



Environmental Site Management Plan

Accident Prevention and Management Plan: Crossness STW



Using this standard

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This standard works in combination with other corporate documents including the Asset Standards, Site Operating Manuals, site Odour Management Plans, Health and Safety Standards, and regulatory permits.

Document Control & Procedures

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0 Document Confidentiality

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1 Glossary of Terms

TERM	DESCRIPTION
AD	Anaerobic Digestion
CHP	Combined Heat and Power
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EMS	Environmental Management System
EPR	Environmental Permitting Regulations
FFT	Flow to Full Treatment
ICA	Instrumentation Control & Automation
IED	Industrial Emissions Directive
OCU	Odour Control Unit
OMC	Operational Management Centre
OMP	Odour Management Plan
PFT	Picket Fence Thickener
PM	Process Manager
PS	Pumping Station
PST	Primary Settlement Tank
Receptors	Sensitive receptors are any fixed buildings or installations where odour annoyance may occur, such as residential homes, schools, hospital, offices, shops or garden centres. Open areas such as playgrounds and public footpaths should also be listed where these are known to have been affected by odour.
SAP	Thames Water's enterprise resource and planning system
SCADA	Supervisory Control And Data Acquisition
SOM	Site Operating Manual
STW	Sewage Treatment Works
TW	Thames Water
UWWTD	Urban Waste Water Treatment Directive

2 Executive Summary

In accordance with the consolidated IED Environmental Permit for Crossness; Waste BAT, specifically BAT1; and associated written management systems, this is the site management plan covering accident prevention and management. Thames Water Utilities Ltd is required to review this plan at least every 4 years, unless there are incidents, operational or managerial changes at the site which would require an earlier review.

The prime function of the Crossness Sludge Treatment Centre (STC) at Crossness Sewage Treatment Works (STW) is to capture the energy potential from the treatment of sewage sludges. The plant is run 24/7 due to the continuous supply of sewage received at the treatment works either from the surrounding catchment, or via tanker discharge.

This document forms part of the Thames Water Environmental Management System (EMS) for the permitted STC within Crossness STW.

Thames 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.

This site management plan for accident prevention and management follows relevant guidance produced by the Environment Agency¹ and includes the following sections:

- This plan provides a list of off-site receptors (Section 4.2);
- This plan provides details of the potentially polluting substances located at the site (Section 4.3);
- This plan identifies potential accidents and states the likelihood and consequence of each accident (Section 5);
- This plan states the measures taken to avoid accidents and measures taken to minimise the impacts of accidents on the environment (Section 5);
- This plan outlines the reporting, recording and review steps to be taken should a potentially polluting incident occur (Section 6); and
- This plan includes reporting forms that should be used in the event of incident occurring (Appendix B).

3 Process Responsibility

The Operational 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 such accidents that occur. This document is reviewed 4-yearly, but the review process is ongoing as part of the regular performance monitoring for the site. This plan was prepared in December 2023 and is next scheduled for review in December 2027.

4 Accident Prevention

In accordance with Thames Water's health and safety obligations and commitments, the STC is to be operated in a manner designed to reduce the risk of accidents to staff, the site and the wider environment.

¹ Guidance 'Develop a management system: environmental permits' published 1st February 2016, last updated 4th August 2021.

As part of the design process for any new plant or equipment on site, a HAZOP review is undertaken to ensure that the risk of accidents and their impacts is reduced through design. The site has been assessed under DSEAR and appropriate zoning applied, with clear signage indicating the zones.

Regular maintenance of the installation, is carried out in accordance the sites preventative maintenance programme, and the SOM. This ensures that the failures of plant are minimised over time and early remedial action implemented for any identified faults noted during maintenance.

4.1 Spill Prevention

The site is equipped with a number of spill kits and drain covers, located close to chemical and oil storage areas and tanks. Staff are trained in the use of these items to minimise the impact of spillages and risks to the works of chemicals or oils entering the site drainage system.

4.2 Off Site Receptors

Crossness STW site is located immediately south of the River Thames, separated by the Thames Path, in an area of the London Borough of Bexley. Although the site is immediately bounded by open and green space on all sides, the wider area is suburban in nature with a mixture of uses. To the east is the Riverside Resource Recovery Waste Incinerator (approximately 300 m to the east) and a number of warehouses and distribution centres (approximately 500 m to the east). To the south, is the A2016 Eastern Way and further warehouse units (approximately 300 m to the south) and a large school (approximately 700 m to the south). To the west is a large residential development with some commercial premises (approximately 250m to the west).

The site is located within the boundaries of AQMA, namely the Bexley AQMA, which was declared by Bexley Borough Council for Particulate Matter PM10 (24-hour mean) and Nitrogen Dioxide NO₂ (Annual Mean).

The whole of the STW and STC is within a Flood Zone 3 in an area that benefits from flood defences. This indicates that the land within this zone would have a high probability of flooding without the local flood defences. These protect the area against a river flood with a 1:100 annual probability of flooding as a result. The site sits outside the boundaries of any Source Protection Zones.

A Local Nature Reserve (LNR) is located immediately adjacent to the site (namely Crossness LNR), whilst Abbey Wood Site of Special Scientific Interest (SSSI) is located approximately 1.5 km to the South-West of the site. There are 20 non-statutory designated Local Wildlife Sites (LWS's), which are located within 2 km of the site of the Crossness STW, including the Crossness Sewage Treatment Works Pond LWS, Erith Marshes LWS and River Thames and Tidal Tributaries LWS.

The closest area of ancient and semi-natural woodland habitat is Lesnes Abbey Woods located approximately 1.2km to the South-West of the site. There are no Ramsar sites, Special Protection Areas (SPAs), Marine Protection Areas (MPAs) or Special Areas of Conservation (SACs) within 10 km of the site.

There are also records of protected species and habitat within the specified screening distance of the site. This includes protected fish and protected fish migratory routes associated with the River Thames and its tidal tributaries and Mudflats, Coastal and Floodplain Grazing Marsh and Mudflats associated with the southern banks of the River Thames. The Coastal Saltmarsh Mudflats at this location are a designated Priority Habitat.

For habitat sites, the relevant distance for consideration are: International designations (SAC, MPA, SPA and Ramsar - 10km); National designations (SSSI – 2km); Local and National Nature Reserves, Local Wildlife Sites and Ancient Woodland (2km).

Designated site review

Site Name	Designation	Direction from site	Distance from site
Abbey Wood	SSSI	South-West	1.5 km
Crossness	LNR	East	0m
Lesnes Abbey Woods	LNR	South-West	1.2 km
n/a	SAC	n/a	n/a
n/a	SPA	n/a	n/a
n/a	Ramsar	n/a	n/a
n/a	NNR	n/a	n/a
n/a	MPA	n/a	n/a
Lesnes Abbey Woods	Ancient & Semi-Natural Woodland	South-West	1.2 km

List of Local Wildlife Sites

Scratton's Farm Ecopark Franks Park, Belvedere Crossness Sewage Treatment Works Pond Belvedere Dykes Dagenham Breach and the lower Beam River in Dagenham Lower River Beam and Ford Works Ditches River Thames and tidal tributaries Lesnes Abbey Woods and Bostall Woods Ridgeway in Greenwich Tump 53 Nature Park Southmere Park & Yarnton Way/Viridion Way The Ridgeway Crossway Park and Tump 52 Erith Marshes Goresbrook and the Ship & Shovel Sewer Gallions Reach Park Twin Tumps and Thamesmere Thamesview Golf Course Crossways Lake Nature Reserve and Thameside Walk Scrub Rainham Railsides	All sites <2,000 m
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4.3 Stored Substances

Site tank inventory

Tank Purpose	Number	Operational Volume (m ³)	Total Operational Volume (m ³)	Construction
Picket Fence Thickeners	6	1,856	11,136	Steel
Primary Sludge Blending Tank	1	3,655	3,655	Concrete
SAS Blending Tank	1	3,655	3,655	Concrete
Sludge Buffer Tanks	12	4,000	48,000	Concrete
THP High Energy Blending Tank	1	30	30	Steel
THP Blended Sludge Tanks	2	235	470	Steel
Pre-THP Dewatering Feed Tanks	2	183	366	
THP Feed Silos	2	85	170	Steel
THP Process	1	Consisting of the following		
Pulper Tank	1	34	34	Steel
Reactor Tanks	4	13	52	Steel
Flash Tank	1	42	42	Steel
Primary Digester Tanks	8	3,330	26,640	Concrete
Digested Sludge Buffer Tanks	2	250	500	Steel
Overall Total			94,750	
Polymer Tank (for Primary Sludge Thickening)	1	10 tonnes		Steel
Polymer Tank (for SAS Thickening)	1	10 tonnes		Steel
Polymer Silo (for Pre THP Dewatering)	1	30		Steel
Polymer Silo (for Digested Sludge Dewatering)	1	30		Steel

Tank Purpose	Number	Operational Volume (m ³)	Total Operational Volume (m ³)	Construction
Main diesel storage tanks	2	350		Steel
Diesel storage day tanks (for MTU and Paxman Engines)	6	3.5		Steel
Powerhouse dump tanks	2	10.5		Steel
Webster House Boilers	2	16		Steel
Powerhouse Emergency Lighting Generator	1	0.5		Steel
SPG Standby Engine	1	0.4		Steel

5 Assessment

Risk Matrix and Terminology for Accident for Risk Assessment

Likelihood ↓	Consequence		
	Low	Medium	High
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

Classification	Likelihood	Consequence	Risk
Low	Probability of an event is low and likely only to occur in the long-term (a yearly basis or less frequent).	Impact is low or a minor, short-term nuisance. Minor release to a non-sensitive receptor or pollution of water course. Non-permanent health effects to human health (preventable by appropriate PPE). Minor surface damage to buildings; structures; services; or the environment which can be repaired immediately.	A level of harm is possible although this may not be noticeable to a receptor and would be a short-term event without lasting effects. Level of harm can be reduced using industry best practice and appropriate management techniques.
Medium	It is probable that an event will occur periodically in the medium-term (twice yearly basis).	Impact is noticeable in the short to medium-term. Large release impacting on the receiving media killing flora and fauna and requires remediation. Nuisance causing non-permanent health effects to human health. Damage to buildings; structures; services; or the environment preventing short-term use and/or requiring repair.	A level of harm may arise to a receptor which is noticeable although not long-lasting and may require some remedial actions in order to prevent re-occurrences.
High	An event is very likely to occur in the short-term (monthly or weekly basis) and is almost inevitable over the long-term OR there is evidence at the receptor of harm or pollution.	Impact is significant, wide-ranging and long-lasting effect. Has a chronic or acute impact on human health. Very large release that has a major impact on flora and fauna which may be very difficult to remediate. Significant damage to buildings; structures; services; or the environment which prevents use long-term and may require complete replacement. May cause a long-term impact or contribute towards a global issue due to releases of greenhouse gases.	A level of harm is likely to arise to a receptor that is severe causing significant harm to human health or the environment without appropriate remedial and mitigation measures being implemented. Remedial works to infrastructure and processes is required in the long-term.

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Major fire and/or explosion causing the release of polluting materials to air, water or land.	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population</p> <p>Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p>	Low	High	Medium	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Management systems requires DSEAR assessment which is adhered to by site operations.</p> <p>Designated ATEX zones on site and lightning protection system in place around Biogas Storage Holders and the Primary Digester Tanks. Fire alarm systems installed and maintained.</p> <p>Biogas contained within a closed system and monitored for safety and subject to a LDAR plan. Automatic cut off valve to biogas supply to stop biogas flows, electric temperature sensor, pressure monitors, flame arrestors, etc.</p> <p>Warning signs clearly displayed, and staff wear biogas alarms to alert to the presence of biogas. All visitors subject to site inductions and accompanied. Permit-to-work system in place.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively.</p> <p>Smoking only permitted in designated areas of site.</p>	Low
Minor fire causing the release of	Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory	Low	Medium	Low	Follow site Incident Response Plan and inform relevant authorities.	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
polluting materials to air, water or land	<p>irritation, illness and nuisance to local population</p> <p>Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p>				<p>Management systems requires DSEAR assessment which is adhered to by site operations.</p> <p>Designated ATEX zones on site and lightning protection system in place around Biogas Storage Holders and the Primary Digester Tanks. Fire alarm systems installed and maintained.</p> <p>Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop biogas flows, electric temperature sensor, pressure monitors, flame arrestors, etc.</p> <p>Warning signs clearly displayed, and staff wear biogas alarms to alert to the presence of biogas. All visitors subject to site inductions and accompanied. Permit-to-work system in place.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively.</p> <p>Smoking only permitted in designated areas of site.</p>	
Failure to contain firefighting water	<p>Emissions to ground and ground water of contaminated firefighting water entering soil and/or groundwater. Run-off from site to surface water courses.</p>	Low	Medium	Low	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Site surfaces fall to the site drainage system which has been designed to sufficient capacity to contain firefighting water. Site drainage returns to the Works</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	<p>Harm to aquatic flora and fauna.</p> <p>Chronic effect on water quality</p>				<p>Inlet providing containment and treatment process for fire water.</p> <p>Arrange for off-site tankering of firefighting water, if required.</p> <p>It is unlikely for run-off to leave site due to drainage and size of site.</p>	
<p>Accidental explosion of biogas</p>	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p> <p>Pollution of water or land</p>	<p>Low</p>	<p>High</p>	<p>Medium</p>	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Management systems requires DSEAR assessment which is adhered to by site operations including a LDAR plan.</p> <p>Designated ATEX zones on site and lightning protection system in place around Biogas Storage Holders and the Primary Digester Tanks. Fire alarm systems installed and maintained.</p> <p>Biogas contained within a closed system and monitored for safety. Automatic cut off valve to biogas supply to stop biogas flows, electric temperature sensor, pressure monitors, flame arrestors, etc. Lightning protection system installed.</p> <p>Likelihood reduced by availability of multiple on site uses of biogas (three CHP engines, three boilers and two emergency flares) and use of pressure release valves as a safety measure.</p>	<p>Low</p>

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Significant leak of biogas to atmosphere	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population.</p> <p>Global warming potential of greenhouse gases.</p>	Low	High	Medium	<p>Site assets are protected by physical means to prevent vehicle strike by use of kerbing and barriers, and exposed pipework is guarded by barriers in places.</p> <p>Regular proactive and preventative maintenance and regular visual checks.</p> <p>PRVs/PVRVs are present to avoid over-pressurisation of biogas system. Biogas detectors are in place between the two layers of biogas membranes which will raise the alarm should a leak of biogas be detected.</p>	Low
Biogas transfer systems, biogas storage tank, biogas engines, flares or PRVs failure causing emissions of biogas	<p>Emissions to air and dispersion leading to: inhalation by local human and animal receptors. Odour impact. Global warming potential. Risk of fire and explosion</p>	Low	High	Medium	<p>The plant is designed to capture and utilise all biogas possible, combusting the biogas in order to maximise recovered value from the biological treatment of sludge.</p> <p>The biogas system utilised is subject to regular preventative maintenance to minimise the potential for leaks occurring. The system is also protected with a comprehensive array of pressure and flow sensors and with isolation valves to minimise the potential for release if a leak is detected.</p> <p>Personnel on site wear portable biogas detectors in order to alert staff to presence of biogas.</p> <p>Two emergency flares are available and utilised for the safe disposal of surplus biogas in the event of plant breakdown, or a surplus of biogas above the</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					level that can be safely stored or utilised. Use of the emergency flares is recorded. PRVs are in place on the Biogas Storage Holders to be operated in the event of failure of the emergency flares to prevent over pressurisation and catastrophic failure.	
Leaks of emission to air, but principally NOx.	Emissions to air and dispersion leading to harm to protected nature conservation sites – SSSIs, SAC and SPA. Harm to protected site through toxic contamination, nutrient enrichment, disturbance etc.	Medium	High	High	Site is located within an AQMA declared for NO ₂ and PM ₁₀ . The nearest designated protected habitat is a LNR located immediately adjacent to the site and three LWSs located within and immediately adjacent to the site. A further LNR, Ancient Woodland site and SSSI can be found approximately 1.2 km and 1.5 km to the South-West of the site respectively. Previous emissions modelling submitted shows that deposition and impacts on habitats sites are unlikely to be unacceptable. There are no changes to emissions sources with this variation. Site operations will be subject to emission limits under current Regulations with infrastructure designed to minimise uncontrolled releases. Checks, monitoring and preventative maintenance will further minimise fugitive emissions.	Medium
Spillage of sludges or liquid during tanker transfer	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of	Low	Low	Low	Transfer operations of waste materials is largely an automated process controlled by the Process	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
operations e.g. pipework leaks	liquids from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality				<p>Controllers and parameters set within the SCADA system.</p> <p>All pipework is standardised, including tanker couplings. Tanker offloading area is of concrete construction with kerbing to prevent release to ground.</p> <p>In event of a spillage, follow site spillage response plan and inform relevant site personnel and relevant authorities.</p> <p>Spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage. Site drainage returns to works inlet providing treatment process for sludge or arrange off-site tankering of waste to another site. Sludge is relatively viscous and not highly mobile.</p>	
Spillage of raw materials during (e.g. diesel, polymer, anti-foam) during use, transfer and disposal operations.	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna. Chronic effect on water quality	Low	Medium	Low	<p>Raw materials are stored on made ground, within bunded containers or on bunds to contain spillages of 110% of the volume. Regular inspections for leaks and damage, with remedial action as required. Contents of bunds are regularly checked during environmental audits and after periods of heavy rainfall and emptied as required.</p> <p>In event of a spillage, follow site spillage response plan and inform relevant site personnel. COSHH data sheets available.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					<p>Deliveries to site are made by approved suppliers. Use of raw materials is carried out by trained personnel or automatically controlled processes.</p> <p>Penstock valves are fitted to bunded areas holding chemicals, e.g. ferric chloride delivery point. In the event of a minor spillage, spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage if suitable.</p> <p>Site drainage returns to works inlet providing treatment process for suitable materials or arrange off-site tankering of waste, if required.</p> <p>It is unlikely for run-off to leave site due to drainage and size of site.</p>	
<p>Spillage of sludges (e.g. primary sludge, digested sludge) during processing and transfer operations e.g. tank overtopping, pipework leaks</p>	<p>Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.</p> <p>Harm to aquatic flora and fauna.</p> <p>Chronic effect on water quality</p>	<p>Low</p>	<p>Low</p>	<p>Low</p>	<p>Processing and transfer operations of waste materials is largely an automatic process controlled by the Process Controllers and parameters set within the SCADA system.</p> <p>Tanks are fitted with sensors linked to SCADA to monitor levels within a tank and can inhibit additional pumping if high alarms activate.</p> <p>Preventative maintenance programme and maintenance plans are in place in order to maintain equipment effectively and minimise the risk of spillages.</p>	<p>Low</p>

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					<p>In event of a spillage, follow site spillage response plan and inform relevant site personnel and relevant authorities.</p> <p>Spill kits are provided around the site which can be used to contain a spillage and direct it towards site drainage.</p> <p>Site drainage returns to Works Inlet providing treatment process for sludge or arrange off-site tankering of waste to another site. Sludge is relatively viscous and not highly mobile. It is unlikely for run-off to leave site due to drainage and size of site.</p>	
<p>Failure of sludge storage tanks / Primary Digester Tanks</p>	<p>Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses.</p> <p>Harm to aquatic flora and fauna.</p> <p>Chronic effect on water quality.</p>	<p>Low</p>	<p>High</p>	<p>Medium</p>	<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Regular infrastructure inspections for tanks and pipework and planned preventive maintenance system in place. Regular visual inspections for tanks and pipework where this is aboveground and visible, and reactive maintenance.</p> <p>In-line flow monitoring in key locations and tank level monitoring would identify losses and enable a quick response.</p> <p>Sludge is relatively viscous and not highly mobile limiting the distance it can spread in a short time period. It is unlikely for run-off to leave site due to drainage and size of site.</p>	<p>Low</p>

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
Acceptance of non-conforming wastes and wastes that are incompatible with the waste treatment process	<p>Impacts on the normal performance of site treatment processes leading to emissions to ground and ground water contaminating soil and/or groundwater.</p> <p>Harm to aquatic flora and fauna and chronic effect on water quality. Harm to aquatic flora and fauna</p>	Low	Medium	Low	<p>Waste materials subject to waste pre-acceptance checks prior to delivery to site and subject to waste acceptance checks prior to discharge.</p> <p>Site has physical security measures to prevent unauthorised access to the site and all discharge points.</p> <p>Waste can only be accepted at the site if it is suitable for the biological treatment process.</p> <p>Site processes are monitored automatically with alarms to alert staff in the event of abnormal situations.</p> <p>Staff conduct regular monitoring of all plant and equipment during routine site activities.</p>	Low
All on-site hazards: machinery	<p>Direct physical contact with human population and /or livestock after gaining unauthorised access to the installation</p> <p>Bodily injury</p>	Low	High	Medium	<p>Direct physical contact is minimised by activity being carried out within enclosed Primary Digester Tanks.</p> <p>Site activities are managed and operated in accordance with a management system. Site physical security measures, including site security personnel 24/7, perimeter fence, CCTV and access control to prevent unauthorised access.</p> <p>Assets are protected by various physical means including fencing, kerbing and bollards to prevent vehicle strikes.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					Vehicles equipped with reversing alarms. Use of banksmen as appropriate.	
Vandalism causing the release of polluting materials to air (smoke or fumes), water or land.	<p>Emissions to air and dispersion leading to inhalation by local human receptors. Respiratory irritation, illness and nuisance to local population</p> <p>Emissions to ground and ground water of digestate contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna and chronic effect on water quality.</p> <p>Injury to staff, fire fighters or arsonists/vandals.</p>	Low	High	Medium	<p>Unauthorised access is unlikely to happen and minimised by physical site security measures and effective management systems.</p> <p>Site has site security personnel 24/7, perimeter fence, CCTV and access control barrier entry for all vehicular access.</p> <p>Additional security fences around some assets and other assets are kept within locked containers or buildings. Warning signs are displayed.</p>	Low
Flooding from rivers, streams and groundwater	Emissions to surface water course and harm to aquatic flora and fauna. Infiltration to ground and groundwater. Harm to aquatic flora and fauna and chronic effect on water quality.	Medium	Medium	Medium	<p>Site is in a Flood Zone 3 which benefits from flood defences.</p> <p>General wider works designed to minimise risk of localised works flooding due to storm surges.</p> <p>Potentially polluting substances stored within suitable containers and provided with bunds to contain spillages.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
					<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Take appropriate corrective and preventative actions to minimise environmental impact</p>	
Flooding due to drain blockages and/or excessive rainfall causing localised on-site surface water flooding	Emissions to surface water course and harm to aquatic flora and fauna. Infiltration to ground and groundwater. Harm to aquatic flora and fauna and chronic effect on water quality.	Medium	Low	Low	<p>Site wide drainage system linked to main sewage works, which includes additional capacity in storm tanks within the works to manage additional flows.</p> <p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Take appropriate corrective and preventative actions to minimise environmental impact. It is unlikely for run-off to leave site due to drainage and size of site.</p>	Low
Extreme weather conditions leading to abnormal conditions / release of potentially polluting substances	<p>Emissions to air and dispersion leading to inhalation by local human receptors and impacts on local ecological receptors. Respiratory irritation, illness and nuisance to local population. Harm to flora and fauna.</p> <p>Emissions to ground and ground water contaminating soil and/or groundwater. Run-off from site polluting surface water courses. Harm to aquatic flora and fauna</p>	Low	Medium	Low	<p>The treatment process can be controlled from off-site locations in the event of the site being inaccessible due to extreme weather e.g. snow, flooding.</p> <p>Storage tanks for potentially polluting substances have been designed to relevant industry standards at the time of construction.</p> <p>Lightning protection is installed at relevant locations to protect assets from lightning strike.</p> <p>Potentially polluting substance are stored in accordance with MSDS requirements and away from sensitive receptors.</p>	Low

Activity/Hazard	Environmental Impact (Pathway-Receptor)	Likelihood	Consequence	Risk	Risk Management	Residual Risk
	and chronic effect on water quality.				<p>Follow site Incident Response Plan and inform relevant authorities.</p> <p>Take appropriate corrective and preventative actions to minimise environmental impact.</p>	
Loss of mains power leading to failure of pumps / control systems and possible leaks and escape of sludge.	Emissions to ground and ground water of materials entering soil and/or groundwater. Run-off of liquids from site to surface water courses. Harm to aquatic flora and fauna.	Low	Medium	Low	<p>Site CHP engines able to supply electricity to the site using biogas supplies on site. Emergency standby generators provide back-up power / contingency plans to the STW and provide power to critical operations in the event of an electrical outage.</p> <p>Failsafe systems in place to ensure sludge remains in situ in the event of a loss of power and that systems are promptly returned into operation.</p> <p>Site wide drainage system linked to main sewage works in the event of a spillage.</p>	Low
Vandalism	Damage to plant or equipment on site due to unauthorized access to the site.	Low	Medium	Low	<p>Site accessed restricted at all times, including electronically controlled gates and 2 metre fencing. CCTV present at site.</p> <p>During normal operating hours, there is a culture of challenge around non-staff on site</p>	Low

6 Reporting and Recording

6.1 Reporting

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

Details of the information that should be reported to the Environment Agency are found in the most recent variation of the site's Environmental Permit but is reproduced as Appendix B of this document.

6.2 Recording

The procedure employed by TWUL for 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.

In the event of an accident, a Schedule 5 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; and
- Immediate measures taken to minimise environmental impacts.

A copy of the Schedule 5 notification form is provided in Appendix B. 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 installation. The associated actions arising will be held on SharePoint. 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.

6.3 Post-incident Review

Following an incident where potentially significant environmental effects occur, and the nature of the incident warrants it, an investigation will take place to determine both the root cause of the incident and how to prevent the incident reoccurring. The findings of the investigation will be reported to TWUL's management and shared with all relevant employees to enable the incorporation of good practice into future works.

A formal 'event learning' review of all on site processes and procedures will be undertaken by TWUL following any incident with potentially significant environmental consequences, if the processes are determined to be contributory to the cause of the incident. Any changes to processes or procedures required as a result of the formal review will be communicated to TWUL 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 TWUL management and employees.

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

6.4 Contacts

The key emergency contacts in the event of an accident or incident are:

Contact	Number
Thames Water Utilities Limited Customer Services	08459 200800
Environment Agency	0800 807060 (incident number) 03708 506506 (normal number)
Emergency services	999

Appendix A

Site Specific Key Contacts

Role	Name	Email address	Phone Number
Area Operations Manager			
Site Performance Manager			
Technically Competent Manager			
Customer Centre			
Thames Water Environmental Compliance Manager			
Thames Water Health and Safety Manager			

Appendix B

Notification Forms

To be inserted from relevant permit document.