BIO DYNAMIC UK LIMITED
PERMIT VARIATION APPLICATION
Environmental Risk Assessment
April 2022

biodynamic
Bio Dynamic UK limited

Client: Bio Dynamic UK Limited
Document Reference: HC1677-08

REPORT SCHEDULE

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Client: Bio Dynamic UK Limited

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Project Director: Joanna Holland

Project Manager: Jo Chapman

AUTHOR	DATE
Jo Chapman	14th March 2022
REVIEWER	DATE
Joanna Holland	13th August 2022
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Final Version 1.1	24th April 2023	Update for changed site configuration	Maxwell Bagnall

CONTENTS

1. ENVIRONMENTAL RISK ASSESSMENT

1.1. Introduction

The following qualitative risk assessment has been prepared to support a bespoke environmental permit variation application for Bio Dynamic UK Limited AD Facility at Private Road No. 4, Colwick Industrial Estate, NG4 2JT, NGR SK 63425 39835.

1.2. Summary of Key Assessment Parameters

Facility	Bio Dynamic UK Limited AD Facility
Operator	Bio Dynamic UK Limited
Location	Private Road No. 4, Colwick Industrial Estate, NG4 2JT, NGR SK 63425 39835
Location of Key Environmentally Sensitive Sites	The site is in a predominantly industrial area on land which was formerly in use as railway sidings, approximately 150m north of the river Trent. There are several permitted waste operations in the general surrounding locations of the Colwick industrial estate, and the site is immediately adjacent to the B D Gas Permits Limited biogas upgrading facility which is a directly associated activity to the Bio Dynamic UK Limited AD facility. The site is in an area designated as a Secondary A aquifer at the superficial geological level and a secondary B aquifer at the bedrock level. There are several groundwater and surface water abstractors in the area, and the site is located in a groundwater source protection zone 3. There are no designated habitats sites within 2km of the site. There are several locally designated nature reserves and priority habitat areas within 100m and 200m of the site. The area is predominantly industrial in character, the nearest local residential properties located approx. 730m to the southwest and 860m to the southeast.
Risk Assessment Carried out by	H&C Consultancy Limited
Date	**14/03/22 – updated 24/04/23 to reflect changes to configuration.**
Risk Criteria Summary	
Parameter 1	The anaerobic digestion facility occupies an approximately 1.4-hectare site, located in a predominantly industrial area. The operation is designed to process up to 150,000 tonnes of waste per year received as either packaged or unpackaged solid wastes, or pumpable liquid wastes. Approximately 20,000tpa of this will be exported offsite for use in other AD facilities following short term storage and treatment to de-package,

	shred, screen and bulk the waste. The remaining 130,000tpa will be processed in the onsite AD operation, equating to approximately 356 tons per calendar day of fresh waste material.
Parameter 2	The system is largely a closed system, with release points operating during emergency situations only. Solid waste feedstocks will be received and processed in an enclosed building. Liquid feedstocks will be received by tanker and offloaded directly to the pre-storage tanks located outside the process building. Emissions contained within the waste reception and processing area are extracted and vented to atmosphere via an odour abatement system which will be assessed by impact modelling and designed to meet current BAT.
Parameter 3	There will be four CHP engines with aggregated outputs of 5.025 MW el. and aggregated thermal inputs of 8.67MWth that will make exhaust emissions to air. The site will also operate two emergency flare units and a 2600kW thermal output capacity (2731 kW thermal inputs) dual fuel backup biogas/diesel powered boiler. The majority of biogas produced at the site will be exported to the adjacent BD gas permits biogas upgrading facility, upgraded to biomethane and injected into the national grid gas network. Air dispersion modelling of the impacts of emissions from the engines, flares, and boiler, have concluded that predicted concentrations of all pollutants were below the relevant Environmental Quality Standards (EQSs) at all locations of human exposure for all meteorological data sets modelled. Resultant impacts were classified as not significant. Impacts were also predicted at relevant ecological sites. The results indicate that emissions from the plant are not predicted to significantly affect existing conditions at any designation.
Parameter 4	The liquid storage and process tanks are contained within an impermeable concrete bund that has been sized to provide a volume of greater than 110% of the capacity of the largest single tank, and 25% of the combined capacity of all the tanks.
Parameter 5	Surface water accumulating in the concrete bunded area is collected in a collection sump from where it is pumped to a storage tank and then used within the process. Domestic sewage is collected in a sealed cesspool and tankered offsite.
Parameter 6	All condensate is collected in a separate collection system and recirculated within the process.
Parameter 7	Hydrogen sulphide is controlled via a combination of bacterial control via sulphur mats and associated oxygen dosing, and chemical dosing with ferric hydroxide.
Parameter 8	The site will be fitted with a rapid dosing system for dosing of anti-foaming agent as a means of managing foaming incidents in a timely fashion.
Parameter 9	Raw materials used in the process such as ferric chloride, disinfectants, fuels and oils are stored in suitable facilities at the site. Water for use in the process is obtained from interception and re-use of rainwater, and water abstracted from a borehole.

Parameter 10	A noise modelling assessment has been carried out in assessment of the potential impacts of noise arising from the site. This has demonstrated that the noise from the proposed plant would not have an adverse impact on residential amenity.
Parameter 11	The operator will dispatch all final digestate to land as an agricultural fertilizer certified to PAS110 standard.

1.3. Appendices

Appendix 1	Air Quality Impact Assessment Report and Associated Data Input Files
Appendix 2	Noise Impact Assessment Report
Appendix 3	Bioaerosol Risk Assessment
Appendix 4	~~H1 Risk Assessment for Discharge to Surface Water~~ withdrawn
Appendix 5	Groundsure Report
Appendix 6	Odour Impact Modelling Assessment Report and Data Input Files – updated 24.04.23

1.4. Summary List of Site Receptors

Site Name/Description	Proximity to Site	Details
Designated Habitats and Wildlife Sites		
	No SSSI's, SAC's, SPA's, or NNR's within 2km of the site.	
Local Habitats and Wildlife Sites		
	Local Nature Reserves	
	Netherfield Lagoons	88m NE
	Designated Ancient Woodland	
	Malkin Hill Wood	1296m E
	Green Belt	
	Designated by Gedling LA	77m NE
	Designated by Rushcliffe LA	155m S
	Designated by Nottingham LA	1998m W
	Priority Habitats Sites	
	Deciduous Woodland	53m NE
	Deciduous Woodland	64m NE
	No main habitat but additional habitats present	68m NE
	Deciduous Woodland	87m NE
	Deciduous Woodland	160m NW
	No main habitat but additional habitats present	178m N
	No main habitat but additional habitats present	179m NE
	Coastal and floodplain grazing marsh	237m SE
	Habitat Networks Enhancement Zones	
	Network Enhancement Zone 2	105m E
	Network Enhancement Zone 1	105m E
	Network Enhancement Zone 2	134m E
Groundwater and Abstractors		
	The site is located in an area designated as a Secondary A aquifer at the superficial geological level, which is indicative of permeable layers capable of supporting water supplies at a local rather than strategic scale, and in	

Site Name/Description	Proximity to Site	Details
	some cases forming an important source of base flow to rivers. At the bedrock level, the site is in an area designated as a secondary B aquifer, which is indicative of predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. Groundwater vulnerability summary classification: Secondary superficial aquifer - High Vulnerability. Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer. Two ground water abstraction points within 500m of the site as follows. 237m SW of the site – ENVA – for use for dust suppression and industrial purposes. 499m NW of the site – Trent Concrete Structures Limited – for process water. The operator is in the process of applying for an abstraction licence to abstract groundwater for use within the process.	
Source Protection Zones		
	The site is situated in a source protection zone 3: total catchment	
Surface Water Abstractors		
	Four licenced surface water abstractors within 1km of the site. These are all for crop irrigation purposes.	
Nitrate Vulnerable Zones		
	Site in a designated surface water NVZ	
Surface Water		
	The river Trent is approx. 140m to the south of the site at the closest point. In addition, there are a number of watercourses that run to the south and north of the site and discharge to the river Trent. A small watercourse is shown on search maps to cross the site to discharge to the river Trent. There is no visible evidence of this watercourse at the site, and despite the	

Site Name/Description	Proximity to Site	Details
	fact that the digester bunds have been created by excavating material, there is no evidence that this currently exists. A drain does exist on the other side of the railway line and in current OS maps the presence of a watercourse crossing the site is not shown. It is considered that this is a former feature that is no longer in existence at the site	
Flood Zone		
	Located in an area designated as Low risk (less than 1 in 100 but greater than or equal to 1 in 1000 chance) for river and coastal flooding, Flood Zone 2. The site is located 101m north of flood defences managed by the Environment Agency. Risk rating for surface water flooding is 1 in 100 years, 0.1m - 0.3m. Risk rating for groundwater flooding is low.	
Air Quality Management Area		
	The site is not situated in an air quality management area	
Residents		**Location in Relation to Site**
	Residential dwelling overlooking Holme Lane and in the Holme Pierrepont location	From 640m SW
	Residential dwelling overlooking Oak Avenue and in Radcliffe on Trent area	From 860m SE
	Residential dwellings in the Netherfield area	From 1.3km NW
Workplaces		
	The wider site is immediately adjacent to a waste processing and transfer site under the operation of ENVA (formerly Wastecycle) located between 50m to 250 to the west of the site. There are several other waste operations within 250m of the site, including a car breaker to the west of the site operated by Donald Tainton, and a series of registered exempt activities for storage and use of wastes.	
Other Amenity Sites		
	Horse-riding school (Oakfield Livery) overlooking Island Lane	670m SE
	Holme Pierrepont National Water Sports Centre and Country Park	850m - 2km SW

Site Name/Description	Proximity to Site	Details
Highways and Transport		
	Mainline railway is located immediately adjacent to the north of the site. Road number 4 of Colwick Industrial Estate terminates approx. 50m SW of the site.	

Risk Criteria Rating

Risk ratings are based on the likelihood of an event occurring multiplied by the severity of potential impact. Ratings are made of residual risk following implementation of preventative measures on site. The following scale is applied to rate these parameters:

Severity	Likelihood
1 – No environmental harm arising 2 – Fleeting localised impacts 3 – Localised impacts medium term 4 – Wider scale impacts of a fleeting nature, or localised impacts of a more persistent nature 5 – Widespread/persistent impacts on high amenity/sensitive sites	1 – Very unlikely to happen 2 – Low probability – occasional 3 – Likely to occur 4 – Highly likely to occur 5 - Inevitable

Severity ↑						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	66	8	10
	1	1	2	3	4	5
		1	**2**	**3**	**4**	**5**
	Likelihood →					

Final calculated risk band ratings are as follows	Insignificant	1 – 5
	Low	6 – 10
	Medium	11 – 15
	High	16 – 20
	Very High	20 - 25

1.5. Environmental Risk Assessment

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of Exposure (Likelihood)**	**Consequence (Severity)**	**What is the overall risk?**
What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
Dust from movement of vehicles to and from the facility.	Local residents, users of nearby highway, local workplaces and local habitats.	Air Wind-blown dispersion in atmosphere.	Site Manager is responsible for checking wind strength and direction and taking corrective action if necessary. Road surfaces are concrete, so low likelihood of generation of materials. Wheel washing facilities are available on site. If the road surface becomes dry and more dust is being created therefore, the road surface will be dampened down to minimise dust. Surface will be kept swept clean.	1- Dust could reach the adjacent highway or if a strong wind blew on a dry summer day. However this would be unlikely as low risk of dust generation and minimised by management actions, as necessary. Local residential properties too far away to be impacted.	2 – Nuisance, dust on cars, clothing, and inhalation of dusts.	2 – Insignificant. The nature of wastes received and stored on site, and nature of storage facilities mean that there is a low risk of these releases from being generated from the site.
Dust from burning of biogas.	Local residents, users of nearby highway, local workplaces and local habitats.	Emission to air from engine stack, and flare.	Release of dusts is not a significant risk factor associated with burning of biogas fuels in this type of plant. Annual emissions monitoring to be carried out in accordance with permit requirements. Ongoing maintenance schedule for engines and flare.	1 - Unlikely not an associated risk with this type of fuel or plant.	1 - Nuisance, impact on amenity, and impact on local habitats.	1 – Insignificant.
Release of particulate matter	Local residents, users of nearby highway,	Air. Windblown dispersion in	Wastes delivered to site via closed vehicles or tankers. Final digestate	1 – unlikely due to the nature of	2 – nuisance to local receptors	2 – Insignificant. The nature of wastes received and

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and microorganisms from wastes delivered to, stored, treated at the site and dispatched from the site.	local workplaces and local habitats.	atmosphere.	is stored in a gas tight secondary digester prior to dispatch or processed in the digestate dewatering and filtrate treatment system. Dewatering process takes place in an enclosed container and sludge stored in a covered skip prior which is taken off site when full. Offloading of wastes takes place in a sealed building. Air from the building is extracted and passed through an odour abatement system prior to release. Gas upgrading process applies use of acid scrubber and carbon filters for removal of unwanted elements of biogas. Bioaerosols risk assessment has been undertaken to evaluate potential impacts from this hazard. Risk found to be very low. As such, potential impacts as a result of bioaerosol emissions from the facility are not considered to be significant.	wastes and storage handling and treatment facilities applied at the site.	and potential health impacts.	stored on site, and nature of treatment and storage facilities mean that there is a low risk of these releases from being generated from the site.
Litter.	Local residents, users of nearby highway, local workplaces and local habitats.	Air, windblown, dispersion in atmosphere.	Wastes are received on site as pumpable slurries and unpackaged and packages solid wastes. All deliveries and storage of solid wastes made into a sealed building. All packaged wastes will	2 – Removed packaging will be washed and stored inside building in a dedicated skip. Loss of	3 – Nuisance, loss of amenity, harm to animal health and potential impact on adjacent	6 – Low due to containment infrastructure in place.

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			be passed through a de-packaging unit before being passed into the process. Final packaging will be stored in the reception building in a skip before being removed from site for disposal.	containment is unlikely but may occur occasionally.	farmland/habitats and amenity sites.	
Mud on roads from movement of vehicles to and from the facility.	Local residents, users of nearby highway, local workplaces and local habitats.	Deposited on the ground by vehicles accessing and leaving the site.	Road surfaces on site are concrete, so low risk of mud being generated from roads within the site. Wheel washing facilities are available in the waste reception shed. Roads and concrete reception/yard areas will be swept and kept clean on a regular basis. An inspection will be made of all vehicles entering the site at the weigh bridge, and any concerns over mud on the wheels of incoming vehicles can be recorded and addressed with the supplier/haulier in question. All vehicles entering and leaving the reception shed will be managed in line with ABPR requirements.	2 – Mud is unlikely to get onto the local roads as a result of generation on the site, due to nature of road surfacing, road maintenance activities, wheel wash facilities on site. Potentially contaminated vehicles entering the site will be checked, and wheel wash facilities made available if needed.	2 – Road safety and amenity for local residents and road uses on roads external to the site.	4 – Insignificant due to control measures available on site, and low risk of mud generation from the site itself.
Odour from delivered, stored dispatched, and processed waste feedstocks and wastes.	Local residents, users of nearby highway, local workplaces and local habitats.	Air.	All deliveries of solid wastes to site take place in a sealed building in accordance with the incoming waste procedure. Building is fitted with extraction and abatement system. Displaced air from tankers loading wastes for dispatch offsite	2 - Odours unlikely to impact on local receptors. Solid waste delivery and processing takes place in reception building with	2 - Nuisance and odour annoyance which may have more impact in hot summer	4 – Insignificant.

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			for use in third party AD plants is diverted back to the building and passed through the abatement system that serves the building. Loading of tankers for removal of digestate takes place outdoors with a carbon filtration system employed to abate odours prior to release of displaced air from tankers. Reception building has an extraction and abatement system that achieves a state of negative pressure inside the building. Fast acting roller shutter doors in use, and commitment to waste turnaround time of 1-2 days. External waste reception and pre-storage tanks have head spaces linked to the odour abatement system and therefore no displaced air is released to atmosphere on filling. The site operates a full and comprehensive odour management plan that outlines measures for ongoing monitoring of impact of odours arising from the site, and incident reporting investigation procedures. Odour modelling has	extraction and abatement. Displaced air from liquid tanker deliveries and waste transfer activities is diverted to the abatement system before release.	months.	

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			been undertaken to support the risk assessment for the site. Modelling assessment report concludes that predicted odour concentrations were below the relevant benchmark level at all sensitive residential locations in the vicinity of the site for all modelling years. As such, potential odour emissions from the facility are not considered to be significant.			
Odour from fermentation of wastes in the digestion process.	Local residents, users of nearby highway, local workplaces and local habitats.	Air.	Wastes are moved from the waste reception tanks to the pasteurisers and then to a buffer tank before being passed to the primary and secondary digesters via closed pipe systems that have no facility to vent to air. Displaced air from the buffer tank and pasteurisers is diverted to the odour abatement system for treatment prior to release. The site operates a full and comprehensive odour management plan that outlines measures for ongoing monitoring of impact of odours arising from the site, and incident reporting	1 -Very unlikely as digestate is moved between tanks in a closed system.	2 - Nuisance and odour annoyance which may have more impact in hot summer months.	2 – Insignificant.

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			investigation procedures. In the eventuality that the CHP engines or adjacent biogas upgrading unit are not operational, biogas is to be burnt in one of two emergency flares. Pressure relief valves on digesters may vent in exceptional, emergency situations for short periods of time if for any reason the engines or upgrading facility was not operational, and the flares were not available. A record of use of these valves will be made in the site diary/SCADA system and on an incident report if they are ever in use. Odour modelling has been undertaken to support the risk assessment for the site. The odour modelling assessment report concludes that predicted odour concentrations are below the relevant benchmark level at all sensitive residential locations in the vicinity of the site for all modelling years. As such, potential odour emissions from the facility are not considered to be significant.			

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Odour from exhaust from gas roof fans.	Local residents, users of nearby highway, local workplaces and local habitats.	Air.	Gas roof fan exhausts may contain varying biogas content which may create odour impacts. This will be monitored via daily sniff test monitoring and if impacts are identified then corrective actions will be taken.	2 – Impacts have not been detected during monitoring during previous operations at the sits.	2 – Impacts will be localised if they occur	4 - Low
Odour from storage and movement of digestate on site.	Local residents, users of nearby highway, local workplaces and local habitats.	Air.	Final digestate will be removed by tanker directly from the sealed/gas tight secondary digester for dispatch from site for use as a biofertiliser. Further storage is available off site in satellite storage tanks and lagoons closer to the intended site of spreading. Removal of digestate will be via closed tankers, operating an enclosed pipe system on removal, situated inside the reception building. All displaced air from tankers will be extracted and passed through an odour abatement system prior to release to atmosphere.	2- Odours generated during tanker offtake are abated on release to atmosphere. Dewatering process is enclosed and low potential of odours from aerobic membrane treatment process.	2 - Nuisance and odour annoyance which may have more impact in hot summer months.	4- Insignificant.
Odour from spreading of digestate to land.	Local residents, users of nearby highway, local workplaces and local habitats.	Air.	Digestate to be spread in accordance with COGAP and intended PAS110. This will reduce agitation and volatilisation of liquid,	3 - Odours could impact on close residents near to spreading areas.	3 - Nuisance and odour annoyance which may	9 – Low.

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			and hence minimise odours. Due note to be taken of weather conditions in specifically identified sensitive areas and spreading to take place where possible when impacts at lowest in line with site specific risk assessments or dynamic risk assessments. Digestate spread by a landspreading contractor who operates in line with the requirements of a mobile plant environmental permit for spreading waste to land for agricultural benefit. Once the digestate is re-validated for PAS110 certification following the site changes, the quality product will be spread per the terms of use in the quality protocol.	Third party landspreading contractor to undertake risk assessment associated with this activity.	have more impact in hot summer months.	
Flies in waste.	Local human population.	Air.	Wastes to be received in as 'fresh' a state as possible as this will maximise gas production potential. Pre-service agreements in place with waste producers to ensure that quality of feedstocks received and criteria for rejection are clear and agreed. Highly degraded or contaminated wastes to be	2 - infrequently due to containment arrangements and turnaround times of feedstocks.	2 - Nuisance from flies will have more impact in hot summer months.	4 – Insignificant.

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			quarantined and rejected from site in line with incoming waste procedure. Wastes to be turned around according to maximum turnaround times outlined in management system. Pest control management plan to be established and use of external specialist contractor to manage pests in a preventative way and in response to evidence of infestation should it be found.			
Rodent infestation.	Local human and animal population.	Travelling between neighbouring properties.	Wastes to be received in as 'fresh' a state as possible as this will maximise gas production potential. Pre-service agreements in place with waste producers to ensure that quality of feedstocks received and criteria for rejection are clear and agreed Highly degraded or contaminated wastes to be quarantined and rejected from site in line with incoming waste procedure. Wastes to be turned around according to maximum turnaround times outlined in management system. Pest control management plan to be established and use of external	2 - Infrequently, due to containment arrangements. Signs of infestation to be monitored on ongoing basis. External contractor to implement response if required.	2 - Nuisance from rodent, hygiene issues.	4 – Insignificant.

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			specialist contractor to manage pests in a preventative way and in response to evidence of infestation should it be found. Building infrastructure and ongoing management designed to reduce potential for ingress of rodents and to reduce areas where harbourage/shelter is available.			
Scavenging animals and scavenging birds.	Local human and animal population.	Air and over land.	Food waste received as pumpable liquids transferred directly to storage tanks, or solid material that is tipped and contained inside a sealed building. All process tanks are covered. Fast acting roller shutter doors will ensure that access opportunities to reception building storage areas are minimised. Regular checks to be carried out for birds inside the building and action to be taken to displace any found to prevent established residence.	2 – Low probability, occasional access by birds.	2 - Nuisance and harm to human health from waste carried off site and faeces.	4 – Insignificant.
Noise from vehicle movements/ deliveries.	Local residents, users of nearby highway, local workplaces and local habitats.	Air.	Vehicle movements for waste and digestate scheduled to occur in accordance with schedule working hours Monday – Saturday. No deliveries of waste or digestate are taken to or from the AD plant out of	2 - Daily responsibility of Site Manager, infrequent impact to neighbours to cause nuisance.	2 -Nuisance from site activities.	4 – Low.

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			these hours and in accordance with any planning restrictions. The Site Manager is responsible for ensuring vehicles are turned around efficiently, with least impact on the neighbouring properties and that vehicles are removed from the surrounding roads quickly. Site is located in a wider industrialised area where there is ongoing generation of background levels of noise from neighbouring sites. All potentially noise generating activities at the site will be carried out in accordance with the Noise Management Plan. Noise impact monitoring assessment has been undertaken and impacts from operations not predicted to be significant.			
Noise/vibration from CHP's engine, boiler and flare.	Local residents, users of nearby highway, local workplaces and local habitats.	Air/land.	CHP engines to be contained within insulated containers. Maintenance schedule in place to ensure machinery is operating as efficiently as possible. Noise management plan in place that outlines measures for management and monitoring and reporting procedures for noise arising from the site.	2 - Use of mitigation measures will reduce impact to insignificant.	2 - Nuisance from noise/vibration.	4 – Insignificant.

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of Exposure (Likelihood)**	**Consequence (Severity)**	**What is the overall risk?**
What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
Noise from odour abatement system and outdoor plant.	Residents, users of nearby highway, local workplaces and local habitats.	Air/land.	Plant has been designed in accordance with BAT selecting equipment with lowest noise ratings and providing containment and abatement where possible. Noise impact modelling assessment has been carried out and impacts from noise not found to be significant. Noise management plan in place that outlines measures for management and monitoring and reporting procedures for noise arising from the site.	2 - Use of mitigation measures will reduce impact to insignificant.	2 - Nuisance from noise/vibration.	4 – Insignificant.
Delivery of liquid wastes.	Ground/groundwater/ surface water.	Spillage through ground or drainage system.	All deliveries will be supervised and will take place during normal working hours. Deliveries will take place in a sealed, impermeable concrete area inside the reception building that drains to a sealed drainage system. Spill kits and wash facilities are situated in this area. State of repair of concrete is monitored on a regular basis, and proactive maintenance carried our if necessary. Any loss of waste from outdoor reception tanks will be	1 -Low as supervised delivery procedure in place, and delivery area has impermeable surfacing and drains to sealed drainage system or bund.	3 - Pollution of watercourse/ groundwater/land	3 – Insignificant.

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of Exposure (Likelihood)**	**Consequence (Severity)**	**What is the overall risk?**
What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
			contained in the concrete bund area.			
Chemical/oil delivery and storage.	Ground/groundwater/ surface water.	Spillage during delivery to drain/ground.	Fuel stores at the site contained in integrally bunded tank. Work instruction to be established for delivery of diesel and engine oil and other bulk stored liquids to site based on site specific risk assessment. Ferric hydroxide will be delivered to the site for dosing in bulk bags on pallets and stored in the main reception hall. Tailored spill kit to be kept on site in the locality of deliveries. Anti-foaming agent (vegetable oil) to be delivered and stored at the site in a 200l tank contained in the pump room which is located in the bunded area. All other raw materials to be stored indoors in small volumes or inside bunds if outdoors.	1 -Low.	3 - Pollution of watercourse/ groundwater/land	3 – Insignificant.
Storage of small volumes of chemicals.	Local environment.	Spillage.	All cleaning chemicals are stored with lids or caps secured. All cleaning chemicals are stored in a dedicated store to ensure substances are not exposed to conditions that could cause a reaction and spillages are	1 - Very low volumes are kept on site. Storage is contained and indoors.	2 - Harm to local environment and animal health.	2 – Insignificant.

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of Exposure (Likelihood)**	**Consequence (Severity)**	**What is the overall risk?**
What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
			contained. Small volumes of chemicals stored in the lab. Chemicals are segregated as appropriate and stored in secondary containers to catch any small spillages. Occasional dosing chemicals stored in covered, and secure chemical store.			
Failure of pipework and pumps.	Ground/water.	Breach of containment.	All pipework to be installed above ground so that regular maintenance checks can be made. Pipework is contained within the bunded area or inside the reception building or technical building.	2 - Low due to measures in place.	3 - Pollution of watercourse/ groundwater/land .	6 – Low.
Condensate from gas line and upgrading unit at adjacent site.	Ground/water.	Spillage/ release to ground/water on removal.	Condensate to be collected in a purpose-built collection system and passed back through AD plant. Condensate not predicted to be produced in large quantities.	2 - Low due to relatively small volumes produced and purpose build containment system.	1 - Low due to relatively small volumes produced.	2 – Insignificant.
Breach of digestion process tanks/pipework.	Ground/water.	Spillage/breach of tank.	All existing process tanks are situated inside a bunded area that is at least 110% volume of the largest tank, and 25% volume of the total volume of all the tanks contained within. Tanks are monitored constantly by computerised system, and a series of alarms are operable to alert staff of malfunction in different areas.	2 - Low due to alarms on tanks, and process control measures and maintenance programme in place.	2 - low due to presence of bund.	6 – Insignificant.

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of Exposure (Likelihood)**	**Consequence (Severity)**	**What is the overall risk?**
What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
			Tanks are subject to daily visual checks for leaks. All pipework within the bund is above ground and so can be inspected/monitored for state of repair. Any breach of containment of these would be contained within the bund. Bund construction is complaint with relevant standards. Partial below ground digester tanks are located above the bund lining and fitted with leak detection system.			
Breach of outdoor liquid waste storage tanks.	Groundwater/surface water.	Spillage or breach of tank.	Any major spillages resulting from tank failure will run to the bunded area and be contained.	2 - Low due to tank design, construction, and maintenance and bund.	2 - Unlikely to impact due to presence of bund.	4 – Insignificant.
Removal of digestate from storage.	Groundwater.	Spillage during removal from storage tank to tanker.	If to be dispatched to land, whole digestate to be removed from the secondary digester by a third-party landspreading contractor. All loading operations will be supervised by site staff. Loading of digestate will take place a dedicated area on a sealed concrete surface that drains to a sealed drainage sump for	2 - Low due to management system in place, staff supervision, but small spillages at least likely to occur given frequency and nature of operation.	2 - Pollution of watercourse/groundwater/land. Small spillages only likely, and areas concerned have secondary or sealed containment.	4 – Insignificant.

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of Exposure (Likelihood)**	**Consequence (Severity)**	**What is the overall risk?**
What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
			containment of small spills and up to one full tanker load should a whole load be lost. Spill kits and wash facilities will be available in this area to aid immediate cleaning following any small spills. Drainage sump will be checked daily.			
Failure of CHP connection or gas grid network connection.	Air.	Release of methane to air and impact on air quality/ emissions of greenhouse gases.	Site has two emergency flare units and an emergency dual fuel backup boiler that have the capacity to burn gas produced by the digesters if the engines, biogas boiler and/or gas upgrading grid connection for the adjacent biogas upgrading unit were unavailable. Pressure relief valves will operate on digesters if flares are unavailable and CHP connection lost.	2 - Low, as unlikely that all of these facilities will be unavailable at the same time but in any case, flares combined are sized to manage all gas arising from the site if needs be.	3 - Impact on localised air quality while pressure relief valves operational.	6 – Low.
Flares.	Air.	Air quality impacts for members of the public, and impact on ecology due to deposition.	Machinery fitted to comply with best available techniques relating to emissions limits. Machinery to be subject to regular maintenance programme to ensure optimum performance. Site to comply with emissions limits and reporting schedules set out in the permit. Flare to be used for short term emergency use only.	3 – Flare likely to be used for short term emergency periods.	2 - Impact on air quality standards will be short term and fleeting on emergency basis only.	6 – Low.

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of Exposure (Likelihood)**	**Consequence (Severity)**	**What is the overall risk?**
What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
Vent from Dual Fuel Boiler.	Air.	Air quality issues for members of the public, and impact on ecology due to deposition.	Machinery fitted to comply with best available techniques relating to emissions limits. Machinery to be subject to regular maintenance programme to ensure optimum performance. Site to comply with emissions limits and monitoring schedules set out in the permit.	2 - Low due to nature of machinery fitted and maintenance schedules and monitoring applied.	2 - Impact on air quality standards.	4 – Insignificant.
Heat from CHP engines.	Air	Air quality impacts for members of the public, and impact on ecology due to deposition.	Machinery fitted to comply with best available techniques relating to emissions limits. Machinery to be subject to regular maintenance programme to ensure optimum performance. Site to comply with emissions limits and monitoring schedules set out in the permit. Heat is recovered from engine cooling waters to heat tanks on site.	1 - Low due to the nature of machinery fitted, maintenance schedules and monitoring applied, and heat recovery on site.	1 - Impact on air quality standards	2 – Insignificant.
Stacks on engines burning biogas.	Air.	Air quality impacts for members of the public, and impact on ecology due to deposition.	Machinery fitted to comply with best available techniques relating to emissions limits. Machinery to be subject to regular maintenance programme to ensure optimum performance. Site to comply with emissions limits and monitoring schedules set out in the permit. Air	2 - Low due to the nature of machinery fitted and maintenance schedules and monitoring applied.	2 - Model predicts insignificant Impact on air quality standards at receptors.	4 – Insignificant.

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk Management**	**Probability of Exposure (Likelihood)**	**Consequence (Severity)**	**What is the overall risk?**
What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
			dispersion modelling exercise has been undertaken to assess the likely impact of emissions to air from the site at nearby receptors. This modelling exercise is attached to this assessment as appendix 1.			
Pressure relief valves.	Air. Local human population and local environment.	Air quality impacts for members of the public, and impact on ecology due to deposition. Odour impacts.	Machinery fitted to comply with best available techniques relating to emissions limits. Machinery to be subject to regular maintenance programme to ensure optimum performance. Site to comply with emissions limits and monitoring schedules set out in the permit. Site has two emergency flares that will burn biogas in a controlled manner if it cannot be utilised by the gas users at the site. Pressure relief valves will only vent in emergency situations where the flare is not available or due to a blockage on the gas line. Odour and accident management in place and make facility for use of pressure relief valves.	2 – Low due to the nature of machinery fitted, maintenance schedules and monitoring applied.	2- Short term impact due to short term occasional usage.	4 - Insignificant
Flooding of site.	Local human population and local environment.	Contaminated Flood Waters.	Permitted waste types are non-hazardous so any waste washed off site will add to the volume of the local post-flood clean-up workload,	1 - No known history of flooding in the area. Site is not in an identified	3 -Contamination of buildings / natural	3 – Insignificant.

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
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What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
			rather than the hazard. The main tanks and reception building for the plant are sealed and would therefore provide a level of containment in such an event. The site is bunded, so a degree of materials would be retained on site following a flooding incident. Site is not in an identified flood risk zone and there is no history of flooding at the site.	flood risk area.	habitats downstream.	
Unauthorised access to site.	Bodily injury to person or animal entering site.	Direct physical contact.	The AD site is surrounded by a perimeter fence and has a lockable gate to the entrance. This gate is closed and locked always when operational staff are not present on site. The AD plant is fitted with CCTV for security purposes and security staff are present on-site during hours when operational staff are not present. The AD plant is fitted with a remote alarm system, so staff are alerted to machine failure at a distance. All vehicles/people entering the site will be received by the weighbridge operator who will be present in this area while the site is open for deliveries Site to be enclosed by perimeter fence and	1 - Low as site is locked and fenced when not manned, and access to the site is controlled during open hours.	4 - Bodily injury/damage to plant.	4 - Insignificant

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
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			additional screening by high natural bunding resulting from site location and positioning.			
Arson and / or vandalism causing the release of polluting material to air (smoke or fumes), water or land.	Local human population, staff, firefighters, vandals, or local environment.	Air transport of smoke. Firewater run-off from site.	Permitted waste types are non-hazardous and process material is in the form of liquid slurries or moist feedstocks, so only a low magnitude risk is estimated. Firewater run-off would be contained via integral bunding system and sealed drainage system of building. Site boundary is fenced and contained by the wider boundary of the site walls with controlled access. Machinery fitted with remote alarm system to alert staff of failure. A series of procedures are in place to manage this eventuality: Accident and Emergency Management Plan. Facility to pump water from the bund to a holding tank in the main reception hall and then controlled release from this tank as a take-off point. Alternatively temporary pipework could be installed in the bund to take off liquids from tankers located in the reception yard area.	1 - Site has a number of security mechanism in place to prevent access.	4 - Respiratory irritation, illness and nuisance to local population. Injury to staff, firefighters or vandals. Pollution of water or land.	4 - Insignificant
Disruption to operations due to	Local sensitive residential and	Various depending on	An agreement will be in place with a suitable digestate offtake	2 – Occasional short-term	3 – Localised medium-term	6 - Low

What do you do that can harm and what could be harmed?			Managing the Risk	Assessing the Risk		
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What has the potential to cause harm?	What is at risk, what do I want to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk – Who is responsible for what?	How likely is this contact? (1-5)	What is the harm that can be caused? (1-5)	What is the risk that still remains? The balance of probability and consequence (Likelihood x Severity) (1-25)
unavailable onsite digestate storage.	workplace receptors and ground/water receptors. Site operations.	impacts arising from disruption to operations.	operator which will require the contracted offtake operator to provide sufficient and robust offsite storage and spreading facilities. This will be presented in the site EMS as a detailed digestate management plan and subject to ongoing monitoring for compliance on the part of the offtake party. The operator has achieved PAS110 certification and end of waste status for digestate for the site and following re-validation for certification to validate the site refurbishment changes, the digestate produced will continue to be PAS110 certified. When the operator undertakes the Phase 2 installation of the digestate dewatering and filtrate treatment system, then digestate will be dewatered, treated and discharged to surface water (the river Trent).	disruption could occur but unlikely due to robustness of offsite provision and agreement in place.	impacts possible if disruption to operations should occur.	

1.6. Abbreviations

Abbreviation	Description
ABPR	Animal By-Products Regulations
AD	Anaerobic Digestion
ATEX	Abbreviation for the ATEX Directive and is short for "Atmospheres Explosibles"
BAT	Best Available Techniques
CCTV	Closed-Circuit Television
CHP	Combined Heat and Power (Engine)
COGAP	Code of Good Agricultural Practice
DSEAR	Dangerous Substances and Explosive Atmospheres Regulations 2002
IBC	Intermediate Bulk Container
LNR	Local Nature Reserve
LWS	Local Wildlife Site
PAS110	Publicly Available Standard for the production of quality digestate
Ramsar	Ramsar Site (a wetland site designated to be of international importance under the Ramsar Convention 1971)
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WHO	World Health Organisation

h&c consultancy

Registered office:
Staffordshire House
Beechdale Road
Nottingham NG8 3FH
Company No. 7861810

0115 923 2253
07506 658098 / 07525 211381
www.hc-consultancy.co.uk