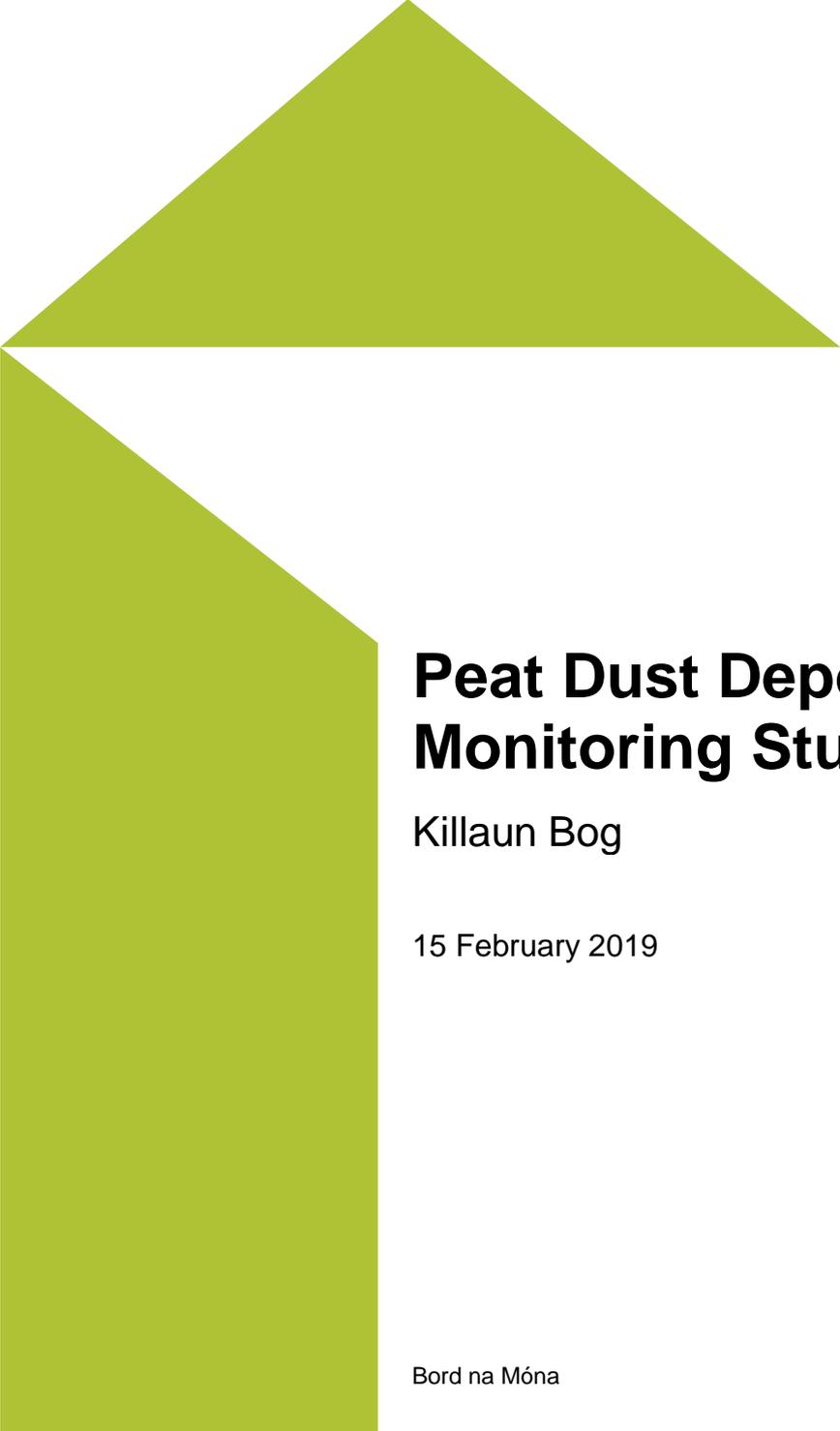


# **Appendix 8.1 Peat Dust Deposition Monitoring Study**

A large, abstract graphic composed of two overlapping green shapes. The top shape is a triangle pointing downwards, and the bottom shape is a trapezoid pointing upwards, together forming a larger, irregular shape on the left side of the page.

# Peat Dust Deposition Monitoring Study

Killaun Bog

15 February 2019

Bord na Móna



Mott MacDonald  
Victory House  
Trafalgar Place  
Brighton BN1 4FY  
United Kingdom

T +44 (0)1273 365000  
F +44 (0)1273 365100  
mottmac.com

Bord na Móna  
Leabeg  
Tullamore  
Co. Offaly

# Peat Dust Deposition Monitoring Study

Killaun Bog

15 February 2019



# Issue and Revision Record

| Revision | Date       | Originator     | Checker | Approver | Description              |
|----------|------------|----------------|---------|----------|--------------------------|
| A        | 15/02/2019 | PP Bertagnolio | C Mills | D Hasset | Draft for client comment |
|          |            |                |         |          |                          |
|          |            |                |         |          |                          |
|          |            |                |         |          |                          |
|          |            |                |         |          |                          |

**Document reference:** 343008\_06 | 02 | A

**Information class:** Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

# Contents

|     |                                     |    |
|-----|-------------------------------------|----|
| 1   | Introduction                        | 1  |
| 1.1 | Daily dust deposition rate          | 1  |
| 2   | Observations and monitoring results | 2  |
| 2.1 | Wind speed and direction            | 2  |
| 2.2 | Rainfall                            | 3  |
| 2.3 | Peat production                     | 4  |
| 2.4 | Other activities at Killaun bog     | 5  |
| 2.5 | Monitoring locations                | 6  |
| 2.6 | Dust deposition results             | 6  |
| 3   | Conclusions                         | 11 |
|     | Appendices                          | 12 |
| A.  | Map of Killaun bog                  | 13 |
| B.  | Monitoring report                   | 15 |

# 1 Introduction

Mott MacDonald were commissioned by Bord na Móna to undertake a study on dust deposition impacts from its activities at the Killaun bog, Co. Offaly.

The dust deposition study ran from June to December 2018. Dust deposition monitoring was undertaken throughout the period and divided into six sampling periods:

- Period 1 - 18/06/2018 to 16/07/2018
- Period 2 - 16/07/2018 to 15/08/2018
- Period 3 - 15/08/2018 to 14/09/2018
- Period 4 - 14/09/2018 to 15/10/2018
- Period 5 - 15/10/2018 to 14/11/2018
- Period 6 - 14/11/2018 to 14/12/2018

This report presents the results of dust deposition monitoring for the study, and provides context for the observations in each period, including weather (wind speed and direction, rainfall) and bog activities (peat production and sales).

## 1.1 Daily dust deposition rate

Dust deposition is expressed in terms of mass per unit area per unit time, e.g.  $\text{mg}/\text{m}^2/\text{day}$ .

There are no Irish or European statutory standards that define the point when deposited dust causes annoyance or disamenity. However, EPA guidance suggest, a soiling of  $10\text{mg}/\text{m}^2/\text{hour}$  is generally considered to pose a soiling nuisance (German Government TA Luft guidance 2002). This equates to  $240\text{mg}/\text{m}^2/\text{day}$  of Total Depositional Dust.

The EPA recommend a maximum level of  $350\text{mg}/\text{m}^2/\text{day}$  of dust deposition when measured according to TA Luft standard, which includes both soluble and insoluble matter (i.e. EPA compliance monitoring is based on the TA Luft Method).

The standard method of measurement of dust deposition is outlined in VDI 2119 (Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German. Engineering Institute). This standard applies to total dust deposition i.e. all particle sizes, including soluble, insoluble and respirable dusts.

## 2 Observations and monitoring results

### 2.1 Wind speed and direction

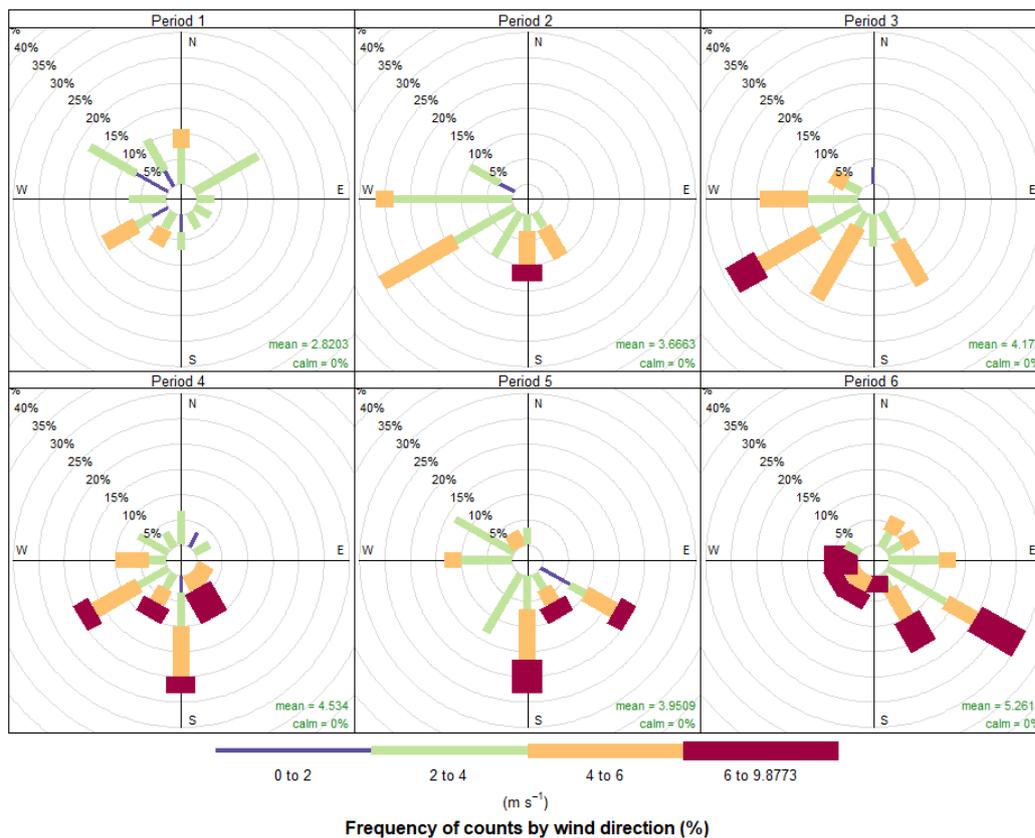
Wind speed and direction at the Gurteen Met Éireann weather station were obtained and are reported below as wind roses. Figure 1 shows wind observations in each monitoring period of the study, which can be compared with the 2008-2017 climatological average in Figure 2.

Period 1 did not display a prevalent wind direction. Periods 2 to 4 had a prevalence of south-westerly winds, which switched to south-easterlies in Periods 5 and 6.

Average wind speed was lowest in Period 1 (2.8m/s) with an increasing trend to the highest speed in Period 6 (5.3m/s), consistently with the climate average wind speeds (lowest in June, increasing to a maximum in February).

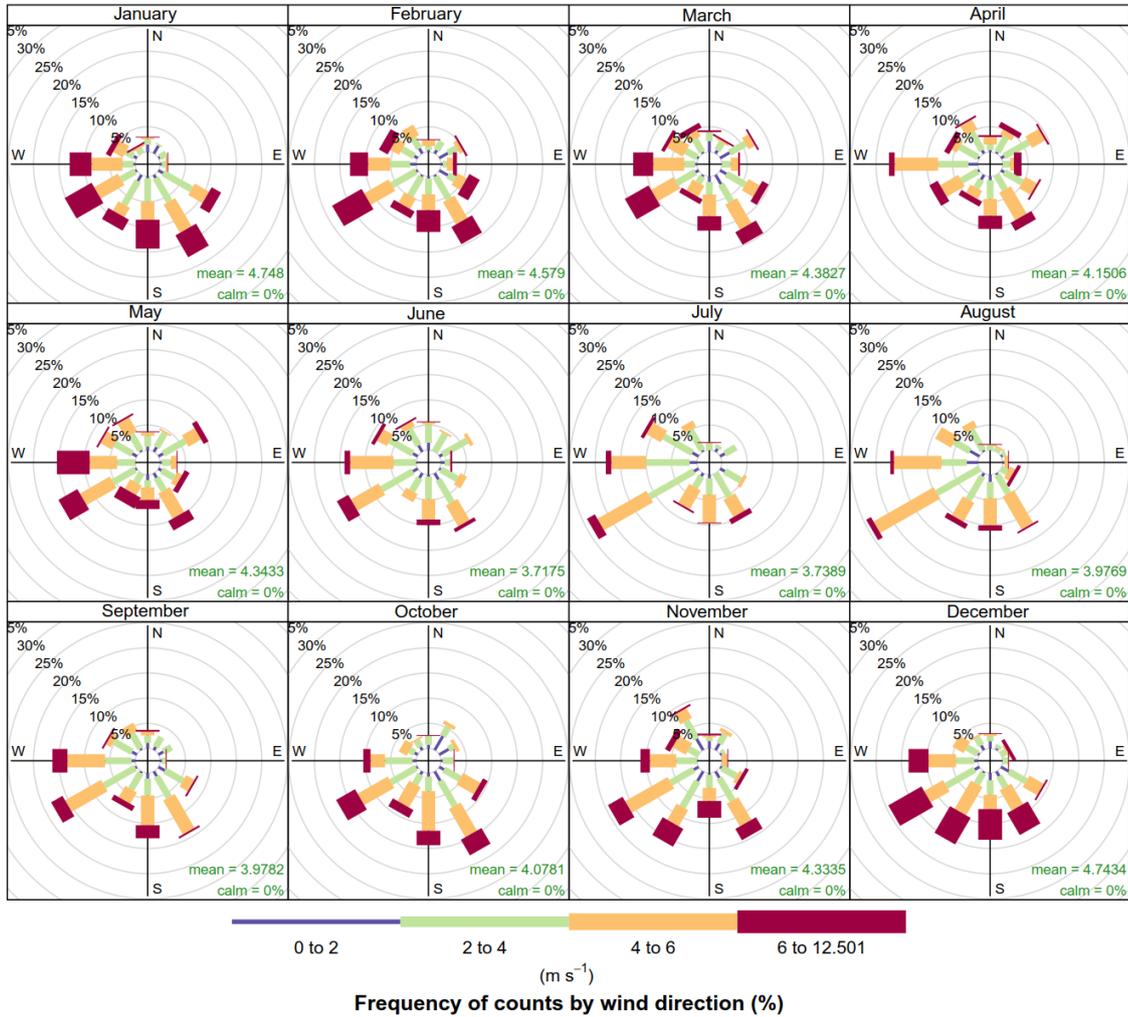
Higher wind speeds are generally associated with higher risk of dust emissions.

**Figure 1: Wind speed and direction at Gurteen weather station during monitoring study**



Source: Met Éireann

**Figure 2: Climate average (2009-2017) wind speed and direction at Gurteen weather station**



Source: Met Éireann

## 2.2 Rainfall

Rainfall measurements were taken at the Killaun bog and compared with measurements taken at the nearest Met Éireann weather station at Gurteen in the same periods from 2009 to 2017.

Rainfall levels and the number of rainy days were comparable at Killaun and Gurteen. Rainfall amounts in Periods 3 to 6 at both Killaun and Gurteen were comparable to the climate average at Gurteen, while Periods 1 and 2 were much drier than the climate average.

The driest period measured at Killaun was Period 1 with 15.5mm, and the wettest was Period 6 with 108.0mm. Period 1 and Period 2 had the lowest number of rainy days observed at Killaun (4 and 6 days).

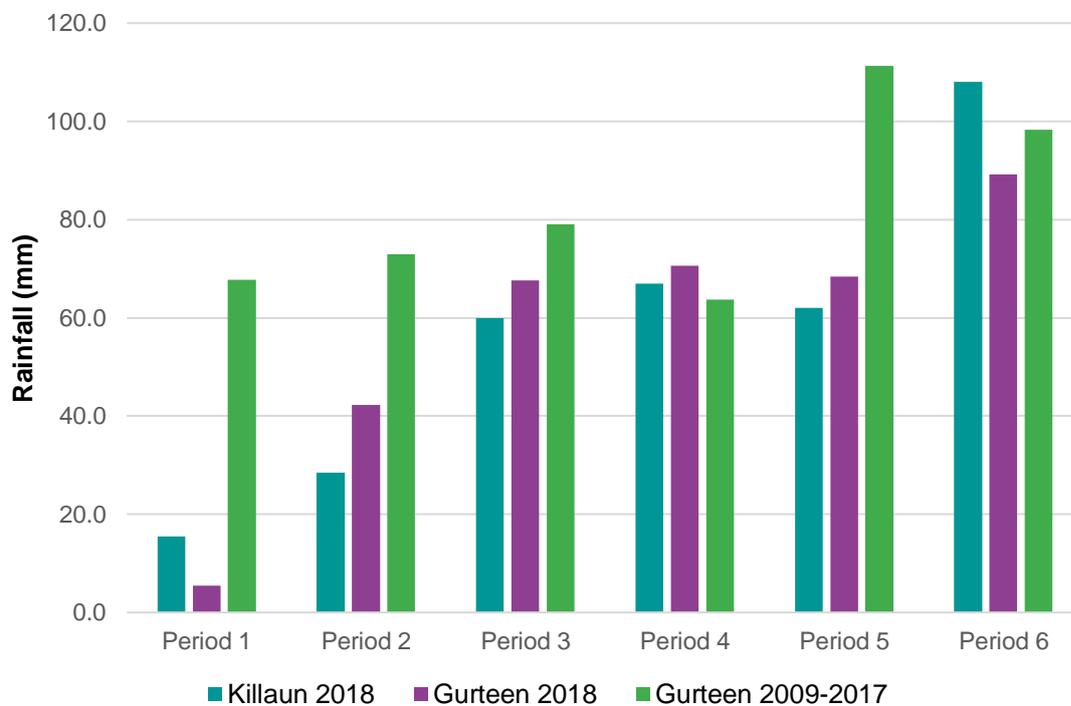
Dry weather is generally associated with higher risk of dust emissions.

**Table 1: Rainfall by monitoring period**

| Period                              | Killaun 2018 |      | Gurteen 2018 |      | Gurteen 2009-2017    |
|-------------------------------------|--------------|------|--------------|------|----------------------|
|                                     | Amount (mm)  | Days | Amount (mm)  | Days | Climate Average (mm) |
| Period 1 - 18/06/2018 to 16/07/2018 | 15.5         | 4    | 5.5          | 4    | 67.8                 |
| Period 2 - 16/07/2018 to 15/08/2018 | 28.5         | 6    | 42.2         | 18   | 72.9                 |
| Period 3 - 15/08/2018 to 14/09/2018 | 60.0         | 12   | 67.6         | 23   | 79.0                 |
| Period 4 - 14/09/2018 to 15/10/2018 | 67.0         | 7    | 70.6         | 22   | 63.7                 |
| Period 5 - 15/10/2018 to 14/11/2018 | 62.0         | 11   | 68.4         | 22   | 111.3                |
| Period 6 - 14/11/2018 to 14/12/2018 | 108.0        | 13   | 89.2         | 26   | 98.3                 |

Source: Bord na Móna, Met Éireann

**Figure 3: Rainfall by monitoring period**



Source: Bord na Móna, Met Éireann

### 2.3 Peat production

The amount of peat harvested (production) can be used as a measure of activity on the Killaun bog. Before the peat is harvested, other activities are undertaken such as milling, harrowing, and ridging, which all have a dust emission potential.

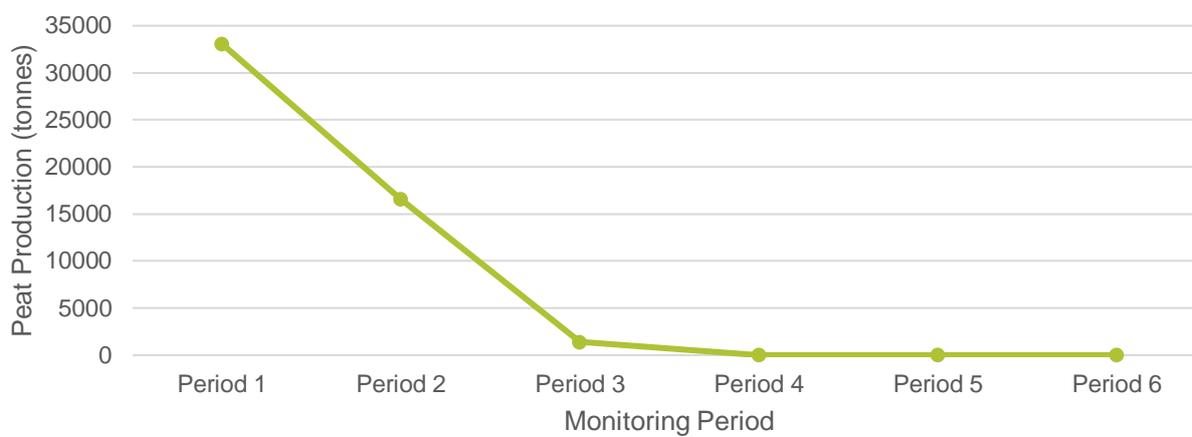
Harvesting on site was carried on nearly every day in Period 1, decreasing to 12 days in Period 2 and only one day in Period 3, as shown in the following table and chart.

**Table 2: Peat Production at Killaun Bog**

| Monitoring Period | Peat harvesting (tonnage) | Harvesting days |
|-------------------|---------------------------|-----------------|
| Period 1          | 32071.0                   | 24              |
| Period 2          | 17554.4                   | 12              |
| Period 3          | 1388.3                    | 1               |
| Period 4          | 0.0                       | 0               |
| Period 5          | 0.0                       | 0               |
| Period 6          | 0.0                       | 0               |

Source: Bord na Móna

**Figure 4: Peat production by monitoring period**



Source: Bord na Móna

The amount of peat harvested was highest in Period 1 and lowest in Period 3. It is understood harvesting finished on 16/08/2018 and no harvesting was carried on in Periods 4 to 6.

All production zones in the Killaun bog were uniformly active when harvesting was carried on. Dust emissions were equally likely from all areas on the production bog on harvesting days.

## 2.4 Other activities at Killaun bog

After the end of the harvesting period, peat stockpiles were covered between 17<sup>th</sup> August and 17<sup>th</sup> September. Five piles were left uncovered, ready to be loaded for removal and sale, and were potential sources of dust emissions in Periods 4 to 6. The name of the stockpiles left uncovered has been inferred by peat sale information provided by Bord na Móna, and the stockpiles are marked in the map in appendix.

Harvested peat is removed from the stockpiles using a rail line crossing the middle of the bog. The rail line is located approximately 250m away from the closest monitoring location (D1), and unlikely to directly affect dust deposition results. Using the rail line, peat is transferred to a loading station where it is loaded on lorries that transport it out of the production bog. The loading station is located approximately 400m away from the closest monitoring location (D2).

There is another commercial peat bog adjacent to the eastern boundary of the Bord na Móna Killaun bog, approximately 350m away from the closest monitoring location (D9). It is noted that this bog was also undertaking production during the summer, and may have had the potential for dust emissions.

## 2.5 Monitoring locations

The Bord na Móna survey at Killaun bog comprises of dust deposition sampling carried on by Odour Monitoring Ireland. The survey used Bergerhoff gauges at sixteen locations, chosen along four transects around the bog and at one regional background location, on Bord na Móna land, approximately 2.8km away from the closest active bog (Boora). Details about the locations are available in the table below and in the maps in appendix. Photos of the monitoring locations are also included in appendix.

**Table 3: Monitoring locations**

| Monitoring location | Monitoring group          | ITM X Coordinate | ITM Y Coordinate | Distance from production field (m) | Direction of production field (deg) | Cardinal Direction of production field |
|---------------------|---------------------------|------------------|------------------|------------------------------------|-------------------------------------|--|
| D1                  | North-North-East Transect | 609760           | 707291           | 0                                  | -154                                | SW                                     |
| D2                  |                           | 609786           | 707352           | 18                                 | -154                                | SW                                     |
| D3                  |                           | 609807           | 707422           | 68                                 | -154                                | SW                                     |
| D4                  |                           | 609797           | 707538           | 111                                | -154                                | SW                                     |
| D5                  |                           | 609812           | 707637           | 177                                | -135                                | SW                                     |
| D6                  |                           | 609865           | 707874           | 400                                | -116                                | SW                                     |
| D7                  | East-North-East Transect  | 610090           | 706904           | 0                                  | -154                                | SW                                     |
| D8                  |                           | 610123           | 706951           | 18                                 | -154                                | SW                                     |
| D9                  |                           | 610163           | 707037           | 92                                 | -154                                | SW                                     |
| D10                 | South-East Transect       | 610407           | 705326           | 0                                  | 151                                 | NW                                     |
| D11                 |                           | 610543           | 705260           | 88                                 | 151                                 | NW                                     |
| D12                 |                           | 610736           | 705189           | 292                                | 157                                 | NW                                     |
| D13                 | South-West Transect       | 608850           | 705600           | 0                                  | 26                                  | NE                                     |
| D14                 |                           | 608763           | 705552           | 50                                 | 26                                  | NE                                     |
| D15                 |                           | 608674           | 705507           | 150                                | 26                                  | NE                                     |
| D16                 | Regional Background       | 618464           | 717148           | 2800                               | -90                                 | W                                      |

Source: Mott MacDonald

## 2.6 Dust deposition results

Dust deposition monitoring results are reported in the table and graphs below.

**Table 4: Periods 1-6 Monitoring Results**

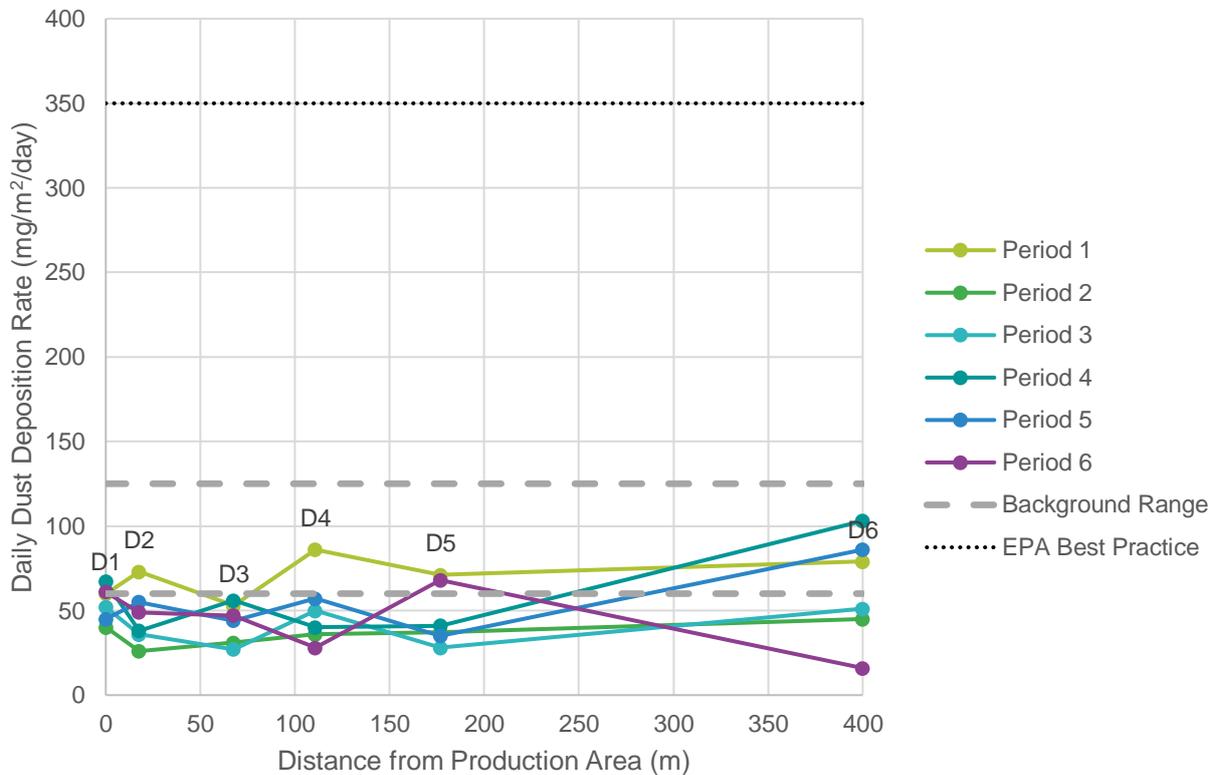
| Monitoring location | Monitoring group          | Daily Dust Deposition Rate (mg/m <sup>2</sup> /day) |          |          |          |          |          |
|---------------------|---------------------------|---|----------|----------|----------|----------|----------|
|                     |                           | Period 1  | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 |
| D1                  | North-North-East Transect | 60  | 40       | 52       | 67       | 45       | 61       |
| D2                  |                           | 73  | 26       | 36       | 38       | 55       | 49       |
| D3                  |                           | 53  | 31       | 27       | 56       | 44       | 47       |
| D4                  |                           | 86  | 36       | 50       | 40       | 57       | 28       |
| D5                  |                           | 71  | 37       | 28       | 41       | 35       | 68       |
| D6                  |                           | 79  | 45       | 51       | 103      | 86       | 16       |
| D7                  | East-North-East Transect  | 114   | 38       | 35       | 41       | 61       | 62       |
| D8                  |                           | 150   | 80       | 58       | 49       | 43       | 42       |
| D9                  |                           | 87  | 46       | 48       | 31       | 37       | 51       |
| D10                 |                           | 172   | 48       | 54       | 63       | 1136     | 59       |

| Monitoring location | Monitoring group    | Daily Dust Deposition Rate (mg/m <sup>2</sup> /day) |          |          |          |          |          |
|---------------------|---------------------|---|----------|----------|----------|----------|----------|
|                     |                     | Period 1  | Period 2 | Period 3 | Period 4 | Period 5 | Period 6 |
| D11                 | South-East Transect | 51  | 38       | 44       | 30       | 39       | 20       |
| D12                 |                     | 59  | 32       | 38       | 27       | 69       | 36       |
| D13                 | South-West Transect | 1301  | 38       | 31       | 30       | 280      | 41       |
| D14                 |                     | 1289  | 58       | 32       | 71       | 186      | 58       |
| D15                 | Regional Background | 103   | 34       | 140      | 69       | 77       | 67       |
| D16                 |                     | 60  | 125      | 87       | 104      | 77       | 66       |

Source: Mott MacDonald, Odour Monitoring Ireland

Dust deposition rates at site D16, away from Bord na Móna peat extraction activities, ranged from 60 to 125mg/m<sup>2</sup>/day. This range can be considered a representative of "regional background" due to weather, natural sources and other human activities.

**Figure 5: Monitoring Results for Periods 1-6 (North-North-East Transect)**



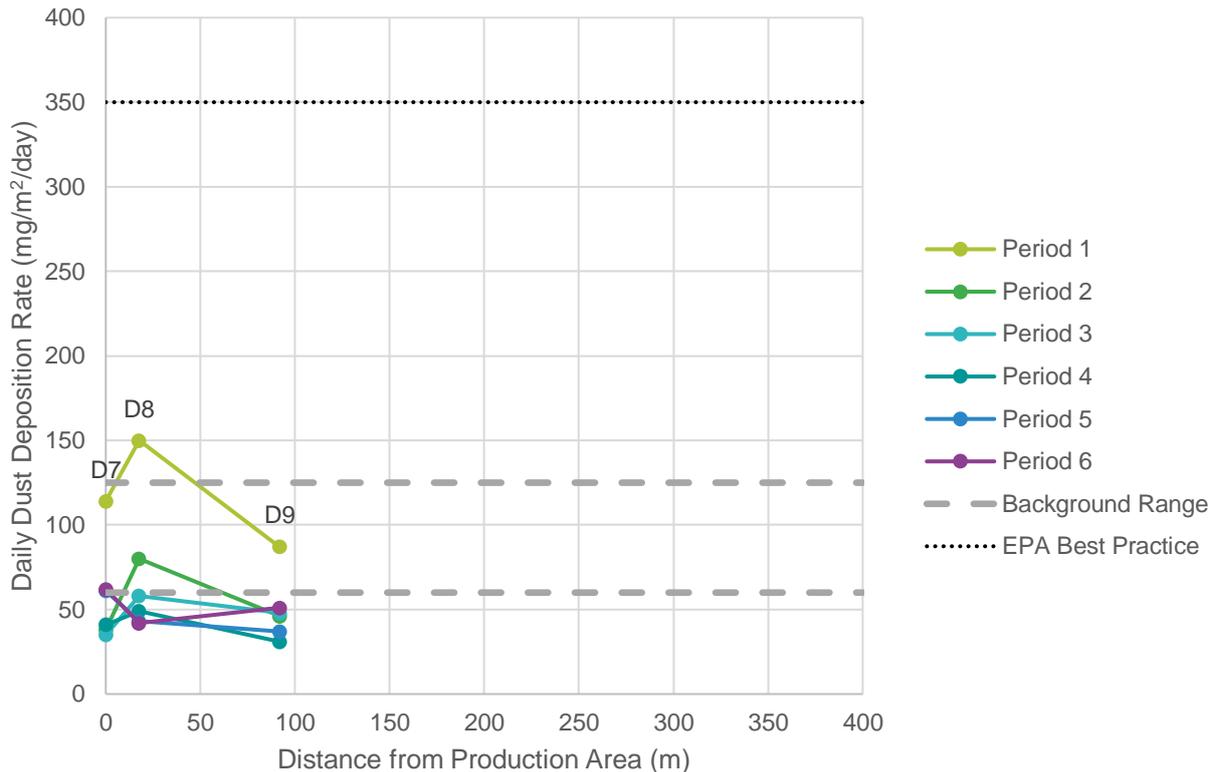
Source: Mott MacDonald, Odour Monitoring Ireland

Daily dust deposition rates measured along the North-North-East Transect ranged from 16 to 103mg/m<sup>2</sup>/day. These monitored values are in the same range or lower than the monitored dust deposition at the background site. Dust deposition on this transect was also well below the EPA Best Practice value of 350 mg/m<sup>2</sup>/day at all sampled locations and for all periods. Dust deposition in Period 1 was higher than in other periods, at the five monitoring locations closest to the production zone (up to 180m away).

At location D6, 400m from the production zone, the highest values were observed in Periods 4 and 5. The highest dust depositions observed at D6 were 103 and 86 mg/m<sup>2</sup>/day respectively, still well below the EPA Best Practice value. Location D6 is also close (less than 50m) to a public road.

No other significant variation with distance was observed across locations.

**Figure 6: Monitoring Results for Periods 1-6 (East-North-East Transect)**



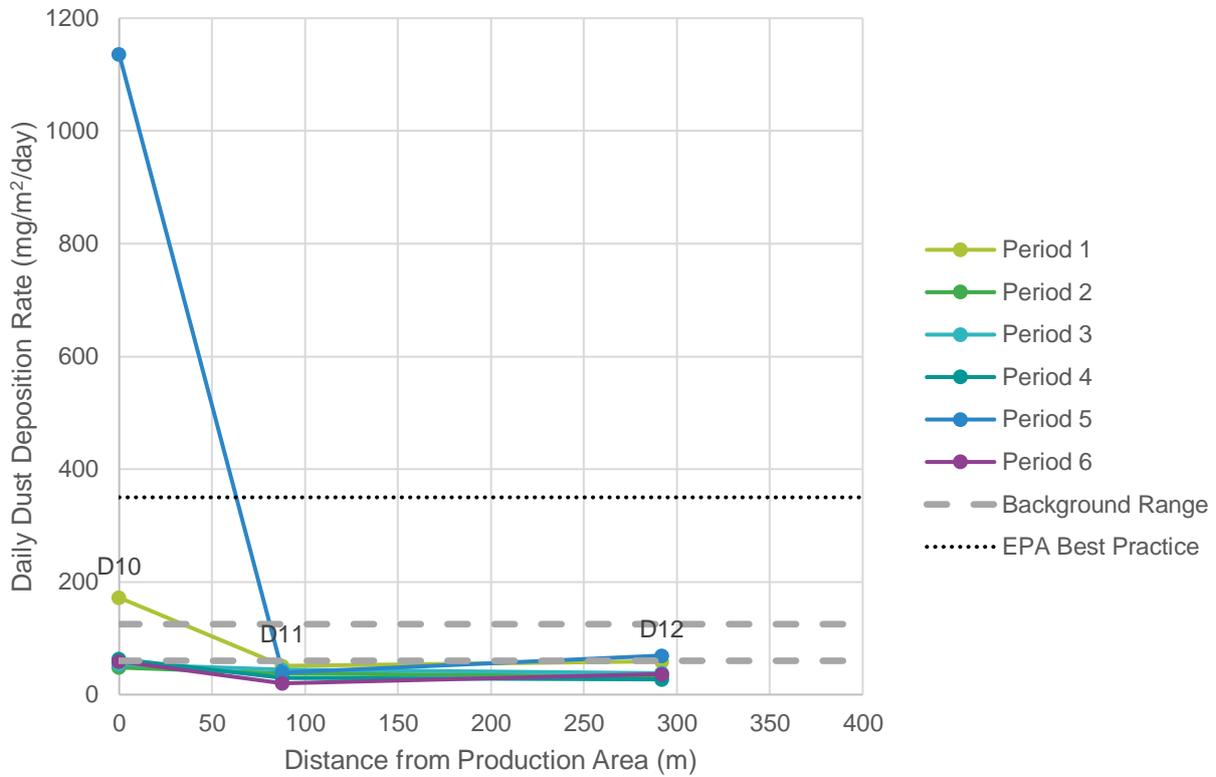
Source: Mott MacDonald, Odour Monitoring Ireland

Daily dust deposition rates measured along the East-North-East Transect ranged from 31 to 150mg/m<sup>2</sup>/day. The highest dust deposition, which was above the background range, was observed at D8 (18m from the production zone) during Period 1, while all other results were within the background range or lower. Dust deposition on this transect was also well below the EPA Best Practice value of 350 mg/m<sup>2</sup>/day at all sampled locations and periods.

Dust deposition was highest in Period 1, then decreasing in Period 2 and consistently low in Periods 3 to 6 at all locations.

A decrease in deposition rates with distance from the production zone was observed in all periods except Period 6 between locations D8 (18m) and D9 (92m), with rates at D9 within the background range in all periods.

**Figure 7: Monitoring Results for Periods 1-6 (South-East Transect)**



Source: Mott MacDonald, Odour Monitoring Ireland

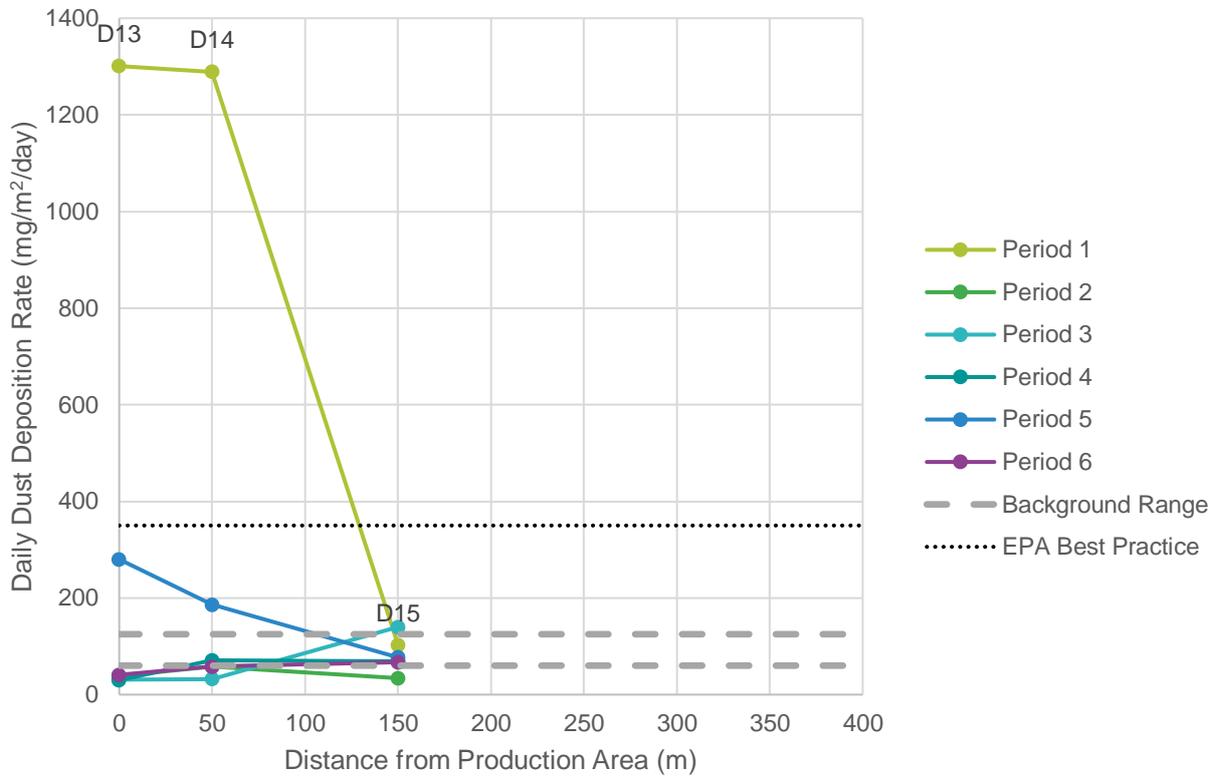
Daily dust deposition rates measured along the South-East Transect ranged from 20 to 1136mg/m<sup>2</sup>/day, with the highest result above both the background range and the EPA Best Practice value of 350 mg/m<sup>2</sup>/day, observed at D10 at edge of the production zone during Period 5.

An elevated value of 172 mg/m<sup>2</sup>/day was also observed at D10 during Period 1, above the background range but below the EPA Best Practice value.

All other dust deposition rates observed on this transect in all periods were within or below the background range.

A decrease in dust deposition with distance was observed between locations D10 and D11, which are located at the edge and at 88m from the production zone, in all periods.

**Figure 8: Monitoring Results for Periods 1-6 (South-West Transect)**



Source: Mott MacDonald, Odour Monitoring Ireland

Daily dust deposition rates measured along the South-West Transect ranged from 30 to 1301mg/m<sup>2</sup>/day, with the highest results, well above both the background range and the EPA Best Practice value of 350 mg/m<sup>2</sup>/day. The highest deposition rates were at locations D13 and D14 up to 133m from the production zone during Period 1. Elevated values (above the background range) were also observed at the same locations in Period 5.

All other dust deposition rates observed on this transect in all periods were within or just above the background range, and well below the EPA Best Practice value.

### 3 Conclusions

From the analysis of monitoring results and other information, it can be concluded that the activities undertaken at the Killaun bog do affect dust deposition rates. However, in general rates of deposition outside the production areas are low and in the range of the regional background and below the EPA Best Practice Level. The results show that whilst there are some elevated rates of deposition that have been monitored, these are due to localised events and the effects of which are not spatially large and are located within a few tens of metres of the production area. In addition, based in the data collected, some localised deposition events occurred outside of the harvesting period and indicate that high deposition events are not solely associated with production.

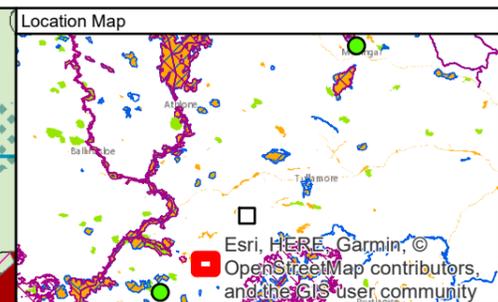
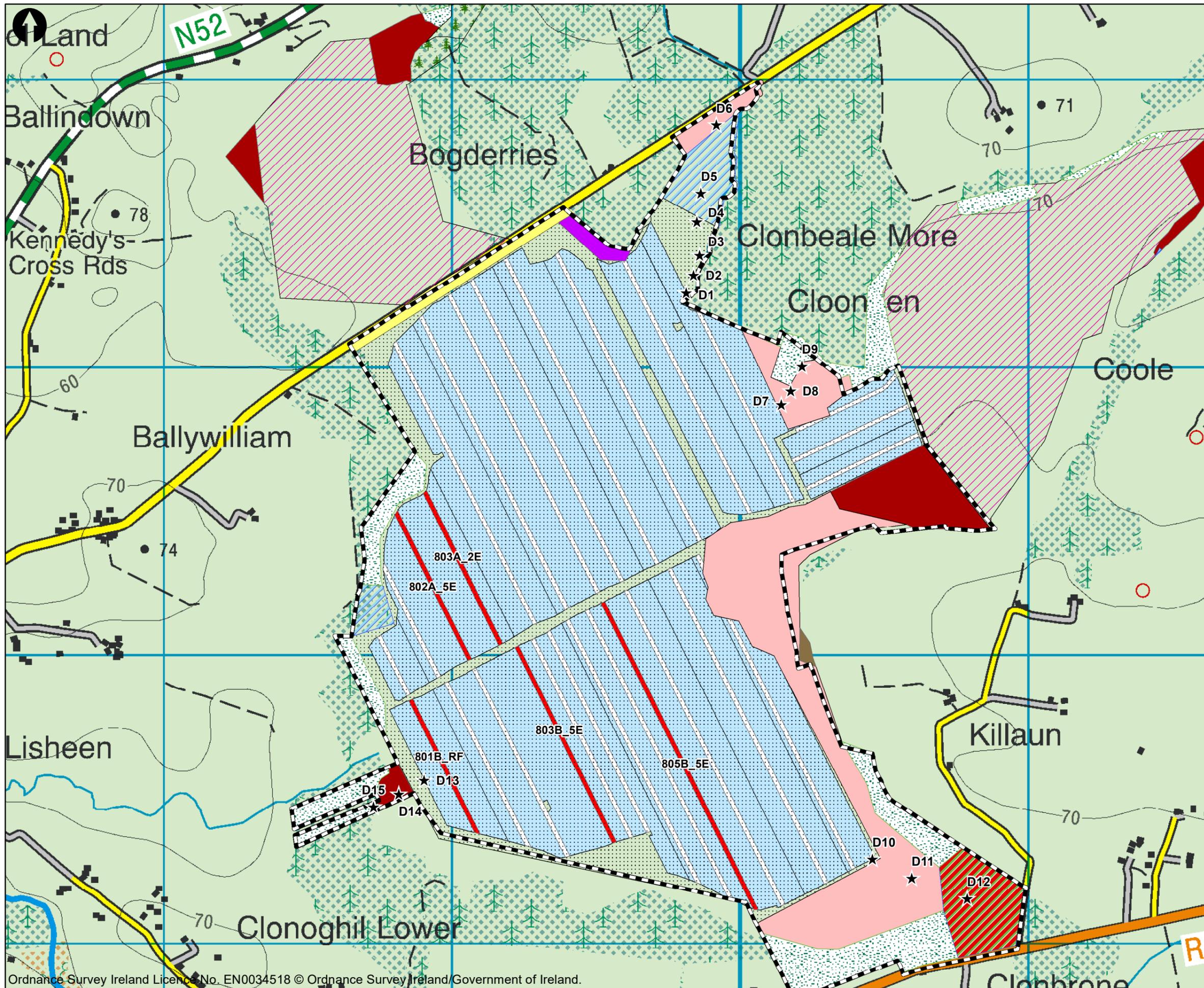
the above conclusions are based on the following key points:

- At the majority of monitoring locations dust deposition rates were below the EPA Best Practice value in all periods, and often in the same range or below the regional background monitoring site.
- Isolated periods of elevated dust deposition rates (above the EPA Best Practice value of 350 mg/m<sup>2</sup>/day) were observed at three locations (D10, D13 and D14). These were directly adjacent to peat production zones, or on unvegetated land as a result of Bord na Móna activities, and less than 100m from the production zone. These were observed both in Period 1 (when harvesting was active) and Period 5 (when no harvesting was taking place).
- The highest rates of dust deposition were observed in Period 1 in all transects, compared to dust deposition rates in Periods 2 to 6. This is likely to be due to larger dust emissions in Period 1, associated with larger quantities of peat harvested and production being carried out for more days within the period. Drier weather in Period 1 compared to other periods is also likely to have increased the dust deposition rate.
- Generally, the highest dust deposition rates were monitored at locations close to the production area. Dust deposition rates decreased to levels comparable to the regional background range at distances from the production zone between 90m and 150m.
- In the NNE transect in Period 1 there was no discernible difference associated with distance from the production zone and dust deposition. It is likely that in Period 1, with drier weather and high rates of production occurring also at other nearby bogs the overall rates of deposition in the area were higher. Dust deposition rates observed on this transect in Period 1 were still within the regional background range and well below the EPA Best Practice value of 350 mg/m<sup>2</sup>/day.

# Appendices

|    |                    |    |
|----|--------------------|----|
| A. | Map of Killaun bog | 13 |
| B. | Monitoring report  | 15 |

## A. Map of Killaun bog



Key to Symbols

|  |                             |
|--|-----------------------------|
|  | Conifer Plantation          |
|  | Cutaway                     |
|  | Cutover                     |
|  | Marginal                    |
|  | Peat Production             |
|  | Silt ponds                  |
|  | Works                       |
|  | Dust Monitoring Location    |
|  | Bord na Móna Land Ownership |
|  | Bord na Móna Land Use       |
|  | Access                      |
|  | Biodiversity Area           |
|  | Birch                       |
|  | Bog remnant                 |
|  | Production Zone             |
|  | Production Zone             |
|  | Peat Stockpile              |
|  | Covered or inactive         |
|  | Uncovered                   |

|     |          |       |                    |        |       |
|-----|----------|-------|--------------------|--------|-------|
| A   | 15/02/19 | PPB   | Killaun Stockpiles | CM     | DH    |
| Rev | Date     | Drawn | Description        | Ch'k'd | App'd |

**M M**  
**MOTT MACDONALD**

Mott MacDonald House  
 8-10 Sydenham Road  
 Croydon, CR0 2EE  
 United Kingdom  
 T +44 (0)20 8774 2000  
 F +44 (0)20 8681 5706  
 W mottmac.com

Client  
**BORD NA MÓNA** Bord na Móna  
 Leabeg  
 Tullamore  
 Co. Offaly  
 W bordnamona.ie  
 Naturally Driven

Title  
 Uncovered Stockpiles

|          |                |              |           |
|----------|----------------|--------------|-----------|
| Designed | PP Bertagnolio | AQ Check     | C Mills   |
| Drawn    | PP Bertagnolio | Coordination | D Hassett |
|          |                | Approved     | D Hassett |

|                |             |     |          |
|----------------|-------------|-----|----------|
| Scale at A3    | Status      | Rev | Security |
| 1:12,500       | ISSUED      | P1  | STD      |
| Drawing Number | Page 1 of 1 |     |          |

Ordnance Survey Ireland Licence No. EN0034518 © Ordnance Survey Ireland/Government of Ireland.

© Mott MacDonald Ltd.  
 This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.  
 We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

## B. Monitoring report



**ODOUR MONITORING IRELAND LTD**

Unit 32 De Granville Court, Dublin Rd, Trim, Co. Meath

Tel: +353 46 9437922

Mobile: +353 86 8550401

E-mail: [info@odoureland.com](mailto:info@odoureland.com)

[www.odoureland.com](http://www.odoureland.com)

**TOTAL DEPOSITIONAL DUST MONITORING AT KILLAUN BOG ON BEHALF OF BORD NA MONA,  
LEABEG, TULLAMORE, CO. OFFALY.**

**PREPARED BY ODOUR MONITORING IRELAND ON BEHALF OF MOTT MACDONALD, SOUTH BLOCK, ROCKFIELD, DUNDRUM, DUBLIN 16**

|                          |                           |
|--------------------------|---------------------------|
| <b>PREPARED BY:</b>      | Dr. Brian Sheridan        |
| <b>ATTENTION:</b>        | Ms. Donna Hassett         |
| <b>DATE:</b>             | 16 <sup>th</sup> Jan 2019 |
| <b>REPORT NUMBER:</b>    | 2018327(1)                |
| <b>DOCUMENT VERSION:</b> | Document Ver. 001         |
| <b>REVIEWERS:</b>        |                           |

## TABLE OF CONTENTS

| <b>Section</b>  | <b>Page number</b> |
|---|--------------------|
| <b>TABLE OF CONTENTS</b>                                      | <b>i</b>           |
| <b>DOCUMENT AMENDMENT RECORD</b>                              | <b>ii</b>          |
| <b>1. Introduction and scope</b>                              | <b>1</b>           |
| 1. Introduction   | 1                  |
| 1.2 Scope of the work   | 1                  |
| <b>2. Materials and methods</b>                               | <b>2</b>           |
| 2.1. Total dust deposition monitoring                         | 2                  |
| <b>3. Results and discussion</b>                              | <b>5</b>           |
| 3.1. Total dust deposition results                            | 5                  |
| <b>4. Concluding remarks</b>                                  | <b>7</b>           |
| <b>5. <i>Appendix I</i> – Pictures of monitoring stations</b> | <b>8</b>           |

## Document Amendment Record

Client: **Mott MacDonald.**

**Project:** TOTAL DEPOSITIONAL DUST MONITORING AT KILLAUN BOG ON BEHALF OF BORD NA MONA, LEABEG, TULLAMORE, CO. OFFALY.

|   |                            |                   |  |                   |             |
|---|----------------------------|-------------------|--|-------------------|-------------|
| <b>Project Number:</b> 2018327(1)   |                            |                   | <b>Document Reference:</b> TOTAL DEPOSITIONAL DUST MONITORING AT KILLAUN BOG ON BEHALF OF BORD NA MONA, LEABEG, TULLAMORE, CO. OFFALY. |                   |             |
| 2018327(1)  | Document for review        | JMC               | JMC  | B.A.S             | 16/01/2019  |
|   |                            |                   |  |                   |             |
| <b>Revision</b>   | <b>Purpose/Description</b> | <b>Originated</b> | <b>Checked</b>   | <b>Authorised</b> | <b>Date</b> |
|  |                            |                   |  |                   |             |

## **1. Introduction and scope**

### **1. Introduction**

Odour Monitoring Ireland Ltd were commissioned by Mott MacDonald to undertake an Total dust deposition monitoring survey at 16 locations in the vicinity of Killaun Bog, Co. Offaly over 6 individual sampling events.

Total depositional dust monitoring was performed using Bergerhoff gauges in accordance with *VDI 2119 guideline standard*.

Sixteen individual monitoring stations were established within the bog area. Fifteen of these locations were located in the vicinity of milling / processing operations while one location was located off site so as to represent ambient baseline conditions.

This report provides the materials and methods, results and discussions and conclusions of the monitoring survey.

### **1.2 Scope of the work**

The following scope of work was performed. This included:

1. Installation of Bergerhoff gauge monitoring stations at preselected monitoring locations as specified by the client.
2. Installation and removable of monitoring sample containers over 6 individual monitoring events.
3. Reporting of results obtained throughout the study.

## **2. Materials and methods**

This section describes the materials and methods used through the study.

### **2.1. Total dust deposition monitoring**

Total dust deposition was measured on the site using Bergerhoff gauges specified in the German Engineering Institute VDI 2119 entitled “Measurement of Dustfall Using the Bergerhoff Instrument (Standard Method).”

16 individual monitoring locations were installed at preselected locations as detailed in *Figure 2.1 and 2.2*. The purpose of these monitors is to assess the total depositional dust impact at each monitoring station.

Each monitoring stations (glass jar) sample container was installed and replaced each month and delivered to the INAB accredited laboratory for analysis (INAB 005T) in accordance with VDI2119 standard.

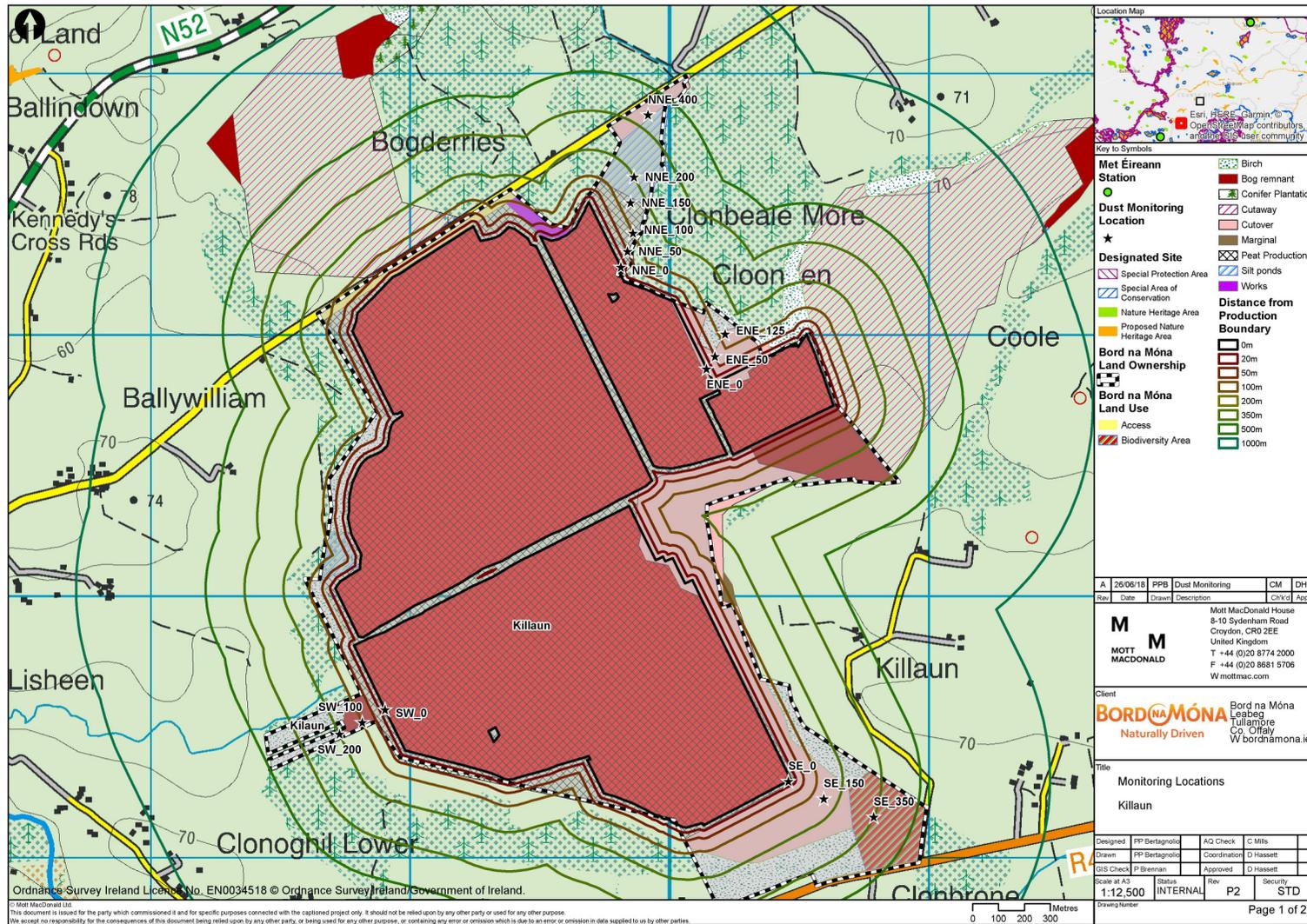


Figure 2.1. Graphical overview of 15 monitoring locations located in the vicinity of Killau Bob, Co. Offaly.

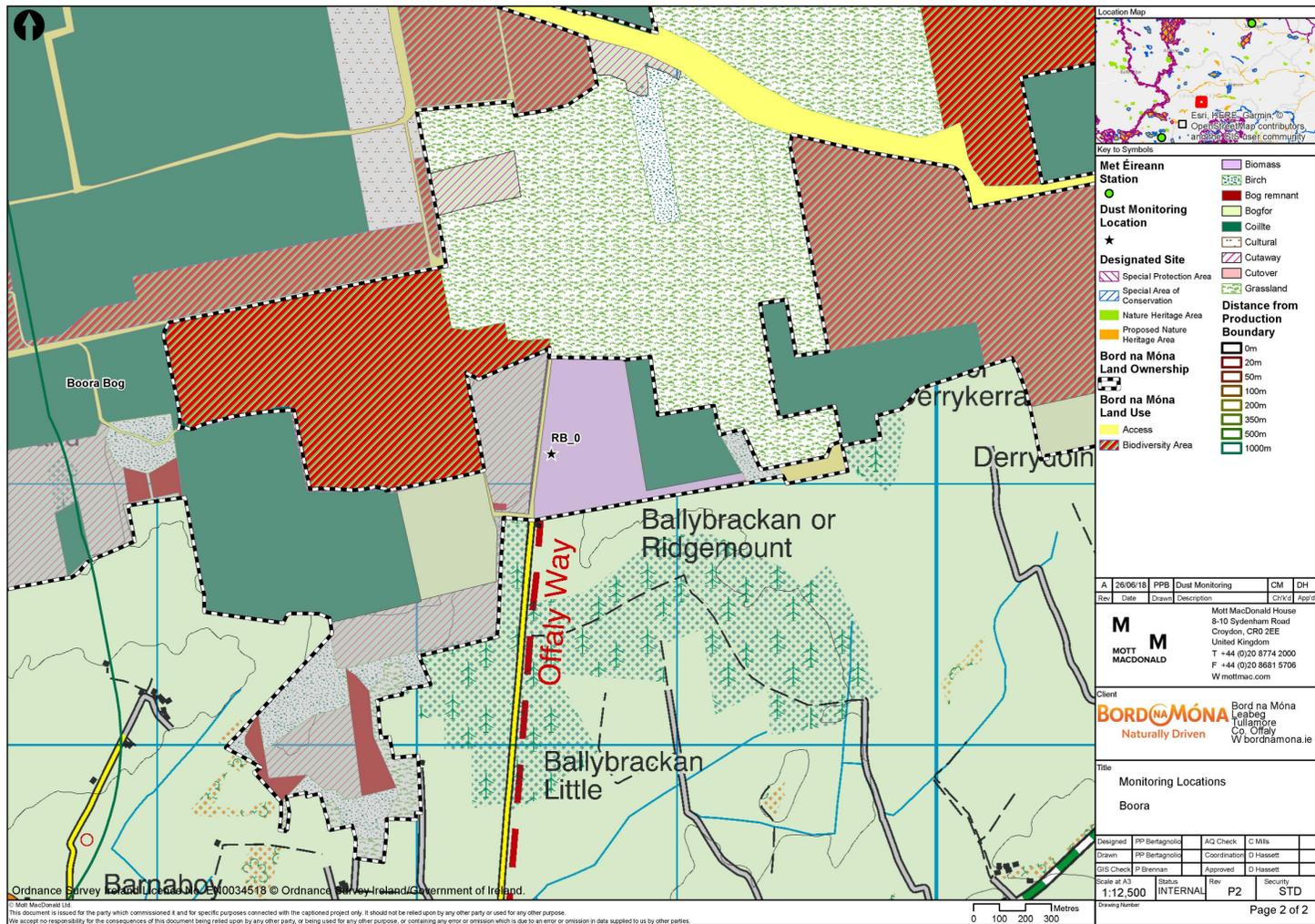


Figure 2.2. Graphical overview of 1 baseline monitoring locations located in the vicinity of Ballybrackan, Co. Offaly.

### 3. Results and discussion

This section describes the results obtained during the survey.

#### 3.1. Total dust deposition results

Currently in Ireland there are no statutory limits for dust deposition, however, EPA guidance suggest, "a soiling of  $10\text{mg}/\text{m}^2/\text{hour}$  is generally considered to pose a soiling nuisance" (TA Luft 2002). This equates to  $240\text{mg}/\text{m}^2/\text{day}$  of Total Depositional Dust. The EPA recommend a maximum level of  $350\text{mg}/\text{m}^2/\text{day}$  of dust deposition when measured according to TA Luft standard, which includes both soluble and insoluble matter (i.e. EPA compliance monitoring is based on the TA Luft Method).

*Table 3.1* presents the results gathered throughout the monitoring 6 monitoring events. Sample identity, Event date and measured deposition value are presented within the table at each monitoring location.

**Table 3.1.** Monitoring results for each monitoring location over the 6 individual sampling events.

| Monitoring location | Monitoring event 1 -<br>18/06/2018 to 16/07/2018<br>(mg/m <sup>2</sup> /day) | Monitoring event 2 -<br>16/07/2018 to 15/08/2018<br>(mg/m <sup>2</sup> /day) | Monitoring event 3 -<br>15/08/2018 to 14/09/2018<br>(mg/m <sup>2</sup> /day) | Monitoring event 4 -<br>14/09/2018 to 15/10/2018<br>(mg/m <sup>2</sup> /day) | Monitoring event 5 -<br>15/10/2018 to 14/11/2018<br>(mg/m <sup>2</sup> /day) | Monitoring event 6 -<br>14/11/2018 to 14/12/2018<br>(mg/m <sup>2</sup> /day) |
|---------------------|--|--|--|--|--|--|
| D1 - NNE 0m         | 60   | 40   | 52   | 67   | 45   | 61   |
| D2 - NNE 50m        | 73   | 26   | 36   | 38   | 55   | 49   |
| D3 - NNE 100m       | 53   | 31   | 27   | 56   | 44   | 47   |
| D4 - NNE 150m       | 86   | 36   | 50   | 40   | 57   | 28   |
| D5 - NNE 200m       | 71   | 37   | 28   | 41   | 35   | 68   |
| D6 - NNE 400m       | 79   | 45   | 51   | 103  | 86   | 16   |
| D7 - ENE 0m         | 114  | 38   | 35   | 41   | 61   | 62   |
| D8 - ENE 50m        | 150  | 80   | 58   | 49   | 43   | 42   |
| D9 - ENE 125m       | 87   | 46   | 48   | 31   | 37   | 51   |
| D10 - SE 0m         | 172  | 48   | 54   | 63   | 1136   | 59   |
| D11 - SE 150m       | 51   | 38   | 44   | 30   | 39   | 20   |
| D12 - SE 350m       | 59   | 32   | 38   | 27   | 69   | 36   |
| D13 - SW 0m         | 1301   | 38   | 31   | 30   | 280  | 41   |
| D14 - SW 100m       | 1289   | 58   | 32   | 71   | 186  | 58   |
| D15 - SW 200m       | 103  | 34   | 140  | 69   | 77   | 67   |
| D16 - RB0           | 60   | 125  | 87   | 104  | 77   | 66   |

#### **4. Concluding remarks**

The following concluding remarks were formed during the study and include:

1. Total dust deposition was measured at 16 individual monitoring locations over 6 monitoring events using Bergerhoff gauges specified in the German Engineering Institute VDI 2119 entitled "Measurement of Dustfall Using the Bergerhoff Instrument (Standard Method)."
2. Total depositional dust analysis was performed in accordance with VDI2119 in an INAB accredited laboratory –INAB 005T.
3. Valid data was collected at each monitoring station over each of the sampling events thereby providing 96 individual data points.
4. All results are presented in Table 3.1 of this document for each monitoring station during each sampling event.

5. **Appendix I – Pictures of monitoring stations**



**Figure 5.1.** Monitoring location 1 – NNE 0 m



**Figure 5.2.** Monitoring location 2 – NNE 50 m



**Figure 5.3.** Monitoring location 3 – NNE 100 m



**Figure 5.4.** Monitoring location 4 – NNE 150 m



**Figure 5.5.** Monitoring location 5 – NNE 200 m



**Figure 5.6.** Monitoring location 6 – NNE 400 m



**Figure 5.7.** Monitoring location 7 – ENE 0 m



**Figure 5.8.** Monitoring location 8 – ENE 50 m



**Figure 5.9.** Monitoring location 9 – ENE 125 m



**Figure 5.10.** Monitoring location 10 – SE 0 m



**Figure 5.11.** Monitoring location 11 – SE 150 m



**Figure 5.12.** Monitoring location 12 – SE 350 m



**Figure 5.13.** Monitoring location 13 – SW 0 m



**Figure 5.14.** Monitoring location 14 – SW 100 m



Figure 5.15. Monitoring location 15 – SW 200 m



**Figure 5.16.** Monitoring location 16 – RBO

