



**THORNFIELD 001 LIMITED**

**BARNES FARM ANAEROBIC DIGESTION FACILITY**

**ODOUR MANAGEMENT PLAN**

**NOVEMBER 2022**

**DATE ISSUED:** NOVEMBER 2022  
**JOB NUMBER:** ST19738  
**REPORT NUMBER:** 006  
**VERSION:** V1.0  
**STATUS:** FINAL

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**ODOUR MANAGEMENT PLAN**

**NOVEMBER 2022**

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## DOCUMENT CONTROL

The following table is used to track changes and updates to the odour management plan

Version	Issued	Changes	Approvers Initials
1. (Original)	JUNE 2019	N/A	AC
2. Oil separator variation	SEPT 2022	New odour control measures for oil separation process	KH/AC

## **1 INTRODUCTION**

- 1.1 Wardell Armstrong has been commissioned by Thornfield 001 Ltd to prepare an Odour Management Plan (OMP) for the anaerobic digestion (AD) facility at Barnes Farm, Rowton in Shropshire. The facility treats up to 90,000 tonnes per annum of food wastes and agricultural waste, generating biomethane (gas) for the National Grid and producing a PAS 110 compliant digestate, which is sold for land improvement applications.
- 1.2 The OMP has been prepared with due regard to Environment Agency (EA) environmental permitting guidance H4 “Odour Management: How to comply with your environmental permit”. The OMP supplements the odour risk assessment included in the Environmental Risk Assessment included with the permit application.
- 1.3 The OMP provides details of the potentially sensitive receptors in Section 2. Potential odour sources are discussed in Section 3 whilst the odour control measures and environmental monitoring to be provided at the facility are discussed in Sections 4 and 5 respectively. Thornfield 001 Ltd will investigate all instances where odour is detected or reported by third parties and this system is discussed in Section 6.
- 1.4 The site will be operated in accordance with an Environmental Management System (EMS) developed in accordance with the Environment Agency’s guidance. Furthermore, all operations at the site will be managed by a Technically Competent Manager.
- 1.5 The OMP concludes that whilst that the site presents a low risk of odour, appropriate measures will be employed to control any potential malodorous emissions from the site. Monitoring will be completed to ensure that odour control is effective at the site and to trigger remedial actions, in the event that odour is detected at the site boundary.

## **2 POTENTIALLY SENSITIVE RECEPTORS**

- 2.1 Barnes Farm AD Facility is located at grid reference SJ 6222 1946, between the villages of Waters Upton and Rowton in Shropshire. The surrounding area is mainly rural comprising fields.

- 2.2 There are relatively few potential receptors within 2km of the site. Table 2:1 below identifies the potential receptors and their distances from the proposed facility.

Table 2:1 Receptors within 2km of the proposed Anaerobic Digestion Facility		
Receptor	Type of receptor	Approximate distance from facility
Barnes Cottages	Residential	75m
Barnes Farm House	Residential	390m
Stone House	Residential	425m
Melverley Farm and campsite	Residential	340m
Rowton	Residential	730m
Waters Upton	Residential	850m

- 2.3 The sources of potential odour that could impact on these receptors are discussed in Section 3.

### 3 POTENTIAL ODOUR SOURCES

- 3.1 The proposed AD facility will treat up to 90,000 tonnes per annum of food wastes, including segregated kitchen and catering wastes with some animal by-products that fall under Category 3 of the Animal By-products Regulations 2005. Agricultural wastes may also be treated, including cattle slurry from Barnes Farm. Putrescible and biodegradable wastes have the potential to be malodorous.
- 3.2 The AD facility will not be located within a building as there is no requirement for a traditional waste reception hall or process building. All wastes received at the site will be in the form of a liquid or sludge. This means all aspects of the waste delivery, storage and treatment will be within sealed, appropriately constructed tanks and vessels. Deliveries and transfers of waste are carried out using sealed tanks, pipes and sealed non-return valves. This means that wastes are never open to the atmosphere. The AD process will operate 24 hours per day, 7 days per week. Though deliveries will be during the day time hours.
- 3.3 The main emission points to air will be from the centrifuge oil separator and storage tank, the biomethane upgrade unit, the CHP units, the boiler and the back-up flare. These emission points will not be significant sources of odour.

- 3.4 The centrifuge oil separator and associated oil storage tank will each be fitted with an odour control system that will consist of a carbon filter to ensure that odorous compounds are captured before air from the system is vented to atmosphere.
- 3.5 Emissions to air from the Biomethane Upgrade Unit stack will consist largely of carbon dioxide and are not expected to generate any odour. Odorous compounds will be treated/captured by the condenser and carbon filters associated with the first part of the gas clean-up process.
- 3.6 Emissions from the CHP and back up flare will be by-products of combustion processes. The high temperatures involved will ensure that any odorous compounds are fully oxidised during the combustion process. Neither of these emissions presents a risk of odour.
- 3.7 There are also a number of pressure relief valves (PRVs) fitted to tanks and plant, from which short-term emissions may occur in an emergency situation. Emissions from these tanks could present risk of odour but emissions from these points are expected to be a rare occurrence. Gas pressure will be managed through close control of the process and sufficient head space will be maintained in the digesters to accommodate gas generated. Gas will be treated in the CHP and the gas to grid plant, ensuring that it is treated effectively. If for any reason gas cannot be managed by one of these two routes then the flare will fire automatically, preventing any over pressure in the system. As a result over pressure in the system is very unlikely.
- 3.8 Another potential source of odour will be the odorant used for odourising the gas before injection into the gas grid. This is an essential health and safety activity, giving the gas its characteristic “gas” smell, so that any gas leaks are quickly identified. The process is closely monitored and controlled to prevent leaks of odorant that might cause an odour nuisance.

#### **4 ODOUR CONTROL MEASURES**

- 4.1 Wastes will be delivered by road tanker or enclosed bowsters or tanks and will be discharged into the liquid waste storage tank using appropriate pipework and connectors, ready to be prepared for the digestion process. A suitably trained site operative will supervise the delivery. Deliveries will be carried out in accordance with written procedures to minimise the risk of leaks or spills.

- 4.2 All pipework on site will be sealed/airtight to prevent emissions of odour.
- 4.3 All site plant will be subject to regular inspection and will be serviced, maintained and repaired as necessary to prevent leaks.
- 4.4 To control malodorous emissions from slurry within the centrifuge oil separator, air displaced from the treatment process will pass through a carbon filter to ensure that odorous compounds are captured before the air is vented to atmosphere.
- 4.5 Treatment takes place within a fully enclosed unit fed by a pipe from the heat exchanger feed line prior to pasteurisation.
- 4.6 To guard against odours emissions from the oil storage tank, the breathing vent is fitted with a carbon filter.
- 4.7 To control the production of hydrogen sulphide in the biogas, which is malodorous, Ferric Chloride will be dosed, as required, to the anaerobic digestion tank.
- 4.8 Ammonia, hydrogen sulphide and non-methane volatile organic compounds will be present to some degree in the biogas produced. These compounds are potentially malodorous. However, the system will be sealed to maintain anaerobic conditions. Gas will be drawn off in a controlled manner and utilised in the CHP and gas to grid plant. The pressure will be monitored and, should over pressure occur, the flare will light automatically to safely burn off excess gas and destroy odorous compounds. The flare will operate in accordance with the Environment Agency's guidance, providing a residence time of 0.3 seconds with a temperature of 1,000°C.
- 4.9 Gas entering the gas to grid unit will be treated to remove odorous compounds. Ammonia is highly soluble and will be removed in the condensate at the Gas clean up unit. Condensate will be collected and directed to the existing liquid waste tank.
- 4.10 Two activated carbon filters will be used to adsorb (and effectively trap) the hydrogen sulphide and non-methane volatile organic compounds. Hydrogen sulphide will tend to be adsorbed in the first filter and VOCs in the second filter.
- 4.11 Finally, the proposed odorant for odourising the gas before injection into the gas grid will be stored in a dedicated specialist container and injected into the biomethane at a maximum rate of 7mg/m<sup>3</sup>. Only small quantities of odorant will be stored on site and it will be managed in accordance with written procedures to prevent any emissions.

## **5 ENVIRONMENTAL MONITORING**

- 5.1 Daily olfactory monitoring will be undertaken by the site manager or nominated site operative along the site boundary.
- 5.2 Olfactory checks will also be carried out during tanker delivery to the process to detect any odour that might occur during unloading.
- 5.3 A record will be made, recording the time and date of inspection, brief details of the weather conditions and wind direction and noting any odour detected.
- 5.4 Monitoring frequencies will be reviewed in the event of an odour event occurring.
- 5.5 All carbon filters will be checked monthly to ensure they are functioning correctly and the carbon will be replaced as required.

## **6 INVESTIGATION AND MANAGEMENT OF ODOUR EVENTS**

- 6.1 The site will be operated in accordance with an Environmental Management System. All operations at the site will be managed by a Technically Competent Manager.
- 6.2 In the event that odour is detected at the site boundary, an investigation will be undertaken to determine the cause.
- 6.3 Where odour nuisance arises due to particular wastes being accepted at the site, the offending materials will be identified and the waste producer will be advised these wastes may no longer be accepted.
- 6.4 Any incidence of odour nuisance will be recorded in the site log, together with details of the investigation into the cause and actions taken to resolve the situation.
- 6.5 The site log will be made available for inspection by authorised officers of the Environment Agency.
- 6.6 In the event of any odour complaints from the public or local businesses, an investigation will be undertaken to determine the cause and mitigation measures implemented as appropriate. Details will be recorded in the site log and reported through the EMS.

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