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# **Eign IED Permit Application**

Accident Management Plan

December 2022

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Accident Management Plan

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# Issue and Revision Record

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# 1 Introduction

## 1.1 Overview

This Accident Management Plan (AMP) has been prepared by Mott MacDonald, for the Dŵr Cymru Welsh Water (DCWW) who are applying for a varied bespoke environmental permit for the Eign Sludge Treatment Centre (STC) in line with the requirements of the Environmental Permitting Regulations 2016, as amended ('the EP Regulations') and NRW guidance 'How to Comply with your Environmental Permit' v8 Oct 2014. The AMP covers environmental accident management techniques, training information and emergency procedures.

## 1.2 Environmental Management System

DCWW have an Environmental Management System (EMS) Policy. In line with the EMS Policy, the Eign STC will be operated in accordance with the DCWW Quality Management System (IMS).

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

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

DCWW has not established an ISO 14001:2004 for Eign Wastewater Treatment Works (WwTW), although the ISO 14001 guidelines are observed and followed at the Site and DCWW will extend the scope of accreditation to include it, where applicable.

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

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

### Scope of the Environmental Management System

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

### Environmental Aspects and Impacts

#### EN (2) 01 - Environmental Aspects and Impacts Register

Consideration of environmental aspects covers, not only 'operational' activities, but also the auxiliary operations such as maintenance. Also included are abnormal situations such as shut down, start up, emergencies and special project trials.

The starting points for environmental aspects is the initial environmental review and this is a systematic examination of the company's activities to identify associated issues and includes:

- Operation or process activities – each operation is listed and evaluated as to the actual or potential impact that it has on the environment (positive or negative). Operations are broken into significant activities.
- Emissions and discharges – for each operation, process or activity, emissions/discharges are identified by the environmental media to which discharges occur, e.g. ambient air, controlled waters, or land.

- Pollutants – for each emission source, the pollutants of concern are identified.
- Use of raw materials – the use of all materials, including raw materials and types of energy fuel is examined, quantified, and classified as unavoidable, preferred, and avoidable use.
- Nuisance – all other effects, caused by the organisation’s activities, such as noise, vibration, odour, steam, dust etc. are considered.

Each environmental aspect is carefully analysed to identify the actual affect it has, or may have, on the environment. While most impacts cause pollution directly or indirectly, it is recognised that some company activities may have effect on the environment. These are considered separately as a special case, as even small benefit may be significant and warrant attention.

The impacts for each environmental aspect are determined by reference to records of measurements, monitoring, surveys, reports, legislations, and codes of practice.

## **Environmental Procedures Overview**

### **EN (3) 02 – Waste Management**

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

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

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

### **EN (3) 04 – Environmental Incidents – Near Miss**

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

### **EN (3) 05 – ISO AND EP Sites**

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

An overall review of the IMS takes place every 12 months, and on other occasions as required, by Senior Management. There is a regular programme of audits covering all aspects of the IMS and EMS; they are included on the Internal Audit Programme operated by the Business Assurance team and audited by the Environment Agency (EA) on a frequent basis. In addition, the EMS and IMS are subject to audit by the inspection and certification company SGS (for accreditation purposes) every 6 months.

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

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

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

### 1.3 Accident Management Plan

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

The Emergency Procedures (Appendix A) reference procedures to comply with environmental legislation and protect the environment and human health in regard to potential accidents:

- Spill prevention and management, and operation of safety valves
- Procedure for recovering spilled product
- Procedures for the prevention of overfilling vessels, management of plant and equipment failures
- Fire prevention and responses to fires, including fire water containment procedures
- Security measures to prevent unauthorised access, arson and vandalism
- Competence, training and awareness requirements
- Monitoring and measurement requirements
- Record keeping procedures for the recording of incidents, accidents and near misses
- Emergency procedures to notify relevant authorities, emergency services and neighbours

### 1.4 Site Location

The site comprises Eign Sludge Treatment Centre (STC) that is situated within the wider Eign Wastewater Treatment Works (WwTW). Site address: Outfall Works Road, Hereford, Herefordshire, HR1 1RY.

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

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

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

The location of the STC is shown in Figure 1.1.



Figure 1.1: Eign STC Site Location and Layout Plan



## 2 Process Description

### 2.1 Incoming Wastewater and Sludge

The Works provides sewage treatment for the catchment of Hereford and the surrounding area, with a population equivalent of approximately 50,000. The incoming sewage is conveyed to the works via a number of offsite pumping stations, rising mains and gravity mains. The full flow to treatment (FTFT) of the works is 861l/s, 287l/s of which is treated on site and the remaining 574 l/s is diverted to Eign's sister site at Rotherwas after screening and de-gritting. The site also receives tankered cess waste and imported sludge. Both indigenous and imported sludge is treated at the Eign STC.

### 2.2 Sludge Treatment

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Refer to 100123523\_MSD\_ProcessFlow\_EIG for a schematic of the sludge treatment process and for the 100123523\_LocationLayoutPlan\_EIG for the Site layout and location of the sludge treatment assets.

The Eign STC IED permit will include:

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

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

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

## 3 Accident Management Techniques

### 3.1 Loss of Containment

#### 3.1.1 Gas Escape

Loss of containment of gaseous materials at the STC 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 Plant the following measures have been adopted:

- The gas holder is a double membrane consisting of an inner and outer membrane of double-sided PVC-lined fabric. The stored gas is contained within the inner membrane. The space between the inner and outer membranes is filled with air under pressure by duty/standby blowers, which run continuously. 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 ensure no fugitive emissions are being released;
- Storage vessels and pipework are subject to regular visual inspection to ensure the structural integrity of the system remains uncompromised;
- All staff with responsibility for the handling or transfer of gaseous materials receive appropriate training for their role; and
- All staff on site 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

In the event of a loss of containment of gaseous materials at the site the Emergency Gas Plan will be followed. Preventative measures incorporated into normal operations include a risk assessment in accordance with the Dangerous Substances and Explosive Atmosphere Regulations 2002 (DSEAR) that will be periodically reviewed and updated against the latest DSEAR regulations and guidance to ensure best practice is adopted at the Plant.

DSEAR zoning is shown in Appendix B.

#### 3.1.2 Liquid Escape

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

- The storage vessels for all liquid materials for sludge treatment on-site are double skinned or banded to 110% capacity and have been manufactured to the required British Standard using appropriate grade materials;
- 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;

- 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 site operational and maintenance teams to ensure the structural integrity of the system remains uncompromised;
- Spill kits comprising suitable materials for the containment of liquid spills have been placed appropriately throughout the site for the use of all staff;
- Site surfaces surrounding liquid storage areas and transfer pipes are constructed of impermeable material and equipped with appropriate drainage structures to prevent escape of fluids to surface waters or groundwaters;
- All staff with responsibility for the handling or transfer of liquid materials receive appropriate training for their role; and
- 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 a Works 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.
- Retained copies of Supplier's Advice Notes are filed in the Reception Building
- 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 Plant management systems.

### 3.1.4 Odorous Emissions

The Eign STC has a an Olfasense odour control unit (OCU) to mitigate the risk of odour. This is a two-stage treatment system, with a wet biofilter as the first stage and carbon polishing filter as the second stage. The system also has duty and standby fans with a design flow rate of 1.5m<sup>3</sup>/s. The OCU extracts from the sludge thickening building and sludge balance tanks. Media life and condition is reviewed on a regular basis although it is anticipated that media should last a minimum of two years. Regular inspection of site storage facilities and pipework is undertaken to ensure that the structural integrity of the system remains intact.

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; and
- 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 light of this the potential for vandalism is considered to be effectively minimised. The following measures have also been adopted as security measures:

- On arrival at site, visitors must sign the visitor's book located in the entrance to the AAD office building and also announce their arrival to staff in the control room located on the first floor.
- The site is manned 24/7
- CCTV is installed across the site
- Fencing has been erected around the site boundary to prevent unauthorised access;
- Lighting has been incorporated to provide increased visibility and deter intruders;
- Warning notices have placed at site access points;
- Regular inspections of the perimeter fencing are undertaken to identify areas of damage and maintenance is undertaken where required.

### 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:

- All pipework at the site used for the transfer of gaseous products has been manufactured to the required British Standards using appropriate grade materials and all pipe joints and seals are also designed to meet the required British Standard; and
- Storage vessels and pipework are subject to regular inspection, by the site team to ensure the structural integrity of the system remains uncompromised.

## 3.2 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 Plant include:

- Uncontrolled release of pollutants from equipment, plant and infrastructure;
- Uncontrolled release of pollutants from material stores; and
- Loss of containment of contaminated firewater.

Fire extinguishers are placed throughout the STC, and operations staff are 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 Plant to be followed in the event of fire incidents at the site. There is automatic gas escape and fire detection equipment installed which initiates a shutdown of processes if activated.

### 3.3 Incident Response Review

Following the occurrence of any incident identified above, the incident will be logged within the company health and safety system and a review of the incident response and applicable emergency procedure will be undertaken. 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.

If appropriate, the findings of this review process will be escalated and will inform immediate or future investment decisions and planning and revisions of the Accident Management Plan.

### 3.4 Tabular Accident Management Plan

Hazard	Likelihood	Consequences	Controls	Actions
Loss of containment – gas leakage	Low	Uncontrolled loss of pollutants from plant / infrastructure	Appropriate training	See appropriate emergency procedure in Appendix A
		Loss from installation materials stores	Bunding of storage containers	
		Adverse impact on human health	Sealed drainage & impermeable areas	
		Adverse impact on local ecology	Pipework & fitting to appropriate British Standards	
			Regular monitoring & inspection	
			Spill kits available	
			All chemical deliveries are supervised and receipts kept.	
Loss of containment – liquid leakage	Low	Uncontrolled loss of pollutants from plant / infrastructure	See above section	See emergency procedures in Appendix A
		Loss from installation materials stores	Auto-shut on some filling systems. Overflows to site return system	
		Adverse impact on human health		COSHH assessments
		Adverse impact on local ecology		
		Loss of amenity in local area		
Vandalism	Low	Uncontrolled loss of pollutants from plant / infrastructure	Site boundary fence and security measures	
		Loss from installation materials stores	CCTV & site lighting	
		Adverse impact on local ecology	Smartwater marking of some plant items	
		Loss of amenity in local area		



Hazard	Likelihood	Consequences	Controls	Actions
Unauthorised access	Low	Uncontrolled loss of pollutants from plant / infrastructure	Signing in and out, and visitors must announce their arrival to a member of Operations personnel.	
Equipment / plant failure	Medium	Uncontrolled loss of pollutants from plant / infrastructure	24/7 telemetry 24/7 control room and access to standby personnel Regular proactive and reactive maintenance	Work instructions
Fire	Low	Uncontrolled loss of pollutants from plant / infrastructure Loss from installation materials stores Adverse impact on human health Adverse impact on local ecology Loss of amenity in local area Loss of containment of fire water	Appropriate training (fire awareness) Fire extinguishers available in area. Bundling of storage containers Sealed drainage & impermeable areas Pipework & fitting to appropriate British Standards Regular monitoring & inspection Spill kits available All chemical deliveries supervised All major plant is continually monitored on telemetry.	Work instructions

## 4 Competence and Training

Staff at the installation 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.

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

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

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 site 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.

DCWW is currently working on an accredited Competency Management System under the Competent Operator Scheme, and hopes to have this completed in the next 6-12 months. The Scheme will develop technical competency courses and skills to demonstrate that personnel have the appropriate technical skills and knowledge to manage the activities undertaken. This will be independently certificated and audited, through a third-party certification body (currently identified as LRQA) to ensure it meets the requirements of the Version 5 Competence Management System Standard, developed by Energy & Utility Skills. The Competence Management System (CMS) will enable Operators to demonstrate technically competent management on the basis of corporate competence and employees' individual competence. Individual competence remains a key component with each employee having the relevant

technical competences required to carry out their role. It is expected that DCWW will gain an accredited CMS by end of February 2023 for all four of its currently permitted sites and two site applying for environmental permits, including Eign.

## 5 Distribution and Revisions

Master copies of the AMP are made available to all staff as part of their induction package and available on Sharepoint (DCWW Document system) for staff to review.

Review of the AMP will be undertaken following any accident or emergency or after a period of not more than every three years; whichever is the sooner. It is the responsibility of the site manager to ensure that this review is carried out. Should a need for earlier review be identified, e.g. following an incident, a change in working practices or equipment at the installation, this shall be undertaken by the Installation EMS Manager.

## 6 Health and Safety

DCWW has a comprehensive H&S management system. This includes numerous instruction and guidance procedures. All staff are trained in elements of H&S appropriate to their role.

All operations within the works are subject to the provisions of the Dwr Cymru/Welsh Water Health and Safety Manual.

Safety equipment such as breathing apparatus, gas bottles, and harnesses is located at the Chester WwTW. Personal gas detectors are carried on Company vehicles.

The training records are held electronically within the SAP HR module and are administered by the Training Dept.

## 7 Non- Compliance Procedures

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 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

1. Loss of containment of gaseous substance
2. Loss of containment of liquid substance
3. 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.

## **A. Emergency procedures**



**DIGESTER SAFETY INSTRUCTIONS**

EIGN WWTW



EMERGENCY INSTRUCTIONS FOR CONTAINING AND CONTROLLING DIGESTER EMERGENCIES

ISSUE:

DATE:

These instructions deal with different types of emergencies, classified into three levels of severity (where appropriate). These levels are SLIGHT, MODERATE and SEVERE. The instructions are intended to be a step by step guide to help operators take the right action in emergency situations.

These instructions are written with the best possible technical input, but the reality of any given emergency will be different, and responding staff are required to make their own risk assessments, using the instruction sheets as guidance for identifying potential hazards.

They are intended to help operators to bring the AD facility into as safe a condition as possible in the event of an emergency.

They are not intended to provide detail on full recovery from an emergency. This must be assessed on a case by case basis.

Where PPE is referenced, this means the equipment required to be worn under site rules & induction.

How to use these instructions:

On each sheet, follow the instructions in order. This is important as some actions are dangerous if done out of sequence:

**Classify the emergency:** Look at the situation and determine its severity and the appropriate course of actions

**Prepare:** Take a step back. Think about where people need to be kept away from, and what the hazards the emergency is creating. Think about who should be contacted before any remedial action is taken. An emergency equipment store exists on site, and should be used appropriately as the situation demands.

**Contain:** Depending on the severity of the emergency, this section gives guidance on measures to stop the situation from getting any worse

**Control:** Measures to bring the situation under control directly, or control the area around the emergency

**Consolidate:** Actions to take once the situation is under control. Actions which start the site on the road to recovery.

The term "site supervisor" is used throughout these instructions to refer to the person responsible for the site at the time of the incident.

DCWW policy is that during normal working hours this is the duty Site Supervisor (Digester Safety Controller). Outside of working hours, telephone SmartHub, and ask for the Bronze Level Manager.

**DCWW internal contacts**

Duty	Name	Contact Number
Site Supervisor		
Site Supervisor		
Smart Hub		
Logistics		
CHP team		

Specialist support is called for in some instructions. The below contacts are identified as willing and able to provide suitable support to this site.

Principle Biogas            0333 207 9991            Mechanical, electrical, biological and process problems (24 hr)

Specialist external agencies must be contacted in some instances. Their contact details are below:

Fire Brigade (fire & emergency)	999
Fire Service: Gorsaf Dan Fire Station (non-emergency)	01244 813 512
Natural Resources Wales	0345 988 1188
Health and Safety Executive (for RIDDOR reporting):	<a href="http://www.hse.gov.uk/riddor/report.htm">http://www.hse.gov.uk/riddor/report.htm</a>



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3 ANAEROBIC DIGESTION FACILITY SITE SPECIFIC HAZARDS

4 EMERGENCY EQUIPMENT REGISTER

5 SITE LAYOUT

6 AD PROCESS FLOW DIAGRAM

EMERGENCY ACTIONS:

7 MECHANICAL DAMAGE

8 FOAMING

9 FIRE

10 CONDENSATE POT BLOWOUT (GAS HOLDER)

11 CONDENSATE POT BLOWOUT (OTHER)

12 PRESSURE RELIEF VALVE LEAK (DIGESTERS)

13 PRESSURE RELIEF VALVE LEAK (GAS HOLDER)

14 BIOGAS LEAK: DIGESTER ROOF

15 BIOGAS RELEASE: WEIR BOX

16 BIOGAS LEAK: GENERAL

17 BIOGAS LEAK: GAS HOLDER

18 BIOGAS LEAK: BOILER HOUSE

19 SLUDGE LEAK: FEED SYSTEM

20 SLUDGE LEAK: HEATING RECIRC

21 SLUDGE LEAK: DIGESTER VESSEL

ADMIN

22 INCIDENT REPORT SHEET

23 PRACTICE REGISTER

24 BLANK TEMPLATE

### **BIOGAS**

This site produces biogas by a biological process. The production of biogas can only be stopped over a period of days by significant process intervention. Biogas is present on site in the concrete digesterheadspaces, the green double membrane gas holding sphere and the connecting pipes and equipment. The risks associated with biogas are described below. See Potentially Explosive Atmospheres drawing of site for detail.

### **TOXIC**

Hydrogen Sulphide is present in biogas in harmful quantities. It is harmful through inhalation and is an eye irritant. Where gas leaks or releases may be present personnel must wear a personal gas monitor and evacuate the area if it alarms.

### **FLAMMABLE**

Biogas contains methane (40-60%) and is therefore flammable when mixed with air. Where biogas leaks or is vented from the process controls must be in place to prevent sparks or other sources of ignition.

### **ASPHYXIAN**

Where biogas is vented in large quantities it will displace the oxygen from the atmosphere local to this release. Where gas leaks or releases may be present personnel must wear a personal gas monitor and evacuate the area if it alarms.

### **SLUDGE**

Sewage sludge contains many bacterial and viruses which are harmful to human health. Avoid direct contact with sludge and digestate. Do not ingest. If contact occurs, wash immediately with water and soap. If flu like symptoms occur after exposure to sludge, consult a doctor and alert them that you are at risk of Weil's disease.

### **HOT WATER**

Hot water is present on site, operating at 70-90 deg. C, 1-3 bar(g). Systems are fitted with pressure relief devices. If water is released from the system, direct contact must be avoided until it has had time to cool.

### **PPE & other equipment requirements:**

Steel toe cap boots  
High visibility vest, jacket or similar  
Bump cap/hard hat  
Gloves  
Personal gas monitor (CH<sub>4</sub>, H<sub>2</sub>S, CO, O<sub>2</sub>)  
Eye & ear protection must be readily available



**DIGESTER SAFETY INSTRUCTIONS**  
EIGN WwTW

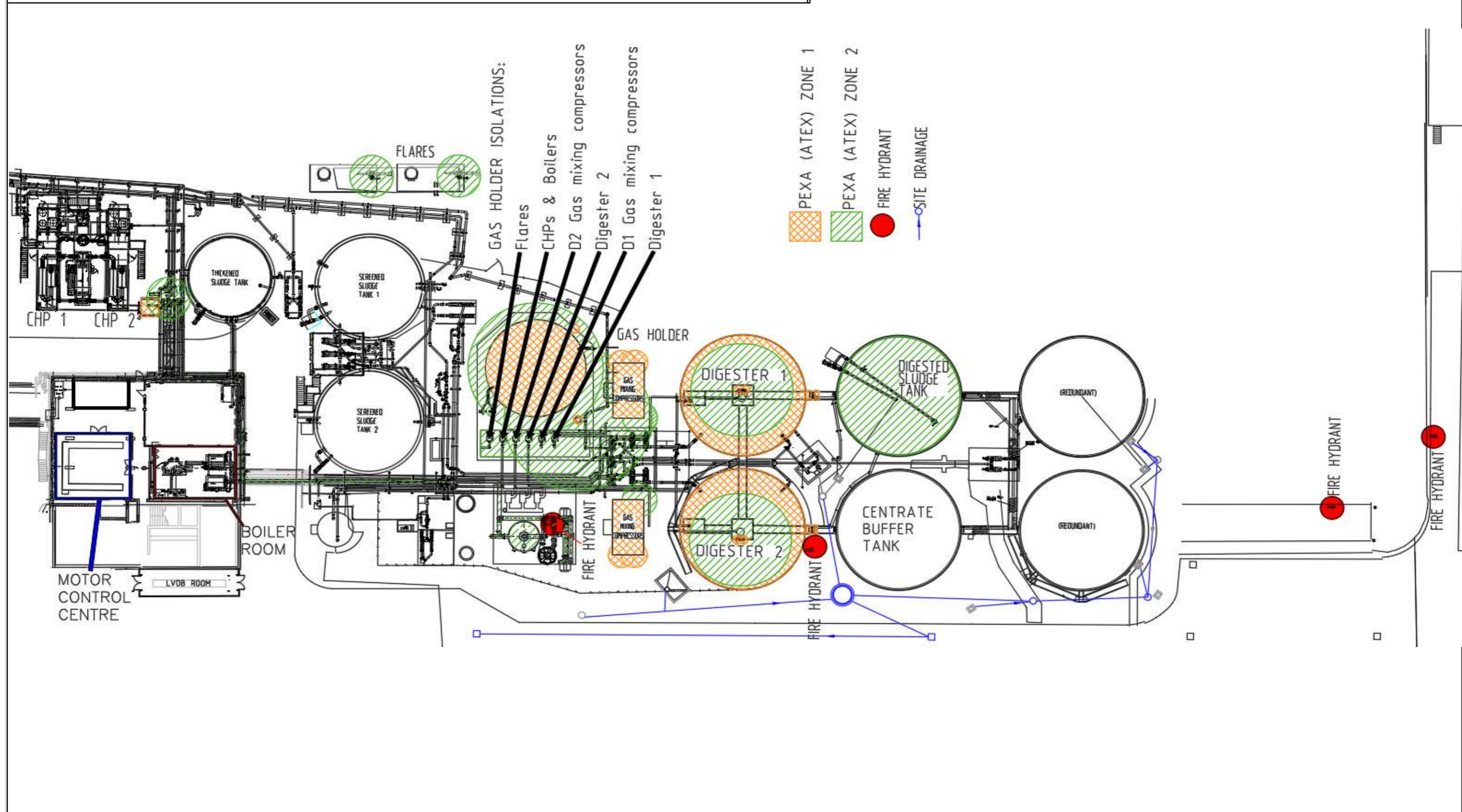


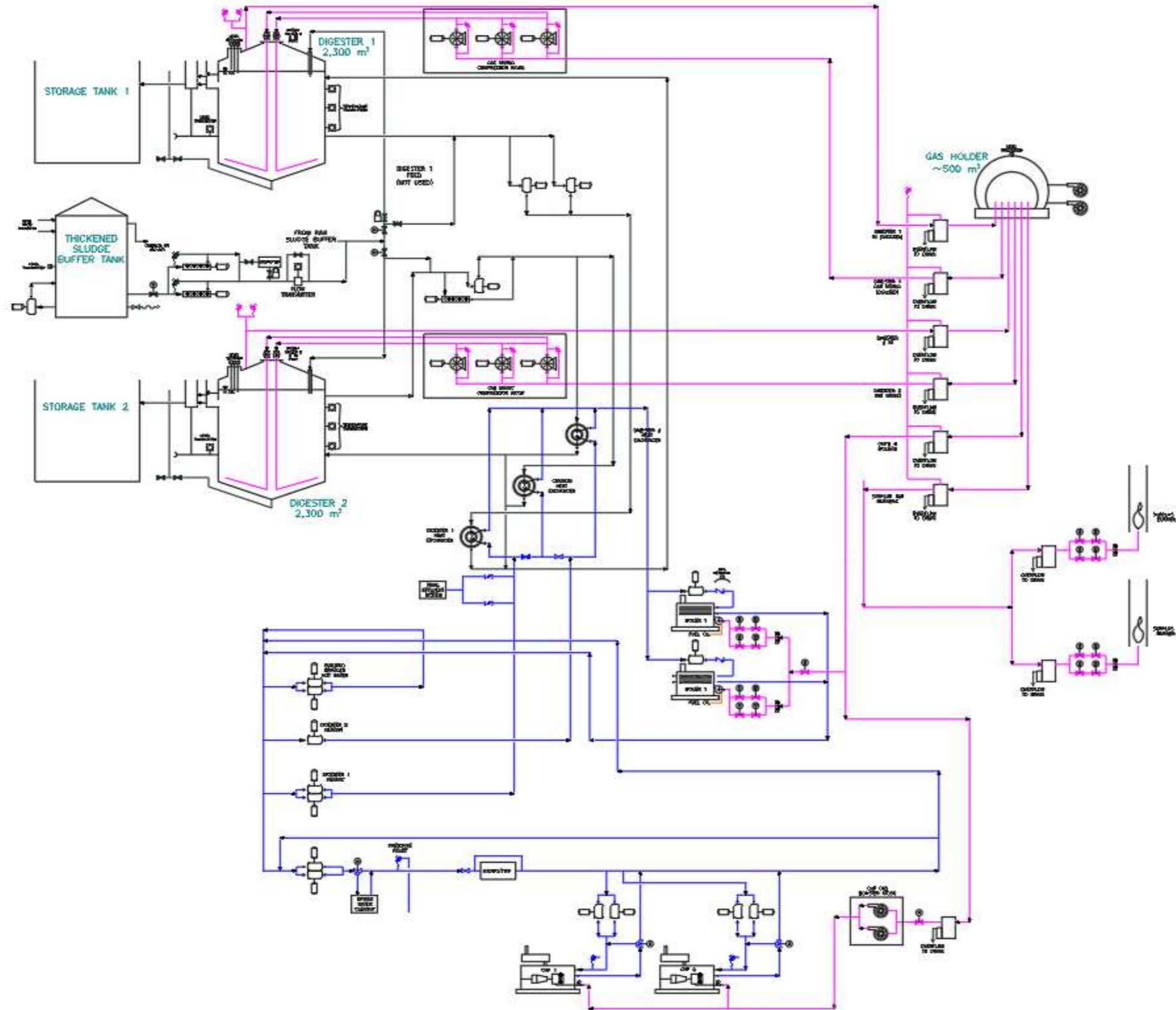
EMERGENCY EQUIPMENT REGISTER

ISSUE:  
DATE:

The following equipment is recommended to be held on site. It is held in a dedicated store unless noted. Locations of equipment are shown on the site layout plan overleaf.

Equipment	Checked: all present & functional	
	Date	Signed
ATEX rated torch & batteries		
Cones / barriers		
100m barrier tape		
Fire extinguisher (CO2, Digester control panel room)		
Fire extinguisher (CO2, Boiler Room)		
Marker pen		
4 x 20m water hoses		
Gaskets, 2 off each:   80 mm 100 mm 150 mm 200 mm 250 mm 300 mm		
6 x lock off padlocks, tags & keys		
Sandbags		
1 full bottle Leak detection fluid		
Gas Analyser (calibrated & on charge, held in site office)		
3 x "authorised access only" signs & zip ties		
3 x Spill Kits		
1 x spare personal gas monitor (Calibrate & on charge, held in site office)		





EMERGENCY INSTRUCTIONS FOR

# MECHANICAL DAMAGE

ISSUE:  
DATE:

## PREPARE

EVACUATE:	Clear people from the area. If the damage is a vehicle strike, turn the ignition off and leave the vehicle in situ. Equipment and machines to be turned off/made safe as staff leave the area.
ASSESS THE RISK:	Is there a fire, or the risk of fire? Identify the equipment damaged; is it sludge, gas or water equipment? Is there risk of the damage becoming worse? Could a sludge release also release gas? (Digesters drained to 83% will vent gas through high level overflow)
COMMUNICATE:	Call the emergency services if required to deal with casualties, fire or risk of fire. Call site supervisor and report the situation.
GATHER EQUIPMENT:	Assess the situation, and gather equipment appropriately

## CONTAIN

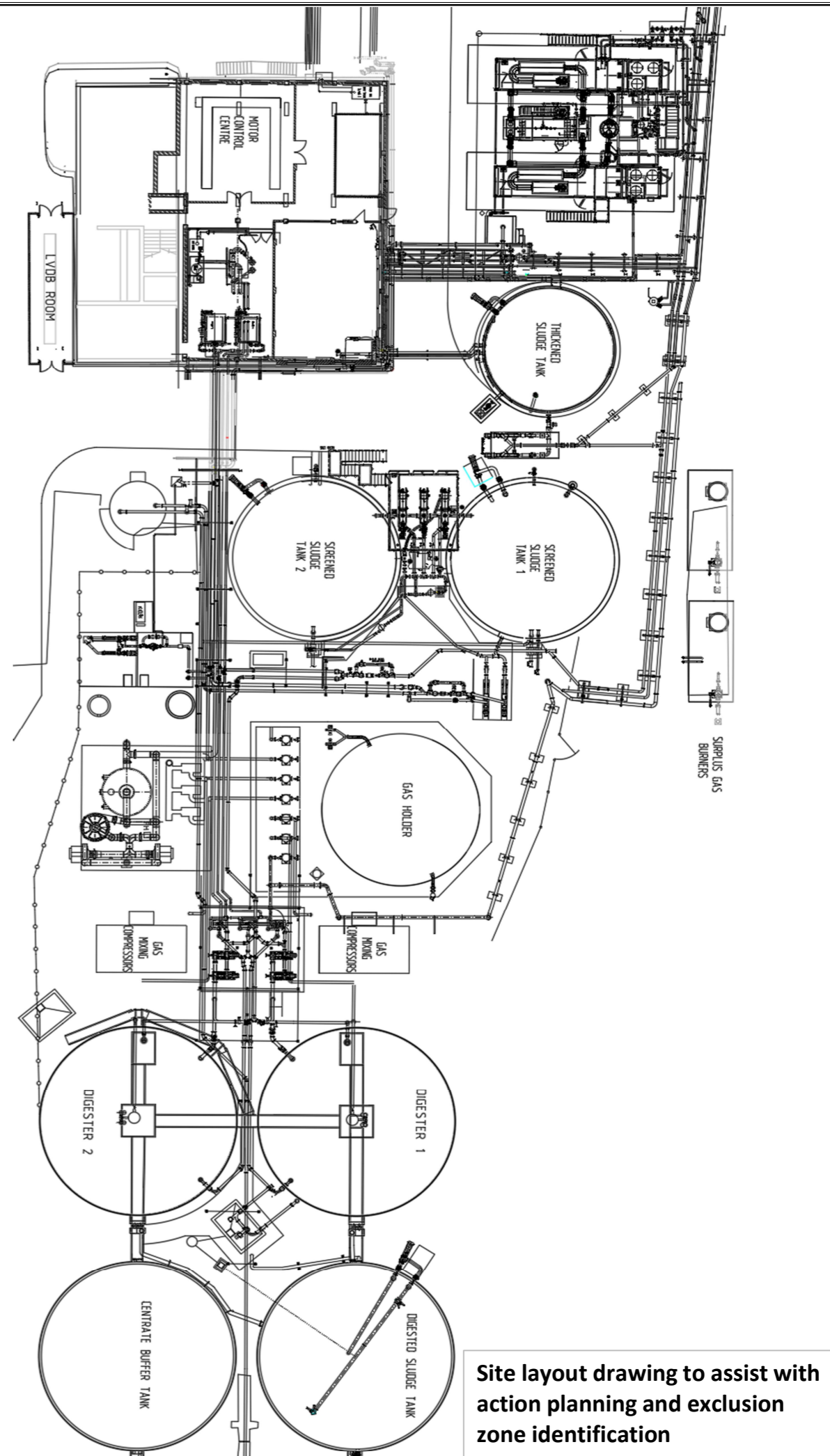
ACTIONS	Make suitable isolations as far as is safe and practical (valves and isolators) See emergency action sheet for relevant system(s) damaged and take actions accordingly Only remove vehicles or other equipment from the area once necessary isolations have been made, in case the removal makes the leak worse.
ADVICE	Be aware of potential complex issues due to damage to more than one system. If in doubt, evacuate the area, maintain a safe distance and call for aid. Contain any spilt sludge as far as possible without compromising safety.

## CONTROL



ACTIONS	Be prepared to act as point of contact for emergency services, vehicle drivers, subcontractors etc. while the site is being evacuated and made safe and until a site manager can take over co-ordination responsibilities.
ADVICE	

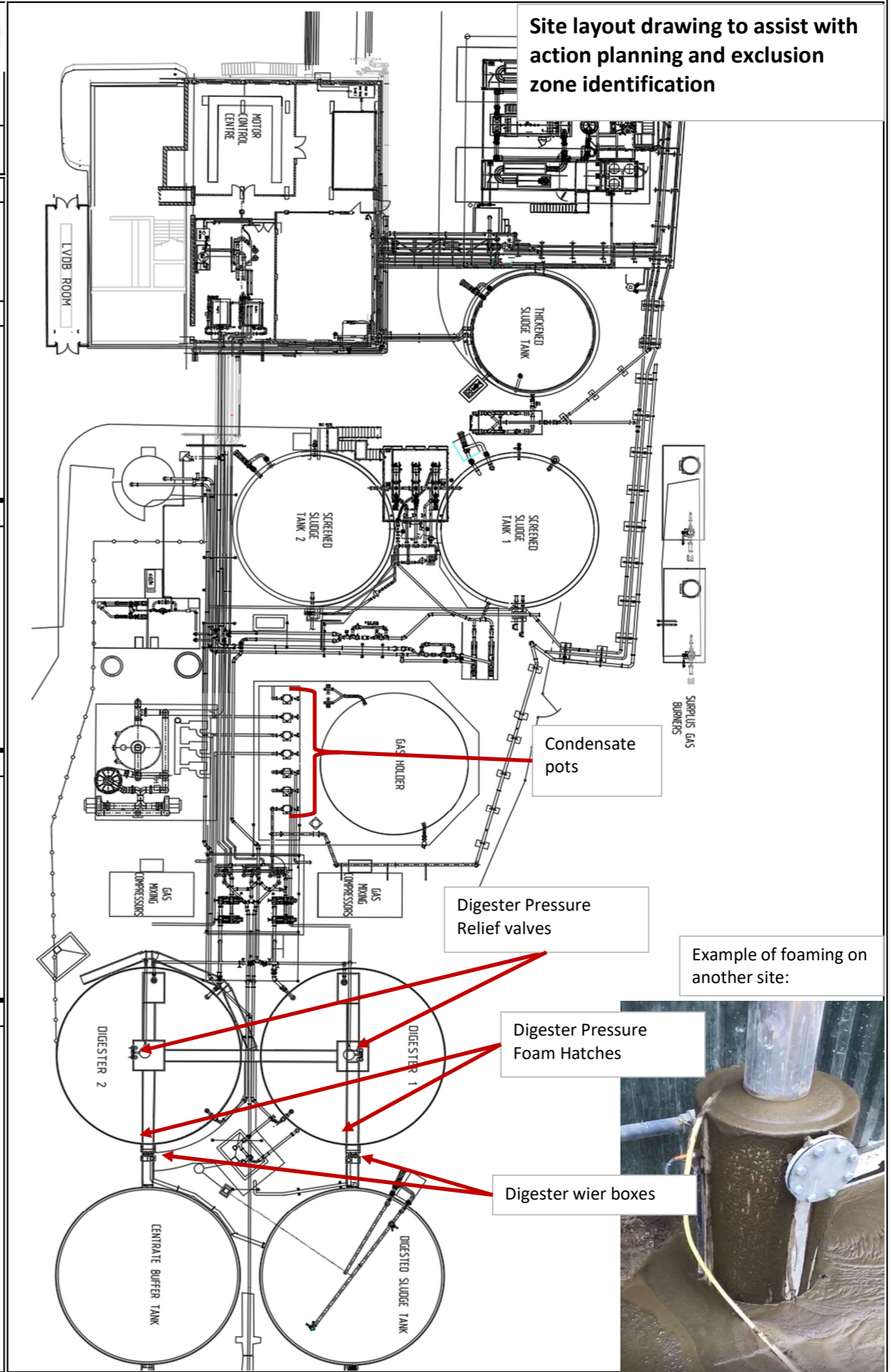
## CONSOLIDATE

ACTIONS	Establish a clear understanding of what happened in the lead up to the damage occurring. Gather eyewitness reports and any relevant process information. This information will be required to put in place any measures to prevent a recurrence of the incident. It may also be information required by a Health and Safety Executive inspector, in the event that an investigation is deemed necessary.
ADVICE	



**Site layout drawing to assist with action planning and exclusion zone identification**

	<b>DIGESTER SAFETY INSTRUCTION</b> EIGN WwTW	
EMERGENCY INSTRUCTIONS FOR		ISSUE: DATE:
<h1>FOAMING</h1>		
<b>CLASSIFY THE EMERGENCY</b>		
<b>MEASURE:</b>	Observation of any of these indicate that foaming may be occurring: Sludge evident at or underneath overflow weir box, foam relief hatches PRVs. Sludge in condensate traps. Spuriously high or low level shown on Digester level transmitter Gas mixing compressor(s) tripped on low pressure	
<b>PREPARE</b>		
<b>EVACUATE:</b>	Clear digester roof area. Only authorised personnel to be present in digester area	
<b>ASSESS THE RISK:</b>	Look at the areas identified on the drawing opposite. These are places where foam may exit the digester.	
<b>COMMUNICATE:</b>	Call site supervisor to alert them of the situation. Call logistics and cancel all tanker deliveries. Have logistics compile a record of all tanker delivery sources for the past month.	
<b>GATHER EQUIPMENT:</b>	PPE & gas monitor, cones & barrier tape, spill kits, portable pumps & hoses	
<b>CONTAIN</b>		
<b>ACTIONS</b>	Stop Feeding (both digesters) Mix continuously, unless foaming has been caused by long interval between mixing. Then mix intermittently.	
<b>ADVICE</b>		
<b>CONTROL</b>		
<b>ACTIONS</b>	Observe digester level transmitter- if it is showing greater than 100 %, or less than 85%, prohibit access to the rooves. Turn off CHP & boilers. Use Flare to manage high gas holder level.	
<b>ADVICE</b>	When foaming subsides, digester level may drop rapidly. Ensure that gas holder is kept relatively full to make up this volume as best possible. Spillage during foaming is inevitable. Focus on protecting the tank structure rather than trying to prevent mess.	
<b>CONSOLIDATE</b>		
<b>ACTIONS</b>	Once foaming has been brought under control and has subsided, begin clear up operation. Gather data of digester feed, mixing and level trends for the 48 hrs leading up to the foaming beginning.	
<b>ADVICE</b>	If foaming/sludge/wash-down water escapes from site, the Environment Agency must be informed.	



EMERGENCY INSTRUCTIONS FOR	<b>FIRE</b>	ISSUE: DATE:
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<b>CLASSIFY THE EMERGENCY</b>		
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MEASURE:	Boiler House / CHP Built in Fire Alarm Operational	Other equipment Fire visible
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<b>PREPARE</b>		
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EVACUATE:	Entire Anaerobic Digester compound area.	
ASSESS THE RISK:	How large is the fire? What equipment is affected? What equipment is likely to become affected?	
COMMUNICATE:	Call the fire service, saying "This is Welsh Water Sewage Treatment works at Hereford off Outfall Works Road. Please be advised that there is a gas fire or explosion risk on this site."	
GATHER EQUIPMENT:		

<b>CONTAIN</b>		
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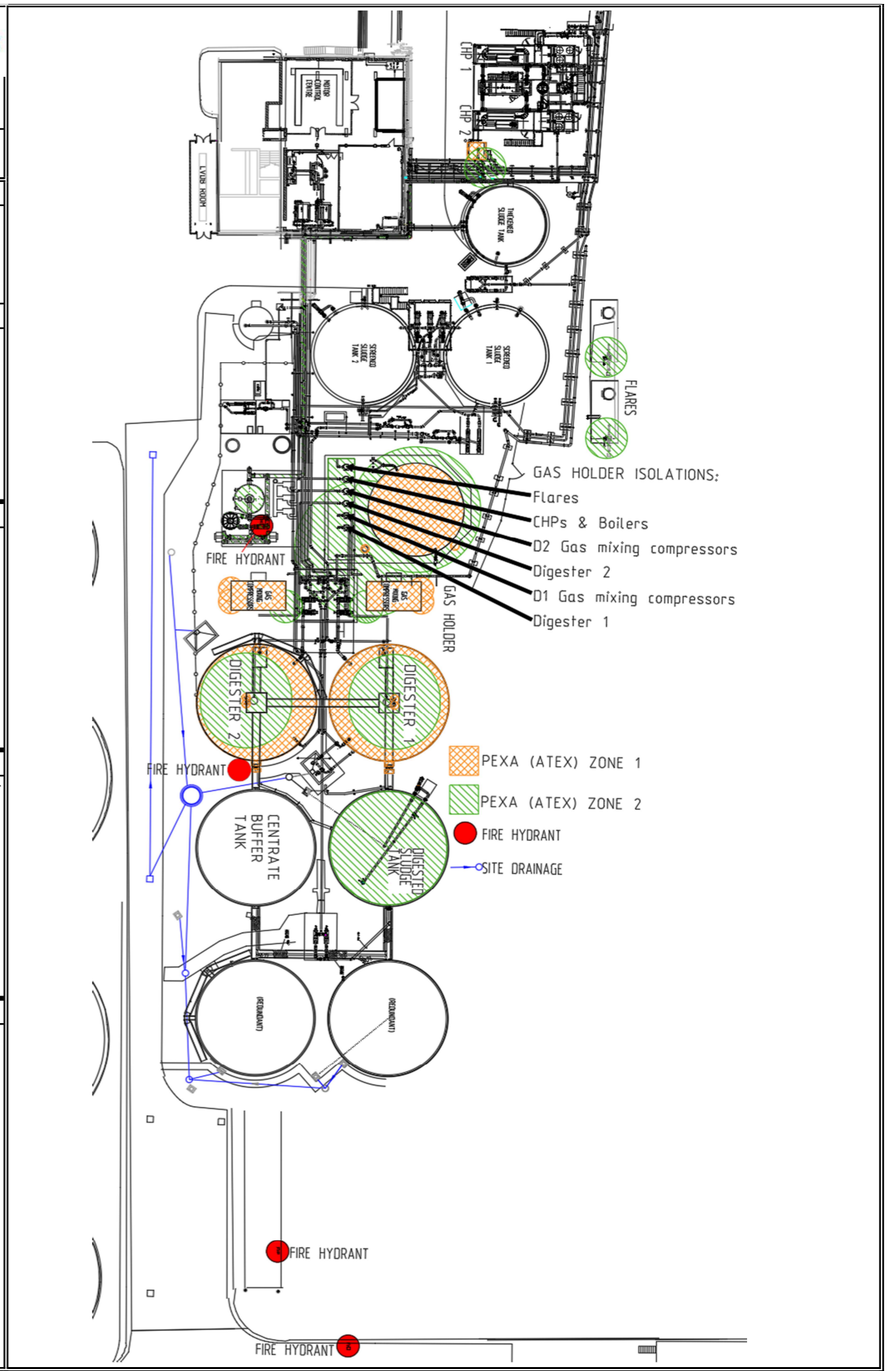
ACTIONS	Observe Surplus Gas Burner. Report its operation to Bronze level supervisor.	IF SAFE turn off affected & nearby equipment at the control panel. If possible, run flare in hand at local control panel. Turn off feeding, boilers and CHP
ADVICE	As part of general site awareness, invite local fire brigade to site so they are familiar with the site, risks and gas safety shutoff valve location	

<b>CONTROL</b>		
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ACTIONS	Be prepared to assist fire service with site knowledge, specifically gas pipe routes and explanation of how the gas holder works.	
ADVICE	Establish exclusion zone around digester site, authorised personnel (fire service etc.) access only.	

<b>CONSOLIDATE</b>		
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ACTIONS		
ADVICE		





EMERGENCY INSTRUCTIONS FOR	<b>GAS HOLDER CONDENSATE POT BLOWOUT</b>	ISSUE: DATE:
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**CLASSIFY THE EMERGENCY**

MEASURE:	HMI shows Gas Holder Low Level, Gas Holder Methane detector is not in alarm state  Equipment not running or failed. Level Switch alarms Possible smell of biogas, wet area around a condensate pot
----------	--

**PREPARE**

EVACUATE:	Area around blown condensate pot
ASSESS THE RISK:	What direction is the wind blowing in? (approach pots from upwind)
COMMUNICATE:	Alert Site Supervisor of blowout and intended action. Confirm wind direction and estimated duration of gas release.
GATHER EQUIPMENT:	Personal Gas Monitor. Water supply available. Hoses from emergency equipment store

**CONTAIN**

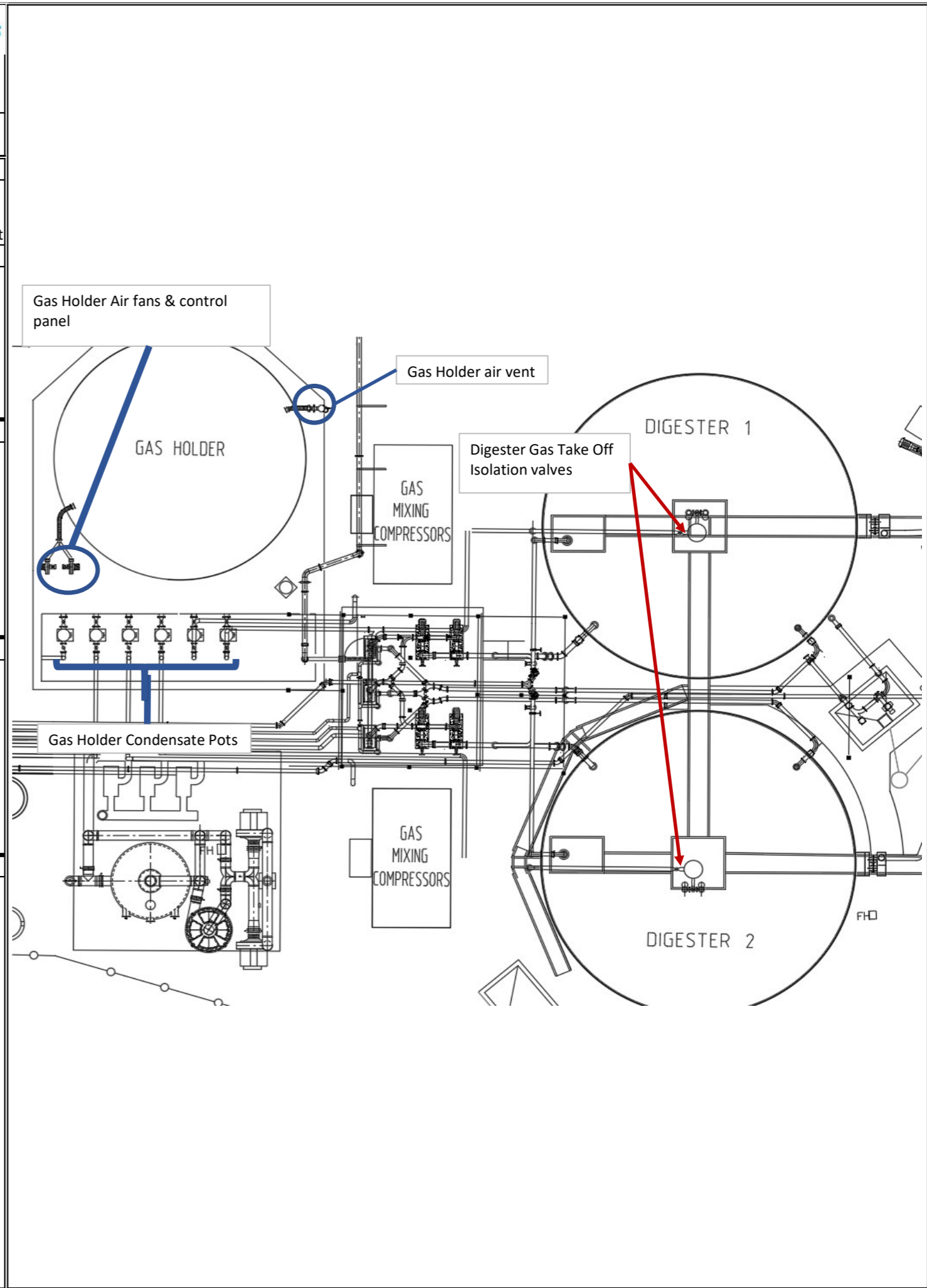
ACTIONS	Use SCADA/MCC isolations to shut down: Digester Gas Mixing, CHPs, Boilers, Flares. Isolate Digester Gas take offs- beware of venting biogas.
ADVICE	Isolating digester gas take offs will rapidly result in biogas venting. Ensure safe evacuation from area as soon as valves are closed. Pit is likely to have significant Biogas/H2S presence.



**CONTROL**

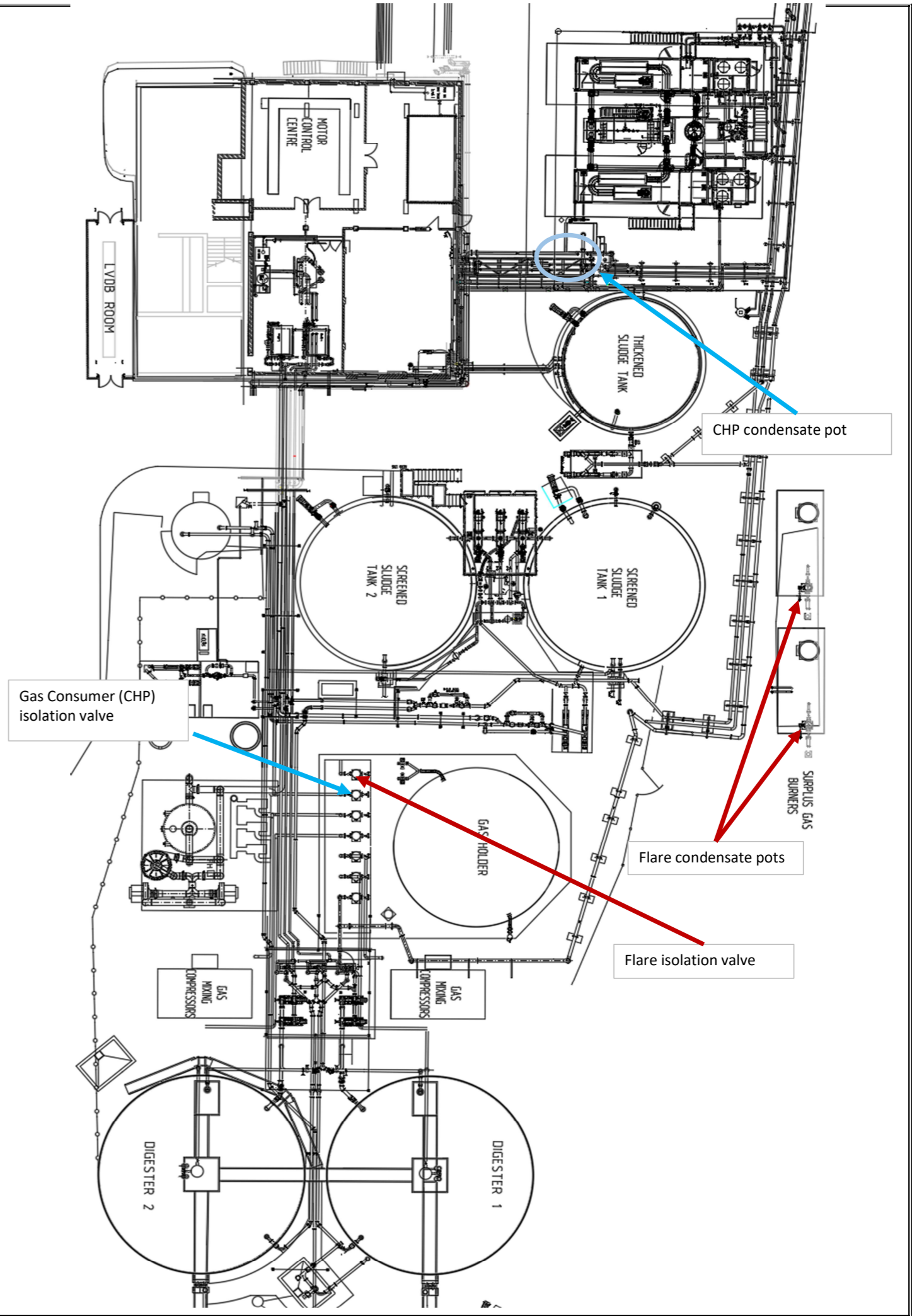
ACTIONS	Turn off Gas Holder air fans. Using a personal gas monitor and maintaining a safe escape route, assess the blow out from outside of the pit. Identify which pot has blown. Prepare water hose. Option 1: Wait for Gas Holder to vent through blown trap/reach equilibrium with remaining liquid. Enter pit and isolate blown trap. Refill with water from hose. Option 2: Turn off Gas Holder air fans. From the upper edge of the pit, aim the hose to fill the blown trap. Once pot is sealed, Isolate from gas system. Turn on air fans. Fill pot completely.
ADVICE	

**CONSOLIDATE**

ACTIONS	Return system to normal operation- introduce digesters back to the gas system and return equipment to automatic operation. Investigate and remedy possible causes for pot losing containment.  Against the names below, create a tally of number of times a pot has blown. For repeat incidents, call specialists to examine the installation and instigate remedial actions.								
	<table style="width:100%; border: none;"> <tr> <td style="width: 50%;">Digester 1 take off</td> <td style="width: 50%;">Flare</td> </tr> <tr> <td>Digester 1 gas mixing</td> <td>CHP &amp; Boilers</td> </tr> <tr> <td>Digester 2 take off</td> <td></td> </tr> <tr> <td>Digester 2 gas mixing</td> <td></td> </tr> </table>	Digester 1 take off	Flare	Digester 1 gas mixing	CHP & Boilers	Digester 2 take off		Digester 2 gas mixing	
Digester 1 take off	Flare								
Digester 1 gas mixing	CHP & Boilers								
Digester 2 take off									
Digester 2 gas mixing									



		<b>DIGESTER SAFETY INSTRUCTION</b> EIGN WwTW			
EMERGENCY INSTRUCTIONS FOR			<b>CHP OR FLARE CONDENSATE POT BLOWOUT</b>		
			ISSUE: DATE:		
<b>CLASSIFY THE EMERGENCY</b>					
MEASURE:		HMI shows Gas Holder Low Level, Gas Holder Methane detector is not in alarm state Equipment not running or failed. Level Switch alarms Possible smell of biogas, wet area around a condensate pot. Daily checks.			
<b>PREPARE</b>					
EVACUATE:		Area around blown condensate pot			
ASSESS THE RISK:		What direction is the wind blowing in? (approach pots from upwind)			
COMMUNICATE:		Alert Site Supervisor of blowout and intended action. Confirm wind direction and estimated duration of gas release.			
GATHER EQUIPMENT:		Personal Gas Monitor. Water supply available. Hoses from emergency equipment store			
<b>CONTAIN</b>					
ACTIONS		Use SCADA to shut down nearby equipment (e.g. Both flares). Isolate upstream (at Gas holder). Use lock-offs as necessary at MCC.			
ADVICE		Approach with caution as biogas may still be venting. Be alert for audible & visual cues such as splashing/bubbling.			
<b>CONTROL</b>					
ACTIONS		Re-fill condensate pot with water until overflow level is reached. Check other condensate pots. Re-open isolation valves. Check that water seal is holding. If it isn't, check area for mechanical damage.			
ADVICE					
<b>CONSOLIDATE</b>					
ACTIONS		Inform line manager that system is no longer venting and is in recovery. Return equipment to automatic operation. Monitor gas holder level to ensure that it rises, and that equipment re-starts appropriately.			
ADVICE		Against the names below, create a tally of number of times a pot has blown. For repeat incidents, call specialists to examine the installation and instigate remedial actions. Flare 1 Flare 2 CHP			

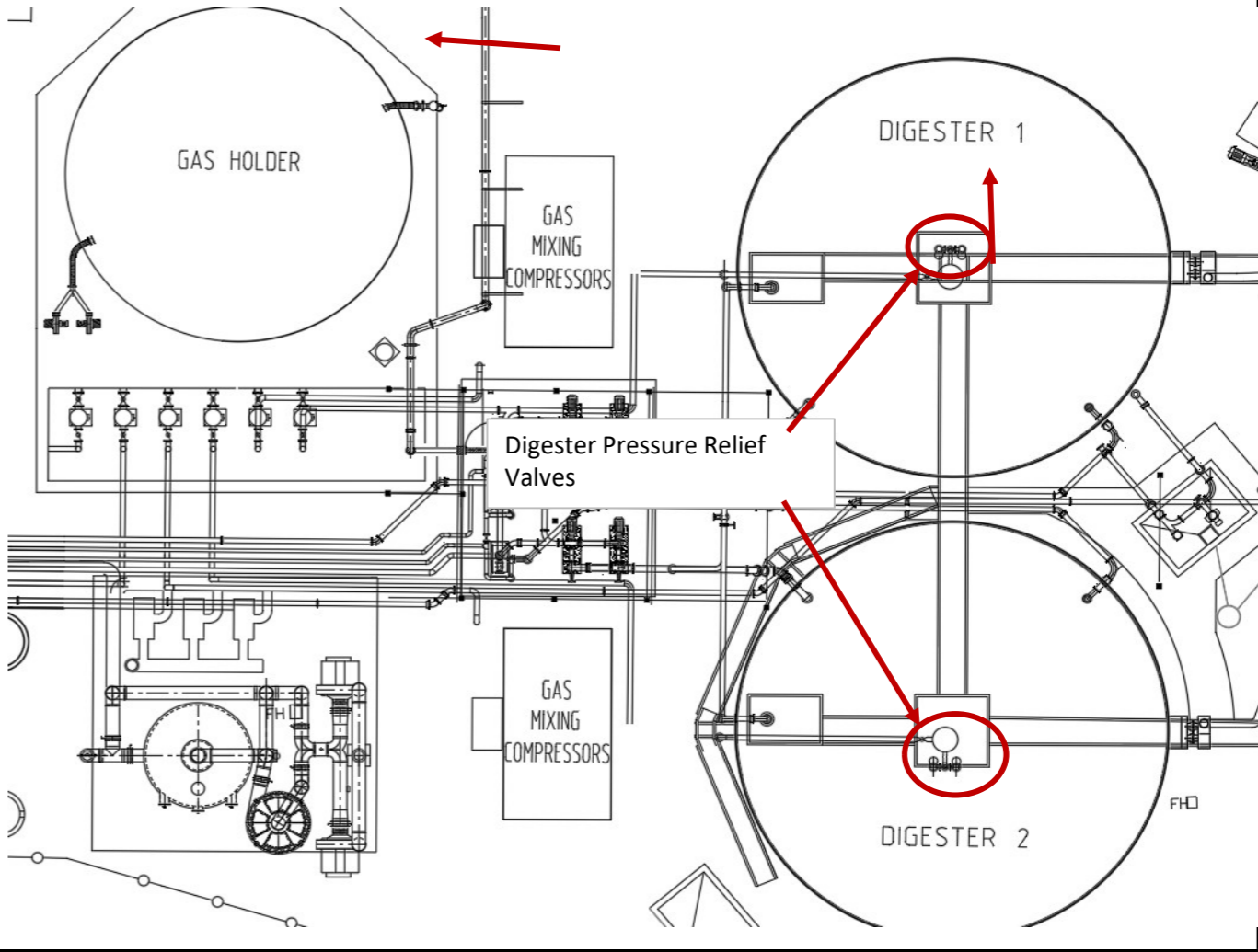


<b>EMERGENCY INSTRUCTIONS FOR DIGESTER PRESSURE RELIEF VALVE (PRV) LEAK</b> <b>Please note: the below assumes the gas holder is NOT at high level. If it is, then the valve operating is part of normal operation. Refer to site O&amp;M manuals.</b>	ISSUE: DATE:
--	-----------------

CLASSIFY THE EMERGENCY			
	SLIGHT	MODERATE	SEVERE
MEASURE:	Personal gas monitor alarms at 0.5 m.	Personal gas monitor alarms at 1 m.	
EVACUATE:	<b>PREPARE</b> Digester Roof		
ASSESS THE RISK:	Wind strength & direction- strong wind will make a release safer, but will mask a big release.		
COMMUNICATE:			
GATHER EQUIPMENT:	PPE & gas monitor,		
CONTAIN	CONTAIN	CONTAIN	CONTAIN
ACTIONS		Ensure other PRV is online, then isolate leaking PRV. UNDER NO CIRCUMSTANCES MAY BOTH PRVs BE ISOLATED SIMULTANEOUSLY.	
ADVICE		Approach and operate valve from upwind.	
CONTROL	CONTROL	CONTROL	CONTROL
ACTIONS	Monitor biogas system pressure, if it drops to below 20mbar, treat as moderate.		
ADVICE			
CONSOLIDATE	CONSOLIDATE	CONSOLIDATE	CONSOLIDATE
ACTIONS	Call statutory maintenance team and arrange for valve servicing to be brought forward.	Call statutory maintenance team and request intervention ASAP	
ADVICE			



Digester Pressure Relief Valve  
Isolation valve





## **B. PEXA (DSEAR) Zoning**

<b>Project Title</b>	Eign and Rotherwas WwTW - Quality	<b>Job No.</b>	241630
<b>Document Name</b>	Eign WwTW DSEAR Assessment		
<b>Document Number</b>	B10503-102503-ZZ-ZZ-FN-EA-RI1701	<b>File Ref.</b>	4-50
<b>Date</b>	21 September 2022	<b>Revision</b>	P1

## Document Checking

	Prepared By	Checked By	Approved By
Name	Chihurumanya Felly-Njoku	Graham Mitchell	Mathew Foley
Signature			

## 1 Purpose of Document

The purpose of this document is to ensure that the design of the installation takes account of any risk of fire, explosion or similar energetic event arising from dangerous substances used or present in the workplace. The risk assessment also considers the possibility of igniting the dangerous substances that could be present.

This document has been produced in accordance with the DCWW Procedural Document ‘Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)’ AM\_L\_PR1\_005 Version 2 and the DCWW DSEAR Handbook Version 20.5.

This file note is complementary to the Explosion Protection Document and is classed as a ‘live’ document that can be referred to at any time and be amended or replaced in the future.

Any of the following will necessitate a review of the risk assessment:

- New dangerous / hazardous substances
- New process to be used
- New equipment to be installed
- New work operation to be undertaken
- Changes to the catchment regarding flammable materials, e.g. industry, fuel depots or filling stations.

## 2 Site Description

---

Eign Wastewater Treatment Works (WwTW) is an existing WwTW located on the outskirts of Hereford Town Centre. Due to increase in flows in the catchment, full treatment of sewage is split between two works – Eign WwTW and Rotherwas WwTW. The sites are approximately 2 kilometres apart on opposite sides of the River Wye.

The overall treatment process at Eign WWTW consists of Emergency Storm Separation and Screening, Inlet Pumping, Inlet Screening, Grit Removal, Storm Treatment, Primary Settlement, Biological Filtration and Final Settlement, the treatment of sludges takes place in a digester plant on the Eign Site.

All incoming flow from Hereford and its environs arrives at the Eign WwTW inlet chamber via 4No. inlet sewers. The flow is then screened, dewatered and pumped to the flow separation chamber where it is split between Eign treatment process, Eign storm and Rotherwas treatment process.

The flow to Eign treatment then flows and splits equally between the two Primary Settlement Tanks where solids are settled out of the flow in the form of sludge and removed for further treatment. Settled effluent from the Primary Settlement Tanks gravitates towards the biological filtration plant.

Flows enter the High Rate Filters Pumping Station, from where the effluent is pumped equally to the top of each High Rate Biological Filter. The effluent is initially treated by percolating down through the plastic media in each HR Filter; this initial filtration substantially reduces the loading on the Biological Stone Filters during periods of peak flow.

The effluent gravitates downwards through the HRFs and enters the HRF Humus PS, from where it is pumped to the centre of the HR Filters Humus Tank for settlement. The Humus Tank effluent gravitates over a centrifugal weir and enters the Filters Recirculation Chamber. From here it gravitates to the initial Stone Filters Distribution Chamber, from where the flow is distributed equally to the 14No. Stone Filters via 3No. Secondary Distribution Chambers.

The biologically treated effluent exits the filters and gravitates to the Filtrate Pumping Station which contains 2No. Archimedes Screw Pumps which deliver the effluent to the Humus Tanks Distribution Chamber where the flow splits equally between the 2No. Humus Tanks for final settlement. The sludge removed from the Humus Tanks is returned to the Inlet Works for further treatment.

The settled effluent weirs out of the Humus Tanks and flows to the Works Outfall for discharge into the River Wye.

In the event of low flows being experienced at the treatment plant the final effluent is recirculated back through the biological filters by means of an automated valve which diverts the flow into the flow prior to the biological filtration distribution chambers.

The sludge produced on the site and that imported to the site by road tanker all undergo thickening and full digestion prior to being centrifuged and limed ready for disposal to land.

Figure 1 shows a schematic overview of the existing processes at Eign WwTW, as illustrated in the Works Operating Manual.

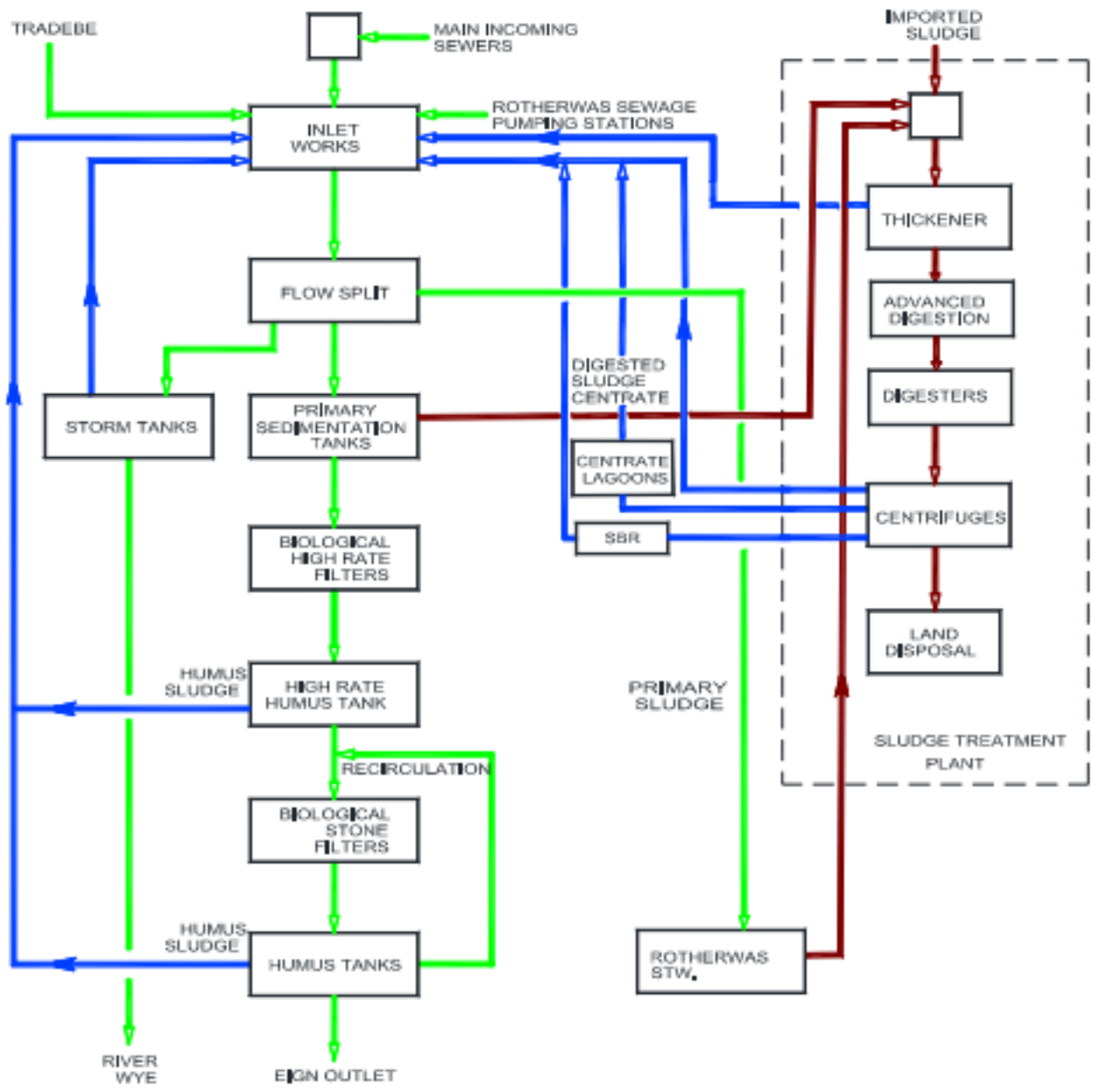


Figure 1: Eign Process Block Diagram



The proposed works at Eign WwTW are as follows:

- Combined 3 cell civil structure for the Interception, Sample and Outfall Chambers,
- Tertiary Solids Removal (TSR) Plant,
- TSR Lift Pumping Station,
- Dirty Backwash Water Tank,
- Clean Water Tank,
- Draindown Pumping Station,
- Dirty Backwash Return Pumps,
- Refrigerated Autosampler For Regulatory Monitoring.
- Final Effluent Instrumentation.
- TSR Lift PS MCC to supply power and control the:
  - TSR Lift Pumping Station
  - Final Effluent Instrumentation
  - 2No. Combined Interception, Sample and Outfall Chamber actuated weirs
- TSR MCC to supply power and control the:
  - TSR Plant
- TSR Ancillaries MCC to supply power and control the:
  - Draindown pumping station
  - Dirty backwash return pumps
  - Clean Water and Dirty Backwash Tank Instrumentation

### 3 Risk Assessment and Conclusion

---

All of the electrical equipment associated with the proposed works, outlined in Section 2, is to be installed downstream of the Primary Settlement Tanks (PSTs). The most up to date PEXA information held by DCWW – Classified in Jan 2003, confirmed as latest information in Aug 2021 – indicates that the Inlet Chamber, the Primary Settlement Tanks and their associated distribution chambers are classed as Zone 2 up to the coping level (Appendix A1).

Effluent reaching the Eign PSTs will already have gone through several stages of exposure to the atmosphere and turbulence. Due to the large surface area of the tanks, it is likely that most remaining flammable material will quickly evaporate.

The risk that significant amounts of flammable material would pass through the PSTs and then through the Biological Filter Beds and Humus Tanks at Eign to reach the new TSR plant is considered to be negligible.

With respect to the presence of Methane due to geological infiltration, ground gas monitoring data indicated elevated concentrations of methane, which may present a risk should any confined spaces be proposed for the development (e.g., chambers) and a risk during construction. However, ground gas monitoring was carried out and ground gas flow rates were generally between 0.1 and 0.5 l/hr. As such, the risk posed by ground gas is considered to be low. Additionally, no coal mines and landfills were identified in the area. See Eign Geotechnical Risk Headliner Report – B10503-102503-XX-XX-RP-GB-GC7702.

Consequently, this file note is generated to register that a full PEXA study shall not be carried out and that all new areas, volumes and pipework in for the proposed works shall be considered Non-Hazardous in relation to DSEAR. All plant installed within these areas will be suitable for Non-Hazardous areas.

# A1 Eign WwTW Existing PEXA Information

## DCWW Potentially Explosive Atmosphere Area Classification

Site Name.	Eign STW & CSO	Sheet No.	1	Date.	09/01/03
Asset No.	30903	Grid Ref.	SO5203038780	Revision No.	1

Plant / Process Equipment	Area Classification Zone	Extent of Zoned Area	Remarks Flammable material, source, ventilation, process conditions, reasons, reference to Pexa drawing, other relevant details.
Screw Lift Pumps Low Level	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Screen Area	Zone 2	Up to Floor Level	Risk of Flammable Liquid Spill into Sewer
Screw Lift Pumps High Level	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Primary Tanks	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Storm Tanks	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
CSO Area	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Storm Pumping Well	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Storm Screen	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Original Inlet Chamber No 1	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Original Inlet Chamber No 2	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer

August 2021 - This is the most complete PEXA information we presently hold on this asset and it may have been superseded by capital works or changes in process.

A site specific risk assessment will be required to determine the current DSEAR status and help with this can be obtained via the DCWW Statutory Maintenance Team who

can be contacted by email [statutorymaintenance@dwrwymru.com](mailto:statutorymaintenance@dwrwymru.com)

**DCWW Potentially Explosive Atmosphere  
Area Classification**

<b>Site Name.</b>	Eign Stw (CSO)	<b>Sheet No.</b>	1	<b>Date.</b>	11/11/03
<b>Asset No.</b>	33646	<b>Grid Ref.</b>	SO5203038780	<b>Revision No.</b>	2

<b>Plant / Process Equipment</b>	<b>Area Classification Zone</b>	<b>Extent of Zoned Area</b>	<b>Remarks</b> Flammable material, source, ventilation, process conditions, reasons, reference to Pexa drawing, other relevant details.
Storm Pumping Well	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Storm Screen	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Original Inlet Chamber No 1	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Original Inlet Chamber No 2	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
<p><b>NB see separate sheets for main STW's and digester sites</b></p> <p>August 2021 - This is the most complete PEXA information we presently hold on this asset and it may have been superseded by capital works or changes in process.</p> <p>Site specific risk assessment will be required to determine the current DSEAR status and help with this can be obtained via the DCWW Statutory Maintenance Team who can be contacted by email</p> <p style="text-align: center;"><a href="mailto:statutorymaintenance@dwrwymru.com">statutorymaintenance@dwrwymru.com</a></p>			

**DCWW Potentially Explosive Atmosphere**  
**Area Classification**

<b>Site Name.</b>	Eign STW Digester	<b>Sheet No.</b>	1	<b>Date.</b>	14/09/2004
<b>Asset No.</b>	30903	<b>Grid Ref.</b>	SO 5203038780	<b>Revision No.</b>	3

Plant / Process Equipment	Area Classification	Extent of Zoned Area	Remarks
			Flammable material, source, ventilation, process conditions, reasons, reference to Pexa drawing, other relevant details.
Sludge reception sump/tank	2	Within sump.	Risk of delivery of digesting/partially digested sludge. Methane production
Rotamat Screen	2	Within confined sludge holding areas Within tank.	Risk of delivery of digesting/partially digested sludge. Methane production.
2 Raw sludge tanks.	2	Within tank.	Risk of delivery of digesting/partially digested sludge. Methane production.
Centrifuge feed sump.	2	Within tank.	Risk of delivery of digesting/partially digested sludge. Methane production
2 Digesters	1	Within tanks	Methane generated/risk of air entry.
Around roof of digester	1	Within 5 metres vertically of roof of digester.	Regular methane blow off from Whessoe valves. Risk of leak of methane from digester roof.
Condensate trap pit.	2	Within condensate trap pit	Risk of methane blow off.
Odour control unit.	2	Within odour control unit and pipework to and from it.	Risk of methane production from areas air drawn from.
Gas holder	1	Within gas holder	Risk of air entering methane storage holder
Around gas holder	2	2 metre radius area around holder	Risk of gas leak from holder
Compressed air inflating sack around holder and vent .	2	Within sack around holder and 3 metre radius sphere around vent.	Risk of methane leak into inflating sack.

August 2021 - This is the most complete PEXA information we presently hold on this asset and it may have been superseded by capital works or changes in process.  
A site specific risk assessment will be required to determine the current DSEAR status and help with this can be obtained via the DCWW Statutory Maintenance Team who can be contacted by email

[statutorymaintenance@dcwrcymru.com](mailto:statutorymaintenance@dcwrcymru.com)

**DCWW Potentially Explosive Atmosphere**  
**Area Classification**

<b>Site Name.</b>	Eign STW Digester	<b>Sheet No.</b>	1	<b>Date.</b>	14/09/2004
<b>Asset No.</b>	30903	<b>Grid Ref.</b>	SO 5203038780	<b>Revision No.</b>	3

<b>Plant / Process Equipment</b>	<b>Area Classification</b>	<b>Extent of Zoned Area</b>	<b>Remarks</b>
Gas compressor cubicles and venting area.	2	Within gas compressor cubicles and 3 metre radius of vent.	Flammable material, source, ventilation, process conditions, reasons, reference to Pexa drawing, other relevant details. Risk of methane leak under pressure.
Flare stack	2	5 metre radius around outlet	Risk of non-ignition of gas and failure of auto cut out.
Gas pressure relief valve.	2	5 metre radius sphere around vent stack	Risk of blow off of methane from pressure relief valve.
Digester site drainage sump.	2	Within sump.	Risk of spillage of digesting material producing methane.
<p>August 2021 - This is the most complete PEXA information we presently hold on this asset and it may have been superseded by capital works or changes in process.</p>			
<p>A site specific risk assessment will be required to determine the current DSEAR status and help with this can be obtained via the DCWW Statutory Maintenance Team who can be contacted by email</p>			

[statutorymaintenance@dwrwymru.com](mailto:statutorymaintenance@dwrwymru.com)

**DCWW Potentially Explosive Atmosphere**  
**Area Classification**

<b>Site Name.</b>	Eign Stw (CSO)	<b>Sheet No.</b>	1	<b>Date.</b>	11/11/03
<b>Asset No.</b>	33646	<b>Grid Ref.</b>	SO5203038780	<b>Revision No.</b>	2

<b>Plant / Process Equipment</b>	<b>Area Classification</b> <b>Zone</b>	<b>Extent of Zoned Area</b>	<b>Remarks</b> Flammable material, source, ventilation, process conditions, reasons, reference to Pexa drawing, other relevant details.
Storm Pumping Well	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Storm Screen	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Original Inlet Chamber No 1	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Original Inlet Chamber No 2	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
<p><b>August 2021 - This is the most complete PEXA information we presently hold on this asset and it may have been superseded by capital works or changes in process.</b></p>			
<p><b>NB see separate sheets for main STW's and digester sites</b> site specific risk assessment will be required to determine the current DSEAR status and help with this can be obtained via the DCWW Statutory Maintenance Team who can be contacted by email</p>			
<p><a href="mailto:statutorymaintenance@dwrcymru.com">statutorymaintenance@dwrcymru.com</a></p>			

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A site specific risk assessment will be required to determine the current DSEAR status and help with this can be obtained via the DCWW Statutory Maintenance Team who can be contacted by email

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**DCWW Potentially Explosive Atmosphere**  
**Area Classification**

<b>Site Name.</b>	Eign STW & CSO	<b>Sheet No.</b>	1	<b>Date.</b>	09/01/03
<b>Asset No.</b>	30903	<b>Grid Ref.</b>	SO5203038780	<b>Revision No.</b>	1

<b>Plant / Process Equipment</b>	<b>Area Classification</b> <b>Zone</b>	<b>Extent of Zoned Area</b>	<b>Remarks</b> Flammable material, source, ventilation, process conditions, reasons, reference to Pexa drawing, other relevant details.
Screw Lift Pumps Low Level	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Screen Area	Zone 2	Up to Floor Level	Risk of Flammable Liquid Spill into Sewer
Screw Lift Pumps High Level	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Primary Tanks	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Storm Tanks	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
CSO Area	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Storm Pumping Well	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Storm Screen	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Original Inlet Chamber No 1	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer
Original Inlet Chamber No 2	Zone 2	Up to Coping	Risk of Flammable Liquid Spill into Sewer

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A site specific risk assessment will be required to determine the current DSEAR status and help with this can be obtained via the DCWW Statutory Maintenance Team who

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<b>See separate sheet for Digestion Plant</b>	<b>Separate drawing for Digestion Plant</b>		
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## DCWW Potentially Explosive Atmosphere Area Classification

<b>Site Name.</b>	Eign STW Digester	<b>Sheet No.</b>	1	<b>Date.</b>	14/09/2004
<b>Asset No.</b>	30903	<b>Grid Ref.</b>	SO 5203038780	<b>Revision No.</b>	3

Plant / Process Equipment	Area Classification	Extent of Zoned Area	Remarks
			Flammable material, source, ventilation, process conditions, reasons, reference to Pexa drawing, other relevant details.
Sludge reception sump/tank	2	Within sump.	Risk of delivery of digesting/partially digested sludge. Methane production
Rotamat Screen	2	Within confined sludge holding areas	Risk of delivery of digesting/partially digested sludge. Methane production.
2 Raw sludge tanks.	2	Within tank.	Risk of delivery of digesting/partially digested sludge. Methane production.
Centrifuge feed sump.	2	Within tank	Risk of delivery of digesting/partially digested sludge. Methane production
2 Digesters	1	Within tanks	Methane generated/risk of air entry.
Around roof of digester	1	Within 5 metres vertically of roof of digester.	Regular methane blow off from Whessoe valves. Risk of leak of methane from digester roof.
Condensate trap pit.	2	Within condensate trap pit	Risk of methane blow off.
Odour control unit.	2	Within odour control unit and pipework to and from it.	Risk of methane production from areas air drawn from.
Gas holder	1	Within gas holder	Risk of air entering methane storage holder
Around gas holder	2	2 metre radius area around holder	Risk of gas leak from holder
Compressed air inflating sack around holder and vent .	2	Within sack around holder and 3 metre radius sphere around vent.	Risk of methane leak into inflating sack.

August 2021 - This is the most complete PEXA information we presently hold on this asset and it may have been superseded by capital works or changes in process.

A site specific risk assessment will be required to determine the current DSEAR status and help with this can be obtained via the DCWW Statutory Maintenance Team who can be contacted by email [statutorymaintenance@dwrcymru.com](mailto:statutorymaintenance@dwrcymru.com)

## DCWW Potentially Explosive Atmosphere Area Classification

<b>Site Name.</b>	Eign STW Digester	<b>Sheet No.</b>	1	<b>Date.</b>	14/09/2004
<b>Asset No.</b>	30903	<b>Grid Ref.</b>	SO 5203038780	<b>Revision No.</b>	3

<b>Plant / Process Equipment</b>	<b>Area Classification</b>	<b>Extent of Zoned Area</b>	<b>Remarks</b>
Gas compressor cubicles and venting area.	2	Within gas compressor cubicles and 3 metre radius of vent.	Flammable material, source, ventilation, process conditions, reasons, reference to Pexa drawing, other relevant details. Risk of methane leak under pressure.
Flare stack	2	5 metre radius around outlet	Risk of non-ignition of gas and failure of auto cut out.
Gas pressure relief valve.	2	5 metre radius sphere around vent stack	Risk of blow off of methane from pressure relief valve.
Digester site drainage sump.	2	Within sump.	Risk of spillage of digesting material producing methane.
<p>August 2021 - This is the most complete PEXA information we presently hold on this asset and it may have been superseded by capital works or changes in process.</p>			
<p>A site specific risk assessment will be required to determine the current DSEAR status and help with this can be obtained via the DCWW Statutory Maintenance Team who can be contacted by email</p>			

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