Berkswell Recycling Limited

Bioaerosols Assessment

Berkswell Recyling Limited

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Basis of Report

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Table of Contents

Tables in Text

Appendices

1. Introduction

SLR Consulting have been commissioned by Berkswell Recycling Limited (hereafter referred to as 'the client') to undertake a Bioaerosols Risk assessment to support a permit variation application to increase their green waste processing at their composting facility at Berkswell Recycling Limited (hereafter known as "the Site") from 45,000 tonnes to 90,000 tonnes per year. The site is located at Cornets End, Meriden, within the Solihull Metropolitan Borough Council (SMBC) administrative area.

SMBC have identified sensitive receptors in the vicinity of the composting site at Cornets End and have requested a Bioaerosols risk assessment be undertaken for all receptors within 250m of the Site.

As no receptors have been located within 250m of the Site, the nearest identified sensitive receptor, Mercote Mill Farm located approximately 285m from the Site, has been included within the assessment.

The location of Berkswell Recycling Limited and the identified sensitive receptor are shown in Figure 1.

Figure 1 – Site Location

2. Guidance Documents

The following guidance documents have been considered in the preparation of the Bioaerosols Risk Assessment.

The Technical Guidance Note M9 detailing the 'Environmental monitoring of bioaerosols at regulated facilities'[1] guidance was published by the Environment Agency in 2018. The technical note includes methods to measure bioaerosols and determine bioaerosol concentrations in ambient air downwind of a facility.

The UK Government also published the Environment Agency and Defra guidance 'Control and monitor emissions for your environmental permit[2]'. This guidance details when a permit may be a required and a number of mitigation measures that may assist sites with reducing impacts on nearby receptors. For bioaerosols this guidance refers to the methods for dust management and deems these assessment and mitigation measures appropriate for management of bioaerosol emissions.

3. Scope

3.1 Scope of Work

The scope of work for the Bioaerosols Risk Assessment includes the following;

- desktop review of previous bioaerosols monitoring undertaken at Site;
- download and processing of five years of meteorological data from Birmingham Airport; and
- undertaking a source-pathway-receptor assessment to satisfy the requirements of the Environment Agency.

The assessment methodology followed is detailed within the UK Government guidance Control and monitor emissions for your environmental permit[2] using a source-pathway receptor assessment. The source-pathway-receptor assessment investigates the pathway effectiveness of the route between a hazard and a receptor, identifying the effectiveness of the pathway and the subsequent risk likely to be experienced by the receptor. In this instance the pathway will be influenced by meteorological conditions, so we have included an analysis of meteorological data from Birmingham airport, which is located approximately 5.7 km to the north east of the composting site and considered to be representative of conditions at the Site.

4. Baseline Environment and Overview of Previous Monitoring

Berkswell Recycling Ltd regularly undertakes ambient bioaerosol sampling at the site in order to satisfy their permit conditions and the requirements of the Environment Agency. The most recent sampling was carried out on the 13th of May 2025, with previous sampling periods carried out in July and November 2024.

Two types of sampling are carried out at Berkswell Recycling Limited;

[1] Environment Agency, M9 - Environmental monitoring of bioaerosols at regulated facilities V2, 2018 [2] Environment Agency & Defra, Control and monitor emissions for your environmental permit, 2016.

- single session of bioaerosol sampling for Aspergillus fumigatus and mesophilic bacteria in line with the permit requirements: and

- collection of a single compost sample for carbon to nitrogen (C:N) ratio testing in line with the permit requirements.

The sampling is carried out by and air quality team from Cundall Johnston & Partners LLP. All preparation, storage and analysis of the samples was undertaken by ISO1725 accredited laboratory UH Ventures Ltd, trading as Biodet, in accordance with the Environment Agency's (EA) M9 Technical Guidance Note[1]. All normal site activities were carried out during the testing phase.

For all testing periods throughout 2024 and 2025, it was found that concentrations of Aspergillus fumigatus were low at the majority of testing locations and the median did not exceed the EA reference level of 500 CFU/m^3 at either downwind or upwind locations.

Measured concentrations of mesophilic bacteria were found to be elevated. The calculated upwind and downwind medians have consistently exceeded the EA reference level of 1000 CFU/m^3 with the exceptions of the downwind median in July 2024 which was 16 CFU/m^3 below the reference level.

Upon review of the last three environmental bioaerosols survey report, high concentrations of bioaerosols were found on the upwind location consistently. This has been identified as the surveying company using the same sampling locations each time, rather than using the most appropriate monitoring locations based on the actual wind direction of the day.

A summary of the Results can be seen in Table 1 below; The full reports produced by Cundall can be seen in Appendix 1.

Table 1 - Measured Concentrations of Bioaerosols (CFU/m^3)

Report Date	Upwind Median (mesophilic bacteria)	Downwind Median (mesophilic bacteria)	Upwind Median (Aspergillus Fumigatus)	Downwind Median (Aspergillus Fumigatus)
July 2024	1121	984	83	85
November 2024	5268	1477	104	152
May 2025	5000	2500	100	100

5. Qualitative Bioaerosols Risk Assessment

5.1 Bioaerosols Risk at Receptors – methodology

The source potential, sensitivity of the receptors and the potential pathway from source(s) to receptors was considered in accordance with the UK Government Guidance[2] to determine the likely risk of bioaerosol impacts for future occupants of the Proposed Development using the risk matrices outlined in **Table 2** and **Table 3**.

Table 2 - Risk of Exposure

Pathway Effectiveness	Residual Source Emissions

	Small	Medium	Large
Highly effective pathway	Low Risk	Medium Risk	High Risk
Moderately effective pathway	Negligible Risk	Low Risk	Medium Risk
Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

Table 3 - Descriptor of Effects

Risk of Exposure	Receptor Sensitivity		
	Low	Medium	High
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

5.2 Bioaerosols Source Potential

The sampling results shown in Section 4 details the levels of bioaerosols measured at Site. The sampling measured concentrations of Aspergillus fumigatus and mesophilic bacteria.

Concentrations of Aspergillus fumigatus were considered to be low, and there were no exceedances of Environment Agency reference level of 500 CFU/m^3. Concentrations of mesophilic bacteria were elevated with the upwind and downwind medians exceeding the reference level of 1000 CFU/m^3 during all sampling periods except for the downwind median during July 2024.

Due the consistent measured exceedances of the medians for mesophilic bacteria above the reference level of 1000 CFU/m^3, the source potential is considered to be Large.

5.3 Potential Pathway

For a bioaerosols risk there must be a pathway from bioaerosol source(s) to receptors. Meteorological data for Birmingham Airport between 2019 and 2023 have been used in this assessment. An analysis of the data has shown that the prevailing wind is from the south, with average wind speeds in the range of 3.2 – 3.7 m/s that would likely enable good dispersion.

The pathway effectiveness for receptors is summarised in Table 4, and has been derived based on the following factors:

- distance between sources and receptors;
- wind direction frequency and mean wind speed during downwind events; and
- terrain and obstacles.

5.3.1 Meteorological data

Wind speed and wind direction data from Birmingham between 2019 and 2023 have been sourced and analysed to determine the wind frequency and determine the pathway

effectiveness from bioaerosol source to receptor in line with the UK Government Guidance[2] follows:

- infrequent: Frequency of winds from the direction of the source are less than 5%;
- moderately frequent; The frequency of winds from the direction of the source are between 5% and 12%;
- frequent: The frequency of winds from the direction of the source are between 12% and 20%; and
- very frequent: The frequency of winds from the direction of the source are greater than 20%.

The analysis presented in Table 4 below reveals a consistent wind pattern throughout the year. Southerly winds dominate, collectively representing approximately 23% of the wind frequency. Consequently, these wind directions have been classified as Very Frequent, south westerly, westerly and north westerly winds as Moderately Frequent and all remaining wind directions as Infrequent. The wind roses for Birmingham 2019 - 2023 are shown in Figure 2.

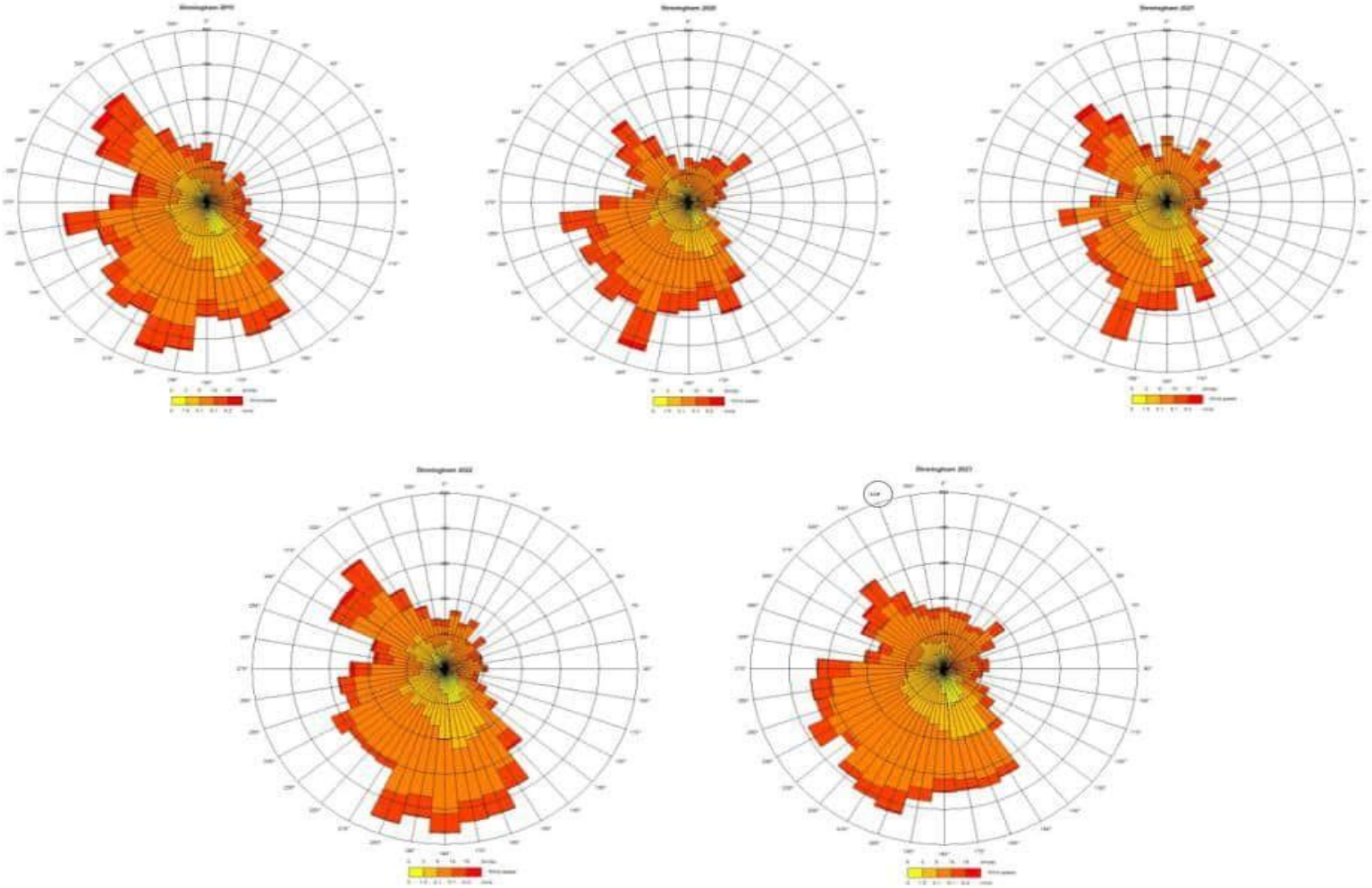
Table 4 – Meteorological Analysis of Birmingham (2019 – 2023)

Year		Wind direction							
		N	NE	E	SE	S	SW	W	NW
2019	Wind Frequency % of the Year	8.5	4.7	6.1	11.8	22.6	15.6	15.4	15.2
	Average wind speed m/s	3.6	3.7	4.0	3.5	3.3	3.5	3.9	4.1
2020	Wind Frequency of the Year	8.6	8.5	5.4	7.9	23.5	17.8	15.5	12.8
	Average wind speed m/s	3.6	4.4	3.7	3.2	3.7	3.8	3.9	4.0
2021	Wind Frequency % of the Year	11.1	9.2	6.3	7.5	22.3	14.5	13.2	15.9
	Average wind speed m/s	3.3	3.8	3.5	3.0	3.4	3.3	3.4	3.9
2022	Wind Frequency % of the Year	9.8	5.6	5.6	10.9	25.4	14.4	13.5	14.9

	Average wind speed m/s	3.0	3.9	3.5	3.4	3.4	3.3	3.9	3.9

2023	Wind Frequency % of the Year	10.4	7.2	5.9	9.7	21.2	17.3	16.1	12.0
	Average wind speed m/s	3.3	4.1	4.0	3.1	3.2	3.5	3.9	4.0
Average	Wind Frequency % of the Year	**9.7**	**7.0**	**5.8**	**9.5**	**23.0**	**15.9**	**14.7**	**14.1**
	Average wind speed m/s	**3.5**	**3.9**	**3.7**	**3.2**	**3.4**	**3.4**	**3.8**	**3.9**
Frequency Category		**Moderately Frequent**	**Moderately Frequent**	**Moderately Frequent**	**Moderately Frequent**	**Very Frequent**	**Frequent**	**Frequent**	**Frequent**

Figure 2 – Wind Roses Birmingham 2019 - 2023



5.4 Receptors and their sensitivity

5.4.1 Potential Receptors

Berkswell Recycling Ltd run an open window composting facility at their site. This facility processes 45,000 tonnes of green waste a year with the aim to increase production, upon acceptance of their permit variation application, to 90,000 tonnes per year.

A potential sensitive receptor outside the guidance distance of 250m of the Site has been identified as a high risk receptor and has therefore been included in the source-pathwayreceptor risk assessment. Mercote Mill Farm is located approximately 285m to north west of the composting facility, and contains a residential unit, considered to be a 'high risk' receptor.

Table 5 - Pathway Effectiveness at Receptors

Receptor ID	Proposed Receptor Details and Location	Distance from Bioaerosol Source	Terrain and Obstacles	Frequency of Downwind position and average wind speed	Pathway Effectiveness
Mercote Mill Farm	Residential unit to the northwest of the compositing facility	285m from site	No obstacles in way between composting facility and receptors	9.5% of year with N winds Average Speed 3.2 m/s	Moderately Effective

5.4.2 Risk of Bioaerosol Exposure (Impact) at Receptors

There is a residential receptor located at Mercote Mill Farm located approximately to the north west of Berkswell Recycling Limited. It is likely that these units will be more susceptible to bioaerosol effects during south easterly winds.

Based on the analysis of the meteorological data from 2019-2023 as shown in Table 3, the frequency of winds from the south is between 7.9-11.8% of the year, with an average wind speed of 3.2 m/s which is considered to create a Moderately Effective Pathway before proximity to the source is considered.

3 m/s corresponds to a light breeze on the Beaufort Scale which is expected to create a beneficial environment for dispersion and dilution of bioaerosols, further dispersing any bioaerosol emissions from the source away from the identified sensitive receptor.

The identified sensitive receptor is located 285 m upwind of the composting facility and is only expected to experience downwind meteorological conditions approximately 9.5% of the year. Additionally, bioaerosols generally decrease to typical background concentrations 100 - 250m downwind from the source[2]. A distance of 50 m would be expected for a return to typical background concentrations upwind of the source. The identified residential receptor

[2] Health and Safety Executive, Bioaerosol emissions from waste composting and the potential for workers' exposure, 2010

is approximately 285 m from the site. When proximity to the source is considered, the pathway is considered to be ineffective.

Table 6 - Summary Risk Assessment

Receptor	Residual Source Emissions	Receptor Location to Source	Pathway Effectiveness	Bioaerosols Impact Risk	Proposed Development Sensitivity	Magnitude of Effect
Mercote Mill Farm	High	285 m	Ineffective	Low Risk	High	Slight Adverse Effect

It is therefore concluded that the risk of bioaerosol impacts from Berkswell Recycling Limited is Low at the identified sensitive receptor and the effect can be considered Slight Adverse.

6. Mitigation

It is anticipated from the source-pathway-receptor assessment that the risk of impacts from composting activities at Berkswell Recycling Limited is Low. Despite this, the report produced by Cundalls detailing the results of the bioaerosol monitoring at site, recommends that ambient bioaerosol sampling continues to be undertaken as long as the site remains operational, in line with the permit requirements.

Additionally, the UK Government Guidance[2] recommends utilising the mitigation measures set out for dust management on sites where bioaerosol emission may be a risk. The measures set out the in the UK Government Guidance, that may be relevant to for bioaerosols are:

Site layout, housekeeping and operations

- designing the layout of your site to prevent emissions and limit the emissions sensitive receptors are exposed to – for example homes, schools, hospitals or nursing homes, food preparation facilities or similar;
- using good housekeeping practices to make sure your site is clear of dust, mud, litter and other debris;
- using road sweepers to remove dust, mud, litter and other debris;
- avoiding activities that could spread dust and particulates, mud or litter during high winds – for example, loading and unloading waste from vehicles outside buildings or treating waste materials outside buildings;
- using sprinklers to direct potential bioaerosol emissions to the ground and to shorten the impact distance;
- making sure treatment process parameters, such as temperature or moisture, are set at the right level;

- composting pad rotating procedures are followed, so the material is processed within permissible time periods; and
- making sure abatement systems, if in place, are designed to treat and minimise releases – these systems must be monitored and maintained following the designer's or manufacturer's recommendations.

Vehicle movement

- using enclosed vehicles, skips or containers wherever possible, or covering them if this is not possible (unless they're empty);
- enforcing speed limits and reducing vehicle movements and idling on site;
- minimising the number of access points to your site from public roads;
- surfacing or paving roadways suitably (ideally with concrete) to make them easy to clean;
- making sure vehicles keep to paved roads;
- regularly cleaning and dampening roadways;
- using wheel wash systems to slow trucks – wash wheels and keep roadways damp; and
- making sure road-going vehicles do not enter unmade ground and muddy areas (including the tipping piles) to reduce muddy track-out.

Dust suppression and monitoring

- using appropriate dust suppression systems (such as mist sprays, bowsers, water cannons, chemical suppressants, heavy water and foam suppressants) at appropriate locations and times; and
- installing dust and particulate monitors with trigger alarms. **Stockpiled wastes and open ground**
- you must keep stockpile levels at least 0.5m below the top of structures holding the waste to minimise wind-whipping at all times;
- controlling the moisture content of the material in the stockpile to prevent materials becoming friable; and
- planting grass or trees on open ground to reduce airborne bioaerosols being spread .

If you cannot avoid positioning stockpiles outdoors, or leaving them uncovered, you should take steps to prevent material escaping from them. For example by:

- using sprays and binders;
- appropriately positioning bay walls or windbreaks;
- making sure stockpiles do not face the direction of the prevailing wind;
- minimising waste storage heights and volumes;
- covering; and
- minimising stockpile volumes.

7. Conclusions

The risk of bioaerosol impacts from Berkswell Recycling Limited at the Proposed Development is concluded to be Low, with a Slight Adverse effect for identified sensitive receptor, Mercote Mill Farm, following a review of previous monitoring and a risk assessment based upon a source-pathway-receptor methodology.

The assessment has taken into account the previous monitoring undertaken by Cundalls between July 2024 and May 2025. The monitoring study showed low concentrations of Aspergillus fumigatus that did not exceed the EA reference levels and slightly elevated mesophilic bacterial concentrations where the upwind and downwind medians exceed the reference levels. However, this might be due to the monitoring locations not having been located on the actual wind direction axis on the day of monitoring. Further monitoring using appropriate monitoring locations each time will stablish a quantitative impact on the sensitive receptor.

The assessment included a source-pathway-receptor assessment and an analysis of meteorological data. Due to consistent exceedances of the reference level for mesophilic bacteria (1000 CFU/m^3) the source potential was considered to be Large. The pathway effectiveness was considered to be ineffective due to the distance between the Site and sensitive receptor (285 m) where it would be expected that the concentrations of bioaerosols would return to background levels. Additionally, the analysis of meteorological data showed that the sensitive receptor was only expected to experience downwind meteorological conditions approximately 9.5% of the year. Following the source-pathway-receptor methodology this resulted in a Low risk of bioaerosol risk and a Slight Adverse Effect for the sensitive receptor included within the study.

Relevant mitigation measures in line with the UK Government Guidance and the recommendations to continue regular site monitoring detailed in the monitoring report are recommended to reduce any potential effect on the identified receptor that may result due to the increase in production.

Appendix A Monitoring Report

Berkswell Recycling Limited

Bioaerosols Assessment

Berkswell Recyling Limited

SLR Project No.: 405.065996.00001

28 November 2025

Project title	Berkswell	Job number
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Principal author	Checked by	Verified by
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Document Ref.

Contents

1.0

Introduction

1.0 Introduction

1.1 Scope of Work

Cundall were appointed by Freeland Horticulture Limited to undertake ambient bioaerosol sampling at the Berkswell Recycling Centre. The activity on site consists of green waste windrow turning and shredding, screening and storage, which are processes that are a source of bioaerosols. Bioaerosol sampling and analysis is required to satisfy the permit conditions and requirements of the Environment Agency.

The scope of works outlined and agreed can be summarised as follows:

- Single session of bioaerosol sampling for *Aspergillus fumigatus* and mesophilic bacteria in line with the permit requirements.
- Collection of a single compost sample for carbon to nitrogen (C:N) ratio testing in line with the permit requirements - *results to follow separately.*

1.2 Capability

The work was carried out on the 2nd of July 2024 by Cundall's air quality team, who are all Members or Associate Members of the Institute of Air Quality Management (IAQM). The work was managed and overseen by team members who are also professionally chartered.

Enumeration of these microorganisms was carried out by the UKAS accredited laboratory Biodet. All medium preparation, storage and analysis were undertaken in accordance with the Environment Agency's Technical Guidance Note "*TGN M9 Environmental Monitoring of Bioaerosols at Regulated Facilities, Version 2, July 2018*[3]".

[3] Environment Agency (2018) Technical Guidance Note M9, Environmental monitoring of bioaerosols at regulated facilities, Version 2, July 2018 https://www.gov.uk/government/publications/m9-environmental-monitoring-of-bioaerosols-at-regulated-facilities

2.0

Sampling Strategy

2.0 Sampling Strategy

2.1 Site Location

The site is Freeland Horticulture, Berkswell, Cornets End Ln, Coventry CV7 7LH. An aerial image of the site is shown in Figure 2-1.

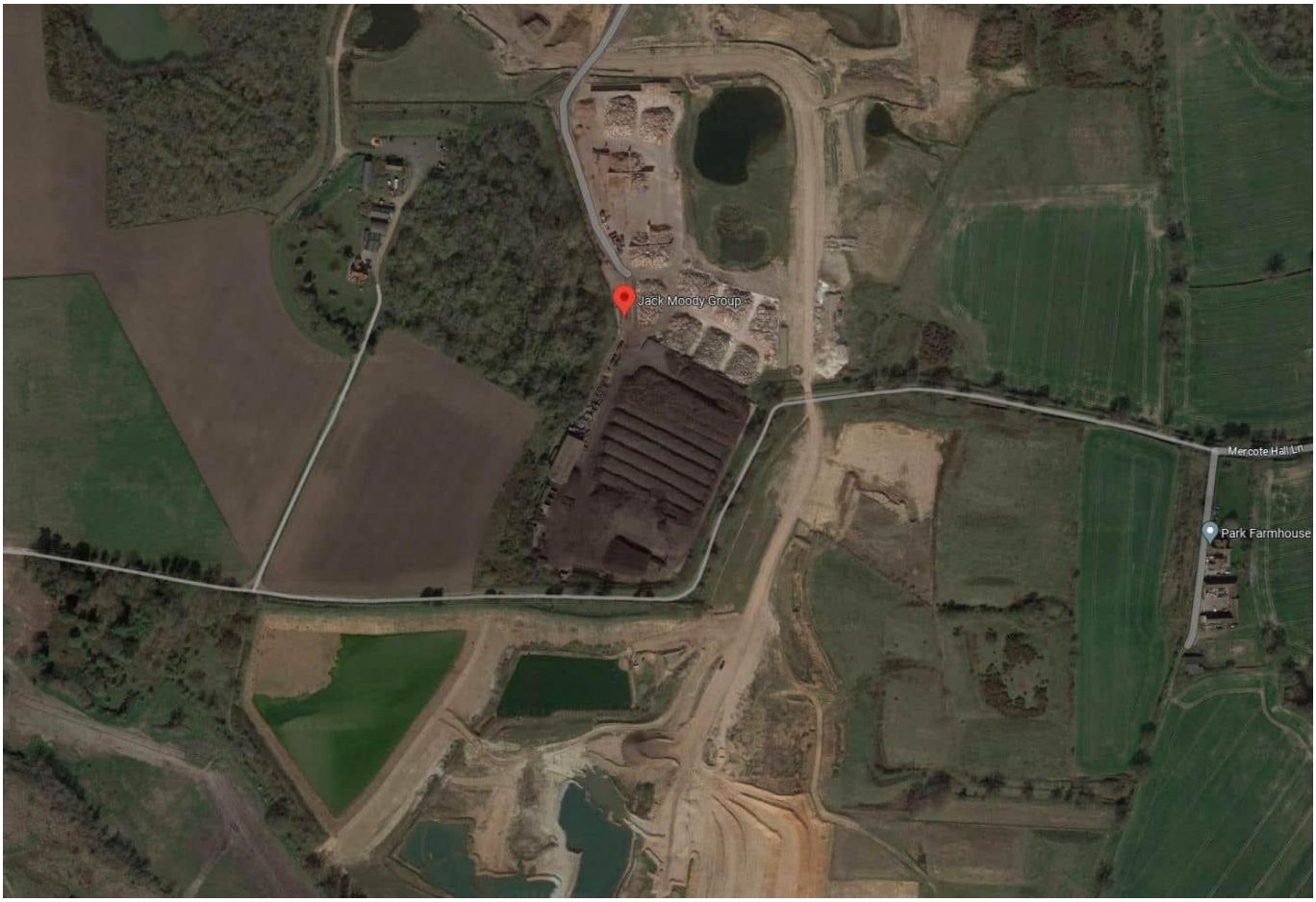

Figure 2-1: Location of the Site (Courtesy of Google Satellite)

2.2 Sampling Procedures

2.2.1 Ambient Bioaerosol Sampling

Sampling for *Aspergillus fumigatus* and mesophilic bacteria was undertaken in accordance with the Environment Agency's M9 guidance[1], which provides a standardised approach for the monitoring of airborne microorganisms, known as bioaerosols.

Figure 2-2 illustrates the sampling locations, which were chosen based on the wind direction on the day.

- The upwind location was approximately 130m from the centre of the active operational area and approximately 50m from the operational boundary.
- The downwind locations should be located at a distance equivalent to the nearest sensitive receptor. In this case that is Mercote farm, approximately 285m to the north-west. However, due to access restrictions associated with the quarry, the downwind locations were closer to the site than the nearest sensitive receptor.

  The downwind locations were set out in a 'fan like shape arrangement' as per the M9 guidance[1].

Location details are provided in Table 3-1 and Table 3-2.

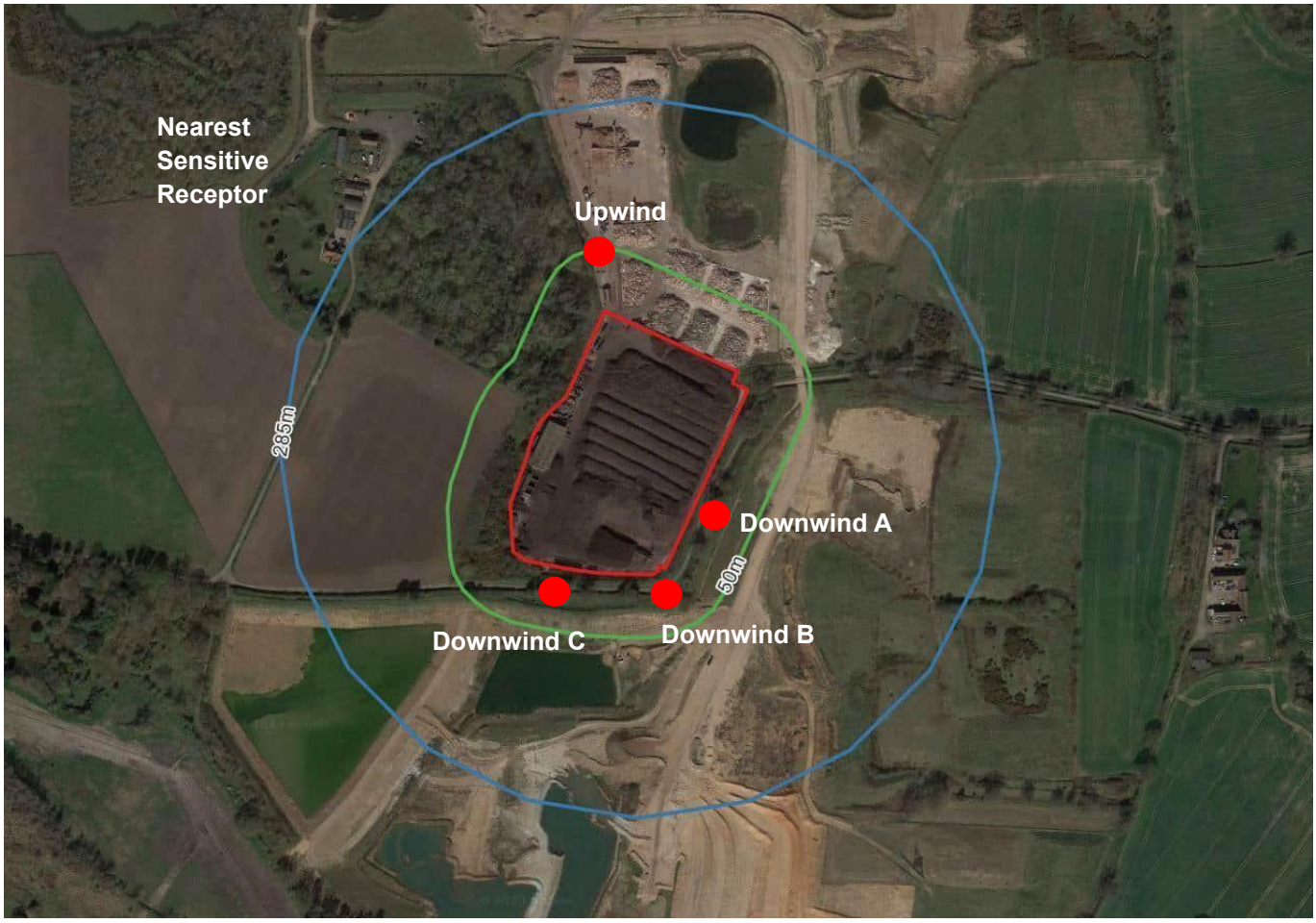

Figure 2-2: Sampling Locations (Courtesy of Google Satellite)

The sampling was carried out using the filtration method with Institute of Occupational Medicine (IOM) sampling heads. At each sampling location, three IOM filter heads were fixed in a vertical position at a height of 1.5m using a tripod. They were connected to calibrated air sampling pumps using appropriate tubing (see Figure 2-3 for downwind B example set up). The sampling duration was 60 minutes at a flow of approximately 3 l/min (see Table 3-1and Table 3-2 for further details) and sampling at the upwind and downwind locations was carried out simultaneously. Two 'field blanks' were collected (one upwind and one downwind) by exposing a filter in an IOM filter head but with the pump switched off. Following the sampling, filters were placed back in their cassettes and sent to the laboratory for analysis.

Figure 2-3: Sampling set up, downwind B

2.2.2 Meteorological Conditions

Meteorological conditions were recorded using a Grimm EDM264 Standalone dust monitor[4] with integrated weather station. This was installed in the car park area of the site. The parameters recorded at six-second intervals were as follows:

- Wind direction (degrees from true north)
- Wind speed (m/s)
- Temperature (°C)
- Humidity (%)

[4] https://www.et.co.uk/products/air-quality-monitoring/particulate-monitoring/stand-alone-environmental-dust-monitor-model-edm-264

3.0

Sampling Results

3.0 Sampling Results

3.1 Ambient Bioaerosol Sampling

The M9 guidance[1] states that *"because of the broad scatter inherent in the measurement of bioaerosol concentrations, the median value should be used. Use of the median reduces the effect of extreme values and any outliers present will not influence the measurement result. Therefore, the median of the replicate samples should be used to assess the result for each sample location."* Therefore, the below results interpretation preferentially considers the calculated median result for each parameter sampled.

3.1.1 *Aspergillus fumigatus*

The results of the *Aspergillus fumigatus* sampling are shown in Table 3-1. Bioaerosol analysis results are reported in colony forming units (CFU).

- At the upwind sampling location results ranged from 76 to 86 CFU/m^3 with an overall calculated median of 83 CFU/m^3.
- At the downwind sampling locations results ranged from 81 to 690 CFU/m^3 with an overall calculated median of 85 CFU/m^3.

The results exceeded the EA reference level of 500 CFU/m^3 at locations DWB 2 and DWB 3. However, the calculated medians did not exceed the reference level.

Comparison of the median values indicates that concentrations at the upwind and downwind locations were roughly comparable.

3.1.2 Mesophilic bacteria

The results of the mesophilic bacteria sampling are shown in Table 3-2.

- At the upwind sampling location results ranged from 606 to 1417 CFU/m^3 with an overall calculated median of 1121 CFU/m^3.
- At the downwind sampling locations, results ranged from 485 to 2534 CFU/m^3 with a median of 984 CFU/m^3.

Concentrations at both the upwind and downwind locations were therefore elevated, with upwind results slightly higher than the downwind results.

A number of the individual upwind and downwind results and the upwind median exceeded the EA reference level of 1000 CFU/m^3, however the calculated downwind median did not exceed the reference level.

It must be noted that the downwind sampling locations were located closer to the site that the nearest sensitive receptor due to access restrictions. In reality, it is therefore likely that concentrations of mesophilic bacteria at this receptor would be lower than those measured during this sampling session. Additionally, the elevated upwind concentrations indicate the potential for another source of mesophilic bacteria in the vicinity of this sampling location that is not associated with the main site activities

Site: Berkswell Sampling date: 02/07/24 Estimated mass of materials: Unknown Bioaerosol type: *Aspergillus fumigatus* Activities affecting the concentration of bioaerosols: Normal activity on site					Site operator: Freeland Monitoring contractor: Cundall Type of materials processed on site: Green waste Site activity: Green waste windrow turning and shredding, screening and storage.					
Location and National Grid Reference	**Sample reference**	**Distance from centre of active area** (m)	**Difference in bearing between location of samplers and mean direction wind blows to** (°)	**Sampling start/end time** (hh:mm)	**Sampling duration** (mins)	**Pump flow rate** (l/min)	**Pumped Volume** (l)	**Concentration of bioaerosols** (CFU/m^3)	**Median of upwind samples** (CFU/m^3)	**Median of downwind samples** (CFU/m^3)
Upwind 422830, 280578	UW 1	170	198	11:42-12:42	60	3.0	180.0	<83	**83**	**85**
	UW 2	170	198			2.9	174.0	<86		
	UW 3	170	198			3.3	198.0	<76		
Downwind A 422922, 280373	DWA 1	95	12			2.8	168.0	<84		
	DWA 2	95	12			2.8	168.0	<84		
	DWA 3	95	12			2.9	174.0	81		
Downwind B 422884, 280305	DWB 1	85	18			2.8	168.0	<89		
	DWB 2	85	18			2.8	168.0	625		
	DWB 3	85	18			2.9	174.0	690		
Downwind C 422795, 280309	DWC 1	75	48			3.0	180.0	<82		
	DWC 2	75	48			3.3	198.0	149		

	DWC 3	75	48			2.9	174.0	85		

Table 3-1: Results of Aspergillus fumigatus sampling

 Table 3-2: Results of mesophilic bacteria sampling

Site: Berkswell Sampling date: 02/07/24 Estimated mass of materials: Unknown Bioaerosol type: *Mesophilic bacteria* Activities affecting the concentration of bioaerosols: Normal activity on site					Site operator: Freeland Monitoring contractor: Cundall Type of materials processed on site: Green waste Site activity: Green waste windrow turning and shredding, screening and storage.					
Location and National Grid Reference	**Sample reference**	**Distance from centre of active area** (m)	**Difference in bearing between location of samplers and mean direction wind blows to** (°)	**Sampling start/end time** (hh:mm)	**Sampling duration** (mins)	**Pump flow rate** (l/min)	**Pumped Volume** (l)	**Concentration of bioaerosols** (CFU/m^3)	**Median of upwind samples** (CFU/m^3)	**Median of downwind samples** (CFU/m^3)
Upwind 422830, 280578	UW 1	170	198	11:42-12:42	60	3.0	180.0	1417	**1121**	**984**
	UW 2	170	198			2.9	174.0	1121		
	UW 3	170	198			3.3	198.0	606		
Downwind A 422922, 280373	DWA 1	95	12			2.8	168.0	670		
	DWA 2	95	12			2.8	168.0	1004		
	DWA 3	95	12			2.9	174.0	485		
Downwind B 422884, 280305	DWB 1	85	18			2.8	168.0	982		
	DWB 2	85	18			2.8	168.0	1071		
	DWB 3	85	18			2.9	174.0	1897		
Downwind C 422795, 280309	DWC 1	75	48			3.0	180.0	984		
	DWC 2	75	48			3.3	198.0	2534		
	DWC 3	75	48			2.9	174.0	848		

3.2 Meteorological Conditions

The meteorological conditions are detailed in Table 3-3 and can be summarised as follows:

- Wind direction was on average 152° from true north (towards the south south-east)
- Mean wind speed during sampling was 0.4m/s
- Arithmetic mean air temperature was 15.5°C
- Arithmetic mean of relative humidity was 65.7% Cloud cover was approximately 7/8

Site: Berkswell Sampling date: 02/07/24				Site operator: Freeland Monitoring contractor: Cundall				
Location and National Grid Reference	**Sample reference**	**Bearing of samplers from centre of operational area or turning / screening operation** (° from true north)	**Mean direction the wind blows to during the sampling period** (° from true north)	**Difference in bearing between location of samplers from centre of operational area and mean direction wind blows to** (°)	**Mean wind speed during sampling** (m/s)	**Arithmetic mean of air temperature** (ºC)	**Arithmetic mean of relative humidity** (%)	**Prevailing weather conditions** (cloud cover in eigths)
Upwind 422830, 280578	UW 1	350	152	198	0.4	15.5	65.7	7/8
	UW 2	350		198				
	UW 3	350		198				
Downwind A 422922, 280373	DWA 1	140		12				
	DWA 2	140		12				
	DWA 3	140		12				
Downwind B 422884, 280305	DWB 1	170		18				
	DWB 2	170		18				
	DWB 3	170		18				
Downwind C 422795, 280309	DWC 1	200		48				
	DWC 2	200		48				
	DWC 3	200		48				

Table 3-3: Meteorological conditions at each sampling location

4.0

Conclusion

4.0 Conclusion

Ambient bioaerosol sampling was carried out on the 2nd of July 2024 at the Berkswell Recycling Centre.

Concentrations of *Aspergillus fumigatus* were low at the majority of locations and the upwind and downwind median results were roughly comparable. Two of the individual downwind results exceeded the Environment Agency (EA) reference level of 500 CFU/m^3. However, the calculated medians did not exceed the reference level.

Concentrations of mesophilic bacteria were slightly elevated, and the upwind results were slightly higher than the downwind results. A number of the individual upwind and downwind results and the upwind median exceeded the EA reference level of 1000 CFU/m^3, however the calculated downwind median did not exceed the reference level.

It must be noted that the downwind sampling locations were located closer to the site that the nearest sensitive receptor due to access restrictions. In reality, it is therefore likely that concentrations at this receptor would be lower than those measured during this sampling session. Additionally, the elevated upwind concentrations of mesophilic bacteria indicate the potential for another source of mesophilic bacteria in the vicinity of this sampling location that is not associated with the main site activities.

It is recommended that ambient bioaerosol sampling continues to be undertaken as long as the site remains operational, in line with the permit requirements.

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Berkswell Recycling Facility

Ambient Bioaerosol Sampling Report

Berkswell Recycling Limited

Job No:	1038725
Doc ref:	JMB-CDL-XX-XX-RP-AQ-40204
Revision:	P01
Revision date:	06 December 2024

Ambient Bioaerosol Sampling Report

Project title	Berkswell Recycling Facility	**Job number**
Report title	Ambient Bioaerosol Sampling Report	1038725

Document revision history

Revision ref	Issue date	Purpose of issue / description of revision
P01	06 December 2024	Issue

Document validation (latest issue)

06/12/2024	06/12/2024	06/12/2024
X F.Jajarmi	X A.Trevis	X J.Carrington
Principal author	Checked by	Verified by
Signed by: Farzaneh Jajarmi	Signed by: Annie Trevis	Signed by: Jenny Carrington

Document Ref.

Contents

Document Ref. JMB-CDL-XX-XX-RP-AQ-40204

1.0

Introduction

1.0 Introduction

1.1 Scope of Work

Cundall were appointed by Berkswell Recycling Limited to undertake ambient bioaerosol sampling at the Berkswell Recycling Centre. The activity on site consists of green waste windrow turning and shredding, screening and storage, which are processes that are a source of bioaerosols. Bioaerosol sampling and analysis is required to satisfy the permit conditions and requirements of the Environment Agency.

The scope of works outlined and agreed can be summarised as follows:

- Single session of bioaerosol sampling for *Aspergillus fumigatus* and mesophilic bacteria in line with the permit requirements.
- Collection of a single compost sample for carbon to nitrogen (C:N) ratio testing in line with the permit requirements - *results attached separately.*

1.2 Capability

The work was carried out on the 12th of November 2024 by Cundall's air quality team, who are all Members or Associate Members of the Institute of Air Quality Management (IAQM). The work was managed and overseen by team members who are also professionally chartered.

Enumeration of these microorganisms was carried out by the UKAS accredited laboratory Biodet. All medium preparation, storage and analysis were undertaken in accordance with the Environment Agency's Technical Guidance Note "*TGN M9 Environmental Monitoring of Bioaerosols at Regulated Facilities, Version 2, July 2018*[5]".

[5] Environment Agency (2018) Technical Guidance Note M9, Environmental monitoring of bioaerosols at regulated facilities, Version 2, July 2018 https://www.gov.uk/government/publications/m9-environmental-monitoring-of-bioaerosols-at-regulated-facilities

2.0

Sampling Strategy

2.0 Sampling Strategy

2.1 Site Location

The site is Freeland Horticulture, Berkswell, Cornets End Ln, Coventry CV7 7LH. An aerial image of the site is shown in Figure 2-1.

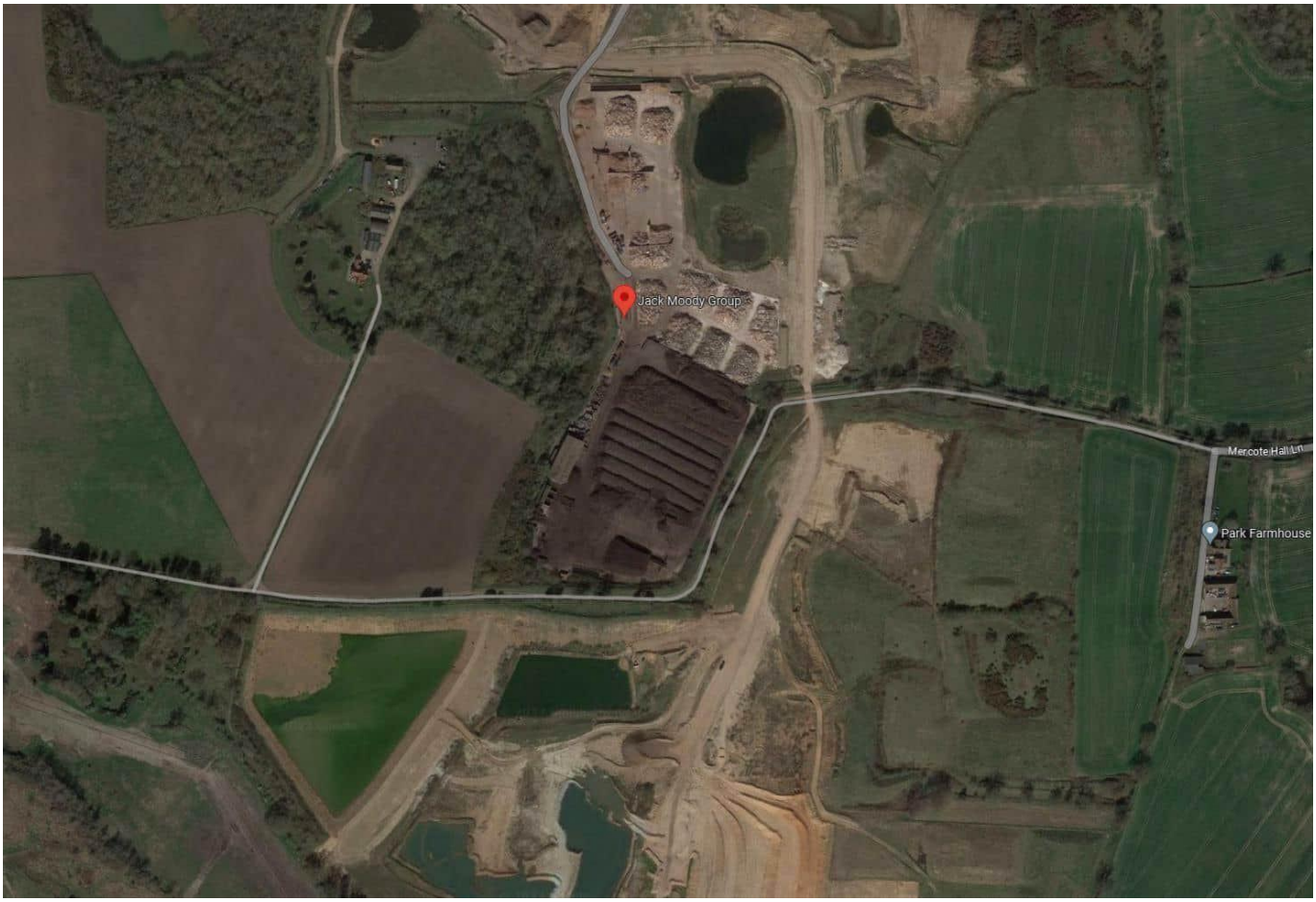

Figure 2-1: Location of the Site (Courtesy of Google Satellite)

2.2 Sampling Procedures

2.2.1 Ambient Bioaerosol Sampling

Sampling for *Aspergillus fumigatus* and mesophilic bacteria was undertaken in accordance with the Environment Agency's M9 guidance[1], which provides a standardised approach for the monitoring of airborne microorganisms, known as bioaerosols.

Figure 2-2 illustrates the sampling locations, which were chosen based on the wind direction on the day.

- The upwind location was approximately 170m from the centre of the active operational area and approximately 50m from the operational boundary.
- The downwind locations should be located at a distance equivalent to the nearest sensitive receptor. In this case that is Mercote farm, approximately 285m to the north-west. However, due to access restrictions associated with the quarry, the downwind locations were closer to the site than the nearest sensitive receptor.

  The downwind locations were set out in a 'fan like shape arrangement' as per the M9 guidance[1].

Location details are provided in Table 3-1 and Table 3-2.

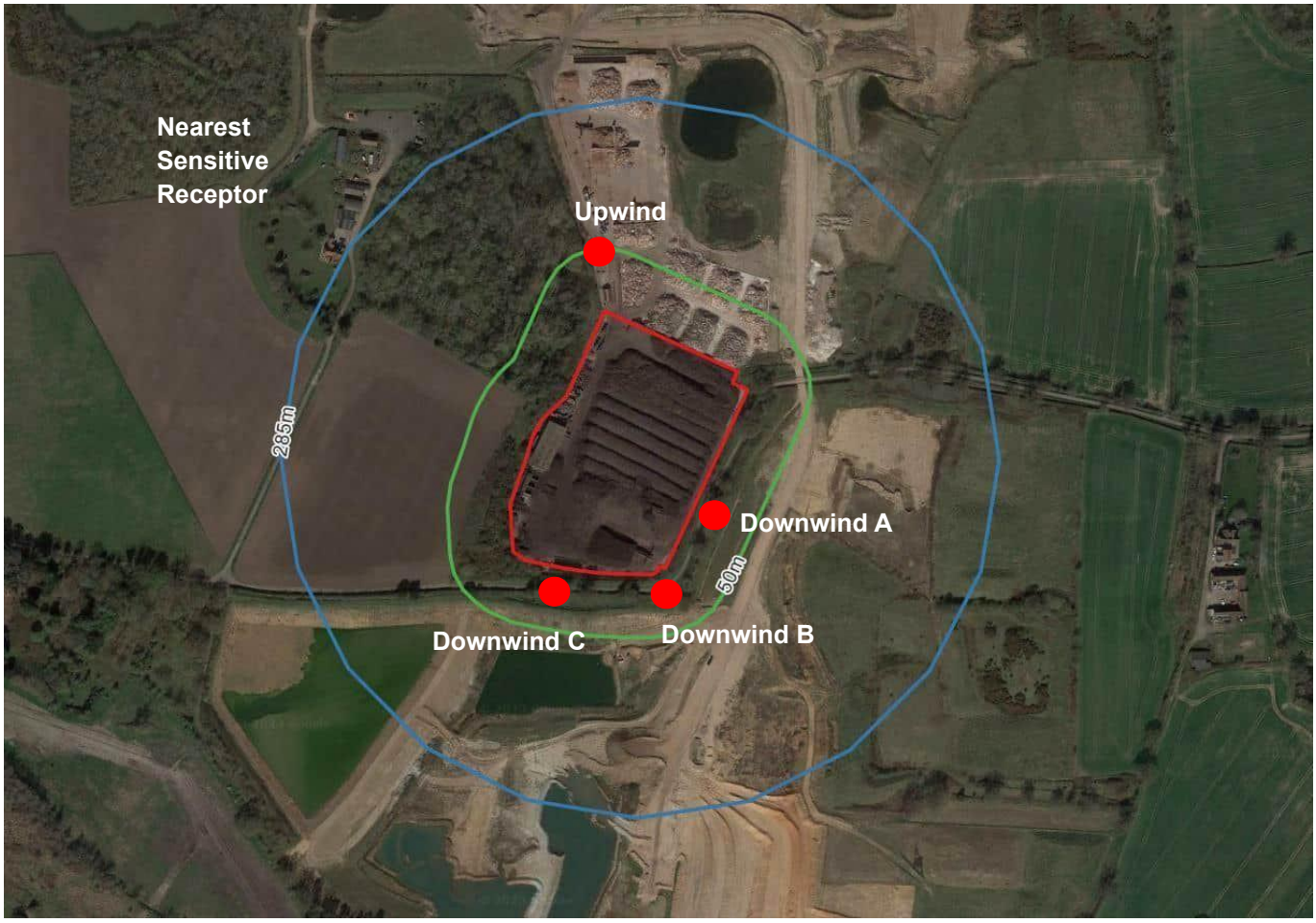

Figure 2-2: Sampling Locations (Courtesy of Google Satellite)

The sampling was carried out using the filtration method with Institute of Occupational Medicine (IOM) sampling heads. At each sampling location, three IOM filter heads were fixed in a vertical position at a height of 1.5m using a tripod. They were connected to calibrated air sampling pumps using appropriate tubing (see Figure 2-3 for downwind B example set up). The sampling duration was 60 minutes at a flow of approximately 2.5 l/min (see Table 3-1 and Table 3-2 for further details) and sampling at the upwind and downwind locations was carried out simultaneously. Two 'field blanks' were collected (one upwind and one downwind) by exposing a filter in an IOM filter head but with the pump switched off. Following the sampling, filters were placed back in their cassettes and sent to the laboratory for analysis.

Figure 2-3: Sampling set up, downwind B

2.2.2 Meteorological Conditions

Meteorological conditions were recorded using a Grimm EDM264 Standalone dust monitor[6] with integrated weather station. This was installed in the car park area of the site. The parameters recorded at three minute intervals were as follows:

- Wind direction (degrees from true north)
- Wind speed (m/s)
- Temperature (°C)

[6] https://www.et.co.uk/products/air-quality-monitoring/particulate-monitoring/stand-alone-environmental-dust-monitor-model-edm-264

- Humidity (%)

3.0

Sampling Results

3.0 Sampling Results

3.1 Ambient Bioaerosol Sampling

The M9 guidance[1] states that *"because of the broad scatter inherent in the measurement of bioaerosol concentrations, the median value should be used. Use of the median reduces the effect of extreme values and any outliers present will not influence the measurement result. Therefore, the median of the replicate samples should be used to assess the result for each sample location."* Therefore, the below results interpretation preferentially considers the calculated median result for each parameter sampled.

3.1.1 *Aspergillus fumigatus*

The results of the *Aspergillus fumigatus* sampling are shown in Table 3-1. Bioaerosol analysis results are reported in colony forming units (CFU).

- At the upwind sampling location results ranged from 89 to 104 CFU/m^3 with an overall calculated median of 104 CFU/m^3.
- At the downwind sampling locations results ranged from 96 to 761 CFU/m^3 with an overall calculated median of 152 CFU/m^3.

The results exceeded the EA reference level of 500 CFU/m^3 at locations DWB 1 and DWC 1. However, the calculated medians did not exceed the reference level.

3.1.2 Mesophilic bacteria

The results of the mesophilic bacteria sampling are shown in Table 3-2.

- At the upwind sampling location results ranged from 625 to 6,458 CFU/m^3 with an overall calculated median of 5,268 CFU/m^3.
- At the downwind sampling locations, results ranged from 288 to 6,087 CFU/m^3 with an overall calculated median of 1,477 CFU/m^3.

Concentrations at both the upwind and downwind locations were therefore elevated, with upwind results slightly higher than the downwind results.

A number of the individual upwind and downwind results and the upwind and downwind median values exceeded the EA reference level of 1.000 CFU/m^3.

It must be noted that due to access restrictions, the downwind sampling locations were located closer to the site than the nearest sensitive receptor (approximately 20 m from the site boundary, compared to 285 m for the nearest sensitive receptor). In reality, it is therefore likely that concentrations of mesophilic bacteria at this receptor would be lower than those measured during this sampling session.

Additionally, it was observed during the day of the site visit that there were a number of stockpiles of waste material located to the north of site. This area had been vacant on the most recent previous visits. The separate components of the waste material in these stockpiles was visible and the material appeared to be in early stages of decomposition. As mesophilic microorganisms play a key role in primary breakdown, this may be a contributing factor to the elevated mesophilic bacteria concentrations recorded in the samples collected in November 2024.

Site: Berkswell Sampling date: 12/11/24 Estimated mass of materials: Unknown Bioaerosol type: *Aspergillus fumigatus* Activities affecting the concentration of bioaerosols: Normal activity on site					Site operator: Freeland Monitoring contractor: Cundall Type of materials processed on site: Green waste Site activity: Green waste windrow turning and shredding, screening and storage.					
Location and National Grid Reference	**Sample reference**	**Distance from centre of active area** (m)	**Difference in bearing between location of samplers and mean direction wind blows to** (°)	**Sampling start/end time** (hh:mm)	**Sampling duration** (mins)	**Pump flow rate** (l/min)	**Pumped Volume** (l)	**Concentration of bioaerosols** (CFU/m^3)	**Median of upwind samples** (CFU/m^3)	**Median of downwind samples** (CFU/m^3)
Upwind 422830, 280578	UW 1	170	216	12:00-13:00	60	2.4	144	<104	**104**	**152**
	UW 2	170	216			2.8	168	<89		
	UW 3	170	216			2.4	144	<104		
Downwind A 422922, 280373	DWA 1	95	6			2.6	156	<96		
	DWA 2	95	6			2.7	162	370		
	DWA 3	95	6			2.2	132	<114		
Downwind B 422884, 280305	DWB 1	85	36			2.3	138	761		
	DWB 2	85	36			2.3	138	217		
	DWB 3	85	36			2.3	138	<109		
Downwind C 422795, 280309	DWC 1	75	66			2.5	150	600		
	DWC 2	75	66			3.3	198	152		
	DWC 3	75	66			2.2	132	<114		

Table 3-1: Results of Aspergillus fumigatus sampling

9 *Table 3-2: Results of mesophilic bacteria sampling*

Site: Berkswell Sampling date: 12/11/24 Estimated mass of materials: Unknown Bioaerosol type: *Mesophilic bacteria* Activities affecting the concentration of bioaerosols: Normal activity on site					Site operator: Freeland Monitoring contractor: Cundall Type of materials processed on site: Green waste Site activity: Green waste windrow turning and shredding, screening and storage.					
Location and National Grid Reference	**Sample reference**	**Distance from centre of active area** (m)	**Difference in bearing between location of samplers and mean direction wind blows to** (°)	**Sampling start/end time** (hh:mm)	**Sampling duration** (mins)	**Pump flow rate** (l/min)	**Pumped Volume** (l)	**Concentration of bioaerosols** (CFU/m^3)	**Median of upwind samples** (CFU/m^3)	**Median of downwind samples** (CFU/m^3)
Upwind 422830, 280578	UW 1	170	216	12:00-13:00	60	2.4	144	625	**5268**	**1477**
	UW 2	170	216			2.8	168	5268		
	UW 3	170	216			2.4	144	6458		
Downwind A 422922, 280373	DWA 1	95	6			2.6	156	288		
	DWA 2	95	6			2.7	162	926		
	DWA 3	95	6			2.2	132	2841		
Downwind B 422884, 280305	DWB 1	85	36			2.3	138	6087		
	DWB 2	85	36			2.3	138	4783		
	DWB 3	85	36			2.3	138	870		
Downwind C 422795, 280309	DWC 1	75	66			2.5	150	4600		
	DWC 2	75	66			3.3	198	985		
	DWC 3	75	66			2.2	132	1477		

3.2 Meteorological Conditions

The meteorological conditions are detailed in Table 3-3 and can be summarised as follows:

- Wind direction was on average from the northwest (314° from true north), blowing to the southeast (134 °)
- Mean wind speed during sampling was 0.6 m/s
- Arithmetic mean air temperature was 9.7°C
- Arithmetic mean of relative humidity was 74.9% Cloud cover was approximately 7/8

Site: Berkswell Sampling date: 12/11/24				Site operator: Freeland Monitoring contractor: Cundall				
Location and National Grid Reference	**Sample reference**	**Bearing of samplers from centre of operational area or turning / screening operation** (° from true north)	**Mean direction the wind blows to during the sampling period** (° from true north)	**Difference in bearing between location of samplers from centre of operational area and mean direction wind blows to** (°)	**Mean wind speed during sampling** (m/s)	**Arithmetic mean of air temperature** (ºC)	**Arithmetic mean of relative humidity** (%)	**Prevailing weather conditions** (cloud cover in eigths)
Upwind 422830, 280578	UW 1	350	134	216	0.6	9.7	74.9	7/8
	UW 2	350		216				
	UW 3	350		216				
Downwind A 422922, 280373	DWA 1	140		6				
	DWA 2	140		6				
	DWA 3	140		6				
Downwind B 422884, 280305	DWB 1	170		36				
	DWB 2	170		36				
	DWB 3	170		36				
Downwind C 422795, 280309	DWC 1	200		66				
	DWC 2	200		66				
	DWC 3	200		66				

Table 3-3: Meteorological conditions at each sampling location

4.0

Conclusion

4.0 Conclusion

Ambient bioaerosol sampling was carried out on the 12th of November 2024 at the Berkswell Recycling Centre.

Concentrations of *Aspergillus fumigatus* were variable, and the upwind median result was lower than the downwind median. Two of the individual downwind results exceeded the Environment Agency (EA) reference level of 500 CFU/m^3. However, the calculated upwind and downwind median results did not exceed the reference level.

Concentrations of mesophilic bacteria were slightly elevated, and the upwind results were slightly higher than the downwind results. A number of the individual upwind and downwind results and the upwind and downwind median values exceeded the EA reference level of 1000 CFU/m^3.

It must be noted that due to access restrictions, the downwind sampling locations were located closer to the site that the nearest sensitive receptor (approximately 20 m from the site boundary, compared to 285 m for the nearest sensitive receptor). In reality, it is therefore likely that concentrations of mesophilic bacteria at this receptor would be lower than those measured during this sampling session.

Additionally, it was observed during the day of the site visit that there were a number of stockpiles of waste material located to the north of site. This area had been vacant on the most recent previous visits. The separate components of the waste material in these stockpiles was visible and the material appeared to be in early stages of decomposition. As mesophilic microorganisms play a key role in primary breakdown, this may be a contributing factor to the elevated mesophilic bacteria concentrations recorded in the samples collected in November 2024.

It is recommended that ambient bioaerosol sampling continues to be undertaken as long as the site remains operational, in line with the permit requirements.

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Berkswell Recycling Facility

Ambient Bioaerosol Sampling Report

Berkswell Recycling Limited

Job No:	1038725
Doc ref:	JMB-CDL-XX-XX-RP-AQ-40205
Revision:	P01
Revision date:	13 June 2025

Project title	Berkswell Recycling Facility	**Job number**
Report title	Ambient Bioaerosol Sampling Report	1038725

Document revision history

Revision ref	Issue date	Purpose of issue / description of revision
P01	13 June 2025	Issue

Document validation (latest issue)

13/06/2025	13/06/2025	12/06/2025
X F.Jajarmi	X A.Trevis	X J.Carrington
Principal author	Checked by	Verified by
Signed by: Farzaneh Jajarmi	Signed by: Annie Trevis	Signed by: Jenny Carrington

Document Ref.

Contents

1.0

Introduction

1.0 Introduction

1.1 Scope of Work

Cundall were appointed by Berkswell Recycling Limited to undertake ambient bioaerosol sampling at the Berkswell Recycling Centre. The activity on site consists of green waste windrow turning and shredding, screening and storage, which are processes that are a source of bioaerosols. Bioaerosol sampling and analysis is required to satisfy the permit conditions and requirements of the Environment Agency.

The scope of works outlined and agreed can be summarised as follows:

- Single session of bioaerosol sampling for *Aspergillus fumigatus* and mesophilic bacteria in line with the permit requirements.
- Collection of a single compost sample for carbon to nitrogen (C:N) ratio testing in line with the permit requirements - *results attached separately.*

1.2 Capability

The work was carried out on the 13th of May 2025 by Cundall's air quality team, who are all Members or Associate Members of the Institute of Air Quality Management (IAQM). The work was managed and overseen by team members who are also professionally chartered.

Enumeration of these microorganisms was carried out by the UKAS accredited laboratory Biodet. All medium preparation, storage and analysis were undertaken in accordance with the Environment Agency's Technical Guidance Note "*TGN M9 Environmental Monitoring of Bioaerosols at Regulated Facilities, Version 2, July 2018*[7]".

[7] Environment Agency (2018) Technical Guidance Note M9, Environmental monitoring of bioaerosols at regulated facilities, Version 2, July 2018 https://www.gov.uk/government/publications/m9-environmental-monitoring-of-bioaerosols-at-regulated-facilities

2.0

Sampling Strategy

2.0 Sampling Strategy

2.1 Site Location

The site is Freeland Horticulture, Berkswell, Cornets End Ln, Coventry CV7 7LH. An aerial image of the site is shown in Figure 2-1.

Figure 2-1: Location of the Site (Courtesy of Google Satellite)

2.2 Sampling Procedures

2.2.1 Ambient Bioaerosol Sampling

Sampling for *Aspergillus fumigatus* and mesophilic bacteria was undertaken in accordance with the Environment Agency's M9 guidance[1], which provides a standardised approach for the monitoring of airborne microorganisms, known as bioaerosols.

Figure 2-2 illustrates the sampling locations, which were chosen based on the wind direction on the day.

- The upwind location was approximately 170 m from the centre of the active operational area and approximately 50 m from the operational boundary.
- The downwind locations should be located at a distance equivalent to the nearest sensitive receptor. In this case that is Mercote farm, approximately 285 m to the north-west. However, due to access restrictions associated with the quarry, the downwind locations were closer to the site than the nearest sensitive receptor.

  The downwind locations were set out in a 'fan like shape arrangement' as per the M9 guidance[1].

Location details are provided in Table 3-1 and Table 3-2.

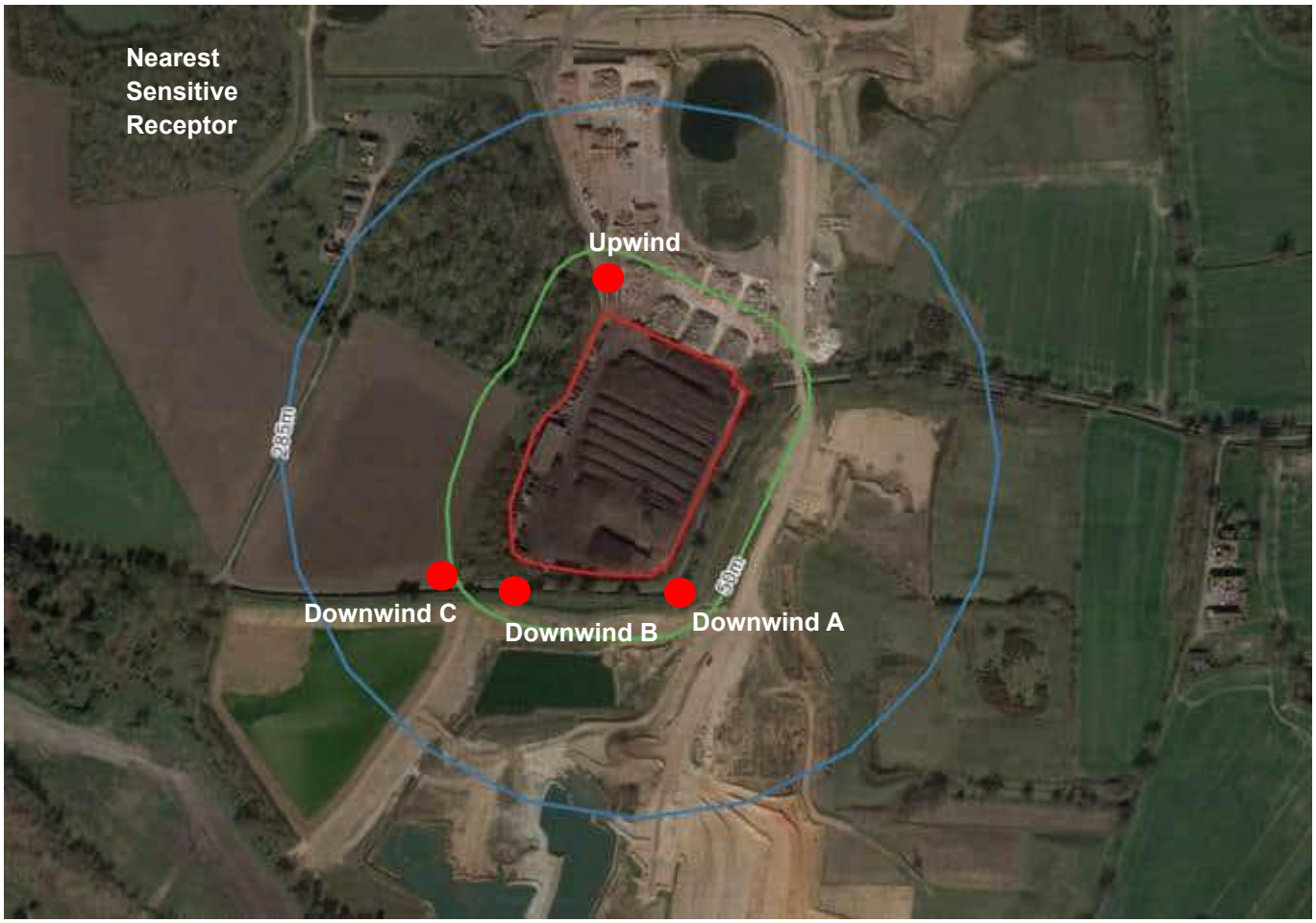

Figure 2-2: Sampling Locations (Courtesy of Google Satellite)

The sampling was carried out using the filtration method with Institute of Occupational Medicine (IOM) sampling heads. At each sampling location, three IOM filter heads were fixed in a vertical position at a height of 1.5m using a tripod. They were connected to calibrated air sampling pumps using appropriate tubing (see Figure 2-3 for downwind B example set up). The sampling duration was 60 minutes at a flow of approximately 2.5 l/min (see Table 3-1 and Table 3-2 for further details) and sampling at the upwind and downwind locations was carried out simultaneously. Two 'field blanks' were collected (one upwind and one downwind) by exposing a filter in an IOM filter head but with the pump switched off. Following the sampling, filters were placed back in their cassettes and sent to the laboratory for analysis.

Figure 2-3: Sampling set up, downwind B

2.2.2 Meteorological Conditions

Meteorological conditions were recorded using a Grimm EDM264 Standalone dust monitor[8] with integrated weather station. This was installed in the car park area of the site. The parameters recorded at three minute intervals were as follows:

- Wind direction (degrees from true north)
- Wind speed (m/s)
- Temperature (°C)
- Humidity (%)

[8] https://www.et.co.uk/products/air-quality-monitoring/particulate-monitoring/stand-alone-environmental-dust-monitor-model-edm-264

3.0

Sampling Results

3.0 Sampling Results

3.1 Ambient Bioaerosol Sampling

The M9 guidance[1] states that *"because of the broad scatter inherent in the measurement of bioaerosol concentrations, the median value should be used. Use of the median reduces the effect of extreme values and any outliers present will not influence the measurement result. Therefore, the median of the replicate samples should be used to assess the result for each sample location."* Therefore, the below results interpretation preferentially considers the calculated median result for each parameter sampled.

3.1.1 *Aspergillus fumigatus*

The results of the *Aspergillus fumigatus* sampling are shown in Table 3-1. Bioaerosol analysis results are reported in colony forming units (CFU).

- At the upwind sampling location results ranged from 100 to 104 CFU/m^3 with an overall calculated median of 100 CFU/m^3.
- At the downwind sampling locations results ranged from 89 to 500 CFU/m^3 with an overall calculated median of 100 CFU/m^3.

The results did not exceed the EA reference level of 500 CFU/m^3 at the upwind or downwind locations. Additionally, the calculated medians did not exceed the reference level.

3.1.2 Mesophilic bacteria

The results of the mesophilic bacteria sampling are shown in Table 3-2.

- At the upwind sampling location results ranged from 4,500 to 6,400 CFU/m^3 with an overall calculated median of 5,000 CFU/m^3.
- At the downwind sampling locations, results ranged from 100 to 8,333 CFU/m^3 with an overall calculated median of 2,500 CFU/m^3.

Concentrations at both the upwind and downwind locations were therefore elevated. A number of the individual upwind and downwind results and the upwind and downwind median values exceeded the EA reference level of 1,000 CFU/m^3.

It must be noted that due to access restrictions, the downwind sampling locations were located closer to the site than the nearest sensitive receptor (within 50 m of the site boundary, compared to 285 m for the nearest sensitive receptor). In reality, it is therefore likely that concentrations of mesophilic bacteria at this receptor would be lower than those measured during this sampling session.

Additionally, it was observed during the day of the site visit that there were a number of stockpiles of waste material located to the north of site. The separate components of the waste material in these stockpiles was visible and the material appeared to be in early stages of decomposition. As mesophilic microorganisms play a key role in primary breakdown, this may be a contributing factor to the elevated mesophilic bacteria concentrations recorded in the samples collected in May 2025.

Site: Berkswell **Sampling date: 13/05/25** **Estimated mass of materials: Unknown** **Bioaerosol type: *Aspergillus fumigatus*** **Activities affecting the concentration of bioaerosols: Normal activity on site**								**Site operator: Freeland** **Monitoring contractor: Cundall** **Type of materials processed on site: Green waste** **Site activity: Green waste windrow turning and shredding, screening and storage.**		
Location and National Grid Reference	**Sample reference**	**Distance from centre of active area** (m)	**Difference in bearing between location of samplers and mean direction wind blows to** (°)	**Sampling start/end time** (hh:mm)	**Sampling duration** (mins)	**Pump flow rate** (l/min)	**Pumped Volume** (l)	**Concentration of bioaerosols** (CFU/m^3)	**Median of upwind samples** (CFU/m^3)	**Median of downwind samples** (CFU/m^3)
Upwind 422727, 280621	UW 1	170	85	12:00-13:00	60	2.5	150	100	**100**	**100**
	UW 2	170	85			2.4	144	<104		
	UW 3	170	85			2.5	150	<100		
Downwind A 422793, 280354	DWA 1	107	105			2.6	156	96		
	DWA 2	107	105			2.5	150	<100		
	DWA 3	107	105			2.5	150	<100		
Downwind B 422666, 280348	DWB 1	146	45			2.5	150	<100		
	DWB 2	146	45			2.5	150	500		
	DWB 3	146	45			2.7	162	278		
Downwind C 422612, 280353	DWC 1	180	35			2.4	144	104		
	DWC 2	180	35			2.8	168	89		
	DWC 3	180	35			2.6	156	96		

Table 3-1: Results of Aspergillus fumigatus sampling

 Table 3-2: Results of mesophilic bacteria sampling

Site: Berkswell **Sampling date: 13/05/25** **Estimated mass of materials: Unknown** **Bioaerosol type: *Mesophilic bacteria*** **Activities affecting the concentration of bioaerosols: Normal activity on site**					**Site operator: Freeland** **Monitoring contractor: Cundall** **Type of materials processed on site: Green waste** **Site activity: Green waste windrow turning and shredding, screening and storage.**					
Location and National Grid Reference	**Sample reference**	**Distance from centre of active area** (m)	**Difference in bearing between location of samplers and mean direction wind blows to** (°)	**Sampling start/end time** (hh:mm)	**Sampling duration** (mins)	**Pump flow rate** (l/min)	**Pumped Volume** (l)	**Concentration of bioaerosols** (CFU/m^3)	**Median of upwind samples** (CFU/m^3)	**Median of downwind samples** (CFU/m^3)
Upwind 422830, 280578	UW 1	170	85	12:00-13:00	60	2.5	150	6400	**5000**	**2500**
	UW 2	170	85			2.4	144	5000		
	UW 3	170	85			2.5	150	4500		
Downwind A 422922, 280373	DWA 1	107	105			2.6	156	2019		
	DWA 2	107	105			2.5	150	300		
	DWA 3	107	105			2.5	150	100		
Downwind B 422884, 280305	DWB 1	146	45			2.5	150	400		
	DWB 2	146	45			2.5	150	6900		
	DWB 3	146	45			2.7	162	8333		
Downwind C 422795, 280309	DWC 1	180	35			2.4	144	7292		
	DWC 2	180	35			2.8	168	2500		
	DWC 3	180	35			2.6	156	3846		

3.2 Meteorological Conditions

The meteorological conditions are detailed in Table 3-3 and can be summarised as follows:

- The predominant wind direction was northeasterly, with a frequency of more than 30%. The average wind direction was from east/northeast (85°) towards the west/southwest (265°).
- Mean wind speed during sampling was 1.3 m/s
- Arithmetic mean air temperature was 21.5°C
- Arithmetic mean of relative humidity was 40.2%
- Cloud cover was approximately 0/8

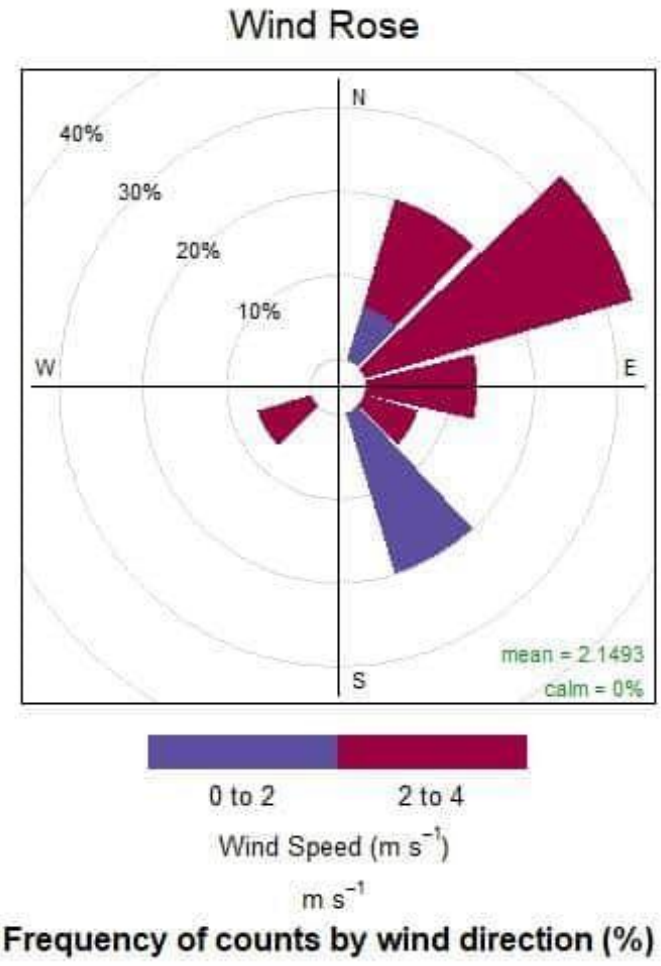

Figure 3-1: Windrose from the on-site weather station during the monitoring period

Site: Berkswell **Sampling date: 13/05/25**				**Site operator: Freeland** **Monitoring contractor: Cundall**				
Location and National Grid Reference	**Sample reference**	**Bearing of samplers from centre of operational area or turning / screening operation** (° from true north)	**Mean direction the wind blows to during the sampling period** (° from true north)	**Difference in bearing between location of samplers from centre of operational area and mean direction wind blows to** (°)	**Mean wind speed during sampling** (m/s)	**Arithmetic mean of air temperature** (°C)	**Arithmetic mean of relative humidity** (%)	**Prevailing weather conditions** (cloud cover in eigths)
Upwind 422830, 280578	UW 1	350	265	85	1.3	21.5	40.2	0/8
	UW 2	350		85				
	UW 3	350		85				
Downwind A 422922, 280373	DWA 1	160		105				
	DWA 2	160		105				
	DWA 3	160		105				
Downwind B 422884, 280305	DWB 1	220		45				
	DWB 2	220		45				
	DWB 3	220		45				
Downwind C 422795, 280309	DWC 1	230		35				
	DWC 2	230		35				
	DWC 3	230		35				

Table 3-3: Meteorological conditions at each sampling location

4.0

Conclusion

4.0 Conclusion

Ambient bioaerosol sampling was carried out on the 13th of May 2025 at the Berkswell Recycling Centre.

Concentrations of *Aspergillus fumigatus* were variable, and some downwind results were slightly elevated. However, all individual upwind and downwind results and the upwind and downwind median values did not exceed the EA reference level of 500 CFU/m^3.

Concentrations of mesophilic bacteria were slightly elevated. A number of the individual upwind and downwind results and the upwind and downwind median values exceeded the EA reference level of 1000 CFU/m^3.

It must be noted that due to access restrictions, the downwind sampling locations were located closer to the site that the nearest sensitive receptor (within 50m of the site boundary, compared to 285 m for the nearest sensitive receptor). In reality, it is therefore likely that concentrations of mesophilic bacteria at this receptor would be lower than those measured during this sampling session.

Additionally, it was observed during the day of the site visit that there were a number of stockpiles of waste material located to the north of site. This area had been vacant on the most recent previous visits. The separate components of the waste material in these stockpiles was visible and the material appeared to be in early stages of decomposition. As mesophilic microorganisms play a key role in primary breakdown, this may be a contributing factor to the elevated mesophilic bacteria concentrations recorded in the samples collected in May 2025.

It is recommended that ambient bioaerosol sampling continues to be undertaken as long as the site remains operational, in line with the permit requirements.

ZERO CARBON DESIGN 2030

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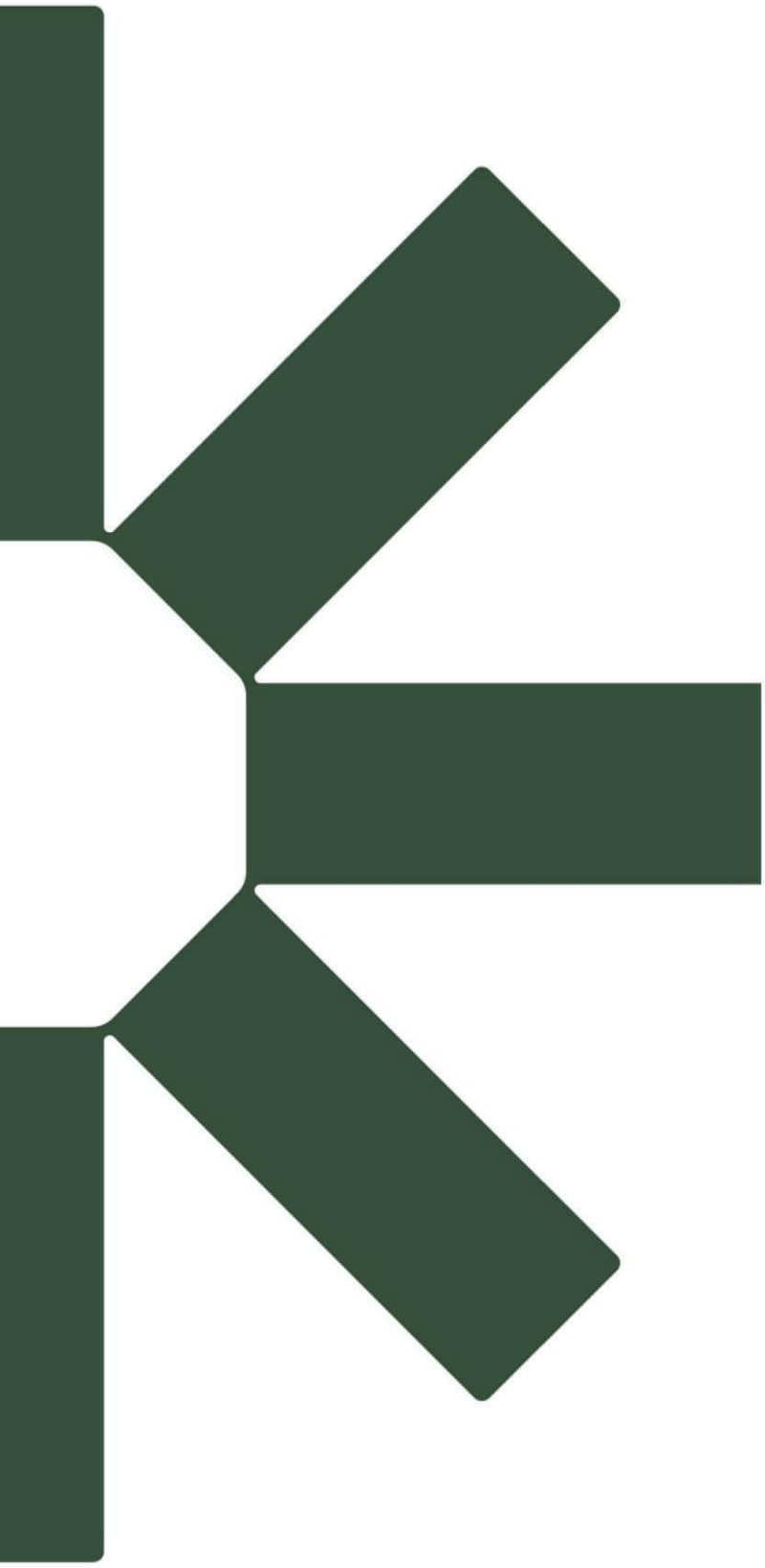

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