed to withstand variance in pressure so that they do not routinely start to vent when gas production fluctuates.

Explained in answer to points ii) and iii)

PVRVs are installed, maintained and calibrated by a competent approved specialist contractor. The installation was carried out in accordance with the manufacturer's literature.

All new installations will be tested for tightness and function and receive an inspection before becoming a live asset. Following installation, a conformance and function certificate will be provided. PVRVs are inspected annually by a competent person and calibrated to ensure the maximum set pressure remains correct and vacuum protection is maintained.

vi) Provide the maximum pressure for each digester above which there will be no further feed introduced.

MAD1 digesters are controlled by an ultrasonic level TD set at 98% and a hydrostatic pressure TD set at 99%, normal operating levels of each digester is 93-95% on ultrasonic TD and 96% on pressure TD, if either level is reached the sludge feed is inhibited for that digester, a high priority alarm will alert the engineer via the SCADA network and pager system. Maximum intended design operating pressure for MAD1 is 27mbarg.

MAD2 digesters (2&4 and 1&3) are also controlled by an ultrasonic level and hydrostatic pressure transducer. Furthermore, they have an additional radar to control foaming.

PVRV's can lift in the event of a sudden asset failure i.e. GTG, CHP's or flare stack causing excess pressure in the common gas main. All digester PVRVs have been calibrated to a lift pressure of 36mbarg whilst the APD PVRVs are calibrated to a lift pressure of 32mbarg. A telemetry alarm would also be generated for the operational team to investigate and take appropriate action to reduce pressures which may include stopping or reducing feeds.

MAD1&2 & APD normal operating pressures 20-25 mbar, low level high priority alarm 18mbar.

vii) Confirm that PVRVs are designed in accordance with BS EN ISO 28300:2008, or other recognised standards.

PVRVs have been designed in accordance with API2521, API2000, 2014/34 EU

viii) Describe how you detect leaks from your PVRVs under normal operating conditions.

Observational checks are conducted regularly assessing if the PVRVs are seated correctly and are not leaking in normal operating conditions.

Medium and high-rate releases in normal operation would be detected by lower than expected flow measurements on the biogas flow meters, where alarms are set up for high and low flow readings.

Additionally, we conduct 6 monthly LDAR surveys with an appropriate contractor to complete an installation review of potential fugitive emission sources.

ix) Explain how you restrict using PVRVs, so they activate in emergency situations only.

As a primary consumer of the biogas, the gas to grid plant will consume up to 2500m^3 per hour of biogas to be treated and injected back into the National Grid.

Alternatively, the combined heat and power engine (CHP) is sized to consume the gas production as per mass flow calculations.

In the event of gas production exceeding the capabilities of the CHP; whether because of increased gas yield or due to asset performance, the flare stack will operate to regulate gas holder level and therefore system pressure, to ensure there is not a release from a PVRV. In the event of gas production exceeding capabilities of the CHP feed rate, the digestion process organic loading would be reduced by operational staff; either by adjusting the digester feed volume or %DS thickness.

Planned maintenance activities that have the potential to cause an environmental impact from the PVRVs are controlled by a process risk assessment (PRA). PRAs are submitted in advance of any planned activity for review and approval by the site scientist and site manager and if needed other departments such as engineering or compliance are consulted. The competent person will assess whether the risk present from the planned activity is of a tolerable level and where required will implement additional controls, including informing the EA of any potential issues as per Schedule 5 notification.

High PVRV pressures could be generated by asset failures. Asset failures generate telemetry alarms with set levels 1 – 7, in the event of a telemetry alarm being triggered this will first go to the on-site control room so that it can be actioned. Telemetry alarm levels response times are determined on a risk-based approach.

x) Describe how you will log and record release events from PVRVs.

When PVRVs operation occurs, there will be associated pressure alarms triggered from gas system. These are recorded in the archive data on the SCADA system. A record is also made on the company health and safety management system as a 'Process Safety incident'. This will then trigger a root cause investigation.

Additionally, we report all gas releases from these PVRVs to the Environment Agency via a Schedule 5 notification.

AERA

In response to Poole RFI received on 17 August 2023; we have revised the air emission work for Avonmouth incorporating the requirement for inclusion of Carbon Monoxide (CO), Particulates (PM10) and Total Volatile Organic Compounds (TVOCs) into the modelling as well as revising the AERA report. We confirm we use low sulphur diesel throughout.

Both the AERA report (item no 8) and the Air Emission modelling (item no 9) are included in the attachment pack.

LDAR

Schedule 5 no.2 Qu7

Taking into consideration the proposal submitted in response to the previous two questions, provide a revised version of your leak detection and repair (LDAR) programme and ensure the following points have been addressed:

We have attached the revised LDAR plan (item number 10) and have answered the questions within the text. For each sub-question below, the relevant section or appendix has been referenced.
i) Include a method for locating unknown fugitive emission sources.
See Section 9 of attached LDAR plan (OPSP538).
ii) Estimates of the type and volume of release from each leak location.
See Section 7 and Appendix 1 Table 2 of attached LDAR plan (OPSP538).
iii) Prioritised locations (from highest risk to lowest risk) based on potential quantity of release, environmental impact and your DSEAR.
See Appendix 1 Table 2 of attached LDAR plan (OPSP538).
iv) Identification of monitoring methods and frequency of monitoring to quantify significant emissions where possible.
See Section 8 of attached LDAR plan (OPSP538).
v) Specify the equipment used for leak detection.
See Section 8 of attached LDAR plan (OPSP538).
vi) Deadline for the implementation of leak detection activities.
Annual surveys are already completed, and the further requirements of the LDAR will be rolled out before permit issue.
vii) A description of the mitigation measures you will implement in the event of diffuse emissions.
See Section 10 of attached LDAR plan (OPSP538).
viii) A map of the site and inventory that identifies locations (point and area sources) for potential emissions.
See Appendix 2 of attached LDAR plan (OPSP538)
ix) Identification of components deemed as high, medium or low risk.
See Appendix 2 of attached LDAR plan (OPSP538).
xi) Inclusion of a written statement obtained from Wessex Water Enterprises Limited (WWEL) confirming that they will operate the CHP engine in line with the LDAR programme or provide an additional standalone LDAR programme for WWEL that addresses the CHP and associated assets they control (the provision of a standalone Schedule 5 Notice for WWEL to provide an LDAR programme can be undertaken on request).

Section 1 of the LDAR plan (OPSP538) details this.

Bioaerosols

Bioaerosol monitoring took place on 24 August 2022 and the monitoring report and subsequent Site Specific Bioaerosol Risk Assessment was completed. These were included in the pack submitted in December 2023 as Item numbers 11 and 12. These versions sent in 2023 remain the most up to date.

Digester Monitoring

Avonmouth BC Digestion Process Monitoring Description was included in the attachment pack (Item no 13) sent in December 2023, describing the monitoring procedure for sludge digestion. The version sent in 2023 remains the most up to date version.

The Digestion Process Monitoring Description for the Food Waste Digestion is described in the document with reference WWEL-596138940-5707. This is included in the attachment pack (item No. 7)

Waste Pre-acceptance and Acceptance and Rejection Procedure

Indigenous and imported sludge is described in TRTWP549 Waste Pre-Acceptance, Acceptance and Rejection Procedure, which was included in the attachment pack sent in December 2023 (Item no 14). This version remains the most up to date.

Food waste pre-acceptance is described in GENWMG144 Pre-Acceptance and Waste Acceptance Criteria (PACWAC) Volume, Quality & Quantity, included in the attachment pack (item 8)

Food waste acceptance is described in GENWMP152 Acceptance procedure – Food Waste Reception Hall and GENWMP158 Acceptance Procedure – BFWRF Liquid Tank, included in the attachment pack (items 9)

Food waste rejection procedure is described in GENWMP50 BFWRF Rejection Procedure, included in the attachment pack, (item 10)

Waste storage, Handling, Throughput and EWC acceptance

This section contains Residues plan, tanker best practice, and the EWC codes accepted by Avonmouth. This section also contains details on waste storage and treatment capacity.

Schedule 5 no.2 Q10 i)
Ensure you include EWCs that are suitable for Sludge AD.
The tables below list the EWC codes that represents wastes imported into the sludge AD facility and the Bristol Food Waste Recycling Facility only now and in the future. These are the only EWC codes Avonmouth BC will accept. We have taken reference from Waste codes for sewage sludge materials: Regulatory Position Statement 231 and biological

waste treatment: appropriate measures for permitted facilities for wastes that are appropriate for anaerobic digestion. The codes listed below, in addition to 19 08 05 and 20 03 04, are restricted in terms of their description to “sewage sludge only”.

Form C3 Question 1 (SI Table 4) – List of Waste Codes

Waste Code	Waste description
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05
19 08 05	sludges from treatment of urban waste water
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 12 12	wastes from mechanical treatment of wastes other than those mentioned in 19 12 11 (sewage sludge only)
20 03 04	Septic tank sludge

Table 2 – List of Waste Codes for Anaerobic Digestion of Food Waste and export of pre-treated Food Waste Soup and Pasteurised Food Waste Soup for off-site recycling

Waste Code	Waste Description
02 01 01	Sludges from washing and cleaning
02 01 02	animal tissue waste – category 3 animal by-products (ABP) including blood, animal flesh, fish processing waste, fish carcasses, poultry waste – Category 2 ABP – paunch contents
02 01 03	plant tissue waste – husks, cereal dust, waste animal feeds
02 01 06	animal faeces, urine and manure (including spoiled straw) only
02 01 07	wastes from forestry
02 01 99	wastes not otherwise specified - residues from commercial mushroom cultivation
02 02 01	sludges from washing and cleaning− process water − food washing waste
02 02 02	animal tissue waste − Category 3 ABP including blood, animal flesh, fish processing waste, fish carcasses, poultry waste
02 02 03	materials unsuitable for consumption or processing − coffee, food processing waste, jam, kitchen waste, fruit, vegetable oil, tobacco, tea, vegetable waste − waste fat from processing of meat or fish
02 02 04	sludges from on-site effluent treatment
02 02 99	wastes not otherwise specified − sludges from gelatine production, animal gut contents
02 03 01	sludges from washing, cleaning, peeling, centrifuging and separation− coffee, mushroom compost, food processing waste, food washing waste, tobacco
02 03 02	wastes from preserving agents – only organic material that is biodegradable
02 03 04	biodegradable materials unsuitable for consumption or processing (other than those containing dangerous substances)
02 03 05	effluent from the processes referred to in sources of waste

02 03 99	wastes not otherwise specified - sludge from production of edible fats and oils to include seasoning residues, molasses residues, residues from production of potato, corn or rice starch
02 04 03	sludges from on-site effluent treatment – biological sludge
02 04 99	wastes not otherwise specified - other biodegradable wastes
02 05 01	biodegradable materials unsuitable for consumption or processing (other than those containing dangerous substances) – solid and liquid dairy products, milk, food processing wastes, yoghurt, whey
02 05 02	sludges from on-site effluent treatment
02 05 99	wastes not otherwise specified – other organic wastes that are biodegradable
02 06 01	biodegradable materials unsuitable for consumption or processing (other than those containing dangerous substances) – food condemned, food processing wastes, biscuits, chocolate, yeast, bread, bakery waste
02 06 02	wastes from preserving agents – only organic material that is biodegradable
02 06 03	sludges from on-site effluent treatment
02 06 99	wastes not otherwise specified – other organic wastes that are biodegradable
02 07 01	wastes from washing, cleaning and mechanical reduction of raw materials – brewing waste, food processing waste, fermentation waste
02 07 02	wastes from spirits distillation – spent grains, fruit and potato pulp – sludge from distilleries
02 07 04	biodegradable materials unsuitable for consumption or processing (other than those containing dangerous substances) – brewing waste, food processing waste, fermentation waste, beer, alcoholic drinks, fruit juice
02 07 05	sludges from on-site effluent treatment
02 07 99	wastes not otherwise specified - spent grains, hops and whisky filter sheets/cloths
03 03 02	green liquor sludge – paper sludge, green liquor
03 03 08	wastes from sorting of paper and cardboard destined for recycling – cardboard, newspaper, tissues, paper
03 03 10	fibre rejects and sludges – paper pulp (de-inked only), paper fibre
03 03 11	wastes not otherwise specified - sludges from on-site effluent treatment other than those mentioned in 03 03 10
04 01 01	fleshings and lime split wastes
04 01 05	tanning liquor free of chromium
04 01 07	sludges not containing chromium
04 02 10	organic matter from natural products, e.g. grease, wax
07 02 12	waste plastic - must conform to BS EN 13432. Only as packaging containing organic waste.
07 06 12	sludges from on-site effluent treatment other than those mentioned in 07 06 11 – but excluding sludges resulting from the on-site treatment of disinfectants

15 01 01	paper and cardboard packaging - must conform to BS EN 13432 - no manmade substances. Only as packaging containing organic waste
15 01 02	plastic packaging - must conform to BS EN 13432. Only as packaging containing organic waste.
15 01 03	wooden packaging - must conform to BS EN 13432. Only as packaging containing organic waste.
15 01 05	composite packaging - must conform to BS EN 13432. Only as packaging containing organic waste.
19 02 09	glycerol
19 02 10	combustible wastes
19 05 01	non-composted fraction of municipal and similar wastes
19 05 02	non-composted fraction of animal and vegetable wastes
19 05 03	off-specification compost from source segregated biodegradable waste
19 05 99	wastes not otherwise specified - other organic biodegradable wastes
19 06 03	liquor from anaerobic treatment of municipal waste
19 06 04	digestate from anaerobic treatment of source segregated biodegradable waste
19 06 05	liquor from anaerobic treatment of animal and vegetable waste
19 06 06	digestate from anaerobic treatment of animal and vegetable waste
19 06 99	wastes not otherwise specified - other organic biodegradable wastes
19 08 01	screenings – only the organic fraction which is biodegradable
19 08 05	sludges from treatment of urban waste water
19 08 09	grease and oil mixture from oil/water separation containing only edible oil and fats
19 08 12	sludges from industrial biological treatment
19 08 14	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13 – only biodegradable sludges resulting from the treatment of waste water with high organic matter content
19 09 02	sludges from water clarification – only the biodegradable organic fraction where the purpose of the clarification process is to remove organic solids
20 01 01	paper and cardboard - only as packaging containing organic waste.
20 01 08	biodegradable kitchen and canteen waste
20 01 25	edible oil and fat
20 01 38	wood other than that mentioned in 20 01 37, and only where no non-biodegradable coating or preserving substance present - must conform to BS EN 13432
20 02 01	biodegradable waste − animal faeces, manure, garden waste, green waste, horticultural waste, plant tissue, parks and garden waste, hedge and tree trimmings, grass cuttings and leafy materials
20 03 01	mixed municipal waste − separately collected biowastes

20 03 02	wastes from markets - markets − allowed only if source segregated biodegradable fractions eg. plant material, fruit and vegetables.
20 03 04	septic tank sludge
20 03 06	waste from sewage cleaning

Sludge AD is in black text, as per the response from 2023, and the food waste has been added in blue text.

Schedule 5 no.1 – Qu 14
Explain and provide calculations to show how you have provided adequate storage and treatment capacity for sludge and Food Waste.
For purposes of this response, we take the term tonnes to be equivalent to wet tonnes which is equivalent to m3. In our application we stated that there is 693,500 tonnes/year capacity in the sludge digesters, this equates to 1900 tonnes/day. The raw sewage sludge entering the digesters has been thickened via the GBTs and so the answer to points iii), v) and vi) will be higher as sludge entering the permit boundary will be thinner. The maximum yearly capacity of the food waste digesters is 87600 m3/year.
i) The sludge storage maximum capacity in m3
35,611 m3 Food waste maximum storage capacity is 6525 m3
ii) How you will ensure that the sludge storage maximum capacity on site is not exceeded.
Sludge tank levels are monitored with high level alarms. Import tank, as stipulated in waste management plan, has an inhibit on any tankers being accepted if volumes in import tanks are too high. Lights to indicate the level in the tank are visible to all staff, including drivers, and an audible alarm sounds, they will change to red when the tank level is in inhibit and at 95%. Operational staff have the capability to inhibit the desludging of the UWWT stream to reduce the volume of sludge being passed into the permitted area, however the performance of the waste water treatment process is also key and consequently indigenous sludge takes precedence over tankered imports. Food waste tank levels are also monitored with high level alarms. The Liquid Waste Reception Tank has capacity of up to two tanker discharges; volumes are controlled via acceptance of pre-booked deliveries as per the Acceptance Procedure – Liquid Tank. The tank level is visually available to the driver, and when the tank has reached its high-level alarm, a red light will flash to alert the driver to stop.

iii) The annual throughput of indigenous sludge in tonnes.

1,177,581 population equivalent (p.e.) (based on projected 2025 p.e. within process design review) generating 45g solids per day equals 52.99 tonnes DS/d and the addition of secondary sludges generated through the WRC process equating to 39.07 tonnes DS/d. And using a typical dry solid % of 3.3 % for PST sludge and 0.77% for SAS, this gives the figure of 6,680m3/d indigenous sludge, ((52.99/3.3%)+(39.07/0.77%))

The annual throughput of indigenous sludge is 2,438,200m3/year (6,680*365).

The permitted annual throughput of food waste is 70,000 tonnes per year; the average throughput is ~ 50,000 tonnes per year.

iv) The calculation for how the above storage capacity and retention time provide adequate storage and treatment for the annual throughput of sludge.

The blended indigenous sludge and imported sludge (excluding SAS) is typically ~2.77%DS (dry solids) and once thickened sludge is typically ~6% DS. SAS accounts for 35% of the total daily dry solids production. Pre-thickened SAS is typically 0.77%. The below tables show the average retention time throughout the various stages in the process.

The process at Avonmouth includes Acid Phase Digestion (APD) which is an enzymic hydrolysis plant. This biological pre-treatment phase allows the digestion stage to be smaller and the retention time reduced. At the same time, this optimisation of the anaerobic digestion process allows more effective biological pathogen inactivation. Our commitment to sludge compliance is managed in accordance with a Hazard Analysis Critical Control Point plan (HACCP). This ensures the sludge treated at Avonmouth is in conformity with the applicable Biosolids Assurance Scheme (BAS) and is compliant with the conventional treated standard.

A critical control point within the HACCP includes a maximum daily flow of 1863m3/d (thickened sludge) which equates to an annual throughput of 679,995m3/year thickened sludge. Accounting for the %ds differences between PST/imported sludge and SAS, this also equates to 7,718m3/day pre-thickened sludge with an annual throughput of 2,817,401m3/year.

The processing of indigenous sludge takes priority over imported sludge and the daily operations of site will manage this accordingly.

Process retention times	Maximum SAS vols per day (507m3/d pre-thickened)
SAS balancing tank 534m3	1 day

Process retention times	Maximum import sludge vols per day (684m3/d pre-thickened)
Sludge Import Tank 269m3	<1 day

Process retention times	Maximum sludge throughput (1,606 m3/d primary sludge + 684m3/day imports

	pre thickened = 2,290m3/d)
Strain press feed sump (Internal PS)	<1day
Strained sludge sump (Internal PS)	<1day

Process retention times	Maximum sludge throughput (1,534 m3/d flow split is 67% of pre-thickened PST + Import sludge)
APD GBT 1,2,3 feed tank 483m3	<1 day

Process retention times	Maximum sludge throughput (527m3/d (flow split is 23% of pre-thickened PST + Import sludge, thickens to 4.5%)
Consolidation tanks x2 2454m3	4.66 days

Process retention times	Maximum sludge throughput (527m3/d (flow split is 23% of pre-thickened PST + Import sludge, thickens to 4.5%)
Centrifuge 5 & Raw feed tank 61m3	<1day

Process retention times	Maximum sludge throughput (324 m3/d thickened to 4.5%)
Bellmer feed tank 341m3	1.05 days

Process retention times	Maximum sludge throughput (243m3/d (flow split

	is 23% of pre-thickened PST + Import sludge, thickened vol to 6%ds)
Thickened Bellmer sludge tank 313m3	1.29 days

Process retention times	Maximum SAS thickened production rate is 867m3/d (at 4.5% ds)
Thickened SAS sludge tank 719m3	<1 day

Process retention times	HACCP Maximum limit (1863m3/day thickened digestion feed 6% DS)
APD feed tank 434 m3	<1 day
APD Vessels 1-6 4878m3	2.62 days
MAD 1 Digesters 1-6 + MAD 2 digesters 7-8 21,032 m3	11.3 days
Secondary sludge storage tanks x2 3680m3	1.98 days
Centrifuge feed tank 552m3	<1 day

The below table summarises the average retention time throughout the food waste anaerobic digestion process.

Asset	Volume [m3]	Retention time
Liquid Waste Reception Tank	80	½ day
Hydrolysis Buffer Tank	800	1 – 4 days
Pasteurisation Vessels	15 ea.	1 - 2 hours
MAD 2 Digesters 1 & 3	2400 ea.	18 – 30 days
Post Digestion Storage Tank	800	1 – 4 days

v) The total volume of imported sludge to be received at site each year.

The maximum imported sludge per annum is 250,000m3 /year or 684m3/day derived from our existing permit limits, though annual totals are generally lower. For example, in 2022, total recorded imports were 180,637m3.

The average imported solid food waste is 32,000 m3/year and liquid food waste is 18,000 m3/year. For example, in 2022, the total solid food waste was 29,233 m3 and the total liquid food waste was 17,658 m3.

vi) The combined throughput of both imported sludge volumes and the annual throughput of indigenous sludge per annum.

Based on the calculations in answers iii, iv and v, the total combined throughput is 2,688,200 tonnes/year.

However, due to the variability of the %DS, the maximum total figure of unthickened sludge entering the IED permit boundary could be higher and consequently form C3 states that the maximum annual throughput is 2,850,000 tonnes/year.

vii) The cake skip maximum storage volumes and number of skips.

Each cake trailer holds approximately 15 tonnes. There is no long term storage for full cake trailers. Movements out are continuous throughout the week.

The maximum number of trailers which are held on site is up to five. Therefore, the maximum possible cake storage on site is 75 tonnes.

There are only two food waste digestate (cake) skips in the BFWRF, one for PAS110 standard cake and one for non-compliant cake. Each skip holds up to 18 tonnes for a total of 36 tonnes of cake storage. Batches are determined to be 3 weeks as per PAS110 sampling retention periods.

viii) How you will ensure that the cake skip storage maximum capacity is not exceeded on site.

Trailer numbers are controlled by the Site Manager who oversees the movement of full cake trailers from site and the return of the empty trailers.

The only locations for trailers are by the centrifuges (S1 and S2)].

Food waste digestate skips are checked daily as per the Site Ops HACCP and Daily Checks (GENWMG211). The Food Waste Plant Supervisor controls the changing of skips.

ix) How non-conforming digested sludge cake will be stored on site to ensure it is segregated from conforming digested sludge cake.

All non-conforming digested sludge cake is removed from site promptly for re-treatment.

All non-compliant PAS110 food waste digestate is stored in a unique skip duly labelled. The skip will then be removed from site to a pre-approved outlet for land reclamation. There is no re-treatment of non-compliant digestate at the BFWRF.

x) How long non-conforming digested sludge cake will be stored on site.
Non-conforming digested sludge cake is kept on site for a minimum length of time until it can be removed for retreatment. Non-compliant food waste digestate will be removed from site as soon as a pre-approved outlet has been contacted.
xi) How non-confirming digested sludge cake will be removed off site or treated onsite.
The non-confirming cake is removed from site using our skip removal contractors under the direction of the Biosolids Controllers. The contractor holds a Waste Carrier Licence as detailed in the permit application.
Form C3
Since the previous submission in September 2022, we have revised the installation figures within Table 1a. Total Storage Capacity = 35,611 m3 Annual throughput (tonnes each year) = 2,850,000 wet tonnes (This figure includes imports and indigenous sludge produced by the adjoining WRC. This is a maximum figure of unthickened sludge entering the IED permitted area).
Form B4 – Question 1 Table 1a
For the raw dewatering waste operation the throughput will be 800 m3/d and the annual throughput is 290,000 m3 for the year.

Schedule 5 no.1 Qu4
Provide a copy of your residue management plan.
Residues Plan - Avonmouth Bioresources Centre was included in the attachment pack (Item no 16) of the December 2023 submission. This document remains the most up to date version.
Schedule 5 no.1 Qu15
Explain how you will ensure that the transfer of waste into and from sealed tankers will be managed. This should include: **i) An explanation of procedures to ensure tanker drive off is not undertaken.** **ii) An explanation of how you will contain any leaks, (including worst-case leaks), spills and drips from the transfer of tankered waste at dedicated points.** **iii) An explanation of how you will comply with 'wash out' certification for tankers.**
i) We have two procedures, Best Tankering Practice for Avonmouth (TRTWG801) and, avoiding driving off whilst connected (TBT058) (Items 17 and 18 of the December 2023 submission). Both remain the most up to date versions. In addition to procedure all sludge discharge points are fitted with snap off connectors so in the event of drive off tank and pipework is not damaged, and tank integrity is not compromised. ii) Tankers are fitted with endcaps and isolation valves for large spillages and emergency stop switches. Small spills and drips are collected via drip trays and buckets.

iii) Wessex Water have a fleet of sludge tankers who only transport UWWT (LoW EWC code 19 08 05) sludge between smaller wastewater sludge works and the imports sites such as Avonmouth. This waste is not hazardous and not of an animal by-products origin.
iv) All drivers delivering and removing waste into/from the BFWRF will receive a site induction. Procedures (GENWMP167) and records are maintained. The induction will include emergency spillage response including location of spill kits.
v) All deliveries and waste removals are supervised and follow a procedure. Paperwork related to every food waste import is reviewed upon arrival. The driver will not be allowed to discharge if their paperwork is incomplete or incorrect.
vi) Safe System of Work (SSoW) covers all activities, and a new safe system of work has been created for loading soup into tankers (GENSSOW157). We do not require or issue washout certifications.

Containment

The Containment report, was item no 19, attached with the December 2023 submission. CIRIA 736 IED Report Secondary Containment Assessment issue 2. Issue 2 is still the most up to date version. We have included a solution within our proposals for the safe containment of any digestate loss.

OMP

There are two OMPs for Avonmouth BC. As part of this variation, we have updated both OMP's, the first which covers the sludge digestion and associated DAAs, with changes required by the series of Schedule 5's. An updated copy of TRTWP157 is included as item 11.

The second OMP for the Renewable Energy Centre and Food Waste has been updated to include revised maps, diagrams and process description (item 12).

Maintenance / Corrosion

Schedule 5 no.2 Qu 4
Provide a written description of how you ensure that equipment and pipework (including biogas and sludge/effluent carrying assets) are not subject to corrosion addressing the following aspects:
Inspection and maintenance
See Appendix 1
Design standards
See Appendix 2

Storm overflows

Schedule 5 no.2 Qu9
Provide the following information regarding releases of effluent/digestate in storm conditions:
Provide written procedures which describes the site's contingency arrangements to prevent digestate and effluent being discharged to the WwTW while the WwTW are in storm conditions.
Avonmouth BC returns its liquors downstream of the FFT penstock at Avonmouth WRC inlet. Therefore, this question is not applicable at this site.
Provide a description of the buffer storage proposals to control or hold emissions in the event of storm overflow conditions at the WwTW.
There are no current proposals for additional buffer storage.
Should any contingency arrangements use storage tanks to act as a buffer, provide evidence that demonstrates the waste waters or digestates can be held in this storage during the period of storm overflows.
No storage contingency arrangements are in use.

Raw Material Data Safety Sheets

Schedule 5 no.1 Qu 18				
Provide the material safety data sheets (MSDS) for raw materials used on site				
We have revised the list of raw materials used by this installation and have include the list below as required by Form C3 Q3c Table 5				
	Raw Material Name	*Quantities Annual Throughput /year*	*Total held in site*	*Description of use of raw material*
WWSL	Polymer -Zetag 8160	40,000 kg/a	7000kg (~7 tonnes) (10 x 700kg bags)	Used in poly make up in 2 x locations- SAS GBTs, Belmer GBTS.
	Polymer - Zetag 8187	135,000 kg/a	15t–Silo	Used in poly make up for dewatering plant (centrifuges 5, 6, 7 & 8)
	Polymer Zetag 9248 FS	114,000	16,640 kg (16 x 1040 kg IBCs)	Used in poly make up in SludgeTEK centrifuges 7 and road centrifuges..

	Polymer Zetag 8180	40,000	10 x 700kg bags	Used in poly make up for the APD GBT's
	Antifoam Burst PF 13	45,000 kg/a	4,750 kg	Used for preventing centrate from centrifuges from foaming and infrequently to prevent digester foaming.
	Polymer Zetag 8180	~ 33,000 kg/a	2,100 kg (3 x 700 kg bags)	Used in poly make up for dewatering centrifuges
	Antiprex Antifoam	~ 20L when needed	2 x 1,000 L IBC	Used infrequently to prevent digester foaming
	CHP Oil Premium Engine Oil 15W-40	~1x tank capacity delivery each year	3000L	Engine lubricating oil for onsite CHP gas engine.
	Antifoam Momentive SAG 7133 Antifoam	500 mg/day	100L	To the Process water to prevent foaming
	Carbon OCU MSDS x 2 = Filtracarb SA70 06_2019	n/a	6 tonnes in use in the OCU	Change over occurs every 18 months
	Odorant Natural Blend NB Robinson	33 Litres	50 Litres	To odorise the biomethane injected into the Grid
	FLOGAS Liquid Propane gas	550,000 kg/a	22,700 kg	To improve calorific value of methane injected into the Grid
	Antifreeze Brenntag DOWCAL 100	Top up if required	100 L	heating system antifreeze/inhibitor. Top-up is on an ad-hoc basis. No top-up has occurred in recent years.
	20% Sodium Hydroxide	*40L*	*40L*	Neutralise pH correction the process water
	Brenntag 15% Sodium Hypochlorite	*125L*	5 - 2000L	Used to prevent fouling of biofilter column

Appendix 1 – Inspection and maintenance

At Wessex Water, our maintenance strategy has historically been driven by a risk based approach, using a criticality assessment to determine the optimal maintenance interventions for our assets. Our goal is to provide the best value to our customers, whilst complying with our statutory requirements.

Assets with a high criticality rating have a more proactive maintenance approach. A mixture of Reliability Centred Maintenance / Condition Based Maintenance and Time-based (hours run) maintenance is employed, where applicable, to better understand / monitor the assets' failure modes to ensure that the appropriate activities and frequencies required are implemented to achieve a reduction in unplanned failures. The approach for Medium and Low Criticality assets is described below:

Medium Criticality Grading

Assets that are assessed as medium criticality are given an appropriate level of maintenance. This involves scheduling of planned inspections of the assets at appropriate intervals to identify component deterioration. From this, corrective (work arising) actions are scheduled to prevent the assets failing to perform its intended function.

Low Criticality Grading

Assets that fall into the Low criticality category will have a minimal business impact caused by them failing. The maintenance strategy for these assets is primarily reactive. i.e., they would be operated to the end of their useful life or their operation becomes inefficient and would then be repaired or replaced, whichever is most cost effective. In all cases, very basic routine inspections will be carried out on these assets, e.g., lubrication changes and functional checks.

The defined Maintenance tasks are delivered by our Mechanical and Electrical skilled technicians*. In addition, routine inspection, and front line asset care (cleaning & lubrication) is delivered by our Operations teams in accordance with our site Operational Task lists.

*Some activities require specialist training and skills or certification so are provided by external contractors

Some assets do have specific planned maintenance tasks to check for signs of corrosion, while others require inspection of attached pipework for leaks (which would also cover corrosion). The below table shows recently completed tasks on some assets onsite:

Site	Asset	Work Order	Job Activity Description	Asset PPM frequency	Closed	Task Description
11800 Avonmouth Stc SLU	B-00039271 :: AIR COMPRESSOR (BIO DRIER)	2387035	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	INSPECT ASSOCIATED PIPEWORK FOR LEAKS
11800 Avonmouth Stc SLU	B-00039271 :: AIR COMPRESSOR (BIO DRIER)	2387035	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	INSPECT PRESSURE RELIEF VALVE OPERATION AND FOR SIGNS OF LEAKAGE
11800 Avonmouth Stc SLU	B-00039271 :: AIR COMPRESSOR (BIO DRIER)	2387035	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	INSPECT SEALS FOR SIGNS OF LEAKAGE
11800 Avonmouth Stc SLU	B-00039271 :: AIR COMPRESSOR (BIO DRIER)	2387035	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	PRESSURE VESSEL - LOOK FOR SIGNS OF WEAR AND CORROSION PARTICULARLY AT THE THREAD END OF THE CYLINDER
11800 Avonmouth Stc SLU	B-00039271 :: AIR COMPRESSOR (BIO DRIER)	2387035	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	PRESSURE VESSEL - CHECK SAFETY VALVES AND PIPEWORK FOR LEAKAGES OR DAMAGE
11800 Avonmouth Stc SLU	B-00039270 :: AIR COMPRESSOR (BIO DRIER)	2387034	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	INSPECT ASSOCIATED PIPEWORK FOR LEAKS
11800 Avonmouth Stc SLU	B-00039270 :: AIR COMPRESSOR (BIO DRIER)	2387034	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	INSPECT PRESSURE RELIEF VALVE OPERATION AND FOR SIGNS OF LEAKAGE
11800 Avonmouth Stc SLU	B-00039270 :: AIR COMPRESSOR (BIO DRIER)	2387034	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	INSPECT SEALS FOR SIGNS OF LEAKAGE
11800 Avonmouth Stc SLU	B-00039270 :: AIR COMPRESSOR (BIO DRIER)	2387034	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	PRESSURE VESSEL - LOOK FOR SIGNS OF WEAR AND CORROSION PARTICULARLY AT THE THREAD END OF THE CYLINDER
11800 Avonmouth Stc SLU	B-00039270 :: AIR COMPRESSOR (BIO DRIER)	2387034	Blower - Compressor - Sliding Vane - 1Y	1 Yearly	30/10/2023	DAMAGE
11800 Avonmouth Stc SLU	S-00039351 :: PICKET FENCE SLUDGE THICKENER	2349887	Tank Mixer - Picket Fence - 1Y	1 Yearly	15/09/2023	INSPECT GEARBOX OIL LEVELS & SEALS FOR SIGNS OF LEAKAGE
11800 Avonmouth Stc SLU	S-00065792 :: GRAVITY BELT THICKENER B2	2332622	Belt Press - Gravity Belt Press - 1Y	1 Yearly	08/08/2023	INSPECT GRAVITY BELT STEERING CYLINDER MOUNTINGS AND FOR SIGNS OF LEAKS
11800 Avonmouth Stc SLU	S-00065791 :: GRAVITY BELT THICKENER B1	2332621	Belt Press - Gravity Belt Press - 1Y	1 Yearly	08/08/2023	INSPECT GRAVITY BELT STEERING CYLINDER MOUNTINGS AND FOR SIGNS OF LEAKS
11800 Avonmouth Stc SLU	B-00085016 :: COMPRESSOR | 100 PSI	2332353	Blower - Compressor - 1Y	1 Yearly	17/10/2023	INSPECT ASSOCIATED PIPEWORK FOR LEAKS
11800 Avonmouth Stc SLU	B-00085016 :: COMPRESSOR | 100 PSI	2332353	Blower - Compressor - 1Y	1 Yearly	17/10/2023	INSPECT PRESSURE RELIEF VALVE OPERATION AND FOR SIGNS OF LEAKAGE
11800 Avonmouth Stc SLU	B-00085016 :: COMPRESSOR | 100 PSI	2332353	Blower - Compressor - 1Y	1 Yearly	17/10/2023	INSPECT SEALS FOR SIGNS OF LEAKAGE

In addition to the specific maintenance tasks for leaks/corrosion, our EMI technicians are required to assess and record the condition grade of the installed assets on completion of every planned maintenance job on WAM (Work and Asset Management). The guidance for the asset condition grading can be found in the AMG007 document (provided with Poole response) and is described in more detail later in this response.

We specify and carefully select equipment and materials that are suited to the operating environment. In most cases in Waste Treatment, this requires the material to be resistant to corrosion either through its base material (Stainless Steel, Polypropylene, Glass Reinforced Plastic etc) or through the application of resistant coatings (Epoxy, Nylon, Urethane, Galvanised etc). Where we have specified corrosion resistant materials, our approach to monitoring has historically been limited to infrequent inspection, due to the reduced risk of deterioration.

We are currently reviewing our criticality assessment process to incorporate learnings from BAT and from our work on Process Safety. This work is expected to increase the scope of assets that receive regular inspection and maintenance tasks. For the new assets being installed in the capital scheme at Avonmouth, we are reviewing our approach to maintenance to align with BAT. This includes the formation of a 10 yearly drain and inspection programme for our sludge tanks and digesters.

We are also in the process of implementing a replacement maintenance management system (Dynamics) that will provide greater visibility of our future work activities and improve data capture for our assets.

In instances where we are developing our response and maintenance schedules for specific assets in the permitted area further; we have a working relationship with a selection of competent contractors who we are working with to develop maintenance and service contracts. This is all whilst we are considering the internal requirements necessary to bring certain complex taskings ‘in-house’ and internally develop our technicians’ competencies (ie. Further Compex qualifications).

The below images show the current assessment approach and actions relating to non-concrete tanks and above ground pipework systems detailed in our condition grade assessment guide (AMG007).

The current guidance for poor and unacceptable condition for these asset types is to inspect and monitor until repairs/replacements can be completed. The timescales for replacement will depend on the severity of the issue and the availability of funding.

The condition grade assessment guidance document is in the process of being updated to incorporate different types of assets and materials and to align our scoring and response with recent Ofwat and BAT guidance.

APPENDIX 3B: CONDITION GRADING ASSESSMENT – TANKS (NON-CONCRETE)

CONDITION ASSESSMENT - TANKS (NON-CONCRETE)

	1 Excellent	2 Good	3 Fair	4 Poor	5 Unacceptable
Structural integrity & function	Tank as new i.e. safe installation, structurally sound no evidence of deformation or settlement, surface corrosion or leakage	As 1, protective coating intact	Tank functioning and structually sound with no evidence of deformation or settlement, minor corrosion evident, minor deterioration of seals/joints.	Tank functioning but with structural problems due to deformation or settlement, significant corrosion evident, leakage of contents evident from seals/joints or holes.	Severe corrosion evident affecting integrity, serious structural failure or settlement, significant leakage of contents or odour release creating hazardous environment.
Action	None required	None required	Minor works required if necessary	Requires immediate specialist inspection, on-going monitoring until major refurbishment or replacement	No life expectancy, frequently monitor, replacement required as soon as possible

Examples of asset types covered

Sludge tank	Fuel tank	Silo
Storm tank	Chemical storage tank	Storage hopper
Balancing tank	High rate filter	
Settlement tank	SAF	
Aeration tank		

APPENDIX 4B: ABOVE GROUND PROCESS PIPEWORK SYSTEMS

CONDITION ASSESSMENT - ABOVE GROUND PROCESS PIPEWORK SYSTEMS

	1 Excellent	2 Good	3 Fair	4 Poor	5 Unacceptable
Structural integrity & function	Sound modern components that are all operable and well maintained	As 1, showing superficial wear and tear	All components operable but evidence of minor leakage, deterioration of lagging, or minor corrosion	Function of system affected due to significant leakage, loss of lagging, heavy corrosion, integrity of pipe support suspect, and difficulty with operation or minor components/valves etc	Function of system severely affected and potentially unsafe, effective life exceeded and incurring excessive costs compared to replacement costs due to unreliability.
Action	None repairs required	No repairs required	Minor repairs required if necessary	Requires inspection, ongoing monitoring and major repair within 5 years	Requires major repair as soon as possible

Examples of asset types covered

Interprocess pipeline
Gas lines
Hot water lines
Process air

Appendix 2 – Design Standards

Provide a written description of how you ensure that equipment and pipework (including biogas and sludge/effluent carrying assets) are not subject to corrosion addressing the following aspects:

During the design and construction phase, WWSL and its delivery partners ensures that corrosion prevention is appropriately managed in the following ways:

Appointment of Design Resource

As part of WWS' quality management system, and in line with CDM 2015 regulations, designers will be allocated to projects based on the competency required to complete the task. This is formally documented at a scheme kick-off meeting. It is mandatory for all design calculations, specifications, drawings, and other outputs, to be checked and approved on WWS projects. Where specifying pipework or other assets that may be subject to corrosion, checks will be undertaken by a senior or principal mechanical engineer. The approver will normally be by the discipline lead, workstream lead or the named Principal Designer.

On every scheme, a technical manager (TM) is appointed to provide technical advice and governance as the project progresses. Any deviation from technical standards, including those with relevance to corrosion, must be approved by the TM. Deviations will also require acceptance from the Operator where it has the potential to impact inspection and maintenance of the relevant asset. Relaxation of standards relevant to corrosion would not be acceptable under any circumstance.

Design Reviews

WWS and its partners deliver projects in line with a mandatory project delivery process. This includes mandatory technical review meetings at key project milestones with project stakeholders, including the TM and the Operator. The reviews include:

Outline and Detailed Design Reviews

These meetings are used to confirm that the:

- project need is being addressed.
- design complies with WWS technical standards and specifications.
- design and enabling actions undertaken meet relevant regulatory requirements such as planning, ecological considerations, IED requirements.
- appropriate calculation, design, and drawing checks have been completed.
- design is adequate, practical, safe, and economic to construct, commission, and to operate and maintain with reasonable effort.

The deliverables reviewed typically include a detailed engineering model and associated engineering outline and construction drawings.

A key focus of these reviews is to give the operator a clear understanding of the spatial access, lifting and maintenance provisions included in the design. The use of digital approaches such as engineering 3D models allows operators to quickly understand the design intent and an opportunity to challenge aspects that they feel could be improved.

Hazard and Operability Analysis (HAZOP), Control Philosophy, and URS Review

The HAZOP is a systematic, in depth, review of the design solution, which ensures that appropriate safeguards are in place to avoid the proposed system failing and leading to a safety or pollution event. HAZOP guide words include composition, leakage and spillage, and operation and maintenance e.g. appropriate isolation.

The deliverables reviewed must include all pipeline and instrumentation diagrams, control philosophy, and user requirements specification.

Procurement:

The framework agreements with delivery partners, and their sub-contractors and designers, includes a clause stating that they must comply with WWSL and industry approved technical standards when delivering works on behalf of WWS. Deviation from these standards would be considered a defect requiring rectification unless a deviation is formally agreed with the Technical Manager and Operations prior to installation works.

Delivery partners must hold ISO 9001, 14001, 45001 accreditations and must demonstrate technical competence to be appointed. They are required to deliver projects to the WWSL delivery process.

Technical Standards

All designers must comply with WWS and industry approved technical standards, including the Water Industry Mechanical and Electrical specification (WIMES) standards. WWS standards are regularly reviewed and updated to ensure they reflect latest best practice and innovation. Examples of relevant specifications and what they broadly cover is referenced below.

WIMES

WIMES 8.03 MECHANICAL INSTALLATION – Issue 5 June 2021 Corrosion prevention	Section 4.6 - Corrosion prevention and/or Corrosion protection of Equipment after installation. Table 5 – Corrosivity Category Definitions and Associated Corrosion Prevention / Protection Measures
WIMES 8.03 MECHANICAL INSTALLATION – Issue 5 June 2021 Valve Installation	Section 6 – Valve Installation Install in accordance with the Purchaser's planned maintenance requirements, so all valve components that will require regular inspection, cleaning or maintenance are readily and safely accessible and where appropriate, easily replaceable. Designed to ensure safe isolation. The standard of isolation should be determined in an ALM in accordance with HSG 253 or the purchaser's ALM standard.
WIMES 8.08 Pipework (Non-Buried Applications) – Issue 1, June 2021 Section 6.2 Materials Selection	Defines requirements for the design, fabrication, installation, inspection, and testing of non-buried pipework in the water industry. Pipework material selection to ensure that the specified design life is achieved, considering all possible material

	degradation mechanisms associated with the specified external operating environment and process fluid. Includes provisions to avoid galvanic corrosion.
WIMES 8.08 Pipework (Non-Buried Applications) – Issue 1, June 2021 Section 6.3 Corrosion Prevention	Internal and external surfaces of ductile iron and carbon steel shall be protected in accordance with WIMES 4.01. The type of internal lining and /or external coating shall be as specified / stated in the SCHEDULE.
WIMES 8.08 Appendix C – Pipework specification tables Appendix D – Pipework selection tables.	Allows selection of suitable pipework for the required application.
WIMES 4.01 - Paints and Polymeric coatings for corrosion protection - Issue 5 August 2018	Defines the requirements for paints and polymeric coatings used for the protection of plant and equipment.
WIMES 8.09 – Valves – Issue 2 March 2021	Defines the requirements for the performance, design, construction and testing of valves for use in the water industry. Includes – external operating environment of the valve, special hazards associated with the operating environment, and references for further information relating to the operating environment to which the valve is being incorporated.

WWS Design Standards

DS224 SITE PLANNING – LAYOUT, PLANT, ROADS, LANDSCAPING - Issue 5b, February 2020	Sufficient space provided around all structures and plant, equipment, and instrumentation to facilitate all required access during … operation, inspection & repair.
DS 460 - SLUDGE THICKENING & DEWATERING - MECHANICAL - Issue 5, November 2018	Larger sites are subject to IED … which specify that pipework should preferably be installed above ground, or otherwise contained within a suitable inspection channel.
DS 250 – ABOVE GROUND VERTICAL CYLINDRICAL TANKS. Issue 2 March 2020	Sets out material selection for sludge storage tanks.

Appendix 3 Avonmouth Asset List

This table was originally sent to the EA on the 3rd November 2021, and has been updated here for this submission.

Asset Name	Current permit reference	Permit activity reference (existing permit PP3734LK)	Currently permitted under	Currently operated by	IED STU or DAA?	Comments
Food waste pasteurisation and digestion plant (three pasteurisation units and two digesters), storage tanks	EPR/PP3734LK	A2, A3, A9, A10, A15	WWSL	Food Waste Team	Stand alone STU	Biogas from food waste plant mixes with Sludge produced biogas which is the only link between the food waste digestion and sludge digestion.
Sludge belt drier	EPR/PP3734LK	A1	WWSL	NA	not in use	will be surrendered
OCU for sludge belt drier	EPR/PP3734LK	A6	WWSL	NA	not in use	will be surrendered
Ferric dosing into Adjacent sewage treatment works	EPR/PP3734LK	A8	WWSL	NA	not in use	will be surrendered
Siloxane plant	EPR/PP3734LK	A10	WWSL	NA	not in use	Due to be replaced
Gas holders x 2	EPR/PP3734LK	A11	WWSL	WWSL	IED - DAA	
CHPs x 5	EPR/PP3734LK	A12	WWSL	Biogas team	IED - DAA	

Steam plant (using CHP heat to produce steam to dry sludge in activity A1)	EPR/PP3734LK	A12	WWSL	NA	not in use	
Gas to Grid plant (includes biomethane flare stack)	EPR/PP3734LK	A13	WWSL	Biogas team	IED - DAA	
Flare Stack	EPR/PP3734LK	A14	WWSL	WWSL	IED - DAA	
Sludge import point (tanker point, storage tank)	EPR/UP3797EA	Standard Rules SR2008 no.19	WWSL	WWSL	DAA	
Strain presses	not permitted yet	n/a	n/a	WWSL	DAA	Part of sludge treatment & IED permit
Sludge thickening equipment	not permitted yet	n/a	n/a	WWSL	DAA	Part of sludge treatment & IED permit
Acid Phase Digester plant (6 acid digesters, storage tanks)	not permitted yet	n/a	n/a	WWSL	IED - STU	Part of sludge treatment & IED permit
8 mesophilic digesters	not permitted yet	n/a	n/a	WWSL	IED - STU	Part of sludge treatment & IED permit.
Pre and post digestion storage tanks	not permitted yet	n/a	n/a	WWSL	IED - STU	Part of sludge treatment & IED permit
Dewatering centrifuges	not permitted yet	n/a	n/a	WWSL	DAA	Part of sludge treatment & IED permit