

**Biodet**

Direct line 01707 284545  
Laboratory 01707 284522  
Fax 01707 285046

Mark Evans  
Growing Beds Ltd  
Nr Ravensden  
North Bedford  
Bedfordshire

Our Ref: GBEDS/14/Q4

Date: 20<sup>th</sup> November 2014

**BIOAEROSOL MONITORING REPORT**

Log No. 2181

**BIOAEROSOL MONITORING REPORT FROM GROWING BEDS, RAVENS DEN**  
Sampling performed 13 Nov 2014

The composing site at **Growing Beds, Ravensden** was visited on 13<sup>th</sup> November 2014.

Sampling for the enumeration of airborne micro-organisms was undertaken by Richard Smith of Biodet following so far as reasonably practicable, the Standardised Protocol for the Monitoring of Bioaerosols at Open Composting Facilities (Association for Organic Recycling (AfOR), 2009).

All sampling was carried out on a normal working day whilst operational activities were taking place, which are detailed in Appendix 1: Site data during sampling. The prevailing weather conditions (wind direction, wind speed, temperature and humidity) were recorded at the time of sampling.

On-site activity (turning, screening etc.) was recorded.

**Sampling Points**

Sampling points were chosen to correspond with the criteria of the AfOR Protocol (see page 3: Plan of Site, for further details on the positions):

1. Upwind of the composting activities at approximately 30 metres from the operational boundary, south-south-east (150° from north) of the centre of the site operations.
2. Downwind of composting activities at approximately 225 metres from the operational boundary, north-north-west (330° from north) of the site operations.

3. Nearest Receptor\* at approximately 290 metres from the operational boundary, south-south-west (193° from north) of the screening operation.

\* *A sensitive receptor is defined as ‘any building, structure or installation in which at least one person normally lives or works, other than a building, structure or installation within the same ownership or control as the operator / owner of the composting facility.’ - Standardised Protocol for the Sampling and Enumeration of Airborne Microorganisms at Composting Facilities: [The Composting Association]*

In the case of Growing Beds, the nearest sensitive receptor was determined to be the cottages and farm to the south-west of the site.

The sample points are indicated on the site map (page 3).

Samples were taken at a height of 1.5 metre, using SKC IOM bioaerosol sampling heads at 2.0 litres per minute.

The recovered membranes were tested for mesophilic bacteria and for *Aspergillus fumigatus*. Nutrient agar (NA) was used to culture mesophilic bacteria and the plates were incubated for 7 days at 37 C.

Malt extract agar (MEA) was used to culture *Aspergillus fumigatus* and the plates were incubated for 2 days at 41 C.

Tests were performed in triplicate at each sampling point.

Identification of *Aspergillus fumigatus* was performed by microscopy.

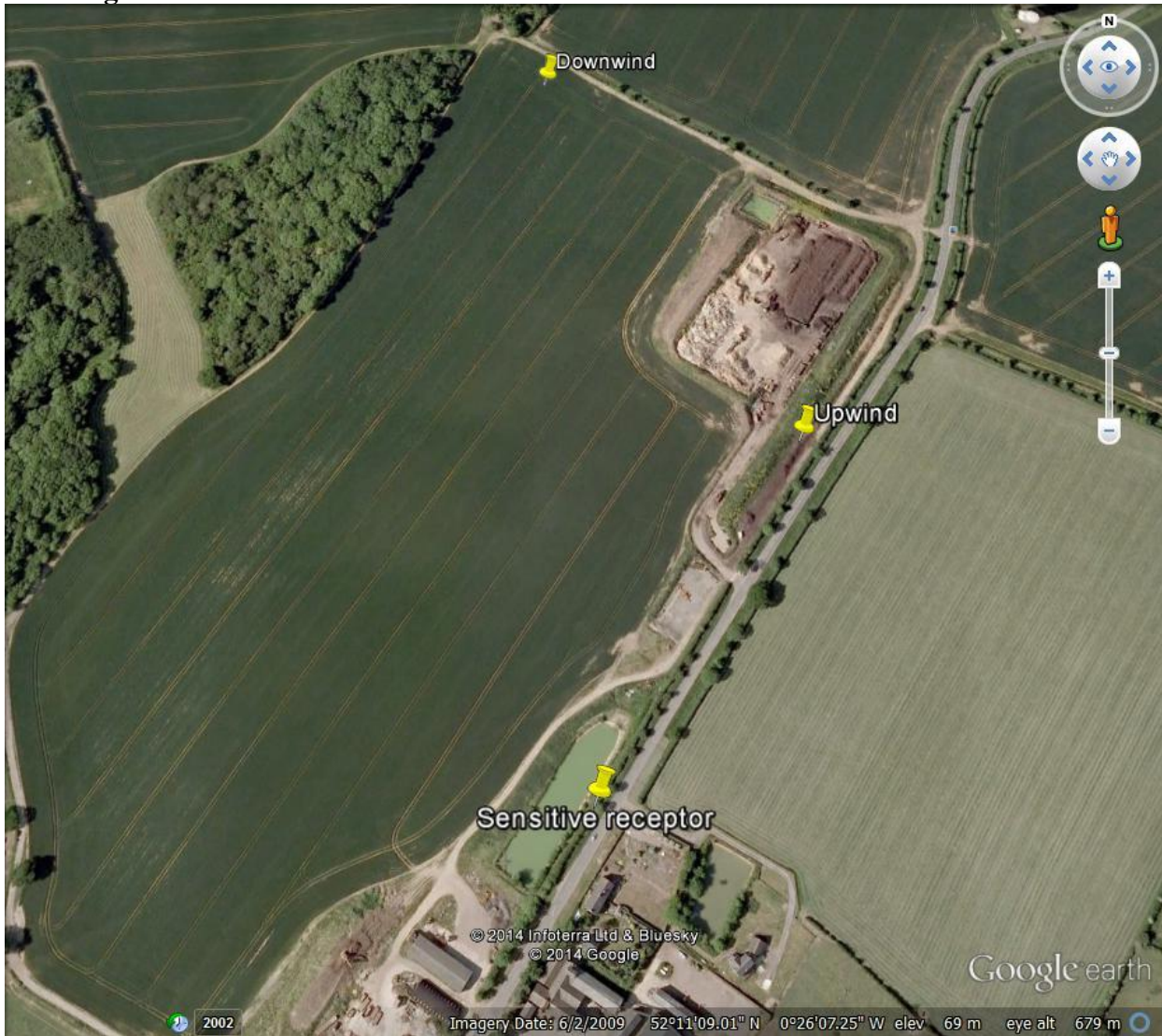
## Results:

<b>Site</b>	<b>Growing Beds, Ravensden</b>
Date of visit:	13-Nov-2014
Operator:	R. Smith
Wind Direction:	South-south-easterly
Wind Speed:	19-22 mph
Operation:	Green waste screening & site operations

## Weather:

- Dry and mild.
- Temperature ranged from 12.3 C to 12.9 C, the average was 12.5 C.
- Relative humidity ranged from 80.6 % to 83.4 %, the average was 82.1%.
- Wind speed ranged from 19 mph to 22 mph, the average was 21 mph.
- Wind direction was on average from the south-south-east (150° from north).

### Growing Beds Plan: 13 November 2014



**Microbiological Results:**

Site: Growing Beds, Ravensden		Site Operator: Mark Evans						
Date: 13 Nov 2014		Commissioning Lab: Biodet, University of Hertfordshire						
Materials processed on site: Green waste								
Location	Sample ref no.	Distance from site operation (m)	Sampling times (hh:min:ss)	Sampling volume (litres)	Microbial type	Calculated concentration of airborne micro organisms (CFU/m <sup>3</sup> )	Arithmetic mean of parallel samples (CFU/m <sup>3</sup> )	Comments relating to activities
Upwind	U1	70	12:45-13:30	90	MB	<200	56	Shredding & site operations.
Upwind	U2	70	12:45-13:30	90	MB	170		
Upwind	U3	70	12:45-13:30	90	MB	<200		
Upwind	U1	70	12:45-13:30	90	AF	<200	0	Shredding & site operations.
Upwind	U2	70	12:45-13:30	90	AF	<200		
Upwind	U3	70	12:45-13:30	90	AF	<200		
Downwind	D1	290	13:30-14:15	90	MB	<200	111	Shredding & site operations.
Downwind	D2	290	13:30-14:15	90	MB	<200		
Downwind	D3	290	13:30-14:15	90	MB	330		

Downwind	D1	290	13:30-14:15	90	AF	<200	0	Shredding & site operations.
Downwind	D2	290	13:30-14:15	90	AF	<200		
Downwind	D3	290	13:30-14:15	90	AF	<200		
S. receptor	S1	320	14:20-15:05	90	MB	<b>4330</b>	1555	Shredding & site operations.
S. receptor	S2	320	14:20-15:05	90	MB	330		
S. receptor	S3	320	14:20-15:05	90	MB	<200		
S. receptor	S1	320	14:20-15:05	90	AF	<200	0	Shredding & site operations.
S. receptor	S2	320	14:20-15:05	90	AF	<200		
S. receptor	S3	320	14:20-15:05	90	AF	<200		

**MB = Mesophilic bacteria, AF = *Aspergillus fumigatus***

**Controls:**

<b>Site: Growing Beds, Ravensden</b> <b>Date: 13 Nov 2014</b>				<b>Site Operator: Mark Evans</b> <b>Commissioning Lab: Biodet, University of Hertfordshire</b> <b>Materials processed on site: Green waste</b>			
Location	Sample ref no.	Distance from shredding operation (m)	Sampling times (hh:min:ss)	Sampling volume (litres)	Microbial type	Calculated concentration of airborne micro organisms (CFU/membrane)	Comments relating to activities
Control 1	C1	n/a	n/a	n/a	MB	<15	Membrane loaded on-site but no air passed through
Control 1	C1	n/a	n/a	n/a	AF	<15	Membrane loaded on-site but no air passed through

**Environmental conditions:**

<b>Site: Growing Beds, Ravensden</b>		<b>Site Operator: Mark Evans</b>	
<b>Date: 13 Nov 2014</b>		<b>Commissioning Lab: Biodet, University of Hertfordshire</b>	
<b>Materials processed on site: Green waste</b>			
<b>Time</b>	<b>Temperature C</b>	<b>Relative humidity %</b>	<b>Wind speed mph</b>
12:50	12.8	80.6	19-22
12:55	12.5	82.7	19-22
13:00	12.5	83.4	19-22
13:05	12.6	82.4	19-22
13:10	12.9	81.6	19-22
13:15	12.8	82.4	19-22
13:20	12.6	81.5	19-22
13:25	12.5	81.7	19-22
13:30	12.3	82.6	19-22
13:35	12.4	83.3	19-22
13:40	12.3	83.1	19-22
13:45	12.3	83.1	19-22
13:50	12.4	82.5	19-22
13:55	12.3	82.2	19-22
14:00	12.3	82.0	19-22
14:05	12.4	82.3	19-22
14:10	12.3	82.0	19-22
14:15	12.3	81.6	19-22
14:20	12.3	82.0	19-22
14:25	12.5	80.9	19-22
14:30	12.4	80.9	19-22
14:35	12.4	81.5	19-22
14:40	12.4	81.4	19-22

### Comments:

Bacteria and fungi occur naturally and are commonly present in the air. Concentrations are highly variable, but background levels of micro-organisms do not normally exceed 1000 cfu/m<sup>3</sup> (colony forming units per cubic metre).

Environment Agency guidance levels of 1000 cfu/m<sup>3</sup> for bacteria and 500 cfu/m<sup>3</sup> for fungi have been used within this report, when assessing the concentrations of bioaerosols.

### Upwind position

*A. fumigatus* spp were not detected at the upwind position.

Mesophilic bacteria were isolated in low numbers from the upwind position during the sampling period (56 cfu/m<sup>3</sup>); and concentrations were therefore below the 1000 cfu/m<sup>3</sup> EA reference level.

### Downwind

*A. fumigatus* spp were not detected at the downwind position.

Mesophilic bacteria were isolated in low numbers from the downwind position (111 cfu/m<sup>3</sup>) and results are low in comparison to levels measured at the 1,000 cfu/m<sup>3</sup> EA reference level.

### Nearest Receptor

*A. fumigatus* spp were not detected at the sensitive receptor position.

Mesophilic bacteria results were elevated at the nearest receptor position (1555 cfu/m<sup>3</sup>) and were above the 1,000 cfu/m<sup>3</sup> EA reference level. However, these results were heavily influenced by one high result (S1) in the three replicates. This result was anomalous compared to the other two Sensitive Receptor sites, and the elevated average result could therefore be attributed to aggregation.



20<sup>th</sup> November 2014

R. SMITH

DATE

DIRECTOR OF BIODET