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Project No: 314766

Odour Assessment & Management Plan

For the site located at:

Crugmor
Penparc
Cardigan
Ceredigion
SA43 1QY

Prepared for:

Stepside Agricultural Contractors

Contents Amendment Record

This report has been issued and amended as follows:

Revision	Description	Date	Signed
1.0	First Issue	29 November 2024	S Carson

Acknowledgement

This report has been prepared for the sole and exclusive use of Stepside Agricultural Contractors in accordance with the scope of work presented in Mabbett & Associates Ltd (Mabbett) Letter Agreement (314766/YP/310524/3.0), dated 31st May 2024. This report is based on information and data collected by Mabbett. Should any of the information be incorrect, incomplete or subject to change, Mabbett may wish to revise the report accordingly.

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Section 1.0: Introduction

1.1 Background

Mabbett was appointed by Stepside Agricultural Contractors to prepare an Odour Assessment and Odour Management Plan (OMP) to support a planning application for the operation of two bio-fertiliser lagoons and a maturation tank to be used to store food industry process slurry (hereafter referred to as the 'Proposed Development') at Crugmor, Penparc, Cardigan, SA43 1QY.

The facility has the potential to cause odour impacts as a result of activities associated with the storage of the food industry by-products. An OMP is a live document that formalises and describes how potential odour will be managed on site.

1.2 Site Description

The site is located at Crugmor, Penparc, approximately 1.2km east from the town of Cardigan. The site is surrounded to the north, west and south by open fields and farmlands, and to the east by ground-mounted solar developments and an existing Anaerobic Digestion (AD) plant.

An aerial view of the Proposed Development and the surrounding area is shown below in Figure 1.1.

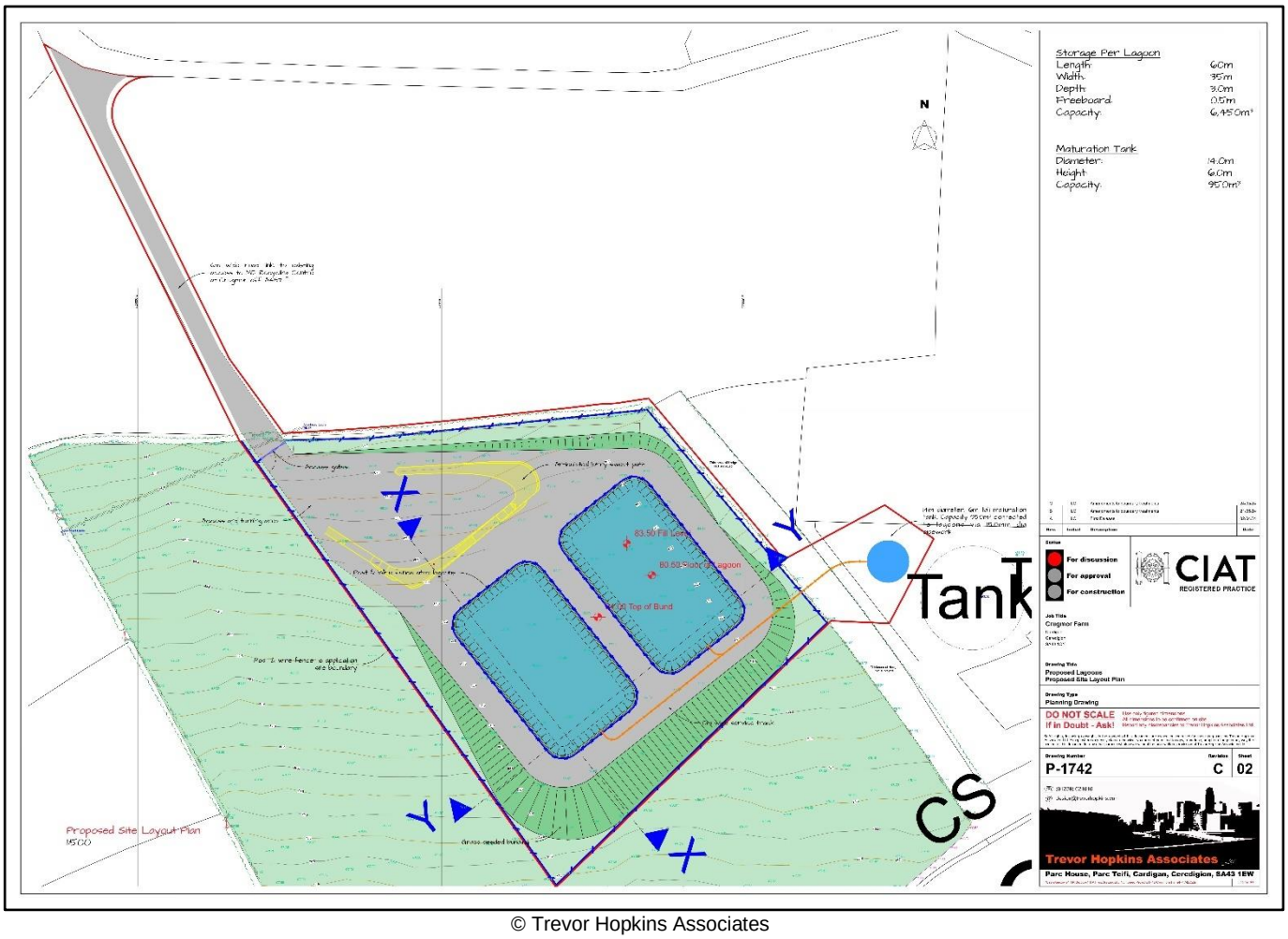
Figure 1.1: Site Location

Imagery © 2024 Google

1.3 Proposed Development

The Proposed Development includes the formation of two fully lined lagoons and an associated maturation tank on land adjacent to the existing Asgard Renewables AD Plant at Crugmor Farm. The Proposed Development will expand the biofertiliser storage capacity of the Asgard Renewables Plant and allow the conversion of its existing biofertiliser storage tank into a functioning digester tank. A site plan is shown in Figure 1.2.

Figure 1.2: Proposed Site Plan (extract from Trevor Hopkins Associates drawing ref: P-1742)



1.4 Process Description

The food industry by-products will be filled and stored in the two lagoons prior to being applied to the land for agricultural benefit. The proposed lagoons will have a floating cover and have a storage capacity of approximately 12,900m^3. The lagoons will be connected to the existing Asgard Renewables AD Plant via a proposed maturation tank. The maturation tank will be a steel panel 'slurry store' type construction with a capacity of 950m^3.

The lagoons will generally be filled in October, storing the effluent from October to February after which it would be pumped out and spread on the surrounding agricultural land throughout the rest of the year.

1.5 Odour Impact Assessment

In order to derive the specific level of mitigation required for the OMP, a qualitative odour impact assessment have been carried out. The assessment follows the source-pathway-receptor conceptual model in accordance with the established guidance.

1.6 Odour Management Plan

This bespoke OMP has been prepared for the Proposed Development in accordance with appropriate guidance, to include the Institute of Air Quality Management (IAQM) Guidance on the assessment of odour for planning. The OMP aims to:

- Formalise and describe how odour issues will be managed on site as part of the site's operational management system.
- Show how odours will be managed and controlled so as to present or minimise impact during normal operations as well as consideration of abnormal events and foreseeable accidents and incidents.

The OMP follows the following basic management system principles:

- **Plan**: identify releases (normal and abnormal conditions) and document the specific control measures for each.
- **Do**: apply the specific control measures (routine and additional).
- **Check**: verify if the measures are working well enough.
- **Act**: review and revise to keep effective.

The OMP is risk-based with the level of depth, complexity and sophistication relating to the complexity of the proposed activities and the potential impact on local sensitive receptors. It is intended to provide a framework to ensure no significant odour impact off-site.

1.7 OMP Maintenance

To ensure that this document remains effective, it will be reviewed, and if necessary updated, by Stepside Agricultural Contractors as follows:

- Should actual operational conditions differ in any significant way from what has been assumed in this OMP, with regards odour, noting that the facility has not yet been built.
- At least once a year.
- Following any complaints from members of the public.
- Following any odour related incidents.

Following any significant change to site operations which may impact odour emissions.

Section 2.0: Odour Legislation, Policy and Guidance

2.1 Ambient Odour Limits

There is no statutory limit in the UK for ambient odour concentrations.

2.2 National Legislation and Policy

2.2.1 Environmental Protection Act 1990

The Environmental Protection Act 1990 makes provision for the improved control of pollution to the air, water and land by regulating the management of waste and the control of emissions. Of particular relevance to the proposed development are the provisions for statutory nuisances.

Statutory nuisances are defined as:

- ***Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance;***

Where a local authority is satisfied that a statutory nuisance exists, or is likely to occur or recur, in the area of the authority, the local authority shall serve a notice ("an abatement notice") imposing all or any of the following requirements:

- Requiring the abatement of the nuisance or prohibiting or restricting its occurrence or recurrence;
- Requiring the execution of such works, and the taking of such other steps, as may be necessary for any of those purposes,and the notice shall specify the time or times within which the requirements of the notice are to be complied with.

2.2.2 Planning Policy Wales

Planning Policy Wales sets the context for development planning in Wales and provides a framework for the spatial development of Wales as a whole. The primary objective of Planning Policy is to ensure that *"the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales."*

2.3 Local Planning Policy

2.3.1 Ceredigion Local Development Plan

The Ceredigion Local Development Plan is the council's primary planning document which sets out the policies used for determining planning applications within Ceredigion.

Policy DM22 'General Environmental Protection and Enhancement' is relevant and states:
"In order to help achieve environmental protection and enhancement, proposed development will be permitted provided that:
1. It protects and enhances where possible air, soil and the water environment and safeguards water resources, both on and off site;…"

2.4 Guidance

2.4.1 Guidance on the Assessment of Odour for Planning

The Institute of Air Quality Management (IAQM) *Guidance on the assessment of odour for planning* was published to assist with the assessment of odour impacts for planning applications.

This IAQM document has been prepared to assist practitioners involved in odour assessment for planning. This guidance has been followed during the qualitative odour impact assessment.

The guidance advises that the following are taken into account when assessing the offensiveness of an odour: Frequency, Intensity, Duration, Offensiveness, and Location; sometimes described by acronym FIDOL.

- **Frequency** of detection (how often exposure to odour occurs).
- **Intensity** as perceived (the perception of the strength of the odour).
- **Duration** of exposure (the length of any particular odour event or length of time exposed to the odour).
- **Offensiveness** (the character of an odour as it relates to its hedonic tone (pleasant, neutral or unpleasant) at a given odour intensity).
- **Location** (the type of receptors e.g. housing, play areas, areas of particular sensitivity etc).

Additional factors that may influence nuisance include:
- The rate of emission at the source(s);
- The duration and frequency of the source emission(s);
- The time of the day that the emission(s) occurs;
- The prevailing meteorological conditions; and,
- The odour detection capacity of individuals to the various source(s).

2.4.2 Natural Resources Wales Guidance – 'How to Comply with Your Environmental Permit'

Natural Resources Wales (NRW) provides practical guidance on environmental permit compliance, along with specific guidance on odour management. It states that *"Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable, to minimise, the odour."*

It lists the activities for which odour is a key issue, and states that every site that falls under one of these activities requires an odour management plan. NRW takes guidance from the EA H4 Odour Management Technical Guidance on odour management and assessing the offensiveness of odours.

2.4.3 EA H4 Odour Management Technical Guidance Note

The EA Technical Guidance Note H4 Odour Management provides additional guiding principles on odour regulation, assessment and control.

Section 3.0: Odour Impact Assessment Methodology

3.1 IAQM Odour Risk Assessment for Planning

The IAQM guidance includes a qualitative risk-ranking assessment approach to predict the risk of odour exposure (impact) at specific receptor locations. The risk assessment uses the source-pathway-receptor approach as outlined below.

- Source is the origin where the odour is released/emitted into the atmosphere;
- Pathway refers to the travelling of the odour through the air to locations off site. Increasing the length of the pathway will increase the dilution and dispersion, hence reducing the concentration of the odour at the receptor, thus reducing exposure; and,
- Receptors refer to the presence of people. They may experience an adverse effect, although sensitivities towards odour differ from individual to individual.

The first step in the assessment is to estimate the odour generating potential of the site activities, termed the "Source Odour Potential", which takes into account three factors:
- The scale (magnitude) of the release of odour;
- How inherently odorous the emission is; and,
- The relative pleasantness/unpleasantness of the odour.

The Source Odour Potential can be categorised as Small, Medium or Large.

Next, the effectiveness of the pollutant pathway as the transport mechanism for odour through the air to the receptor, versus the dilution/dispersion in the atmosphere, needs to be estimated. The pollutant pathway from source to receptor can be categorised as ineffective, moderately effective, or highly effective.

Using the example risk ranking in Table 3.1, the effect of the odour impact on the exposed receptor can then be estimated, taking into account the sensitivity of the exposed receptor.

Table 3.1: IAQM Risk Factors for Odour Source, Pathway and Receptor Sensitivity

Source Odour Potential	Pathway Effectiveness	Receptor Sensitivity
Factors affecting the source odour potential include: ▪ The magnitude of the odour release (taking into account odour-control measures); ▪ How inherently odorous the compounds are; and, ▪ The unpleasantness of the odour.	Factors affecting the odour flux to the receptor are: ▪ Distance from source to receptor; ▪ The frequency (%) of winds from the source to receptor (or, qualitatively, the direction of receptors from source with respect to prevailing wind); ▪ The effectiveness of any mitigation/ control in reducing flux to the receptor; ▪ The effectiveness of dispersion/ dilution in reducing the odour flux to the receptor; and, ▪ Topography and terrain.	For the sensitivity of people to odour, the IAQM recommends that the air quality practitioner uses professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the following general principles, as detailed below.
Large Source Odour Potential ▪ Magnitude – Larger Permitted processes of odorous nature or large sewage treatment works (STWs); materials usage	**Highly Effective Pathway for Odour Flux to Receptor** ▪ Distance – receptor is adjacent to the source/site; distance well below any official set-back distances.	**High sensitivity receptor** Surrounding land where: ▪ Users can reasonably expect enjoyment of a high level of amenity; and,

Source Odour Potential	Pathway Effectiveness	Receptor Sensitivity
hundreds of thousands of tonnes/m^3 per year; area sources of thousands of m^2. ▪ The compounds involved are very odorous (e.g. mercaptans), having very low Odour Detection Thresholds (ODTs) where known. ▪ Unpleasantness – processes classed as "Most offensive"; or (where known) compounds/odours having unpleasant (-2) to very unpleasant (-4) hedonic score. ▪ Mitigation/control – open air operation with no containment, reliance solely on good management techniques and best practice.	▪ Direction – high frequency (%) of winds from source to receptor (or, qualitatively, receptors downwind of source with respect to prevailing wind). ▪ Effectiveness of dispersion/dilution – open processes with low-level releases, e.g. lagoons, uncovered effluent treatment plant, landfilling of putrescible wastes.	▪ The people would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. ▪ Examples may include residential dwellings, hospitals, schools/education and tourist/cultural.
Medium Source Odour Potential ▪ Magnitude – smaller Permitted processes or small Sewage Treatment Works (STWs); materials usage thousands of tonnes/m^3 per year; area sources of hundreds of m^2. ▪ The compounds involved are moderately odorous. ▪ Unpleasantness – processes classed in H4 as "Moderately offensive"; or (where known) odours having neutral (0) to unpleasant (-2) hedonic score. ▪ Mitigation/control – some mitigation measures in place, but significant residual odour remains.	**Moderately Effective Pathway for Odour Flux to Receptor** ▪ Distance – receptor is local to the source. ▪ Where mitigation relies on dispersion/dilution – releases are elevated, but compromised by building effects.	**Medium sensitivity receptor** Surrounding land where: ▪ Users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or, ▪ People wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. ▪ Examples may include places of work, commercial/retail premises and playing/recreation fields.
Small Source Odour Potential ▪ Magnitude – falls below Part B threshold; materials usage hundreds of tonnes/m^3 per year; area sources of tens m^2. ▪ The compounds involved are only mildly odorous, having relatively high ODTs where known.	**Ineffective Pathway for Odour Flux to Receptor** ▪ Distance – receptor is remote from the source; distance exceeds any official set-back distances. ▪ Direction – low frequency (%) of winds from source to receptor (or, qualitatively, receptors upwind of source	**Low sensitivity receptor** Surrounding land where: ▪ The enjoyment of amenity would not reasonably be expected; or, ▪ There is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the

Source Odour Potential	Pathway Effectiveness	Receptor Sensitivity
▪ Unpleasantness – processes classed as “Less offensive” in H4; or (where known) compounds/odours having neutral (0) to very pleasant (+4) hedonic score. ▪ Mitigation/control – effective, tangible mitigation measures in place (e.g. BAT, BPM) leading to little or no residual odour.	with respect to prevailing wind). ▪ Where mitigation relies on dispersion/ dilution – releases are from high level (e.g. stacks, or roof vents >3m above ridge height) and are not compromised by surrounding buildings.	normal pattern of use of the land. ▪ Examples may include industrial, farms, footpaths and roads.

In the third step, the estimates of Source Odour Potential and the Pathway Effectiveness are considered together to predict the risk of odour exposure (impact) at the receptor location, as shown by the example matrix in Table 3.2.

Table 3.2: Risk of Odour Exposure (Impact) at the Specific Receptor Location

		Source Odour Potential		
		Small	Medium	Large
Pathway Effectiveness	Highly Effective	Low Risk	Medium Risk	High Risk
	Moderately Effective	Negligible Risk	Low Risk	Medium Risk
	Ineffective	Negligible Risk	Negligible Risk	Low Risk

The next step is to estimate the effect of that odour impact on the exposed receptor, taking into account its sensitivity, as shown by the example matrix in Table 3.3. The odour effects may range from negligible, through slight adverse and moderate adverse, up to substantial adverse.

Table 3.3: Likely Magnitude of Odour Effect at the Specific Receptor Location

Risk of Odour Exposure	Receptor Sensitivity		
	Small	Medium	Large
High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

According to the IAQM guidance, where the overall effect is greater than “slight adverse”, the effect is likely to be considered significant.

Section 4.0: Sources of Odour

The first stage of the risk assessment is to identify and consider odour risks for the site, and the sources of these odour risks. A review of the proposed development processes was undertaken to identify potential odour sources. A brief summary of the process is detailed below.

4.1 Baseline Odour

Odours are not usually additive in their impacts unless they are of a similar character. The baseline odour at the site is likely to be predominantly rural and agricultural in character due to the surrounding land uses.

4.2 Proposed Development Odour Sources

4.2.1 Transportation of Food Industry By-Product

The food industry process slurry will be transported to the existing AD plant in vacuum tankers. As such, any odour impacts will be controlled by the existing permits for the AD plant. Odour impacts are therefore considered to be negligible and have therefore not been assessed further in this assessment.

4.2.2 Maturation Tank

The food industry process slurry will be transferred from the existing AD plant to a maturation tank via pipes. It is understood that the tank will be completely sealed with no emission point to atmosphere. Odour impacts are therefore considered to be negligible and have therefore not been assessed further in this assessment.

4.2.3 Transfer into Lagoon

The food industry process slurry will be transferred from the maturation tank to the lagoon via pipes. Furthermore, it is understood that the effluent would be bottom filled and would a relatively short-lived process. This would limit potential for odour release during this process. Odour impacts are therefore considered to be negligible and have therefore not been assessed further in this assessment.

4.2.4 Storage of Bio-Fertiliser

The Proposed Development would store food industry process effluent in the winter months (October to February). This would then be spread on surrounding fields as a fertiliser. During storage in the tanks, the waste will go through anaerobic digestion which will lead to the release of gases including ammonia and hydrogen sulphide. The storage of bio-fertiliser is considered to be the main odour source at the site.

The lagoons, whilst of an impermeable clay construction, will be fully high-density polyethylene (HDPE) lined and include an integrated floating HDPE cover, effectively creating a sealed 'bag' within the clay bunding of the lagoon which will reduce the release of gases and reduce odour emissions to air. As per the Defra emissions inventory[1], this mitigation can reduce ammonia emissions from uncovered slurry lagoons by up to 60%. Floating covers can yield a similar odour benefit and are advantageous compared to fixed covers as detailed by Integrated Pollution Prevention and Control (IPPC) guidance[2]:

"Fixed covers will reduce emissions, but the concentration of odour in the headspace can become very high. This may be released in one go when the cover is removed, producing very strong odours at receptors if not dispersed adequately in the air. This may cause particular annoyance, even if short lived. There may also be health and safety implications if workers are exposed to the air in the tank headspace."

4.2.5 Landspreading

During the landspreading process, there is potential for odorous pollutants to be released. Landspreading will take place on surrounding fields in accordance with the National Resources Wales guidance[3].

[1] Inventory of Ammonia Emissions from UK Agriculture 2021 Available at: https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2307061001_UK_Agriculture_Ammonia_Emission_Report_1990-2021_Final.pdf
[2] Technical Guidance Note IPPC SRG 6.02 (Farming) Odour Management at Intensive Livestock Installations
[3] The water Resources Regulations 2021 The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021 Guidance for Farmers and Land Manager (gov.wales)

Furthermore, being surrounded by farmland, landspreading is a common practice in the area and as such is considered to be in keeping with the baseline odours. As such, landspreading of the liquid slurry is considered to be a part of the existing baseline odour of the area and is not considered to be an additional source. Odour impacts from landspreading have therefore not been assessed further in this assessment.

4.3 H4 guidance

The EA's H4 guidance gives the following examples when classifying odour smell:

"Most Offensive
- *Processes involving decaying animal or fish remains*
- *Processes involving septic effluent or sludge*
- *Biological landfill odours*

Moderately Offensive
- *Intensive livestock rearing*
- *Fat frying (food processing)*
- *Sugar beet processing*
- *Well aerated green waste composting*

Least Offensive
- *Brewery*
- *Confectionary*
- *Coffee roasting*
- *Bakery"*

The EA's report *'Review of odour character and thresholds'*[4] lists ammonia as having a sharp and pungent odour, and hydrogen sulphide as having an odour like rotten eggs. The report also states that ammonia has an odour threshold of 1.5 ppm, while hydrogen sulphide has an odour threshold of 0.00041 ppm.

Based on the above classifications, unabated odour emissions from the Proposed Development would be conservatively classified as *'most offensive'*.

4.4 IAQM guidance

In accordance with IAQM guidance, the Proposed Development is considered to have a 'medium' source odour potential. This is due to the proposed floating HDPE cover which will limit odour emission.

[4] Available online - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/290981/scho0307bmkt-e-e.pdf

Section 5.0: Sensitive Receptors

The Proposed Development will be located on land at Crugmor, Penparc, approximately 1.2km east from the town of Cardigan and 0.7km Southwest of Penparc, in a semi-rural area.

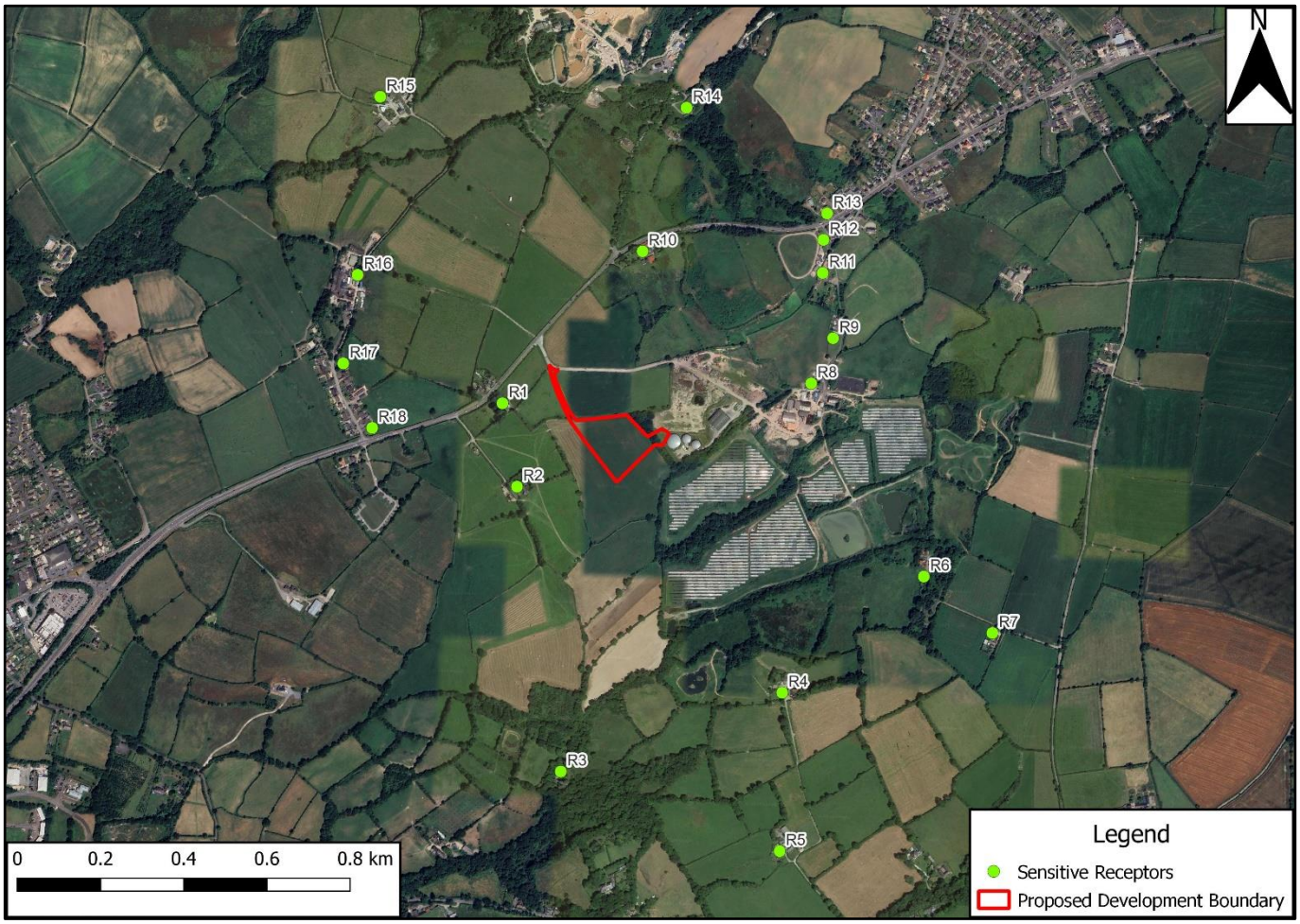
There are few high odour sensitive receptors in close proximity to the Proposed Development. The closest high odour sensitive receptor is located approximately 140m to the west of the site boundary. In total seventeen high sensitive receptors, within 1km of the Proposed Development, have been selected for inclusion in the assessment. These are all residential dwellings and represent the closest receptors in each cardinal direction.

Table 5.1 below lists the identified receptors, their associated sensitivity and distance to the Proposed Development. Figure 5.1 below shows the location of the identified sensitive receptors relative to the Proposed Development.

Table 5.1: Identified Sensitive Receptors

Ref.	Receptor	Odour Sensitivity	X Coordinate (m)	Y Coordinate (m)	Approximate Distance to Proposed Development (m)
R1	Residential	High	219862	247230	140
R2	Residential	High	219896	247029	220
R3	Residential	High	220002	246345	740
R4	Residential	High	220534	246534	640
R5	Residential	High	220528	246153	990
R6	Residential	High	220875	246813	700
R7	Residential	High	221040	246677	910
R8	Residential	High	220604	247278	370
R9	Residential	High	220657	247386	460
R10	Residential	High	220198	247595	350
R11	Residential	High	220632	247543	530
R12	Residential	High	220633	247623	600
R13	Residential	High	220642	247686	650
R14	Residential	High	220304	247940	690
R15	Residential	High	219568	247967	760
R16	Residential	High	219513	247538	520
R17	Residential	High	219479	247326	500
R18	Residential	High	219548	247171	460

Figure 5.1: Sensitive Human Receptor Locations



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Section 6.0: Pathway Effectiveness

6.1 Meteorological Data

Data from Aberporth meteorological observation station (approximately 6.4 km to the north-east of the site) was reviewed to determine likely dispersion of odour from the Proposed Development. The wind roses from 2018-2022 for Aberporth are shown in Figure 6.1 while a more detailed breakdown of wind direction is included in Table 6.1.

Figure 6.1: Wind Roses of 2018 to 2022 Aberporth Meteorological Data

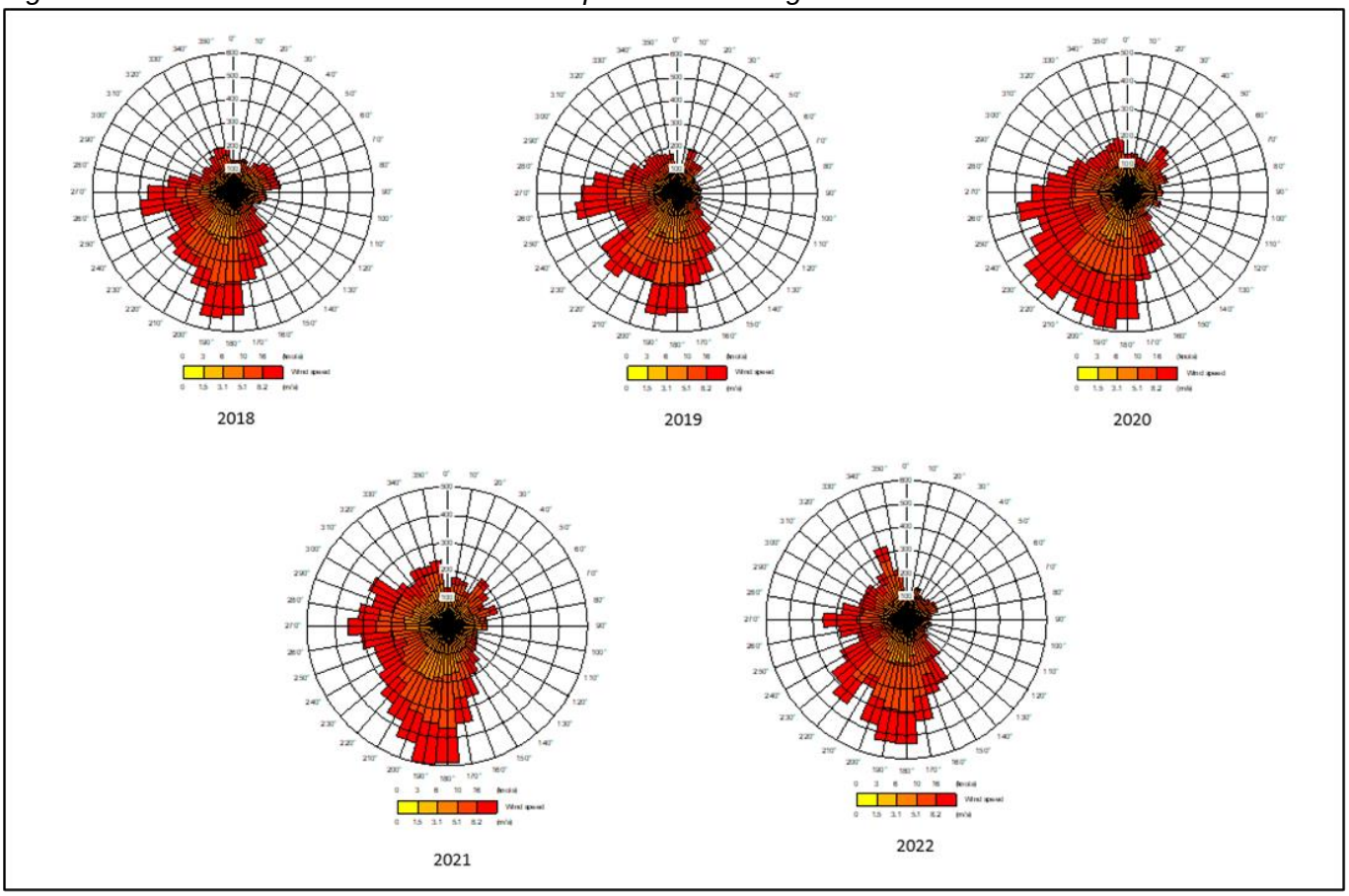

Table 6.1: Aberporth Wind Direction Analysis

Wind Direction (from)	% of Wind from Direction					
	2018	2019	2020	2021	2022	Average
North	10%	9%	9%	11%	11%	10%
North-East	8%	6%	8%	8%	6%	7%
East	9%	6%	7%	8%	6%	7%
South-East	8%	9%	6%	7%	8%	8%
South	26%	25%	22%	23%	26%	25%
South-West	15%	17%	20%	15%	17%	17%
West	17%	20%	18%	17%	15%	18%
North-West	7%	9%	8%	11%	10%	9%

Analysis indicates that the primary wind direction at the site will be from the south meaning that receptors located north (downwind) of the Proposed Development have a higher potential to be impacted by odour emissions. Additional wind directions are also observed from the south-west and west meaning that receptors located north-east and east of the site would also have a greater potential to be impacted by odour emissions.

6.1.1 Effectiveness of Pathway

The effectiveness of the pathway for the identified receptors has been evaluated and is shown in Table 6.2.

Table 6.2: Pathway Effectiveness for Identified Sensitive Receptors

Ref.	Receptor	Odour Sensitivity	Approximate Distance to Site (m)	Direction Relative to Sources	Pathway Effectiveness
R1	Residential	High	140	West	Moderately Effective
R2	Residential	High	220	West	Moderately Effective
R3	Residential	High	740	South	Ineffective
R4	Residential	High	640	South-East	Ineffective
R5	Residential	High	990	South-East	Ineffective
R6	Residential	High	700	South-East	Ineffective
R7	Residential	High	910	South-East	Ineffective
R8	Residential	High	370	East	Moderately Effective
R9	Residential	High	460	East	Moderately Effective
R10	Residential	High	350	North	Moderately Effective
R11	Residential	High	530	North-East	Moderately Effective
R12	Residential	High	600	North-East	Moderately Effective
R13	Residential	High	650	North-East	Moderately Effective
R14	Residential	High	690	North	Moderately Effective
R15	Residential	High	760	North-West	Ineffective
R16	Residential	High	520	North-West	Ineffective
R17	Residential	High	500	West	Ineffective
R18	Residential	High	460	West	Ineffective

Receptors R8 to R14 are largely downwind of the most common wind directions (from the south and west). As the lagoons will have a floating cover, the effectiveness of dispersion is inhibited, and the pathway effectiveness has been determined to be ‘moderately effective’. This is considered to be conservative for receptors R11 to R14 all of which are more than 500m from the site boundary.

Despite being upwind of the prevailing wind direction, receptors R1 and R2 have been conservatively classified as having a moderate pathway effectiveness due to their relative proximity to the Proposed Development. The pathway effectiveness was classified as ‘ineffective’ for all remaining identified receptors.

Section 7.0: Odour Impact Assessment Results

7.1 Source Odour Potential

After taking account of the sources within Section 4.2 and the information about the source, the Source Odour Potential is considered to be *'Medium'* in accordance with IAQM criteria.

7.2 Pathway Effectiveness

In accordance with IAQM criteria, the pathway effectiveness was evaluated to be '*Moderately Effective*' for R1, R2 and R8 to R14. For the remaining identified receptors, the pathway effectiveness was determined to be *'Ineffective'* due to their distance from the source and location upwind of the prevailing wind directions.

7.3 Sensitivity of Receptor

The odour sensitivity was determined to be *'High'* at the 18 identified receptors in accordance with IAQM criteria.

7.4 Risk of Exposure

Based on the combined source odour potential and pathway effectiveness, the risk of odour exposure was determined to be *'Low'* at receptors R1, R2 and R8 to R14. The risk of exposure at the remaining identified receptors was '*Negligible*' in accordance with IAQM criteria.

7.5 Likely Magnitude of Odour Effect

The effect of that odour impact on the receptors R1, R2 and R8 to R14, taking into account their sensitivity, is considered to be of *'Slight Adverse Effect'.* The effect of that odour impact at the remaining assessed receptors (R3 to R7 and R15 to R18), taking into account their sensitivity, is considered to be of '*Negligible Effect*'.

The IAQM guidance states that "*Where the overall effect is greater than "slight adverse", the effect is likely to be considered significant.*" As the overall effect is not greater than 'Slight Adverse', the effect is considered to be 'Not Significant'.

Whilst no additional mitigation measures are recommended to improve the design of the Proposed Development an OMP has been prepared to:

- Formalise and describe how odour issues will be managed on site as part of the site's operational management system.
- Show how odours will be managed and controlled so as to present or minimize impact during normal operations as well as consideration of abnormal events and foreseeable accidents and incidents.

Details on the OMP are included in Sections 8, 9 and 10.

Section 8.0: Routine Controls under Normal Conditions

8.1 Routine Mitigation and Control Measures

This section covers the routine odour mitigation/control measures that will be used day-to-day under normal operating conditions in the absence of any unusual risk factors. These can be summarised as:

- Facility design and Planned Preventative Maintenance (PPM).
- Continuing staff training on odour control awareness.
- Ensuring materials are removed from the storage tanks at suitable frequencies.

8.2 Action List Routine Controls

Table 8.1: Action List (Routine Controls)

Action	Frequency	Responsible Person (s)	Oversight Responsibility
Facility Design and PPM	Design on an as-needed basis, PPM as per design requirements and supplier recommendations	Designers, Facilities Staff	Site / Farm Manager
Training & Documentation	Induction training for all new staff, and further training at suitable frequencies (refresher) or when there is any notable change to site operations which could impact odour	Production Staff	Site / Farm Manager
Materials Management	As required	Facilities Staff	Site / Farm Manager

8.2.1 Facility Design and PPM

Any future design works will be undertaken with odour control good practice in mind.

Maintaining a suitably robust PPM system for all key plant/equipment on site, which is updated/revised as necessary, helps reduce the risk of odorous release.

8.2.2 Training and Documentation

Ensuring adequate staff training and correct documentation is an important odour control measure. All staff will be fully trained on aspects of production and pollution control relevant to their job role, to include odour aspects, prior to working on site.

The requisite training requirements for each job role will be documented and maintained/updated where necessary. Production operating procedures will be prepared and maintained as necessary.

Refresher training will be undertaken at appropriate frequencies and following any significant change to site operations which could impact odour control.

This training and use of appropriate operating procedures, combined with integrated odour control measures and Site Manager oversight, ensures that odour generation is suitably controlled.

8.2.3 Materials Management

Ensure that the slurry is not stored in the lagoons for any longer than specified.

Section 9.0: Reasonably Foreseeable Abnormal Conditions & Additional Controls

9.1 Risk Factors

Three reasonably foreseeable abnormal conditions which could lead to an increased risk of an odour related incident have been identified:

- Adverse weather conditions i.e. high temperatures, stable atmospheric conditions with low wind speeds.
- Failure/damage of equipment.
- Storage lagoon damage or overflow.

These are further discussed below.

9.1.1 Adverse Weather Conditions

Certain weather conditions, most notably hot weather, could potentially result in an increased risk of an odour incident – particularly if combined with another abnormal operation condition. Organic materials generally degrade faster at higher temperatures, thus generating more odour than in normal weather conditions. This is not considered to be a normal event during the times of storage (winter months).

Stable atmospheric conditions with low wind speeds can also lead to poor dispersion and dilution, which may increase odour concentrations at local receptors.

9.1.2 Equipment Failure/Damage

The failure of pumping equipment could lead to losses of materials and thereby increased levels of odorous release.

9.1.3 Storage Lagoon Damage or Overflow

Damage or overflow to the storage lagoons could lead to leakages, in turn increasing the levels of odorous release.

9.2 Triggers for Additional Controls and Checks on Effectiveness

The site has formal and informal triggers in place that could activate additional controls or investigation. These include:

- Odour complaint received.
- Informal comment/complaint from staff or contractor/consultant at the site.
- Abnormal farm operations with potential to lead to abnormal odour release.
- Adverse weather conditions forecast.

The Site / Farm Manager will be responsible for noting these triggers and determining a suitable response. Potential responses are discussed further below.

9.3 Additional Mitigation and Control Measures

In order to respond to foreseeable abnormal conditions, the following additional controls will be implemented as necessary. These can be summarised as:

- Increased awareness and vigilance during warmer weather.
- Capability to promptly resolve equipment issues.

9.4 Action List

Table 9.1: Action List (Abnormal Conditions)

Action	Responsible Person (s)	Oversight Responsibility
Increased Vigilance in Warm Weather	Facilities Staff	Site Manager
Waste Disposal Capability	Facilities Staff	Site Manager
Storage Tanks Maintenance	Facilities Staff	Site Manager

9.4.1 Increased Vigilance in Warm Conditions

The Site / Farm Manager and site staff will exercise additional vigilance (e.g. regular odour checks) regarding odour during warmer weather and periods of low wind speeds, when any potential issues could be exacerbated. This will include:

- Reminding key staff of their responsibilities in relation to odour control at the beginning of summer.
- Regular odour checks on particularly warm days. These checks will be recorded in the Odour Management Log Book (provided in Appendix A).

9.4.2 Waste Disposal Capability

In the event that the produced bio-fertiliser or raw materials need to be discarded leading to the generation of abnormally large waste volumes with odour potential; the site operator will ensure that they have the capability to promptly remove this from the site. This will be achieved by:

- Maintaining a list of suitable waste contractors who can collect above waste from site; and
- Promptly contacting identified contractor(s) to arrange removal/collection as soon as such a situation arises / is detected.

Following the removal of the waste, a formal investigation will be undertaken and (where appropriate) corrective action(s) applied to include update of this OMP noting any new control measures.

9.4.3 Storage Lagoon Maintenance

The storage lagoons will be inspected and maintained regularly to reduce the potential for failure. This will include routine inspections to identify any faults with storage which could potentially lead to abnormal odour release.

In the event of abnormal operation, facilities staff will firstly attempt to resolve the issue, as soon as reasonably practicable. For example, if time of year allows, slurry can be applied to land swiftly to minimise abnormal odour release. If time of year or weather does not allow this, then the fertiliser will be removed and exported to the nearest alternative stores, if available.

In the event that on site staff are unable to resolve the issue, external support will be sought from a suitable source. A database of potential consultants/contractors with emergency contact details will be maintained electronically to allow prompt contact when necessary.

In the unlikely event that the issue cannot be resolved promptly and there is risk of significant odour release from site, the Site Manager will prepare a bespoke response plan. The Local Authority (Ceredigion County Council) and Natural Resources Wales (NRW) will be consulted if the potential risk is deemed sufficiently high.

Following any notable maintenance event, an investigation and suitable correction action(s), where necessary, will be undertaken. This may require update to this OMP.

Section 10.0: Management Good Practice

10.1 Implementing and Maintaining OMP

The Site / Farm Manager has overall responsibility for implementing and maintaining this OMP, being best placed to routinely monitor odour management and with the necessary authority to make changes if needed. The Site/ Farm Manager is also responsible for updating the OMP, should for example an odour complaint or incident lead to changes in odour management being enacted.

10.2 Roles and Resposibilities

A table summarising the roles and key responsibilities of staff is shown below, alongside the minimum required training/competency requirements.

Table 10.1: Staff Roles and Responsibilities

Role	Key Responsibilities	Training/Competency
Facilities Staff	▪ Be vigilant at all times for any abnormal odour generation ▪ Materials management ▪ Lagoon maintenance ▪ Raw materials quality control	▪ Induction training on key equipment and additional training if taking on new roles or when there are any significant changes to site operation which may impact odour. ▪ Understanding of this OMP ▪ Instruction from Site / Farm Manager ▪ Previous experience in job role
Site / Farm Manager	▪ Implementing and maintaining this OMP ▪ Oversight of training ▪ Oversight of process controls ▪ Complaints management	▪ Understanding of this OMP ▪ Previous experience in job role

10.3 Complaints Management

Prompt and efficient response to any complaints which are received is noted as a key control measure for the facility.

10.4 Complaints Management Procedure

This procedure describes what the Site / Farm Manager will do in the event of an odour complaint being received, to better allow assessment of the conditions which led to the complaint. Action will be taken as soon as possible, ideally within hours of the complaint.

- Record the complaint in the Odour Management Log Book: noting the time and date of the complaint/s and (unless the complainant refuses to provide them) the name and contact details of the complainant. The complainant will be asked to describe the issue (e.g. is it constant or intermittent, how long has it been going on for, is it worse at any time of day, to describe the nature of the odour, etc.) and these details recorded. Wind direction, strength and weather conditions will also be recorded. It will be noted if the complaint has been referred to the local Environmental Health Officer (EHO), and if so the regulator contact details and complaint reference will be requested and recorded.
- After receipt of a complaint, an inspection of the site will be undertaken. Odour levels, production batch details and stored material quantities will be noted – and photographic evidence collected (where appropriate). If the complaint was related to an event in the recent past, where possible any abnormal circumstances that were experienced at that time will be noted. Any remedial action necessary will be initiated.

- The area from where the complaint originated will be visited to help ascertain if odour is still a problem, verify the complaint, and record any further pertinent information not initially provided by the complainant.
- After initial investigations have been completed, the complainant will be contacted to explain the result of the investigations alongside (where applicable) any remedial actions to be taken. Any actions carried out and conclusions will be noted in the Odour Management Log Book.
- If necessary, the routine control or additional controls section of this document will be updated to help reduce the risk of any future recurrence. Other relevant site staff will be made aware of any new practices/procedures that are required to be implemented.
- The complaint will be closed upon completion of investigative work and any associated corrective actions, and the complainant advised when this has been done.
- Where the complainant has contacted the local EHO, the relevant regulator contact(s) will be updated upon closure of the complaint.

10.5 Review of the Effectiveness of the Odour and the OMP

As a minimum, the Site / Farm Manager will carry out an annual review of the effectiveness of this OMP and associated odour controls, updating any details as required. This will take into account information from complaints, feedback from the production staff, facilities staff or other site staff. If persistent problems with odour have been identified over the year, then the associated controls can potentially be tightened, for example by introducing odour abatement.

10.6 Record Keeping Relating to Odour and the OMP

The Site / Farm Manager will record any changes made to this OMP document or to associated odour controls in the Odour Management Plan Log Book (see Appendix A). This will describe any changes made and the reasons for doing so, for future reference either by on site staff or regulatory authorities in the event of an incident.

Appendix A: Odour Management Log Book

Attached as a separate .xlsx document, with example tables below.

Table A.1: OMP Document / Odour Controls Updates Log
Use this spreadsheet to record any changes made to the Odour Management Plan document, or associated odour controls.

Date	Description of Updates / Control Changes	Reasons for Updates / Changes

Table A.2: Complaints Log
Use this table in the spreadsheet to record all odour complaints: identify cause(s), take appropriate measures to reduce odour in a timely manner, and record the measures taken.

Complainant Name and Contact Details	Date of Complaint	Time of Complaint	Logged by	Weather Conditions	Distance of Complainant Location from Suspected Odour Source	Odour Details	Reported Effect of Odour on Complainant	Has Complainant Contacted Anyone Else?	Suspected Odour Source (On-site)	Identified Cause(s) for Odour	Corrective Action(s)	Conclusion	Complaint Close Date
e.g. name, address, contact number, email, etc			*name of staff member recording complaint*	***Example Parameters for Consideration:*** *Cloud coverage Temperature Precipitation Wind speed & direction Air pressure*		*e.g. time and duration of experienced odour relevant to complaint; odour intensity and character*	*Report of any ill-effects which may be due to the odour or had to take actions to reduce impacts (e.g. shut windows, go inside, etc)*	*e.g. NRW, EHO*	*e.g. lagoons etc*				

Table A.3: Odour Monitoring Log
Use this spreadsheet to record any odour inspection ("sniff test") results.

Date	Time	Weather Conditions	Inspected Locations	Odour Description	Other Inspection Observations	Corrective Action(s)
		Example Parameters for Consideration: *Cloud coverage Temperature Precipitation Wind speed & direction Air pressure*	***Example Locations:*** *Site boundaries*	***Example Parameters for Consideration:*** *Odour detection and intensity (Odour absent / Odour detected / Odour offensive) Odour character (rotten, sulphurous, etc) Odour type (typical / abnormal for inspected location)*	*e.g. Level of bio-fertiliser in lagoons*	