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Queenborough Sludge Treatment Centre Accident Management Plan

August 2024

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Queenborough Sludge Treatment Centre Accident Management Plan

August 2024

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	January 2024	Amelia Luk	Anita Manns	Anita Manns	Draft (January 2024 Resubmission)
P02	January 2024	Amelia Luk	Shannon Stone	Anita Manns	January 2024 resubmission
P03	August 2024	Mohar Das	Shannon Stone	Anita Manns	Not duly made response August 2024 (NGR amended)

Document reference: 790101_MSD_AMP_QUE August 2024

Information class: Standard

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1 Introduction

This Accident Management Plan (AMP) describes the requirements, procedures and action to be taken in the event of an environmental accident or incident at Queenborough Sludge Treatment Centre (STC). This plan will support the Queenborough STC Environmental Management System.

1.1 Scope

Environmental accidents and incidents shall cover emissions to air, land or water that can cause harm to the environment.

This plan is written in accordance with the IED Environmental Permit application requirements for Queenborough; BAT, specifically BAT1; and associated written management systems and procedures. Southern Water is required to review this plan annually, unless there are incidents, operational or managerial changes at the Site, which would require an earlier review.

The Site is staffed 0700-1800 Monday-Friday and 0700-1500 on weekends.

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

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

- Spill prevention and management, and operation of safety valves
- Procedures for recovering spilled product
- Procedures for the prevention of overflowing vessels, and the 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

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

- EMS – Environmental Management System
- FEC – Field Event Co-ordinator's Manual

- IMP – Incident Management Plan
- BCP – Business Continuity Plan
- CCM – Control Centre Manual
- SIB – Safety Instruction Book
- CAT – Catastrophe Plans

Southern Water is committed to continual environmental improvements, including minimising the risk of accidents both on the site and its operations and in the wider environmental setting. This commitment is delivered through efficient control of processes, capital investments, and environmental training.

1.2 Roles and Responsibility

The Site Manager for the site has overall responsibility for reviewing the processes on the site to minimise the risk of accidents and reduce the impact of any accidents should they occur. This document is reviewed annually, but the review process is ongoing as part of the regular performance monitoring for the site. In the case of an emergency, key contacts and communication details are listed in Table 1.1.

Table 1.1: Key contacts and communication in the case of an emergency

Contact	Office Hours	Out of Hours
Southern Water	Duty Manager, Control Centre 01903 272095	Duty Manager, Control Centre 01903 272095
Environment Agency	0800 807060 (Emergency Hotline) 0370 8506506 (Routine enquiries)	0800 807060 (Emergency Hotline) 0370 8506506 (Routine enquiries)
Emergency Services	999	999
Local Police	999	999
Local Hospital	Medway Maritime Hospital, Windmill road, Gillingham, Kent. ME7 5NY	999
EA Incident Hotline	0800 80 70 60	0800 80 70 60
EA Local Contact	0800 80 70 60	0800 80 70 60
Local Authority Emergency Planning Department	Emergency Planning Duty Officer (24 hr) Kent Resilience Team / Kent County Council 03000 414 999	03000 414 999
Borough Council	Swale House, East street, Sittingbourne, Kent. ME10 3HT 01795 417850	0345 988 1188
Water Company	Duty Manager, Control Centre 01903 272095	Duty Manager, Control Centre 01903 272095
Gas Company	0800 111 999	0800 111 999
Electricity Company	UK Power Networks 08433 102243	UK Power Networks 08433 102243
Framework Waste Contractor	MTS 01634 250326	MTS 01634 250326
Specialist Spill Clean Up Contractor	MTS	MTS

Contact	Office Hours	Out of Hours
	01634 250326 Cappagh Browne 0330 3031279	01634 250326 Cappagh Browne 0330 3031279

2 Site information

2.1 Site location

The Site has been in the current location since the 1980s. It is located on the southern marshes below Queenborough (approximately 1.7km north-east of the Site), on the western side of the Isle of Sheppey, Kent. The Queenborough catchment covers the towns of Sheerness, Queenborough, Halfway and Minster.

Activity address: Argent Road, Queenborough, Kent, ME11 5DZ

National grid reference: TQ 90914 70575

2.2 Summary of Site and sensitive receptors

The area surrounding the Site largely comprises marshland, and is bounded to the south (approximately 300m) by The Swale, a tidal channel of the Thames Estuary. Immediately surrounding the site (north, west and south) is a smaller channel named Joan Fleet (approximately 20m north of the site, at its closest), which is fed by a small drain that runs along the western boundary of the site. There are further drains, streams and small surface water features surrounding the Site.

No sensitive human receptors lie within 250m of the Site. An industrial site/depot/works (Elmley Industrial Estate) lies within 400m northeast of the Site, with two car depots mapped 1km north and northeast of the site. A residential area lies within 400m northwest of the Site at the nearest point.

3 Accident Management Techniques

The IED Regulations require the identification of potential accidents associated with the operation of an Installation and implementation of measures to avoid or minimise the effects of an accident, should they occur. This section sets out the measures to be adopted at the Installation to minimise potential risks to the environment. See Section 6 for Emergency Response Procedures.

The Site has an IMP designed to give first response instruction and procedures to control any Incidents/Emergencies at the Site.

Table 3.2 3.1 below provides a list, along with a brief description of each, of the procedures which form part of the IMP.

Table 3.1: Supporting Emergency Procedures – IMP

Procedure Reference	Brief Summary
EMS 234 Chemical and Oil Storage	Specifies the standard for storage of chemicals and oils. Outlines the amounts of substances that can be stored on site without consent from the Local Authority, and details how these substances should be safely stored. Also includes Information on the auditing, training requirements and any associated documents.
EMS 260 Pollution Prevention (standard)	Specifies the standard for managing and reducing the risk of land contamination. Outlines the tasks a manager should complete i.e., ensuring spill kits are available, and who to contact in the event of an incident. The document also lists the measures that Southern Water should take to prevent pollution incidents. Also includes Information on the auditing, training requirements and any associated documents.
EMS 265 Discharges (Standard)	Sets the minimum standard of operation in managing effluent and potable water process discharges. Details definitions which relate to the procedure and outlines the standard. Also includes Information on the auditing, training requirements and any associated documents.
EMS 360 Pollution Prevention Procedure	Outlines the responsibilities of staff in relation to the procedure. The Procedure includes details on items such as site drainage, working on or near watercourses and excavations. As well as addressing different spill types; chemical, oil and sludge/sewage. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 361 Chemical Risk Assessment (Procedure)	Defines the procedure for assessing the environmental risk from bulk chemicals. Outlines the procedure for undertaking a risk assessment, and where required which EMS procedures need to be followed. Also addresses risk mitigation and employee Mott MacDonald 3 awareness as well as the auditing, training requirements, reporting forms and any associated documents.
EMS 362 Environmental Fire Risk Assessment Procedure	Specifies the procedure for minimising the environmental consequence of a fire. Outlines the responsibilities of staff in relation to the procedure and provides a procedure for an Environmental Fire Risk Assessment. Information on the auditing, training requirements, reporting forms and any associated documents

Procedure Reference	Brief Summary
EMS 363 Procedure for Managing oil spills on sites	Outlines the responsibilities of staff in relation to the procedure. The procedure details how to determine the severity of the spill for different scenarios; land, inland waters and coastal waters/beaches, and how to prevent, control and remediate the environmental damage caused by spillages from the site. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 364 Lime Spill Management Procedure	Outlines the procedure for managing lime chemical spills at STCs. Defines the responsibilities of staff, and the procedure for managing the spill including the spill assessment and notification and escalation. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 365 Discharges Procedure	Defines the procedure that must be adopted when managing intermittent discharges. Outlines the responsibilities of staff in relation to the procedure and outlines the procedure where an emergency discharge is foreseeable for both emergency and stormwater and potable water. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 381 Operational Waste Procedures	Specifies the procedure for managing wastes. The procedure addresses the definitions of different waste types and outlines a general procedure for managing waste. Identifies where further procedures should also be followed for specific waste types e.g., asbestos, WEEE and waste oils. Information on the auditing, training Mott MacDonald 4 requirements, reporting forms and any associated documents.
EMS 382 Hazardous Waste Procedures	Specifies the procedure for moving hazardous waste between different sites. The procedure addresses identifying hazardous waste, storage of hazardous waste, consignment notes and record keeping. Information on the auditing, training requirements, reporting forms and any associated documents.
EMS 461 Chemical Risk Assessment (Form)	<p data-bbox="735 1332 1270 1384">A template for a chemical risk assessment including the following:</p> <ul data-bbox="735 1395 1270 1659" style="list-style-type: none"> <li data-bbox="735 1395 879 1417">● Site details <li data-bbox="735 1429 927 1451">● Chemical details <li data-bbox="735 1462 991 1485">● Chemical classification <li data-bbox="735 1496 887 1518">● Risk activity <li data-bbox="735 1529 1206 1552">● Risks for health, fire/DSEAR and environment <li data-bbox="735 1563 1174 1585">● Handling, usage and storage requirements <li data-bbox="735 1597 975 1619">● Management of spills <li data-bbox="735 1630 1110 1653">● Disposal And the safety data sheet.
EMS 480 Waste Descriptions	<p data-bbox="735 1675 1270 1727">Provides written descriptions of different waste types covering the following:</p> <ul data-bbox="735 1738 1270 2013" style="list-style-type: none"> <li data-bbox="735 1738 1070 1760">● Process giving rise to the waste <li data-bbox="735 1771 975 1794">● Waste characteristics <li data-bbox="735 1805 927 1827">● Handling advice <li data-bbox="735 1839 903 1861">● Containment <li data-bbox="735 1872 855 1895">● Disposal <li data-bbox="735 1906 919 1928">● Name of waste <li data-bbox="735 1939 959 1962">● Waste classification <li data-bbox="735 1973 1126 1995">● Producer and registered office details

Procedure Reference	Brief Summary
FEC 307 Reporting of Unauthorised Access, Including Loss, Theft and Vandalism	<ul style="list-style-type: none"> • EWC • Controlled Waste Regulations 2012 description • Waste type • Form • Temperature • SIC code <p>Information on the auditing, training requirements, reporting forms and any associated documents.</p>
FEC 320 Process Related Incidents	<p>Outlines the responsibilities of staff in relations to the reporting these incidents, and the procedure to be followed. Also includes Information on the auditing, training requirements and any associated documents.</p> <p>Specifies the procedures to follow in responding to process-related pollution incidents. Responsibilities of staff are outlined in the procedure, as well as contacting the FEC, FEC actions and reporting procedures. Information on the auditing, training requirements, reporting forms and any associated documents</p>
FEC 322 – Spillage Procedure	<p>Outlines the responsibilities of staff in relation to the procedure. The procedure outlines the process for handling spillages on site including:</p> <ul style="list-style-type: none"> • Spillage assessment • Notifications and Escalation • Containment • Awareness and Training <p>Information on the auditing, training requirements, reporting forms and any associated documents.</p>
IMPO_101 – Overview of the Incident Management Plan	<p>This document sets out the overall structure of the Incident Management Plans and provides a short overview of each of the main plans</p>
IMP 217 and IMP 218 Team Roles – Objectives and Responsibilities	<p>Sets out the Objectives and Responsibilities for roles within the Incident Management Team and provides guidance for the ELT Representative. IMP 217 identifies when Southern Water should contact the Environment Agency, and IMP 218 identifies the process for contacting other authorities.</p>
BCP 415 Guidance on Reporting Potential Media Interest	<p>Sets out the types of incidents to be reported back by Field Operations Staff & Contract staff working on behalf of Southern Water that will potentially attract media interest, including contact numbers.</p>
CCM 302 Procedure Following the Receipt of a Fire Alarm	<p>Provides a consistent regional approach to dealing with any formal notification of a fire alarm within the Company. Outlines the responsibilities of staff, the procedure for Mott MacDonald 6 when a fire alarm notification is received, inspections/audits, training and any associated documents.</p>
SIB 603 Risk Assessment and Safety Instructions for Fire Awareness	<p>Covers the following:</p> <ul style="list-style-type: none"> • Training needs of staff and fire wardens • What Managers must provide (i.e. fire safety meetings, plans) • Inspections • Safety instructions for occupied sites, unoccupied sites, and company vehicles • Firefighting procedure Records to be completed
CAT 303 Actions Following Severe Weather or Flood Warnings	<p>Outlines the plan of actions that should be undertaken following severe weather or floor warnings and the</p>

Procedure Reference	Brief Summary
Environmental Emergencies Poster (EMS)	responsibilities of the staff under these circumstances. The procedure details checklists for the following scenarios: impending severe weather, flood watch, flood warning, severe flood warning, and an all clear checklist. Also includes Information on the auditing, training requirements and any associated documents.
Pollution 30 Minute Plan	Outlines a five-step plan for responding to a pollution incident in 30 minutes and outlines what should be done at each of the five stages.
Site Chemical Risk Register	Southern Water electronic database containing an inventory of hazardous substances used and stored by Southern Water and those relevant to individual sites, helping Southern Water to control substance use and comply with the COSHH regulations
Alternative Response Coordinators Booklet	These documents provide flowcharts and a step-by-step guide for completing the Alternative Response tasks. Mott MacDonald 7 Section 5: Resilience Guidance identifies criteria on when to contact local authorities and other first responders

A site-specific Fire Prevention Plan is available for Queenborough to reduce the risk of fire and explosion. Please see the site-specific Fire Prevention Plan for full details of corrective measures.

3.1 Loss of Containment

3.1.1 Gas Escape

Loss of containment of gaseous materials at the site could result in the escape of biogas or other gases to the atmosphere around the site. In order to minimise the potential for accidental releases of gas from the Installation the following measures have been adopted:

- The gas holders are a double membrane inflatable bag type holders, constructed of a Type IV fabric, which is resistant to UV and microbial degradation. The stored gas is contained within the inner membrane. The exterior dimension of the gasholder remains constant
- All pipework at the site used for the transfer of gaseous products has been manufactured to the appropriate British Standard using appropriate grade materials and all pipe joints and seals are also designed to meet the required British Standard
- Regular monitoring of storage vessels, pipework and gas levels is undertaken to minimise release of fugitive emissions
- Storage vessels and pipework are subject to regular inspection, by the site operators to ensure the structural integrity of the system remains uncompromised
- All staff with responsibility for the handling or transfer of gaseous materials receive training for their role
- All staff on site will receive training in site emergency procedures and the actions to take in the event of discovering a gas leak as part of their mandatory site induction training

- The gas system has safety pressure release valves, which are designed to prevent over-pressurisation of the system. Gas emissions from this point are monitored on telemetry with immediate call-out of staff to remedy
- A waste gas burner is incorporated to deal with excess biogas and is the first point of relief for excess gas or pressure as an emergency measure

The site is designed to meet the Dangerous Substances and Explosive Atmosphere Regulations (DSEAR). Consideration of the requirements of DSEAR is included in the Designers Risk Assessment including information on the operation and maintenance of the Installation to ensure DSEAR requirements are met.

An IMP is in place for the Queenborough site. The IMP includes actions to be followed in the event of a loss of containment of gaseous materials at the Installation.

Preventative measures incorporated into normal operations include a DSEAR operational risk assessment that will be periodically reviewed and updated against the latest DSEAR regulations and guidance to ensure best practice is adopted.

A Leak Detection and Repair (LDAR) plan is in place at the Queenborough STC.

3.1.2 Liquid Escape

Failure of the liquid containment systems at the STC could potentially lead to oil bearing fluids, reagents and process effluents discharging to surface waters and ground waters in proximity to the Installation. Potential risks associated with this have been reduced through the implementation of the following measures:

- The storage vessels for all boiler feed water treatment chemicals and fuel storage liquid materials located within the installation are double-skinned or bunded to 110% capacity and have been manufactured to the required British Standard using appropriate grade materials
- Where applicable, on-site storage tanks are bunded to 110% of their storage capacity in line with environmental good practice and bunds are regularly inspected for liquid content and emptied if required
- Regular monitoring of storage vessels, pipework and fluid levels is undertaken to ensure no fugitive emissions are being released
- Storage vessels, bunds and pipework are subject to regular inspection by the Site Manager or the nominated deputy to ensure the structural integrity of the system remains uncompromised
- All pipework at the site used for the transfer of liquids has been manufactured to the appropriate British Standard using appropriate grade materials and all pipe joints and seals are also designed to meet the required British Standard
- Spill kits comprising suitable materials for the containment of liquid spills have been placed throughout the site for the use of all staff
- Site surfaces surrounding liquid storage areas and transfer pipes are constructed of impermeable material and run off is diverted to appropriate drainage structures to prevent escape of fluids to surface waters or ground waters
- All staff with responsibility for the handling or transfer of liquid materials receive appropriate training for their role
- All staff on site must receive training in site emergency procedures and the actions to take in the event of discovering a liquid spillage and the use of spill containment measures as part of their mandatory site induction training

3.1.3 Material Storage

All chemical tanks and stores must be clearly labelled and marked with appropriate warning signs and all delivery points must be kept locked except when in the presence of an Operations team member.

The levels of raw materials are checked and recorded.

During deliveries of material to site, special care is taken to ensure that all storage tank levels and contents are checked in order to prevent the accidental overfilling of tanks or the inadvertent mixing of substances. Specific measures are in place for the discharging of sludge from delivery tankers to reduce the risk of overfilling of the tank and spillages during discharge.

The following are requirements for deliveries on site:

- Each direct delivery must be checked for the correct quality and strength and to ensure that no damage etc. has occurred in transit
- Supplier's Advice Notes must be checked, to ensure that the goods match the documentation, and then signed
- Retain copies of Supplier's Advice Notes
- All chemical deliveries must be supervised by nominated personnel as detailed on the current list
- Chemical deliveries must be recorded and must include a declaration that they conform to the required standard, either on the delivery note, or as a separate certificate of conformance
- Appropriate training is provided to personnel involved in receipt and handling of deliveries and specific procedures for the filling of tanks have been developed within the management systems

3.1.4 Odour

Biogas is a naturally odorous material; however, the high alkaline conditions present within the STC digesters, scrub most of the hydrogen sulphide (H₂S) (an odorous constituent) from the biogas, resulting in relatively low concentrations. In addition, there will be no other odour emissions at the site from normal operations at the Installation.

Sewage sludges and returned liquors can all contribute to odour on a STC. A number of odour release points/areas have been identified in Queenborough STC, and a combination of good baseline site management and odour control measures have been implemented to manage these sources.

Regular inspection of site storage facilities and pipework will be undertaken to ensure that the structural integrity of the system remains intact in line with the Queenborough STC LDAR plan and Odour Management Plan (OMP).

Regular site inspections and sniff checks are undertaken by the site team to ensure that no significant fugitive emissions of odour likely to cause pollution of the environment, adversely impact human health or significantly reduce the amenity of the local area are present. In the event of an accidental emission of odorous material from site storage facilities or pipework, the source of the emission will be isolated, investigated and, if required, operation suspended until the source of the emission has been sealed.

3.1.5 Vandalism and unauthorised access

Vandalism and unauthorised access to plant infrastructure and work areas has the potential to result in:

- Damage to plant infrastructure and equipment
- Increased risk of injury to personnel
- Uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to the environment

Operations and Maintenance (O&M) activities at the STC occur on a continuous basis and high levels of site security are maintained to prevent unauthorised access to plant infrastructure and work areas in accordance with Field Event Coordinator's Manual (FEC) in relation to Reporting of Unauthorised Access, Including Loss, Theft and Vandalism (FEC 307). In light of this the potential for vandalism is considered to be effectively minimised.

The following measures have also been adopted as security measures:

- For visitors and unauthorised personnel, an intercom system at the Site entrance is used before entry is allowed
- On arrival at site, visitors must sign the visitor's book and also announce their arrival to staff in the control room
- The Site is staffed 0700-1800 Monday-Friday and 0700-1500 on weekends
- CCTV cameras are positioned in key locations around the Site
- Access to Site and waste is restricted by 2.5m high chain link security fence and a 40m wide watercourse which borders the Site
- 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
- Out-of-hour intruder alarms are set for buildings
- CCTV cameras onsite as a deterrent to any unauthorised visitors

3.1.6 Physical Protection Measures

The Site has been designed to include protection of structures to minimise accident / incident issues. Potential risks associated with this have been reduced through the implementation of the following physical protection measures:

- are also designed to meet the required British Standard
- Storage vessels and pipework are subject to regular inspection, by the site team to ensure the structural integrity of the system remains uncompromised.

3.1.7 Overfilling of tanks

Details of the raw materials and process chemicals held on site and their storage arrangements are provided in Table 3.1 below. During deliveries of material to site special care is taken to ensure that all storage tank levels and contents are checked in order to prevent the accidental overfilling of tanks or the inadvertent mixing of substances. Appropriate training is provided to personnel involved in receipt and handling of deliveries and specific procedures for the filling of tanks will be developed within the quality and environmental management system (QEMS) for the site.

The volume of material in the receiving tanks will be measured and recorded manually prior to filling.

In the event of a spillage of polluting substances, absorbent material will be used to clear the spillage. The used materials will be removed and stored in suitable containers prior to authorised disposal. The Installation will incorporate impermeable paving with self-contained drainage.

Table 3.2: Raw Material and Process Chemical Storage

Raw Material / Process Chemical	Maximum storage amount (tonnes or m ³)	Storage
Biogas	<1200 m ³ max	Gas bag Digesters Pipelines Flare Stack CHP Engine.
Diesel Oil	30m ³	Tank
Sludge	270m ³	Tank
Sludge Cake	<6000m ³	Bays
Polymer	8 X 1m ³ /750kg bags	Bags
Lime (Dust).	Variable this is an unusual activity	In bags
Gas Cylinders	Welding / burning Equip.	Gas Bottles stored in a locked building overnight.
Ferric Sulphate	14 cub m	Storage tank.
Aerosol Leaks of Biogas	Not Known as would be formed by leaks	Gas bag Digesters Pipelines Flare Stack CHP Engine
JCB Loader / MTS Tankers & Chemical Delivery tankers.	Diesel Fuel tank on machine	Vehicle stored in a locked building overnight.
Antifoam	1m ³	Intermediate Bulk Container (IBC)
Polymer	8 x 1050 kg as liquid in IBC	IBC
Wastewater	2582m ³ 5458m ³ 3709m ³ 3868m ³	Tanks and lanes
Sludge	2320m ³ 518m ³	Tanks

3.1.8 Fire

Operational activities at the STC are such that the potential for fire and explosion exists. However, the local Fire Service has not carried out any risk assessment investigations on site. Potential hazards arising from fire and explosion at the site include:

- Uncontrolled release of pollutants from equipment, plant and infrastructure
- Uncontrolled release of pollutants from material stores

- Loss of containment of contaminated firewater

Fire detectors and fire alarms are fitted in all buildings. Fire extinguishers are located at strategic points throughout the STC. All fire extinguishers are clearly marked and tested to confirm their functionality. All personnel will be made aware of their location and trained in their use for escape purposes only, in order to minimise the risk to life posed by fire and explosion

However, the emergency policy is to evacuate the building in the event of a fire. Staff are informed during induction of the emergency procedures at the site to be followed in the event of fire incidents at the site.

To reduce the risk of fires from the Anaerobic Digestion process, it is managed by controlling KPI's on process control on a SCADA control system, DSEAR risk assessments are in place, with 12 monthly service agreements in place around the Biogas system. 6 monthly inspections on the Boilers and CHP systems are also conducted.

Controls to reduce the risk of fires are good signage and EX zoned areas with fencing and locked gate policy around DSEAR areas. Lightning protection are also in place on Biogas storage bags. Operational and maintenance staff in both Biogas awareness and DSEAR training have also been trained.

The Digestion process risks are managed by DSEAR risk assessments, Zonal areas & Biogas training for site operators and Maintenance staff along with Gas safe contractors carrying out programmed maintenance activities.

3.1.9 Arson risks

With flammable or combustible materials there is always a risk of arson on a site. This risk is controlled by secure perimeter fencing and an electric gate at the main entrance of the Queenborough site, plus a locked gate policy that is adhered too.

3.1.10 Contingency for Sludge Treatment Issues

In the case of incidents with sludge treatment, the mitigation measures related to sludge treatment processes are listed in Table 3.3. A full list of mitigation measures covering different processes of the entire site can refer to the operational continuity plan of Queenborough.

Table 3.3: Mitigation measures with sludge treatment incidents

Incident	Mitigation plan details
Import reception tank	<p>In the event of a failure of the import sludge tank</p> <p>If the tank should failure or generate a leak then a nurse tank can be installed to continue imports</p> <p>Tank size required – 30m³</p> <p>Previously hired through MTS</p>
Biogas	<p>In the event of an emergency with the CHP</p> <ol style="list-style-type: none"> 1. Locate and close ECV HV406612 and ECV 404 (oil tank) located outside the Boiler House Building. 2. Activate any emergency stops for the CHP which are accessible 3. Inform site FPM (in hours) or Duty Manager (out of hours). 4. Inform Cogenco on [REDACTED] of the emergency so they can attend to investigate. <p>In the event of a gas leak</p> <ol style="list-style-type: none"> 1. Locate and close associated ECV which will isolate the gas line to the affected area. 2. In the event of a fire locate and isolate associated ECV.

Incident	Mitigation plan details
	<ol style="list-style-type: none"> 3. Activate any emergency stops as applicable 4. Inform site FPM (in hours) or Duty Manager (out of hours). 5. Raise emergency P1 for gas service provider to attend and resolve the issue. <p>Failure of Flare Stack</p> <p>In the event of a flare stack failure along with the CHP failure will result in safety releases of biogas from the Whessoe Valves located on the roofs of the two digesters and the Whessoe valves located in the gas holder compound. This is to prevent over pressurisation of the digesters and gas systems.</p> <ol style="list-style-type: none"> 1. Raise a P1 emergency job for our framework partner responsible for biogas work. 2. Restrict access completely to the gas holder compound and to the roofs of both digesters. Erect warning sign and consider replacing padlocks with single key padlocks to prevent unintentional access. 3. Escalate & report to the pollutions team on 07557152385. 4. Reduce or inhibit the digester feed to reduce the biogas generation and the volume being released.
Digester	<p>Digester foaming</p> <p>The most likely causes of digester foaming could be failure of the antifoam dosing system (if a background dose is applied), high variability in flow and thickness of the feed sludge, and high septicity of the feed sludge.</p> <p>If the probe alarm is indicating high foam or high level sludge it will inhibit digester feed as a precaution to prevent a foam or sludge release to ground.</p> <ol style="list-style-type: none"> 1. Check digester feed and compare against previous days. 2. Reduce digester feed by 10% from the previous day. 3. If applicable check anti foam dosing pumps and system. 4. Consider manual dose of antifoam to reduce the foam level. <p>If the foam or sludge level has reached the level where the gas lines are blocked (realised by failure of gas compressors and in catch pits for the gas condensate pots) following the below steps.</p> <ol style="list-style-type: none"> 1. Stop digester feed immediately. 2. Mobile Biogas service provider as a P1 to clear gas lines / Whessoe Valves to prevent gas release via the Whessoe valves. 3. Escalate & report to the pollutions team on [REDACTED] 4. Depending upon the extent of the spillage mobilise suitable resources to instigate clean up. 5. If applicable check anti foam dosing pumps and system. 6. Consider manual dose of antifoam to reduce the foam level. 7. Once gas lines have been cleared then re-start digester feed much reduced digester feed – Please consult Process Scientist or on-call Process Scientist for exact feed rate. <p>Digester loss of heat</p> <p>Digester feed will inhibit <32 degrees with a normal range of 35-36 degrees. It usually takes around a day before it reaches inhibit levels. The most likely causes will be associated with failure of CHP and boilers (standby to CHP).</p> <ol style="list-style-type: none"> 1. Check CHP is operational and heat 3 way valve is operating correctly. If in doubt contact Cogenco on [REDACTED] 2. Check boilers are operational. If low gas then switch to gas oil. 3. Check recirculation pumps and three way valves are operating correctly. 4. Check heat exchanger is receiving the hot water – if not check the isolation valves and jet if required.

Incident	Mitigation plan details
	<p>5. Check the sludge inlet and outlet temperatures – normally you would see a two degree rise across the heat exchanger. If not it could be scaled up so strip and jet.</p> <p>If the CHP has failed then a single boiler will not be sufficient to provide enough heat to maintain both digesters temperature at full flows.</p> <ol style="list-style-type: none"> 1. If the CHP has failed then the Duty boiler will operate 2. On the SCADA select the standby boiler to SCADA HAND and then Press START....this will run both boilers together. <p>Digester recirculation failure</p> <p>Recirculation is important to the health of the digester and retaining the temperature within the range. Unlikely to be any impact from immediate failure.</p> <p>If the recirculation pumps both fail and are not immediate repairable onsite then overpumping can be installed.</p>
Sludge processing pumps	<p>Failure of Sludge Processing Pumps</p> <p>All the sludge processing pumps will operate Duty/Standby so failure of a single unit should not cause an interruption to the sludge throughput. The exception to this is the centrifuge operation (please see above covering Centrifuge failure). In the event of failure of both Duty and Standby pumps:</p> <ol style="list-style-type: none"> 1. Check the critical spare store as this holds a number of spare parts for various sludge pumps onsite. These include motors, gearboxes, rotors and stators. The most common failure items. 2. If no spares are available then check sludge tank levels throughout the process to determine the criticality of returning sludge throughput. <p>If the levels are high then check other local STC's for compatible parts which may be available for these units.</p>
Gravity Belt thickeners	<p>Failure of GBT's</p> <p>GBT's operate as Duty/Standby</p> <p>In the event that both drums have failed and are not repairable – even with the critical spare below and scavenging parts from the downed drums – then a means to deal with the primary sludge needs to be implemented.</p> <ol style="list-style-type: none"> 1. Assess volume within the pre-thickened tanks to determine repair time frame. 2. To maximise the storage room the import sludge would need to be re-directed. 3. Consolidate the sludge in the primary tank to achieve a higher %DS whilst still operating within the operating range. 4. Transfer un-thickened sludge to the TSST to maintain desludging.
Failure of centrifuge	<p>Failure of Centrifuge</p> <p>In the event of failure of the single centrifuge onsite</p> <ol style="list-style-type: none"> 1. Raise a P1 emergency job for our framework partner responsible for centrifuge work 2. Ascertain the levels within the PDST onsite to see if digester throughput will be affected. Tanks are ideally run at <50% capacity so will normally have around 4 day's capacity. 3. If outage is total and due to be ongoing for >3 days consider mobilising a mobile centrifuge to ensure digester throughput is maintained. 4. If the mode of failure is associated with the conveyor utilise the critical spares to repair the conveyor. If a repair cannot be carried out then consider a hire conveyor. <p>The centrifuge details are as follows Alfa Laval ALDEC G2-100 – throughput 53m³/hr. Previous hire equipment needed:</p> <ol style="list-style-type: none"> 1. DP54 Mobile centrifuge – capable of 26m³/hr

Incident	Mitigation plan details
Power failure	<p>2. Portable belt conveyor</p> <p>3. Generator to power the unit and associated fuel cube</p> <p>4. Armoured hose (75m) to feed digested sludge into the mobile unit</p> <p>Can be located within the existing sludge bay with cake being moved with the existing JCB onsite.</p> <p>Fixed Generator Onsite - 1280kVA. If onsite generators fail: The whole site will require a 1500 kVA trailer generator which can be connected direct to the Generator PLC panel utilising 50m of suitably rated cable. HV trained Electrician Required to work alongside with Contractor installing the generator. UKPN will need to be contacted and be onsite to reset their HV switch gear.</p>
Hydraulic overload	Site has a storm permit so will release storm flows greater than 252l/s
Site flooding	Unlikely, but site is at risk of 1 in 200 year storm, could flood MCC/control rooms and result in power failures.

4 Risk Assessment Methodology

The risk assessment has been undertaken by identifying hazards and source-pathway receptors and assigning a probability of exposure and a severity of consequence. These are assigned as described in Table 4.1 and Table 4.2 and are based on the generic risk assessments used for standard rules “SR2012 No11 and No12”, “SR2009 No 4” and “SR2008 No 19”, applicable to anaerobic digestion operations including use of the resultant biogas.

The probability and severity scores are then combined within a matrix to give an overall magnitude of the risk. This matrix is shown in Table 4.3 and is intended to illustrate the general approach to scoring.

Risks are categorised as either low, medium or high; this ranges from being a nuisance in some instances to potential health risks in others.

Table 4.1: Severity Index

Severity of harm	Severity index
Impact to people or designated receptor	High
Impact to non-designated receptor	Medium
All other impacts	Low

Table 4.2: Probability Index

Severity of harm	Severity index
Impact to people or designated receptor	High
Impact to non-designated receptor	Medium
All other impacts	Low

Table 4.3: Magnitude of risk

Severity index	Probability index		
	Low	Medium	High
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

Table 4.4: Accident risk assessment table

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
All surface waters close to and downstream of the Site.	Tank failure, spillages of digestate and/or liquids including oil Damage to drainage system. Spillage of raw materials or sludge/liquor during delivery/storage Contaminated run off from cake storage e.g. containing suspended solids.	Acute or chronic effects to aquatic life, contamination and deterioration of water quality.	Direct run-off from the Site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/groundwater then extraction/ abstraction at borehole or intake.	Low	High	Medium	Potential for leaks from digestions tanks, storage vessels/bays and drainage system which may cause contamination or deterioration of surface water quality. Hardstanding and cake storage bays are generally in a good condition across the Site. Appropriate bunding is provided for raw materials stored on-site and cake storage bays have sufficient capacity for the quantities stored therein. Permeable ground surfacing currently surrounds the digesters, but tanks and skips	The Site drainage plan is documented and all staff are trained in the event of emergency or accident. Impermeable surface and secondary containment, in the form of constructed bunds or portable bunds, is in place around storage areas of all wastes and surrounding the STC and WTW. Bunding will also be implemented for all raw material storage. Additional containment around digesters and other storage vessels is subject to a risk assessment and will be undertaken as part of the BAT requirements and in accordance with the Construction Industry Research and Information Association (CIRIA) standard 736. Hardstanding is potentially planned to be constructed (in line with the recommendations of the CIRIA risk assessment) around the digesters.	Low

				<p>are located on hardstanding. Quantities of liquids stored are generally low. The Site is bounded to the south (approximately 300m) by The Swale, a tidal channel of the Thames Estuary. Immediately surrounding the Site (north, west and south) is a smaller channel named Joan Fleet (approximately 20m north of the Site, at its closest), which is fed by a small drain that runs along the western boundary of the Site. There are further drains, streams and small surface water features surrounding the Site. However, no substantiated pollution incidents to water have been</p>	<p>All transfer of digestate and material takes place under supervision and with flow rate control. All tanks undergo a delegated inspection regime and the process parameters are monitored and understood by Site operatives. Digestion tanks are built to appropriate standard and require appropriate bunding. There are seven open cake storage bays on-site, six in the east of the Site and one back-up bay in the south. All of the cake bays are in good condition and their walls are approximately 1.2m to 1.5m high. The capacity of the cake storage bays is sufficient to contain the quantity of cake stored on-site and limit dust emissions therefrom. Cake is stored on-site and not handled until it is removed. Each bay takes approximately 4-6 weeks to fill. Activities are managed and operated in accordance with the EMS. Spill procedures are in place under EMS363 and 364 as well as a pollution prevention procedure EMS360 All spillages are recorded in the</p>	
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				Low	Medium	Low	recorded in the last five years.	site diary including actions taken.	Low
Abstraction from watercourse downstream of facility (for agricultural or potable use).	Spillage of liquids, contaminated rainwater run-off from waste e.g. containing suspended solids.	Acute effects, closure of abstraction intakes.	Direct run-off from site across ground surface, via surface water drains, ditches etc. then abstraction.	Low	Medium	Low	Watercourse must have medium / high flow for abstraction to be permitted, which will dilute contaminated run-off. No abstraction is undertaken from nearby watercourses.	Site Manager ensures the programme of Planned Preventative Maintenance (PPM) is implemented effectively to minimise the probability of equipment malfunction. Control of substances hazardous to health (COSHH) assessment undertaken for all raw materials. Both clean and	Low
Groundwater, land and surface water	Spillage of liquids, contaminated rainwater run-off from waste e.g. containing suspended solids. Sludge/liquid spillages as a result of loss of tank/pipe integrity/ carelessness during transfer or overfilling	Chronic effects: contamination of groundwater, requiring treatment of water or closure of borehole or closure of abstraction intakes. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality. Pollution of water or land.	Transport through soil/groundwater then extraction at borehole or intake.	Low	Medium	Low	Potential for leaks from digestion tanks and storage vessels. There is permeable gravel surfacing surrounding the digesters. Site infrastructure and hardstanding is generally in a good condition. Quantities of liquids stored are generally low.	contaminated surface water is directed to a pumping station which recirculates it back into the system. The stormwater drainage of potentially contaminated areas from within the Site boundary is routed into the head of the works with no discharge outside of the Site boundary. Regular inspections of the Site drainage systems and other equipment are undertaken, with any repairs and maintenance carried out if necessary. All complaints and other incidents are recorded in the site diary including actions taken. The condensate is clean, uncontaminated water and is small in quantity.	Low

Groundwater, land and surface water	Spillage of sludge/liquids during transfer of imported and indigenous/unknown sludge and liquids from tankers	Acute or chronic effects: contamination of groundwater, requiring treatment of water or closure of borehole or closure of abstraction intakes. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality. Pollution of water or land.	Transport through soil/groundwater then extraction/abstraction at borehole or intake.	Low	Medium	Low	Potential for spillage during transfer of liquid/sludge from tankers. The Site includes sludge treatment with liquid sludge reception facilities. Imported sludge makes up around 2/3 of the total dry solids treated. Reception area for sludge is generally in a good condition.	Impermeable surface required for storage of all waste. Activities to be managed and operated in accordance with the EMS and management plans and procedures implemented to reduce spills when transferring liquids/sludges from tankers. Established procedures in place for the waste duty of care (EMS380), operational waste procedures (EMS381) and waste rejection (EMS488). Compliance with the waste duty of care requirements to ensure waste accepted meets the permit conditions and relevant legislation. All liquid run-off on-site is directed to a return pumping station before returning to the head of the works.	Low
Groundwater, land and surface water	Flooding of site.	If waste is washed off-site it may contaminate natural habitats downstream.	Flood waters	Medium	Medium	Medium	Permitted waste types are sludges/bio-solids, which may contain pathogens, so any waste washed off-site will add to the volume of the local post-flood clean up and may be hazardous to human health.	The drainage network sends water to the head of the works for treatment. There are no direct potentially contaminated discharges to controlled surface waters. Activities to be managed and operated in accordance with a management system and management plans and procedures implemented, including the removal of spilled waste and other pollutants (such as use of	Low

							Area is within a Flood Zone 3 (for flooding from the river) but not known to flood, the Site benefits from flood defences located along Horse Reach/Long Reach (Main River) to the east.	spill kits and mobile bunds) before these could enter any flood waters if an event was to occur.	
Local human population, domestic properties, site offices.	Spillage of odorous materials including oils, fuels, chemicals. Failure to clean up spillages. Contaminated spill equipment not disposed of appropriately.	Nuisance, loss of amenity.	Air transport then inhalation.	Low	Medium	Low	Local residents and staff often sensitive to odour.	Procedures for dealing with spillages are covered in the EMS under EMS363 and 364 for the Site. There is also a Field Event Co-ordinators (FEC) Manual which provides spillage procedures for EP sites (FEC322). The Site Manager shall ensure all relevant staff are appropriately trained to use the spill kits and that all spillages are cleaned up immediately. All areas of the Site are to be cleaned regularly; Site Manager to oversee regular cleaning schedule, all staff trained on importance of good housekeeping and site cleanliness. All spills are recorded in the site diary including actions taken.	Low

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
Local human population and local environment.	Flooding of the Site.	If waste is washed off-site it may contaminate buildings / gardens / natural habitats downstream.	Flood waters	Low	Medium	Low	<p>Permitted waste types are sludges/bio-solids, which may contain pathogens, so any waste washed off-site will add to the volume of the local post-flood clean up and may be hazardous to human health.</p> <p>The Site is not located within an area with the potential for groundwater flooding to occur.</p> <p>Area is within a Flood Zone 3 (for flooding from the river) but not known to flood, the Site benefits from flood defences located along</p>	<p>Area is not known to flood and the drainage network sends water to the head of the works for treatment. There are no direct potentially contaminated discharges to controlled surface waters.</p> <p>Activities to be managed and operated in accordance with a management system and management plans and procedures implemented, including the removal of spilled waste and other pollutants (such as use of spill kits and mobile bunds) before these could enter any flood waters if an event was to occur.</p>	Low

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
							<p>Horse Reach/Long Reach (Main River) to the east.</p> <p>The Site is considered to be a low risk for flooding from surface water, corresponding to a chance of flooding each year of between 1 in 1000 (0.1%) and 1 in 100 (1%).</p> <p>There have not been any reported flooding issues from the Site.</p>		
Local human population and / or livestock after gaining unauthorised access to the installation.	All on-site hazards: machinery, wastes and vehicles.	Bodily injury, death	Direct physical contact.	Low	Medium	Low	Potential injury to on-site personnel as a result of vehicle movements or equipment malfunction or misuse.	Overall management of the site is overseen by an experienced member of staff holding an appropriate Certificate of Technical Competence (CoTC) awarded by the Waste Management Industry Training and Advisory Board. This competent person delegates responsibilities to appropriately experienced and trained site operatives throughout the operating hours.	Low

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
							<p>Direct physical contact is minimised by activity being carried out within enclosed digesters so a low magnitude risk is estimated.</p> <p>Contact with waste is minimal with exception of leaks or spills from unloading of tanker and transfer of filter cake</p>	<p>All operational staff are fully trained in the Site operating procedures and Southern Water's safety and environmental management procedures and are kept up to date on changes. Training includes awareness raising of the potential on-site hazards and health and safety measures to adhere to.</p> <p>Preventative measures will be under continuous review as part of the EMS procedures.</p> <p>Activities are managed and operated in accordance with the EMS – this includes site security measures to prevent unauthorised access. No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification.</p> <p>Access to the Site and waste is restricted by 2.5m high chain link security fence and a 40m wide watercourse which borders the Site. Electronically operated palisade gates secure the main access and are closed at all times when not in use and locked out of hours. The Site also benefits from a CCTV system (normal and thermal), with cameras positioned in key locations around the Site, including one ANPR camera on the main gate.</p> <p>The Site is staffed between 0700-1800 on Mondays to Fridays and between 0700-1500 on weekends. The electric gate is operated by a fob system, for visitors and unauthorised personnel an</p>	

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
								<p>intercom system at the Site entrance is used.</p> <p>Regular inspections of the boundary fencing and buildings are undertaken to ensure that these have not been compromised and continue to prevent easy access to Site. Repairs are undertaken in accordance with the EMS requirements.</p> <p>Key sludge treatment and wastewater treatment activities undertaken within enclosed systems.</p> <p>Approximately 8 tankers per day (220m³) deliver imported liquid sludge to the Site.</p> <p>Vehicle movements around the Site vary depending on what activities are being undertaken. Cake is moved to cake bays once a trailer is full. Cake is removed from the bays frequently during specific land spreading windows – typically throughout the summer months. Waste is removed as required. Therefore, frequent vehicle movements are typically undertaken only by Site staff and maintenance contractors.</p> <p>Operator has produced a hazard review and risk assessment documents relating to this and other types of potential incidents, within the EMS, H&S and O&M manuals.</p>	
Local human population	Explosion of biogas causing the	Respiratory irritation, illness and nuisance to	Air transport	Low	High	Medium	Emissions to air, land or water may	The key sludge treatment and WTW processes are undertaken within enclosed systems such as the anaerobic	Low

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
and local environment.	release of polluting materials to air (smoke or fumes), water or land	local population. Injury to staff, fire fighters or arsonists/vandals. Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality.	Direct run-off from Site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/ groundwater then abstraction.				cause harm to and deterioration of air, land or water. Smoke and fumes may cause irritation, illness or nuisance to local residents and Site staff. An explosion could cause injury to local residents and Site staff from flying debris. Although biogas is flammable, risk of direct physical contact is minimised by activity being carried out within the sludge treatment works and in containerised units or	digestion (AD) and biogas systems. STC sludge storage tanks are covered and not considered a fire risk. Activities are managed and operated in accordance with the EMS, H&S and O&M manuals – this includes site security measures to prevent unauthorised access. No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification. Fire detection equipment is installed in the CHP containers and the boiler building which activate an alarm on detection of a fire. Slam shut valves on biogas lines will automatically close on detection of a fire to prevent any fuel being supplied to the CHP engines or boilers. Training and regular toolbox talks are given to operatives on-site and all operators and staff understand their role in an emergency. The EMS includes procedures relating to maintenance and inspection of bunding of tanks. Site Manager shall ensure the programme PPM is implemented effectively to minimise the probability of fire through faulty plant and equipment. All equipment is checked and calibrated as per the manufacturer’s instructions. Emergency operating procedures are in place.	

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
							locked buildings. Permitted waste types limited to sludges and liquids.	Adequate firefighting measures are implemented on-site. Access to the Site and waste is restricted by 2.5m high chain link security fence and a 40m wide watercourse which borders the Site. Electronically operated palisade gates secure the main access and are closed at all times when not in use and locked out of hours. The Site also benefits from a CCTV system (normal and thermal), with cameras positioned in key locations around the Site, including one ANPR camera on the main gate. The Site is staffed between 0700-1800 on Mondays to Fridays and between 0700-1500 on weekends. The electric gate is operated by a fob system, for visitors and unauthorised personnel an intercom system at the Site entrance is used. 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 the Site. Repairs are undertaken in accordance with the EMS requirements. A Fire Prevention Plan is not required to be submitted for the permit application as the biowaste process on-site is wet anaerobic digestion. However, fire prevention and environmental fire risk assessment procedures are provided in	
Local human population and local environment	Explosion of pressurised tanks due to equipment and/or process failure.	Respiratory irritation, illness and nuisance to local population. Fatality/injury to staff, fire fighters. Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality.		Low	Medium	Low	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke, fumes and material released from tanks may cause irritation, illness or nuisance to local residents and Site staff. Impact from the tank explosion may cause external damages to other equipment,		Low

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
							buildings located close to the epicentre of the explosion.	the EMS and H&S manual (EMS362, H&S204 and H&S440). Firewater is diverted through the drainage system to the head of the works or to storm overflow allowing for contaminated fire water to be contained on-site and treated through the wastewater treatment system. There is also safety zoning of areas under the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)/ Potentially Explosive Atmospheres (PEXA) on-site and smoking is only permitted in designated areas.	
Local human population and local environment	Accidental fire causing the release of polluting materials to air (smoke or fumes), water or land. Equipment failure	Respiratory irritation, illness and nuisance to local population. Injury to staff or fire fighters. Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. Acute or chronic effects to aquatic life, contamination and deterioration	Air transport Direct run-off from Site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/ groundwater then abstraction.	Low	Medium	Low	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke and fumes may cause irritation, illness or nuisance to local residents and Site staff. Although biogas is flammable,	The key sludge treatment and WTW processes are undertaken within enclosed systems such as the AD and biogas systems. STC sludge storage tanks are covered but and not considered a fire risk. Activities are managed and operated in accordance with the EMS, H&S and O&M manuals including, fire and spill management. Fire detection equipment is installed in the CHP containers and the boiler building which activate an alarm on detection of a fire. Slam shut valves on biogas lines will automatically close on detection of a fire to prevent any fuel being supplied to the CHP engines or boilers.	Low

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
		of land and water quality.					<p>risk of direct physical contact is minimised by activity being carried out within the sludge treatment works and in containerised units or locked buildings.</p> <p>Risk of accidental combustion of waste is minimal.</p> <p>Permitted waste types limited to sludges and liquids</p>	<p>A Fire Prevention Plan is not required to be submitted for the permit application as the biowaste process on-site is wet anaerobic digestion. However, fire prevention and environmental fire risk assessment procedures are provided in the EMS, H&S manual and Safety Instruction Book (SIB) (EMS362, H&S204, H&S440, and SIB603). There is also Safety zoning of areas under DSEAR/PEXA on-site and smoking is only permitted in designated areas.</p> <p>Firewater is diverted through the drainage system to the head of the works or to storm overflow allowing for contaminated fire water to be contained on-site and treated through the wastewater treatment system.</p> <p>Training and regular toolbox talks are given to operatives on-site and all operators and staff understand their role in an emergency. The EMS and Safety Instruction Book (SIB) includes procedures relating to maintenance and inspection of bunding of tanks, spills and environmental incidents.</p> <p>Site Manager shall ensure the programme of PPM is implemented effectively to minimise the probability of fire through faulty plant and equipment. All equipment is checked and calibrated as per the manufacturer's instructions.</p> <p>Emergency operating procedures are in place.</p>	

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
								Adequate firefighting measures are implemented on-site.	
Local human population and local environment.	Arson and/or vandalism causing the release of pollution materials to air (smoke and fumes), water or land	Respiratory irritation, illness and nuisance to local population. Injury to staff, fire fighters or vandals/arsonists. Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality.	Air transport Spillages and contaminated firewater by direct run-off from Site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/groundwater then abstraction.	Low	Medium	Low	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke and fumes may cause irritation, illness or nuisance to local residents and Site staff. Although biogas is flammable, risk of direct physical contact is minimised by activity being carried out within the sludge treatment works and in containerised units or	The key sludge treatment and WTW processes are undertaken within enclosed systems such as the AD and biogas systems. STC sludge storage tanks are covered but and not considered a fire risk. Activities are managed and operated in accordance with the EMS, H&S and O&M manuals – this includes site security measures to prevent unauthorised access, fire explosions and spill management. No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification. Fire detection equipment is installed in the CHP containers and the boiler building which activate an alarm on detection of a fire. Slam shut valves on biogas lines will automatically close on detection of a fire to prevent any fuel being supplied to the CHP engines or boilers. A Fire Prevention Plan is not required to be submitted for the permit application as the biowaste process on-site is wet anaerobic digestion. However, fire prevention and environmental fire risk assessment procedures are provided in the EMS and H&S manual (EMS362, H&S204 and H&S440). There is also Safety zoning of areas under	Low

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
							locked buildings. Risk of accidental combustion of waste is minimal. Permitted waste types limited to sludges and liquids	DSEAR/PEXA on-site and smoking is only permitted in designated areas. Training and regular toolbox talks are given to operatives on-site and all operators and staff understand their role in an emergency. The EMS includes procedures relating to maintenance and inspection of bunding of tanks, spills and environmental incidents. Site Manager shall ensure the programme of PPM is implemented effectively to minimise the probability of fire through faulty plant and equipment. All equipment is checked and calibrated as per the manufacturer's instructions. Emergency operating procedures are in place. Adequate firefighting measures are implemented on-site. Access to the Site and waste is restricted by 2.5m high chain link security fence and a 40m wide watercourse which borders the Site. Electronically operated palisade gates secure the main access and are closed at all times when not in use and locked out of hours. The Site also benefits from a CCTV system (normal and thermal), with cameras positioned in key locations around the Site, including one ANPR camera on the main gate. The Site is staffed between 0700-1800 on Mondays to Fridays and between 0700-1500 on weekends. The electric gate is operated by a fob system, for	

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
								visitors and unauthorised personnel an intercom system at the Site entrance is used. 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 the Site. Repairs are undertaken in accordance with the EMS requirements. Firewater is diverted through the drainage system to the head of the works or to storm overflow allowing for contaminated fire water to be contained on-site and treated through the wastewater treatment system.	
Local human population and local environment.	Operator Error	Pollution to air, land, surface water and groundwater and human health	Air transport Direct run-off from site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/groundwater then abstraction.	Low	Medium	Low	Possible contamination to air, land, groundwater and surface water.	Activities to be managed and operated in accordance with the EMS and management plans and procedures implemented. All equipment is checked under preventative maintenance plans and is checked and calibrated as per the manufacturer's instructions. Overall management of the site is overseen by an experienced member of staff holding an appropriate Certificate of Technical Competence (CoTC) awarded by the Waste Management Industry Training and Advisory Board. This competent person delegates responsibilities to appropriately experienced and trained site operatives throughout the operating hours.	Low

Data and information				Judgement			Action (by permitting)		
Receptor	Source	Hazard	Pathway	Probability of exposure	Consequence	Magnitude of risk	Justification for magnitude	Risk management	Residual risk
								<p>All operational staff are fully trained in the Site operating procedures and Southern Water's safety and environmental management procedures and are kept up-to-date on changes. Training includes awareness raising of the potential implications of failure to control operations and the potential impact on the environment.</p> <p>Preventative measures will be under continuous review as part of the EMS procedures.</p> <p>Emergency operating procedures are in place and detailed in the Site's Operational Contingency Plan</p> <p>Senior site-based management have direct responsibility for implementing risk management measures.</p>	

5 Reporting and Recording

5.1 Reporting

The procedure employed by Southern Water for reporting, recording, investigating and responding to incidents or breaches of the permit is the EPR notification procedure. Notifications must be made to the Environment Agency without delay and within 24 hours of the detection of an accident that has caused, is causing or may cause significant pollution or a breach of a limit specified in the site's Environmental Permit.

If an incident with potentially significant environmental consequences occurs, Southern Water will notify the Environment Agency without delay. Southern Water will also inform the Environment Agency should any complaints be received directly to the site due to the incident and will advise what remedial measures or actions have been taken to address the issue. Copies of complaints received will be made available to the Environment Agency for review on request.

Routine operation of the installation is subject to the conditions of the site permit which details various requirements for actions and reporting for both routine and non-compliance.

The permit sections typically include:

- **Section 1 - Management of Installation** - General management of the site, including handling and disposal of wastes
- **Section 2 Operation of Installation** - General operation of permitted activities and improvements
- **Section 3 Emissions and Monitoring** - Routine monitoring of all emissions (e.g. odour), including annual reporting of specified point emissions (e.g. various specified exhaust gases from CHPs)
- **Section 4 Records and Reporting** - An important section that includes the reporting of non-compliance with any permitted element. The major elements of concern would be:
 - Loss of containment of gaseous substance
 - Loss of containment of liquid substance
 - Equipment / plant failure causing loss of gas or liquid – inclusive of routine emissions monitoring.

Any losses or failures to comply with these areas require immediate notification to the Environment Agency, followed by "Schedule 6, Part A Notification" by email or paper means. The Part A must be submitted within 24hrs of detection of failure. "Part B" notification would then follow giving supporting information as soon as practicable.

Handling of the incidents on site will be in line with relevant internal incident and accident procedures. These are all subject to audit via internal and external audit protocols.

5.2 Recording

In the event of an accident, a Schedule 6 notification is completed following an incident with potentially significant environmental consequences. Relevant information that must be recorded includes:

- Date, time and location of the event
- Substances involved, including estimated quantities

- Immediate measures taken to minimise environmental impacts

Part A must be completed within 24 hours of detection of the incident and Part B is completed as soon as practicable. Records will be made of all incidents with potentially significant environmental consequences that occur at the site. The associated actions arising will be held in Corporate Documents.

All records of events with potentially significant environmental consequences and the associated actions arising will be retained as required by the Environmental Permit. Where an incident with potentially significant environmental effects occurs, and the nature of the incident supports further investigation, a post incident review may be required.

5.3 Post-incident Review

Following an incident where potentially significant environmental effects occur, and the nature of the incident warrants it, the incident will be logged and an investigation will take place to determine both the root cause of the incident and how to prevent the incident re-occurring.

This review will assess:

- The cause of the incident
- The effectiveness of the response measures
- The effectiveness of the emergency response management team
- Lessons learned
- Recommendations for improvement

The findings of the investigation will be reported to Southern Water's management and shared with all relevant employees to enable the incorporation of good practice into future works.

Any changes to processes or procedures required as a result of the formal review will be communicated to Southern Water management and employees. If, as a result of the incident, this Accident Management Plan is subject to revision, it should be updated as part of this post-incident review and communicated to relevant Southern Water management and employees.

All safety equipment used to respond to an incident should be checked and replenished as required.

5.4 Competence and Training

Staff at the site have the competency to manage and operate activities without causing pollution. Competency is ensured through the appropriate training of all staff, covering:

- Awareness of the regulatory implications of the Environmental Permit and AMP for the activity and their 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 Environmental Permit
- Prevention of accidental emissions and action to be taken if accidental emissions occur

All staff are aware of the implications of activities undertaken including the operation of the Site. Staff have clearly defined roles and responsibilities. Skills and competencies necessary for key posts are documented and records of training needs and training received for these posts maintained.

Training in the actions to be taken in the event of an accident or emergency is provided to all

Operator and Contractor staff working on site as part of their mandatory site induction procedure. All staff are required to demonstrate their understanding of the AMP, and the actions and procedures contained therein, prior to undertaking any activities on-site. It is the responsibility of the Works manager to ensure that all staff members have received this training.

Regular installation drills are undertaken to ensure that all staff are aware of the actions to be taken in the event of an accident or emergency and those staff with specific responsibilities are fully versed in their duties.

Copies of the AMP are available for the review of all staff.

6 Emergency Response Procedures (ERP)

The following Hazards are addressed in specific Emergency Response Procedures (ERP) which will be located at each Emergency Control Centre.

- Fire
- Explosion
- Pollution
- Flooding
- Road traffic accident impact or collision
- Collapse of a structure or building
- Spill transferring wastes
- Spills transferring chemicals
- Overfilling vessels
- Plant and equipment failures
- Containment failure
- Failure to contain firewater
- Incorrect connection leading to releases to drains and other systems
- Incompatible substances coming into contact

In the event of one or combination of the following incidents occurring, the actions listed in the relevant ERP must be followed

6.1 Fire

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	Action
		Use the Model Fire Emergency plan on the H&S notice Board and in the Grab Pack container. This Model Emergency plan outlines responsibilities for site staff and call out staff during events.
		Raise the Site Alarm - call 999 and raise the alarm with the DM / RCC.
		SW rules are that we only fight fire to evacuate area or building.
		Attend the muster point and check register for any missing persons.
		If it is safe to do so, isolate any fuel sources.
		Make sure the fire brigade first response team are handed the site Grab Pack on arrival.
		Liaise with the fire brigade on the area, mention if anyone is missing and confirm what is stored on site (e.g. chemicals, combustible materials, BIOGAS systems etc)
		Refer to plan of Fire Hydrants / Final effluent / Potable water points for use if required.

6.2 Explosion

N/A	Done	The Incident controller will: -
		Raise the Site Alarm - call 999 and raise the Alarm with the DM / RCC.
		Attend the muster point and check register for any missing persons.
		Make sure the fire brigade first response team are handed the Grab pack on arrival.
		Liaise with the fire brigade on the area, mention if anyone is missing and confirm what is stored on site (e.g. chemicals, combustible materials, biogas systems etc – as per Sections above)

N/A	Done	The Incident controller will: -
		Refer to plan of Fire Hydrants / Final effluent / Potable water points for use if required.

6.3 Pollution

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	Action
		Use the Pollution 30 Minute Plan.
		Consider whether the pollution event can be mitigated or stopped - use the 10-minute checks. If it is safe to do so, isolate the equipment to stop the pollution, the consequence of isolating any equipment needs to be considered.
		If not raise the Alarm with the FEC / Process scientist in hours and DM / RCC/ FEC out of hours.
		Liaise with the FPM/ Process scientist in hours & DM / RCC/ FEC out of hours to reduce the impact.

6.4 Flooding

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Use the Pollution 30 Minute Plan.
		Raise the site alarm – call 999 as soon as the site starts to flood and notify the DM / RCC.
		Attend the muster point and check register for any missing persons.
		If it is safe to do so, try to understand why the site is flooding. This may be obvious like the river is overflowing – the river levels are controlled by the Environment Agency so it may be possible to be managed quickly.
		Make sure the Fire brigade/first response team are handed the KFB Grab pack on arrival.
		Liaise with the fire brigade on the area, mention if anyone is missing and confirm what is stored on site (e.g. chemicals, combustible materials, biogas systems etc)

6.5 Road traffic accident impact or collision

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Raise the Site alarm - call 999 and raise the alarm with the DM / RCC.
		Keep the area isolated, do not move vehicles other than for freeing people.
		Cordon off area if the impact or accident is serious.
		Await instruction from the fire brigade or police depending on the nature of the event.
		Please see plan of Fire Hydrants / Final effluent / Potable water points for use if required.
		For leaking tankers after the event (Fuel or Chemicals) put out spill containment if safe to do so.

6.6 Collapse of a structure or building

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Raise the alarm - call 999 and raise the alarm with the DM / RCC.
		Attend the muster point and check register for any missing persons.

N/A	Done	The Incident controller will: -
		Keep the area isolated, do not move debris other than for freeing people.
		Cordon off area if the collapse is serious.
		Await instruction from the fire brigade or police depending on the nature of the event.
		Please see plan of Fire Hydrants / Final effluent / Potable water for use if required.

6.7 Spill transferring wastes

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Use the Pollution 30 Minute Plan.
		Stop the transfer if safe to do so and isolate if possible - complete Personnel Risk Assessment first.
		Contain the spill if safe to do so, using spill kits if small amounts, cover drains if possible
		Determine what has been spilt and where it has gone (i.e. to ground, to the site drains etc.)
		Report the incident to the FPM/DM/RCC.
		Discuss the impact of the spill with the FPM /Process Scientist/DM.

6.8 Spills transferring chemicals

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Use the Pollution 30 Minute Plan.
		Stop the transfer if safe to do so and isolate if possible - complete Personnel Risk Assessment first.
		Contain the spill, if safe to do so, using spill kits if small amounts, cover drains if possible
		Determine what has been spilt and where it has gone (i.e. to ground, to the site drains etc.)
		Report the incident to the FPM/DM/RCC.
		Discuss the impact of the spill with the FPM /Process Scientist/DM.

6.9 Overfilling vessels

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Stop the transfer if safe to do so and isolate if possible - complete Personnel Risk Assessment first.
		Use the Pollution 30 Minute Plan.
		Contain the spill, if safe to do so, using spill kits if small amounts, cover drains if possible
		Determine what has been spilt and where it has gone (i.e. to ground to the site drains etc.)
		Report the incident to the FPM/DM/RCC.
		Discuss the impact of the spill with the FPM /Process Scientist/DM.

6.10 Plant and equipment failures

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Stop the transfer or process if safe to do so and isolate if possible - complete Personnel Risk Assessment first.
		Use the Pollution 30 Minute Plan.
		Contain the spill, if safe to do so, using spill kits if small amounts, cover drains if possible
		Determine what has been spilt and where it has gone, including Biogas releases (i.e. release to ground, to the site drains or the atmosphere etc.)
		Report the incident to the FPM/DM/RCC.
		Discuss the impact of the spill with the FPM /Process Scientist/DM.

6.11 Containment failure

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Stop the transfer or process if safe to do so by isolation - complete a personal Risk Assessment first.
		Use the Pollution 30 Minute Plan.
		Contain the spill, if safe to do so, using spill kits if small amounts, cover drains if possible
		Determine what has been spilt and where it has gone, including Biogas releases (i.e. release to ground, to the site drains or the atmosphere etc.)
		Report the incident to the FPM/DM/RCC.
		Discuss the impact of the spill with the FPM /Process Scientist/DM.

6.12 Failure to contain firewater

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Use the Pollution 30 Minute Plan.
		Contain the firewater if it is possible to do so, use spill kits if small amounts, cover drains if possible
		Determine what amount has been spilt and where it has gone (e.g. site return WPS, to ground, to the site drains). Consider whether it can be contained and disposed of offsite.
		Report the incident to the FPM/DM/RCC.
		Discuss the impact of the spill with the FPM /Process Scientist/DM. – Process Scientist to risk assess impact.

6.13 Incorrect connection leading to releases to drains and other systems

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Use the Pollution 30 Minute Plan.
		Contain the spill, if safe to do so, using spill kits if small amounts, cover drains if possible
		Determine what amount has been spilt and where it has gone, is it in the site return WPS, has the release been to ground to the site drains. Consider whether it can be contained and disposed of offsite.
		Report the incident to the FPM/DM/RCC.
		Discuss the impact of the spill with the FPM /Process Scientist/DM. – PS to Risk Assessment & impact.

6.14 Incompatible substances coming into contact

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Use the Pollution 30 Minute Plan.
		Keep upwind of any potential fumes.
		Raise the Site alarm - call 999 if any fire or fumes are being generated, raise the Alarm with the DM / RCC.
		Discuss the impact of the spill with the FPM /Process Scientist/DM.
		Contain the liquid solution, if safe to do so, using spill kits if small amounts, cover drains if possible
		Determine what amount has been spilt and where it has gone (e.g. released to site return WPS, to ground, to the site drains). Consider whether it can be contained and disposed of offsite.
		Check the site COSHH register for both or all the components for likely reactions.

6.15 Emission of effluent or Biogas before composition checked

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Use the Pollution 30 Minute Plan.
		Remember this emission may be a release of biogas to atmosphere. (We are Not able to sample biogas).
		Sample the effluent if it is safe to do so and notify the FPM/ Process scientist of results.
		Discuss the impact of the spill with the FPM /Process Scientist/DM for next steps.
		Report the incident to the DM/RCC/ SW Pollution team for Info.
		Stop the transfer if safe to do so and isolate if possible - complete Personnel Risk Assessment first.
		Contain the release if safe to do so, if there are spare containment tanks utilise these via discussion with Incident team.
		Stop the process, use site spill kits if small amounts have been spilt, cover drains if possible.
		Determine what has been released and where it has gone (e.g. to ground, to the site drains etc.)

6.16 Theft & Vandalism

The Duty Operator on receiving either an automatic or a personnel-raised alarm will:

N/A	Done	The Incident controller will: -
		Use the Pollution 30 Minute Plan if the vandalism has affected the process.
		Remember pollution emission may be a release of biogas to atmosphere or poor effluent quality or a release from a process or fuel storage vessel to land or a water course.
		Discuss the impact of the theft or vandalism with the FPM /Process Scientist/DM.
		Report the incident to the DM/RCC/ SW Pollution team for inclusion in the morning 24-hour report.
		Make a thorough inspection of the SCADA and a walk of the site if we have had intruders or vandalism on the site as changes may have been made to the process.
		Report any thefts or vandalism to the police and ask for a crime reference number.

A. Grab Pack

[Southern Water](#)
[Queenborough WTW/STC](#)
[Emergency Grab pack.](#)
[Dec 2023.](#)

[Final Draft](#)

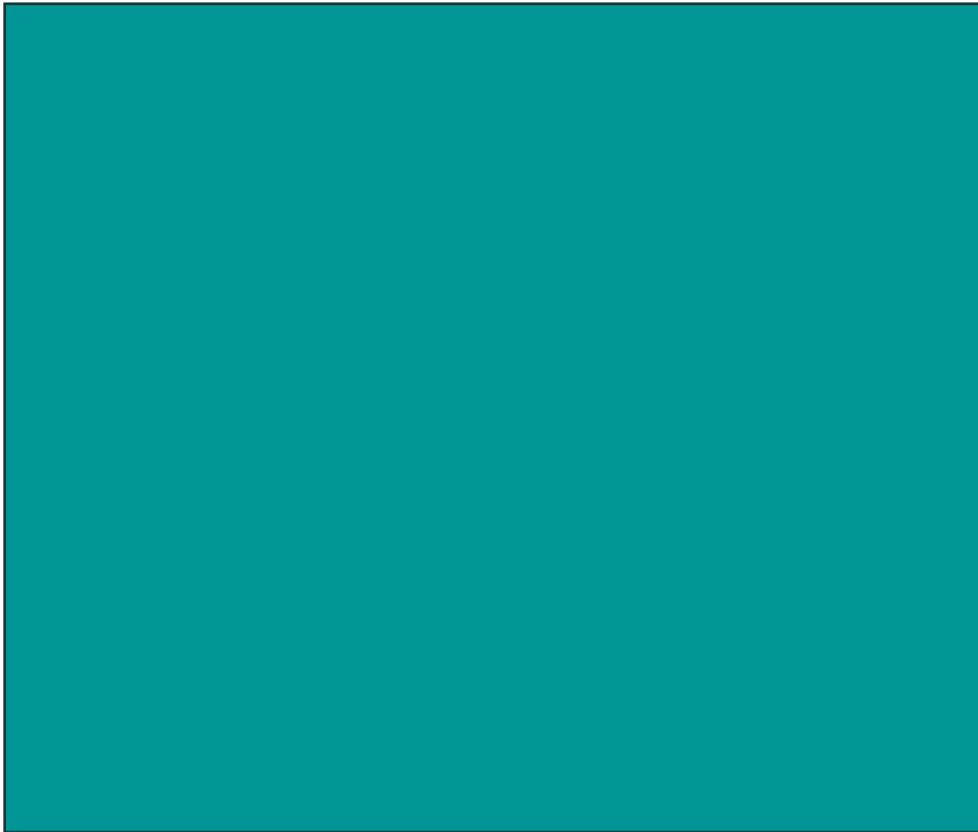


[Version 2.0 Nov 2023](#)

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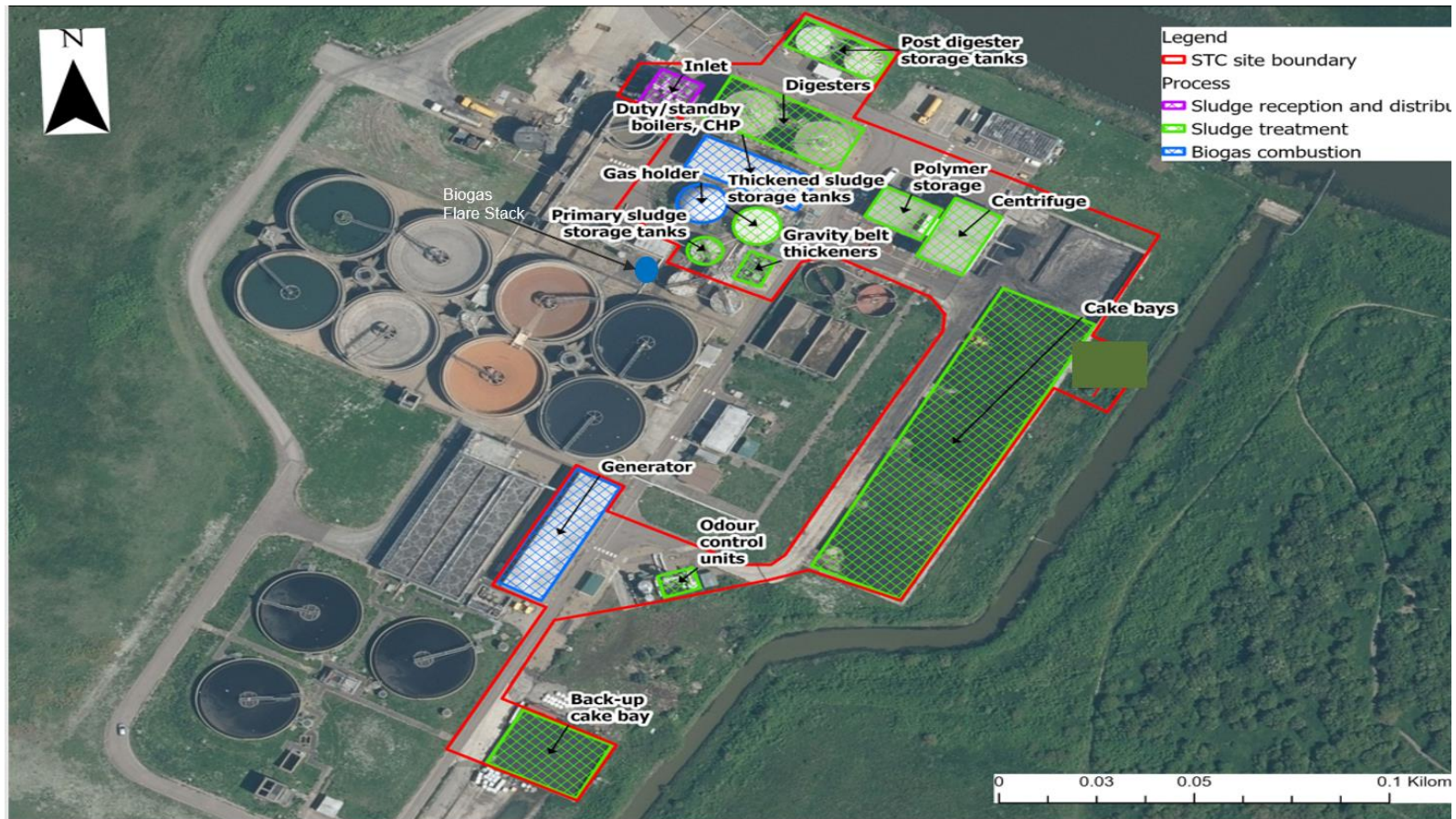
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1. EMERGENCY CONTACT NUMBERS



2. SITE PLANS

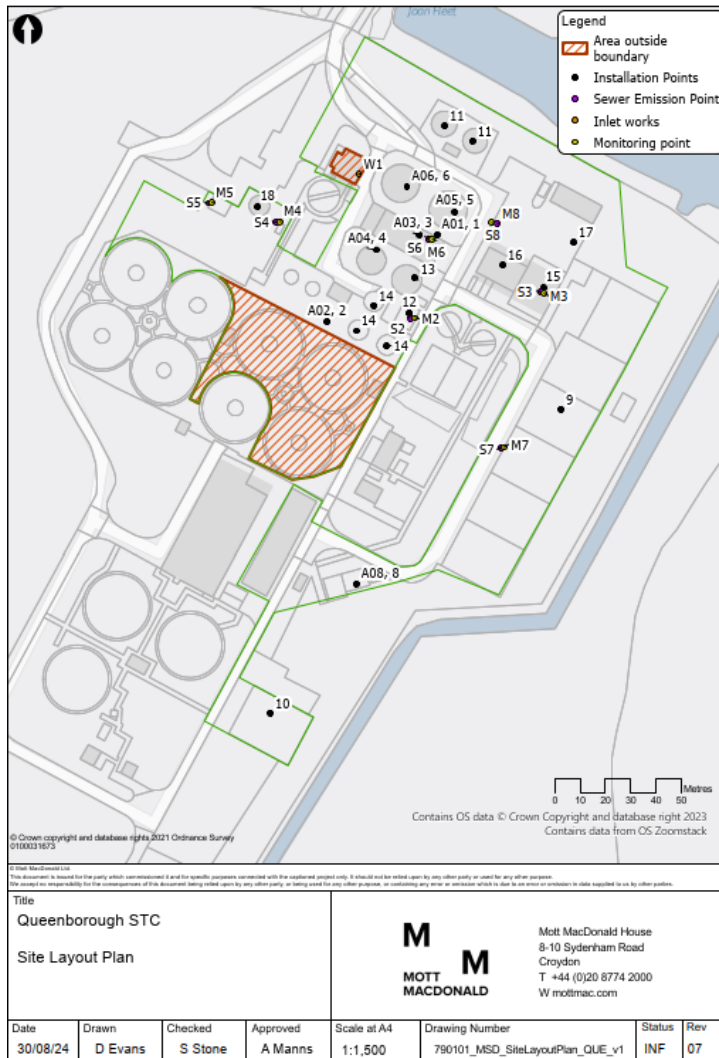
Map of Processes



Map of flammable substances.



Map of biogas systems



Emissions Ref	Emissions Points	Assets Ref	Assets	X	Y
A01	CHP unit	1	CHP	590937	170589
A02	Flare stack	2	Flare	590893	170555
A03	Duty/standby boiler 1 & 2	3	Duty/standby boiler 1, 2 and 3	590930	170589
A04	Whessoe relief valve 1	4	Gas holder	590913	170583
A05	Whessoe relief valve 2	5	Digester 1	590944	170598
A06	Whessoe relief valve 3	6	Digester 2	590925	170608
A08	Odour control units	8	Odour control units x2	590905	170451
S2	GBT Liquors			590926	170556
M2	GBT Liquors			590928	170556
S3	Centrifuge Liquors			590978	170566
M3	Centrifuge Liquors			590979	170566
S4	Sludge Reception			590873	170594
M4	Reception			590875	170594
S5	Surface water drainage			590847	170602
M5	Surface water drainage			590848	170602
S6	Gas condensate			590934	170587
M6	Gas condensate			590935	170587
S7	Surface water			590962	170505
M7	Surface water			590963	170505
S8	Surface water (future bund)			590959	170594
M8	Surface water (future bund)			590961	170594
W1	Inlet works (context only)			590906	170613
		9	Cake bays (6 main bays)	590986	170520
		10	Back-up cake bay	590871	170400
		11	Post digestion storage tanks x2	590940	170632
		11	Post digestion storage tanks x2	590951	170626
		12	Gravity belt thickeners x2	590926	170558
		13	Thickened sludge storage tank	590928	170572
		14	Sludge storage tank 1	590912	170561
		14	Sludge storage tank 2	590917	170545
		14	Sludge storage tank 3	590905	170551
		15	Centrifuges x2	590979	170568
		16	Polymer storage	590963	170577
		17	Waste management area on hardstanding	590991	170586
		18	Sludge Reception	590866	170600

AX: Air emissions SX: Sewer emission points MX: Monitoring Points



3. MATERIALS & CHEMICALS STORAGE ON SITE

List of combustible materials stored on site.

WASTE INVENTORY (See EMS 480)					
Trade Name/ Substance	Solid/liquid/ gas/powder	UN Number	Max Stored on Site	Location Marked on Site Plan	Type of Containment
Biogas	Biogas	UN1971	<1200 m3 max	Biogas Holder 570m3 Headspace. Digester Headspace 326m3 Headspace 10% pipelines Etc.	Gas bag Digesters Pipelines Flare Stack CHP Engine.
Diesel Oil	Liquid	1202	30m3	Next to the boiler and blower house	Tank
Sludge	Liquid	Non - Hazardous	270m3	Sludge Reception Tank	Tank
Sludge Cake	Dried Cake	Non - Hazardous	<6000m3	Cake Bays	Bays
Polymer	Powder	UN2923	8 X 1m3/750kg bags	Inside centrifuge building	Bags
Lime (Dust).	Solid (granules)	UN1956	Variable this is an unusual activity	Cake Bays	In bags
Gas Cylinders	Gas	N/A	Welding / burning Equip.	Stored in Workshop.	Gas Bottles stored in a locked building overnight.
Ferric Sulphate	Liquid	UN2582	14 cub m	Number 8 on site plan.	Storage tank.

Aerosol Leaks of Biogas	Gas	UN1971	Not Known as would be formed by leaks	Biogas Holder area Digester headspace	Gas bag Digesters Pipelines Flare Stack CHP Engine
JCB Loader / MTS Tankers & Chemical Delivery tankers.	Diesel Powered	N/A	Diesel Fuel tank on machine	Stored in workshop marked as building 4 on plan out of hours but may be anywhere on site.	Vehicle stored in a locked building overnight.

Likely combustible waste management.

Paper or cardboard – this is controlled by using sealed bins.

Plastics – We do not store plastic waste other than in recycle Bins.

Rags and textiles – rag is managed in skips by MTS for composting.

Scrap metals contaminated or mixed with other waste such as oils or plastics – managed by Southern Water Scrap metal skips and Fly tipping requests to empty skips.

De-polluted and un-depolluted ELVs – We do not break ELV's

Refuse derived fuel (RDF) and solid recovered fuel (SRF) – N/A.

Compost and plant material – Managed by MTS on SW behalf.

Biomass – Managed In process control and via sludge cake.

Mixed waste containing any combustible wastes – Via Sealed bins.

Sludge cake Storage in cake bays.

Lime used to treat Sludge cake could be stored on Cake Bays if in use.

WEEE – Managed via Locked Wee containers.

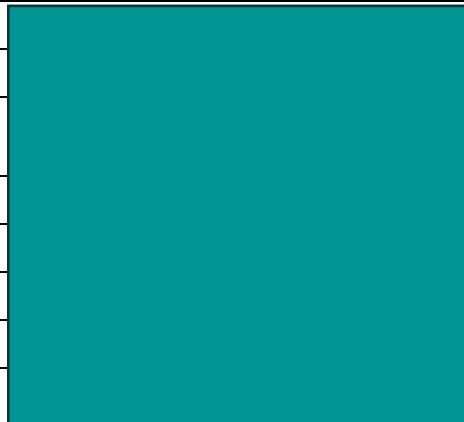
Wood – Pallets are stored on site.

Non-Combustible.

CHEMICAL PRODUCT INVENTORY (See relevant COSHH sheets)					
Trade Name/ Substance	Solid/liquid/ gas/powder	UN Number	Max Stored on Site	Location Marked on Site Plan	Type of Containment
Antifoam	Liquid	N/A	1m3	Outside centrifuge building.	Intermediate Bulk Container (IBC)
Polymer	Liquid	2923	8 x 1050 kg as liquid in IBC	Inside centrifuge building	IBC
Wastewater	Liquid	N/A	2582m3	2 x Storm Tank	Tank
Wastewater	Liquid	N/A	5458m3	4 X Primary Settlement Tanks	Tanks
Wastewater	Liquid – Non-Buoyant	N/A	3709m3	Aeration Lanes	Lanes
Wastewater	Liquid	N/A	3868m3	6 X Final Settlement Tanks	Tanks
Sludge	Liquid	N/A	2320m3	2 X Digesters	Tanks

Sludge	Liquid	N/A	518m3	Thickened Sludge Storage Tank	Tank
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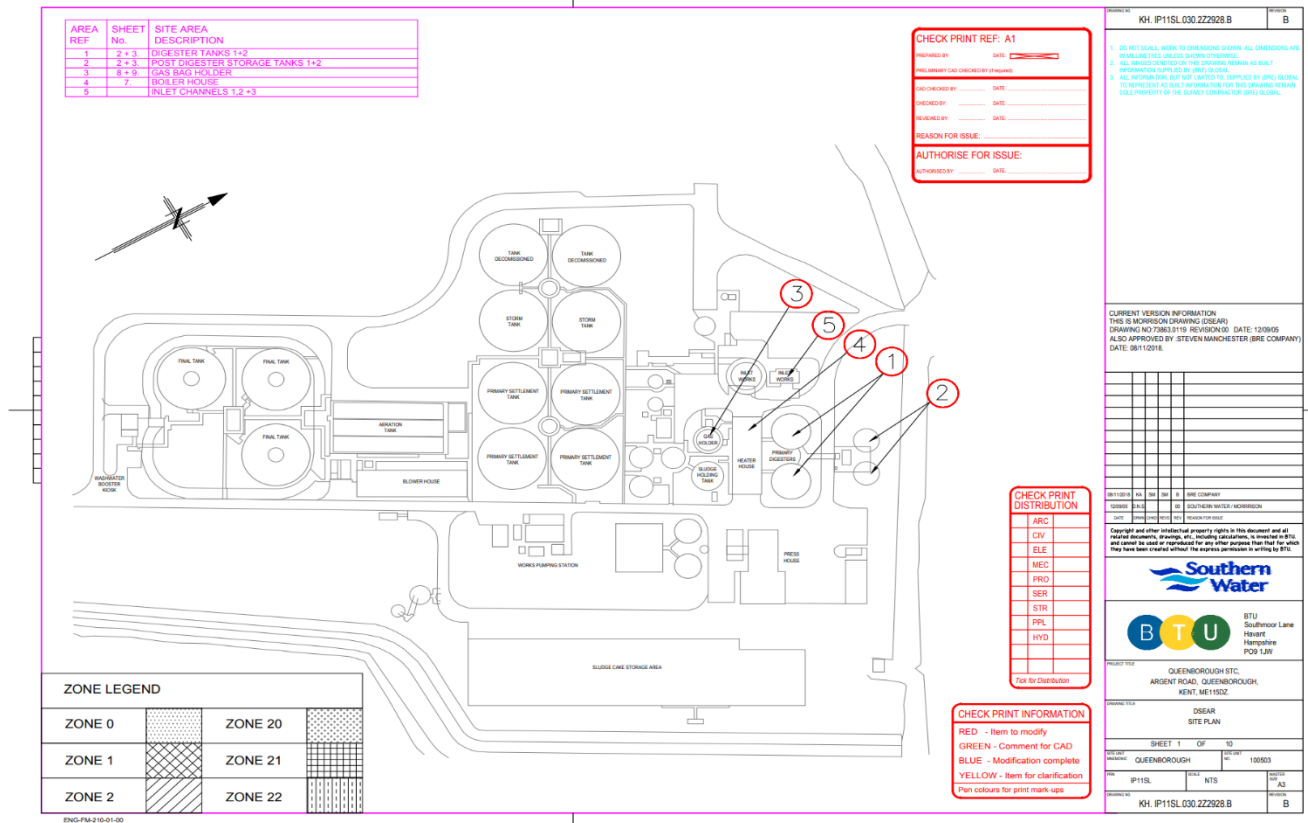
4.LOCATION OF FIRE EXTINGUISHERS ON SITE.

POLLUTION PREVENTION EQUIPMENT INVENTORY (ON AND OFF-SITE RESOURCES) ILLUSTRATED ON HAM HILL IMP MAP		
Location	Amount	Staff Contact
Inside Generator room	2	
Inside Inlet	2	
Inside Aeration/ blower house	6	
Boiler house	5	
Inside centrifuge building	3	
Inside office building	9	
Inside centrifuge building, Generator room ,Ferric Kiosk and oil store	4	

5. WASHATER MAINS & FIRE HYDRANTS



6.DSEAR DRAWINGS



DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



5 Risk assessment

For each hazardous area a risk assessment table has been compiled, giving a risk rating for the identified ignition hazards. The likelihood rating given to sparks generated by equipment is based on the number of non-ATEX equipment present. Equipment in each zoned area was catalogued. Where applicable any hazardous areas allocated are illustrated in hazardous zoning drawings of the site and relevant equipment.

5.1 Preliminary treatment

5.1.1 Inlet works

The inlet works at Queenborough STC are located below a grid walkway open to the atmosphere as can be seen in Figure 1.

According to Southern Water's MED 4004 2015^[3], the inlet works have been allocated a zone 2 classification within the channel area. Therefore, the inlet works are zoned between the liquid surface and the grid walkway as far as screening.



Figure 1: Inlet works.

Raw sewage inlet works

Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks and hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones are not allowed to be taken into zoned areas. Signs present	1	2	2
Lightning	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	1	2	2

DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



5.2 Storm treatment

The storm treatment is unclassified.

5.3 Primary treatment

According to Southern Water's MED 4004 April 2015^[3] the primary treatment process is unclassified.

5.4 Cake storage

The cake is undigested and is stored outside in open bays and is therefore unclassified.



Figure 2: Cake bays.

DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



5.5 Sludge treatment

5.5.1 Digester 1

There are two digesters at Queenborough STC.
Zone 0 internally and zone 1 externally surrounding the top of the digester.



Figure 3: Digester 1.

Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks & hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones not allowed to be taken into zoned areas. Signs present.	1	2	2
Lightening	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	3	2	6

DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



5.5.2 Digester 2

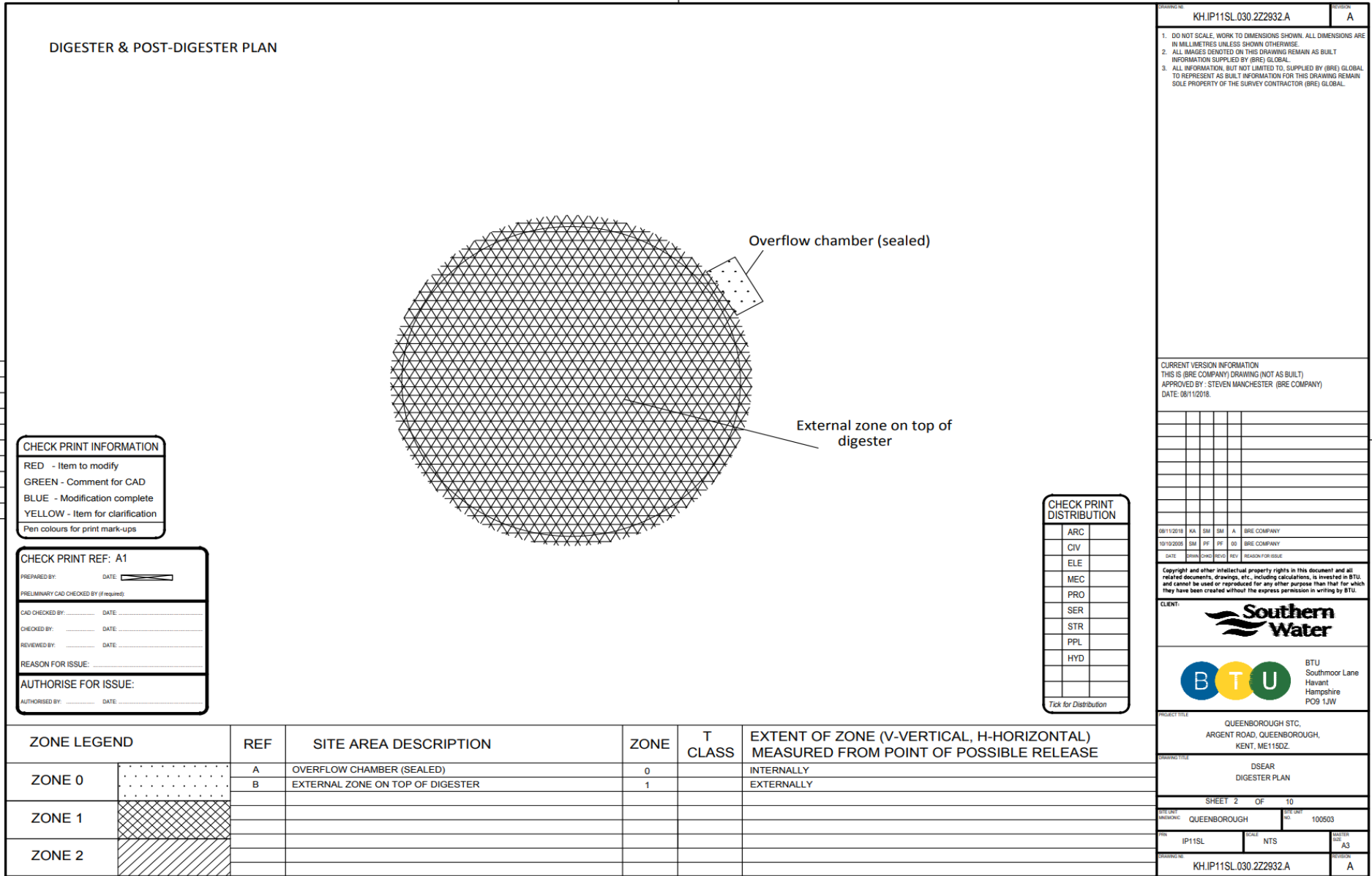
Zone 0 internally and zone 1 externally surrounding the top of the digester.



Figure 4: Digester 2.

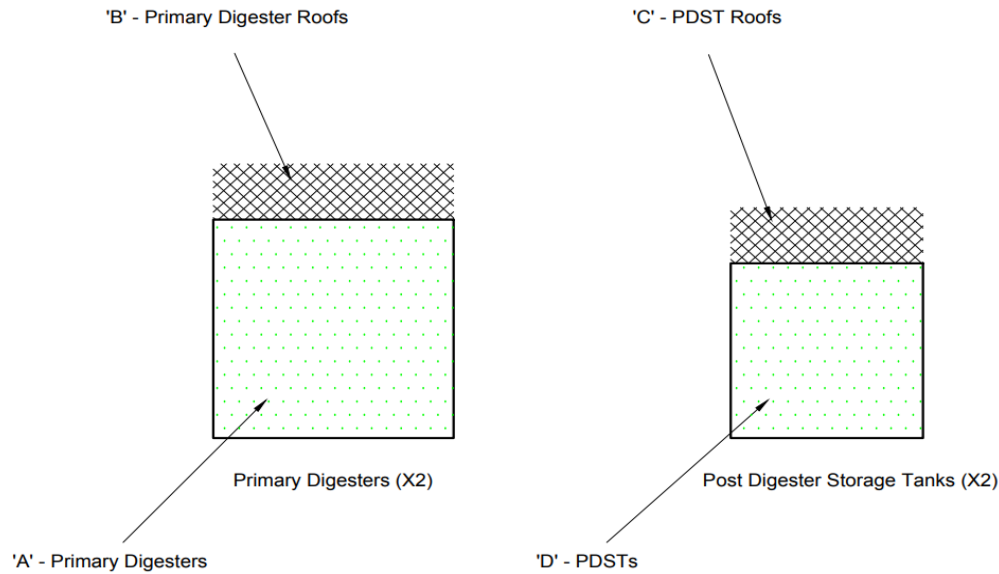
Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks & hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones not allowed to be taken into zoned areas. Signs present.	1	2	2
Lightening	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	2	2	4

The drawing illustrating the extent of the hazardous zoning around the digesters and post-digesters is included in section 5.5.1.



ENG-FM-210-01-00

DIGESTER AND POST-DIGESTER ELEVATION



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DRAWING TITLE DSEAR DIGESTER ELEVATION					
SHEET 3 OF 10					
SITE UNIT / PROJECT NO.	QUEENBOROUGH			SITE UNIT / NO.	100503
FIN	IP11SL	SCALE	NTS		MASTER / NO. / A3
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ZONE LEGEND		REF	SITE AREA DESCRIPTION	ZONE	T CLASS	EXTENT OF ZONE (V-VERTICAL, H-HORIZONTAL) MEASURED FROM POINT OF POSSIBLE RELEASE
ZONE 0		A	PRIMARY DIGESTERS	0	2	INTERNALLY
		B	PRIMARY DIGESTER ROOFS	1	2	EXTERNALLY - 3M 'V' AND 'H' EXTENDING TO THE EDGE OF ROOFS
		C	POST DIGESTER STORAGE TANK ROOFS	1	2	EXTERNALLY - 3M 'V' AND 'H' EXTENDING TO THE EDGE OF ROOFS
ZONE 1		D	POST DIGESTER STORAGE TANKS	0	2	INTERNALLY
ZONE 2						

DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



5.5.3 Condensate traps (digesters 1 & 2)

The two digesters at Queenborough STC each have a dedicated condensate trap.

According to Southern Water's MED 4004 April 2015,^[3] as the condensate trap is above ground, each is allocated a Zone 2, extending 3m around the condensate outlet in all directions.

No Ex signage was observed at either of the condensate traps.



Condensate trap (for digesters 1 & 2)

Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks and hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones are not allowed to be taken into zoned areas. Signs present	1	2	2
Lightning	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	n/a	n/a	n/a

DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



5.5.4 Post digesters 1 & 2

Zone 0 internally and zone 1 externally surrounding the top of the Post digesters.

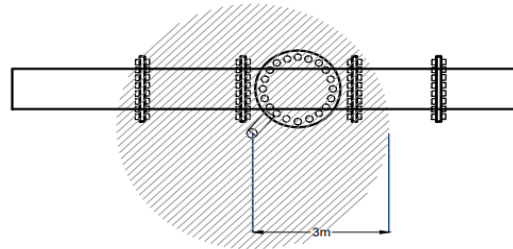


Figure 5: Post digesters.

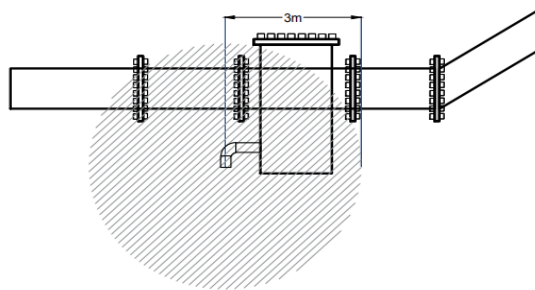
Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks and hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones are not allowed to be taken into zoned areas. Signs present	1	2	2
Lightning	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	3	2	6

The drawing illustrating the extent of the hazardous zoning around the digesters and post-digesters is included in section 5.5.1.

DIGESTER CONDENSATE TRAP RELEASE POINT – HAZARDOUS AREA DIAGRAM PLAN



DIGESTER CONDENSATE TRAP RELEASE POINT – HAZARDOUS AREA DIAGRAM ELEVATION



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ZONE 0	A	PRIMARY DIGESTERS (x2)	2		EXTERNALLY - 3M IN ALL DIRECTIONS FROM SOURCE
ZONE 1					
ZONE 2					

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 KENT, ME115DZ.

DRAWING TITLE
 DSEAR
 DIGESTER CONDENSATE TRAPS

SHEET 4 OF 10

SITE UNIT WORKING	QUEENBOROUGH	SITE UNIT NO.	100503
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DSEAR assessment

Report Number: P104203-1188Q

Issue: 1



5.5.5 Polyelectrolyte

There is one polyelectrolyte dust hopper / dispenser unit on site. The dispenser at Queenborough was surrounded by Perspex below the polyelectrolyte bag.

Following Southern Water's MED 4004 April 2015³, the receiving vessel is allocated a zone 21 classification internally and the external area is allocated a zone 22 classification for 1m.



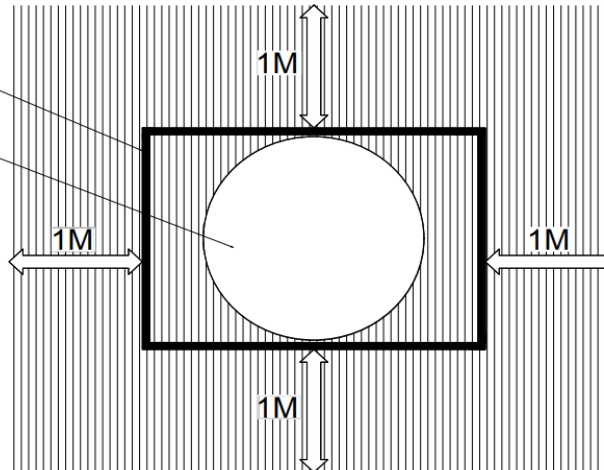
Figure 6: Polyelectrolyte dispenser.

Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks and hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones are not allowed to be taken into zoned areas. Signs present	1	2	2
Lightning	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment or IP5x must be used as a minimum – see catalogued equipment.	2	2	4

POLYELECTROLYTE STATION - PLAN

Support Frame

'A' - Polyelectrolyte Bag



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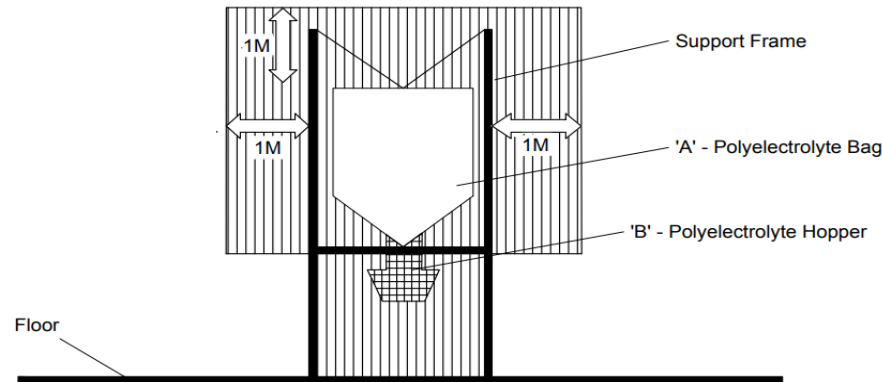
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DRAWING TITLE DSEAR POLYELECTROLYTE STATION PLAN	
SHEET 5 OF 10	
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ZONE LEGEND	REF	SITE AREA DESCRIPTION	ZONE	T CLASS	EXTENT OF ZONE (V-VERTICAL, H-HORIZONTAL) MEASURED FROM POINT OF POSSIBLE RELEASE		
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<table border="1" style="width: 100%; height: 20px;"> <tr> <td style="width: 50%; background-color: #cccccc;"> </td> <td style="width: 50%; background-color: #cccccc;"> </td> </tr> </table>							
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POLYELECTROLYTE STATION - ELEVATION



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NB. The lower half of the polyelectrolyte dispenser frame is surrounded by a Perspex shield. Therefore the Zone 22 does not extend beyond the Perspex.

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SHEET 6 OF 10

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ZONE LEGEND	REF	SITE AREA DESCRIPTION	ZONE	T CLASS	EXTENT OF ZONE (V-VERTICAL, H-HORIZONTAL) MEASURED FROM POINT OF POSSIBLE RELEASE
ZONE 20	A	POLYELECTROLYTE BAG	22	4	EXTERNALLY - 1M 'H' AND 1M 'V' EXTENDING TO FLOOR
ZONE 21	B	POLYELECTROLYTE HOPPER	21		INTERNALLY - WITHIN HOPPER
ZONE 22					

DSEAR assessment

Report Number: P104203-1188Q

Issue: 1



5.6 Gas storage

5.6.1 Boiler house

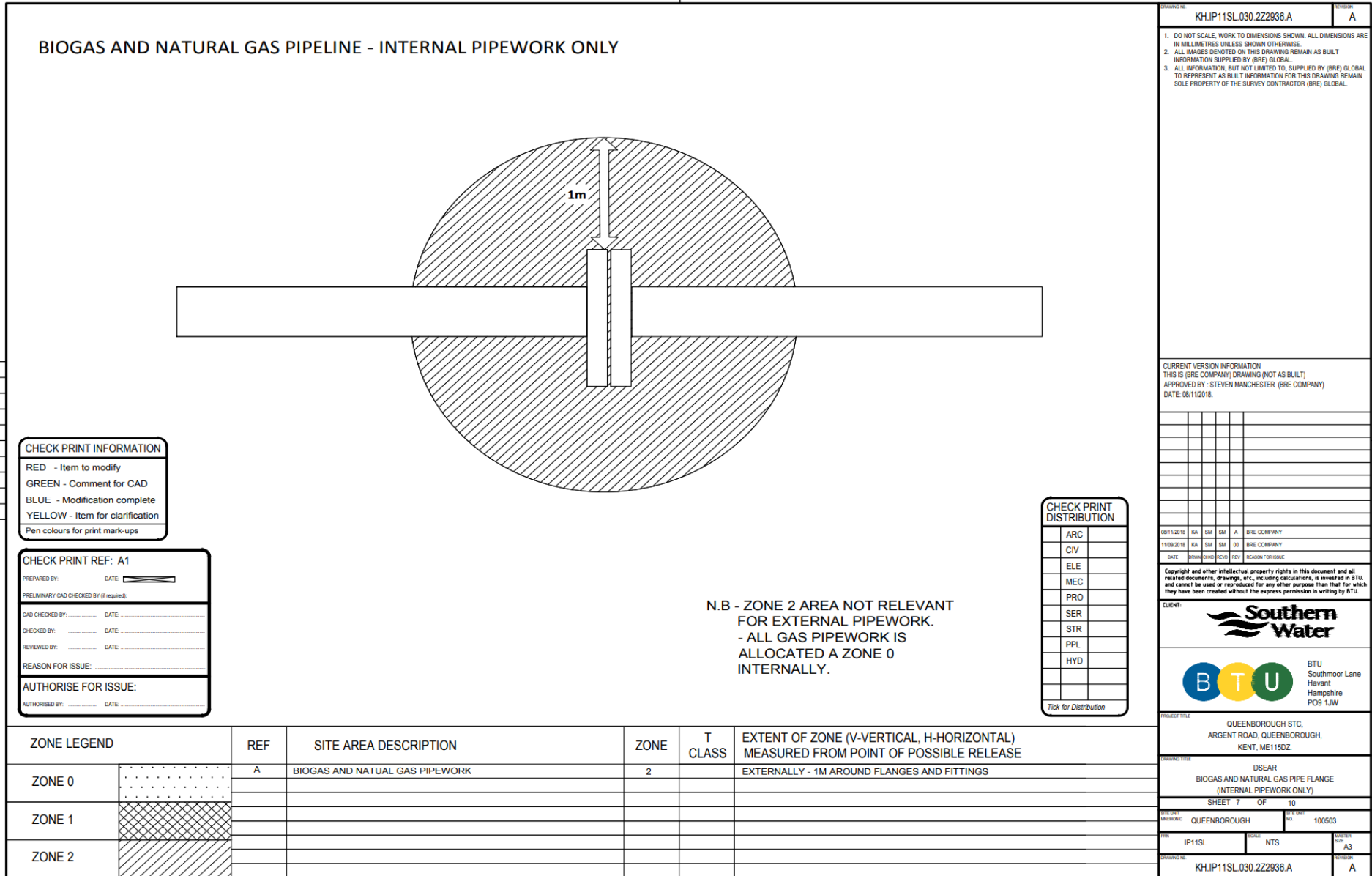
There are two boilers at Queenborough STC. They are located in a boiler house.

A zone 2 hazardous area is allocated extending 1m around all gas flanges and fittings on both natural and biogas pipelines.



Figure 7: Boilers.

Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks and hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones are not allowed to be taken into zoned areas. Signs present	1	2	2
Lightning	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	2	2	4



DSEAR assessment

Report Number: P104203-1188Q
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5.6.2 Gas storage area

5.6.2.1 Double membrane gas bag

A zone 0 was allocated inside inner membrane, zone 1 in outer membrane and zone 2 around PRVs extending 3m. This agrees with Southern Water's MED 4004 April 2015⁽³⁾.



Figure 8: Double membrane gas holder.

Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks and hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones are not allowed to be taken into zoned areas. Signs present	1	2	2
Lightning	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	1	2	2

DSEAR assessment

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5.6.3 Gas booster section

The gas boosters at Queenborough are not located in the gas holder compound but in their own locked compound nearby.

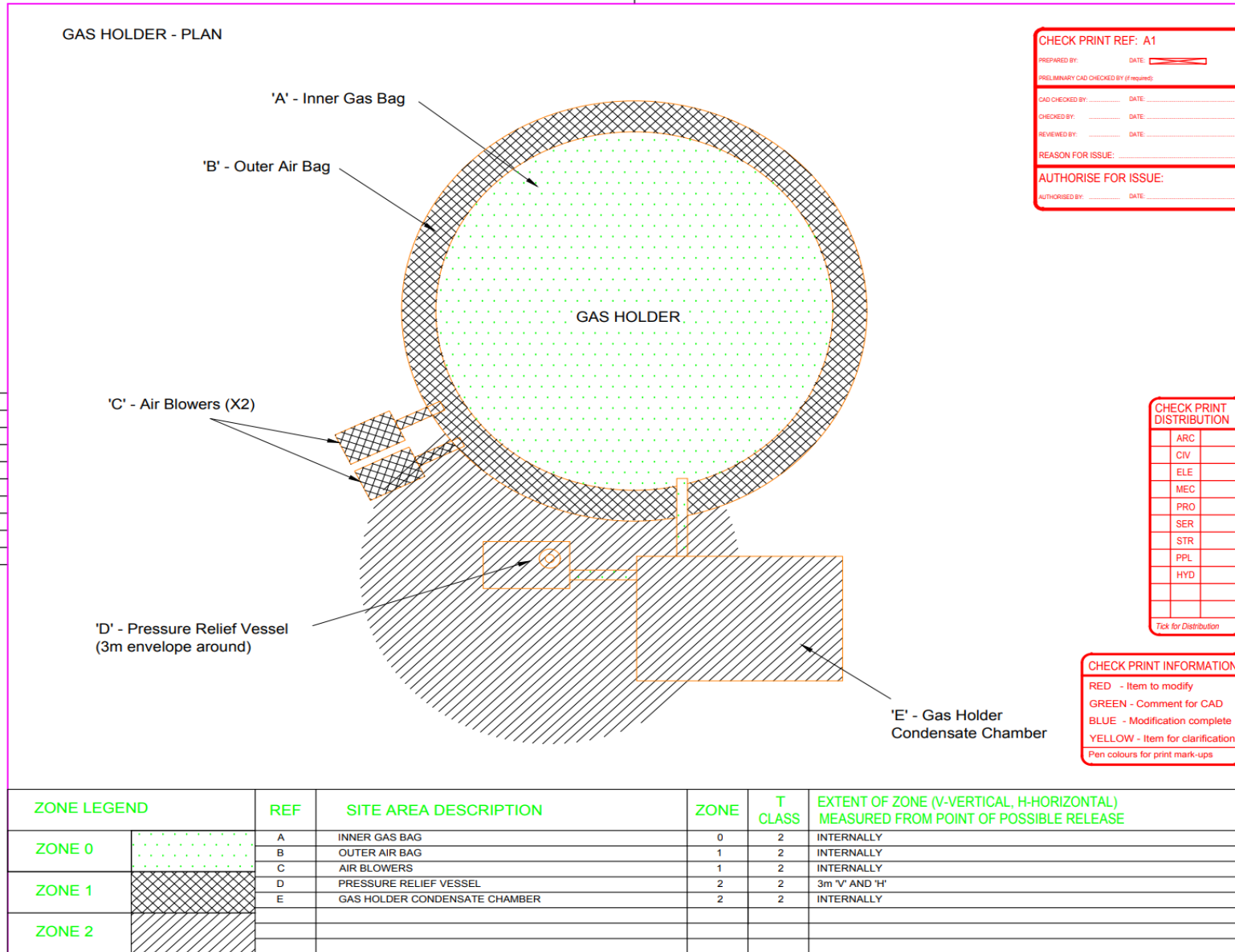
There were two compressors in the compound to compress the gas for mixing in the digesters.

There were also multiple drums of Petro-Canada compressor fluid in the compound. The barrels were on spill grids and according to the MSDS the flashpoint is sufficiently high not to consider the fluid as an explosible risk for DSEAR based on its intended use.



Figure 9: Gas booster compound.

Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks and hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones are not allowed to be taken into zoned areas. Signs present	1	2	2
Lightning	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	2	2	4



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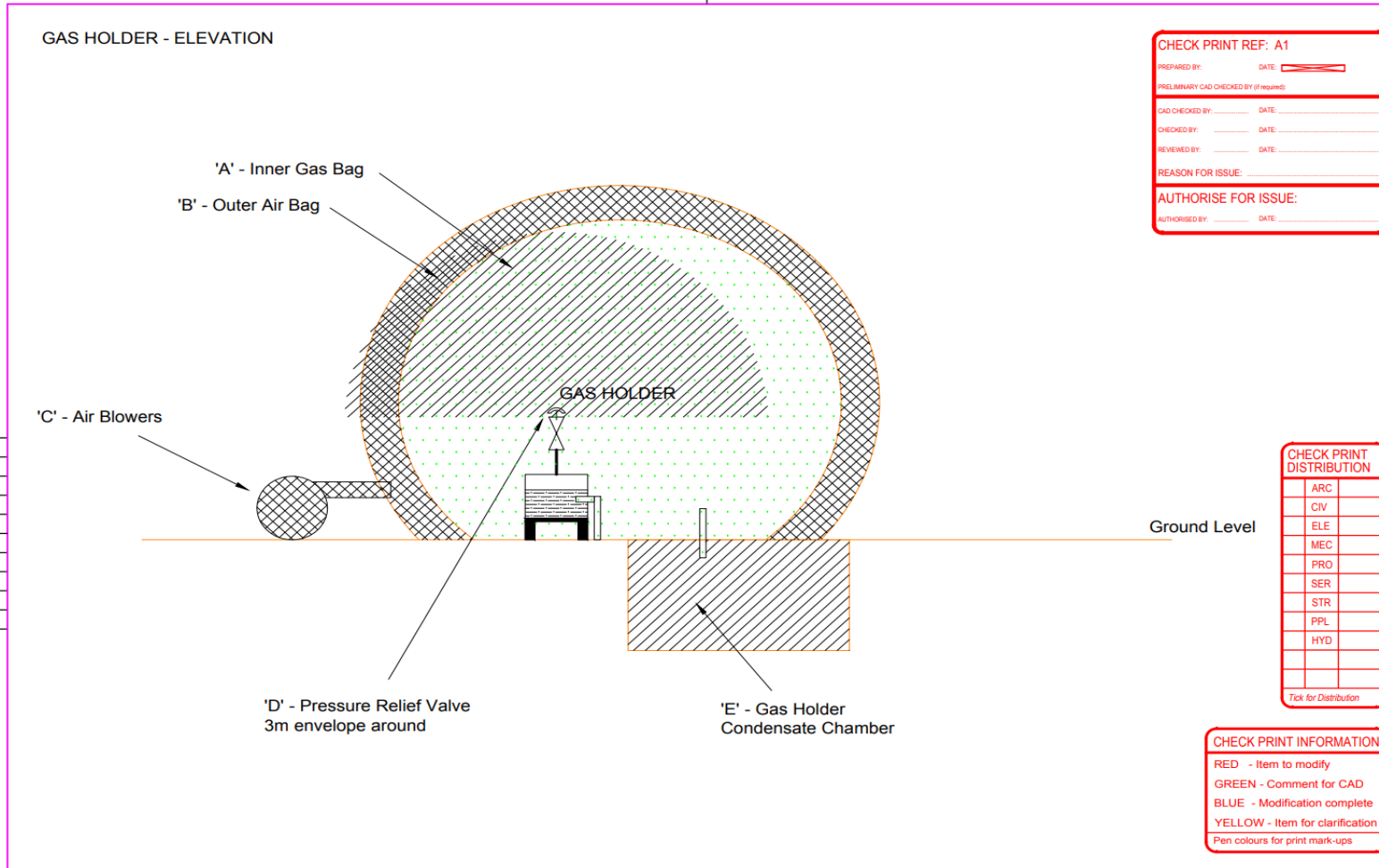
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ZONE LEGEND	REF	SITE AREA DESCRIPTION	ZONE	T CLASS	EXTENT OF ZONE (V-VERTICAL, H-HORIZONTAL) MEASURED FROM POINT OF POSSIBLE RELEASE
ZONE 0	A	INNER GAS BAG	0	2	INTERNALLY
	B	OUTER AIR BAG	1	2	INTERNALLY
	C	AIR BLOWERS	1	2	INTERNALLY
ZONE 1	D	PRESSURE RELIEF VESSEL	2	2	3m 'V' AND 'H'
	E	GAS HOLDER CONDENSATE CHAMBER	2	2	INTERNALLY
ZONE 2					

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ZONE LEGEND		REF	SITE AREA DESCRIPTION	ZONE	T CLASS	EXTENT OF ZONE (V-VERTICAL, H-HORIZONTAL) MEASURED FROM POINT OF POSSIBLE RELEASE
ZONE 0		A	INNER GAS BAG	0	2	INTERNALLY
		B	OUTER AIR BAG	1	2	INTERNALLY
ZONE 1		C	AIR BLOWERS	1	2	INTERNALLY
		D	PRESSURE RELIEF VESSEL	2	2	EXTERNALLY V+H - 3m
ZONE 2		E	GAS HOLDER CONDENSATE CHAMBER	2	2	INTERNALLY

PROJECT TITLE
QUEENBOROUGH STC,
ARGENT ROAD, QUEENBOROUGH,
KENT, ME115DZ.

DRAWING TITLE
DSEAR
GAS HOLDER ELEVATION

SHEET 9 OF 10

SITE UNIT QUEENBOROUGH	SITE UNIT NO. 100503
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DRAWING NO. IP11SL	SCALE NTS	MASTER SHEET NO. A3
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DRAWING NO. KH. IP11SL.030.222930.B	REVISION B
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DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



5.6.4 Flare stack area

According to Southern Water's MED 4004 April 2015,^[3] the flare stack area is unclassified.

BRE concludes the area should be unclassified, however internally the pipework will be allocated a zone 0 classification.

The equipment in the flare stack area was catalogued to determine Ex certification.



Figure 10: Flare stack compound.

DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



5.6.5 Gas condensate traps

There is a single gas condensate trap located next to the car park at Queenborough STC. The condensate trap is covered by a grid, allowing for ventilation.

Based on Southern Water's MED 4004 April 2015,^[3] the condensate trap is allocated a zone 2 internally.

Equipment in condensate traps was not catalogued as BRE aren't contracted to work in confined spaces.



Figure 11: Gas condensate trap.

Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting; sparks and hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones are not allowed to be taken into zoned areas. Signs present	1	2	2
Lightning	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	n/a	n/a	n/a

DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



5.7 Diesel storage

There are three double-skinned diesel storage tanks on site at Queenborough STC. There is also an old, rusted fuel storage tank, see Figure 14. According to the MSDS provided on site, the flashpoint of the fuel was sufficiently high to eliminate the fuel tank from hazardous zoning under DSEAR. It was not clear if the fuel tank was still in use.

According to guidance given in the "Energy Institute: Model code of safe practice Part 15 – Area classification code for installation handling flammable fluids"^[4] the diesel tanks were allocated a zone 1 internally above the liquid level.

As all three diesel tanks are double skinned, no hazardous area classification exists outside the tanks.



Figure 12: Diesel tank 1.



Figure 14: Fuel tank.



Figure 13: Diesel tank 2.



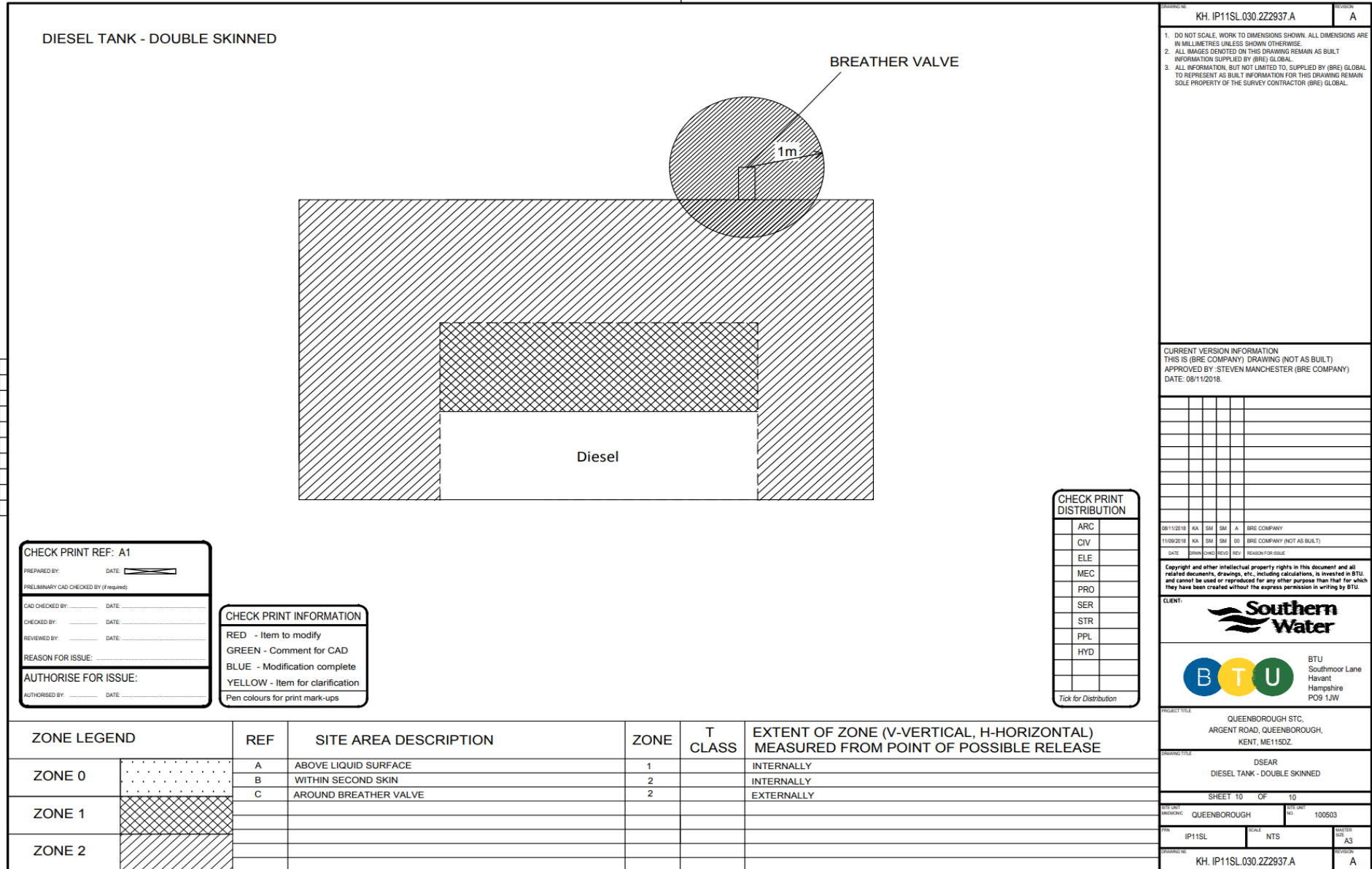
Figure 15: Diesel tank 3.

DSEAR assessment

Report Number: P104203-1188Q
Issue: 1



Hazards	Control measures	Likelihood	Severity	Risk rating
Naked flames	No smoking policy on site except in designated areas. Signs present.	1	2	2
Welding / cutting: sparks and hot surfaces	Permit to work required before maintenance works can be undertaken.	1	2	2
Sparks from mobile phones	Mobile phones are not allowed to be taken into zoned areas. Signs present	1	2	2
Lightning	Exposed zoned areas fitted with protection.	1	2	2
Electrostatic discharge	Earth bonding of equipment.	1	2	2
Sparks from equipment	Ex rated equipment must be used – see catalogued equipment.	n/a	n/a	n/a



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PROJECT FILE
 QUEENBOROUGH STC,
 ARGENT ROAD, QUEENBOROUGH,
 KENT, ME115DZ.

DRAWING TITLE
 DSEAR
 DIESEL TANK - DOUBLE SKINNED

SHEET 10 OF 10

DRAWING NO: QUEENBOROUGH
 NO: 100503

DRAWING NO: KH.IP11SL.030.222937.A
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ZONE LEGEND	REF	SITE AREA DESCRIPTION	ZONE	T CLASS	EXTENT OF ZONE (V-VERTICAL, H-HORIZONTAL) MEASURED FROM POINT OF POSSIBLE RELEASE
ZONE 0 	A	ABOVE LIQUID SURFACE	1		INTERNALLY
	B	WITHIN SECOND SKIN	2		INTERNALLY
	C	AROUND BREATHER VALVE	2		EXTERNALLY
ZONE 1 					
ZONE 2 					

7. FIRE RISK ASSESSMENT

A copy of the Site Fire Risk Assessment needs to be stored with this document.

Electronic link to Site Fire Risk assessment- . [Queensborough STC 2022 FRA.pdf](#)

8. COSHH DATA SHEET

COSHH data sheets for chemicals used on site should be Kept in a folder with the Grab Pack.

Electronic link to the Southern Water COSHH data sheets - [COSHH \(southernwater.co.uk\)](https://www.southernwater.co.uk/coshh)

