



Dust and Air Quality Innovation and Expertise

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**Quarterly non-technical summary: Mountsorrel Quarry particulate matter, dust and weather monitoring**

**Date range:** Quarter 2 2024 (23 February – 31 May 2024)

**Date Report Issued:** 22 July 2024

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## **Introduction**

Every month, the results of dust and particulate matter monitoring at Mountsorrel Quarry are compiled and summarised in 'compliance' reports, which are then shared with Charnwood Borough Council (CBC), Leicestershire County Council (LCC) and the Environment Agency. The monitoring results are discussed in more detail during Technical Liaison meetings held with CBC and LCC on a quarterly basis.

Once the quarterly liaison meetings are held, we prepare a cover letter to provide a non-technical overview of the most recent three months of finalised reports. This letter covers the period from 23 February – 31 May 2024.

An explanation of how and why dust and air quality are measured at Mountsorrel Quarry is available [here](#).

## **Changes to reporting**

Following consultation with CBC and LCC, the format and focus of the compliance reports have been revised. In addition to presenting PM<sub>10</sub> and PM<sub>2.5</sub> data from both on-site monitors, an increased emphasis is being placed on the frequency of short-term PM<sub>10</sub> alerts sent to quarry management, the investigations triggered by the alerts and the changes to on-site processes to minimise dust.

The general air quality of the surrounding area is now assessed by comparing the particulate matter concentrations recorded by CBC at the southern end of Hawcliffe Road against the relevant Air Quality Objectives (AQOs). Data from a Defra Automatic Urban and Rural Network (AURN) monitoring station at Leicester University are also presented for reference.

## **Weather summary**

March was generally quite cool and wet, with very few dry days. Temperatures rose gradually through early April, however from mid-April onwards, cooler weather returned. During April there were a number of dry periods. From early May onwards, temperatures became much milder, and there were numerous extended dry periods throughout the month.

During March and April, winds were predominantly blowing from the south and southwest, meaning that there may have been the potential for dust to escape in a northerly or northeasterly direction. During May however, winds were more variable, coming from the south, north and east in roughly equal proportions.

## Deposited dust

During this period, deposited dust levels were below the site-specific threshold level at all locations. This is likely due to ongoing improvements to on-site dust management, the commissioning of the new screen house, and the generally wet weather experienced through much of March and April.

The frequency of threshold level exceedances over the previous three months is shown for each monitoring location in Figure 1 using pie charts.



Figure 1: Frequency of high dust levels, Quarter 2 2024



## Particulate Matter

### On-site PM<sub>2.5</sub>

PM<sub>2.5</sub> concentrations were broadly similar at Hawcliffe Road and Quorn House, with the period averages being 4.4 µg/m<sup>3</sup> and 3.3 µg/m<sup>3</sup> respectively (Figure 2).



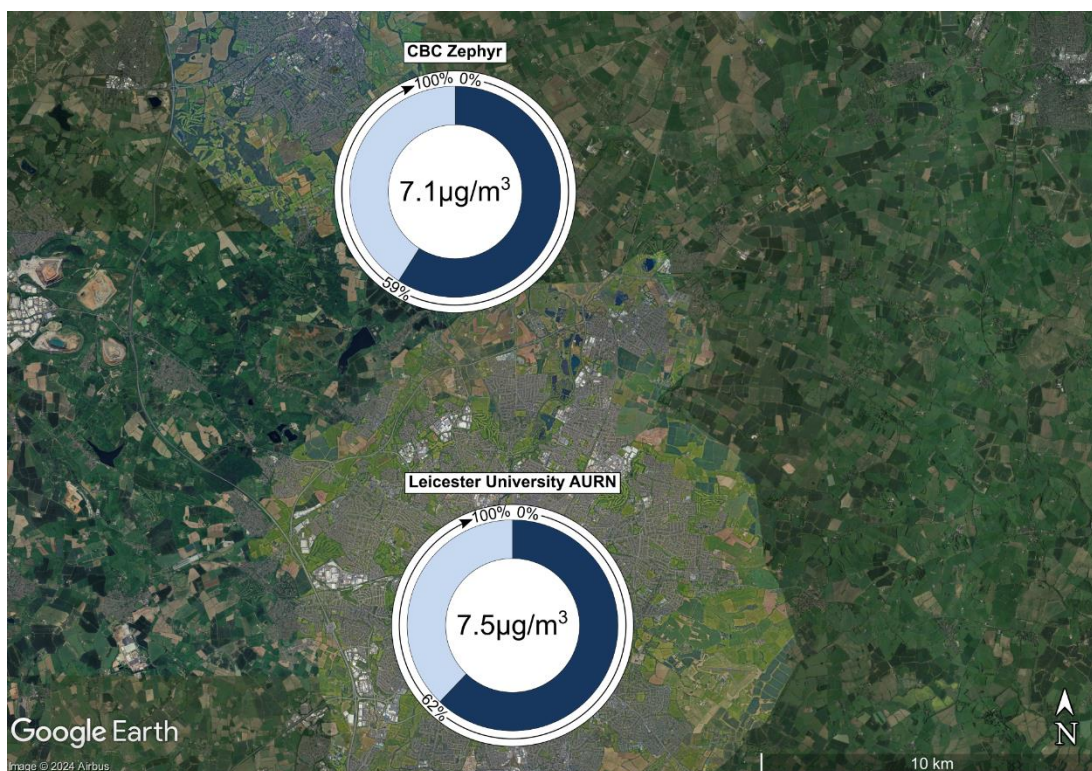
**Figure 2: PM<sub>2.5</sub> monitoring summary, Quarter 2 2024**

### Off-site PM<sub>2.5</sub>

As shown in Figure 3, the period average PM<sub>2.5</sub> concentrations recorded at the CBC monitoring station at the southern end of Hawcliffe Road was 7.1 µg/m<sup>3</sup> or 59 % of the AQO (12 µg/m<sup>3</sup> as an annual average). The period average concentration at the Leicester University AURN monitoring station was slightly higher, at 7.5 µg/m<sup>3</sup> or 62 % of the AQO.

The broad similarity of period average PM<sub>2.5</sub> concentrations recorded at all four locations show that the site was not a significant source of PM<sub>2.5</sub> during this period.





**Figure 3: PM<sub>2.5</sub> monitoring summary, CBC and AURN monitoring stations, Quarter 2 2024**

#### **On-site PM<sub>10</sub>**

PM<sub>10</sub> concentrations recorded at both on-site locations were very similar for this quarter, with period averages being 4.2 µg/m<sup>3</sup> at Hawcliffe Road and 5.2 µg/m<sup>3</sup> at Quorn House.

The short-term PM<sub>10</sub> trigger level (125 µg/m<sup>3</sup> over a 15-minute period) was not exceeded at either location, therefore no alerts were sent out during this quarter.



**Figure 4: PM<sub>10</sub> monitoring summary, Quarter 2 2024**

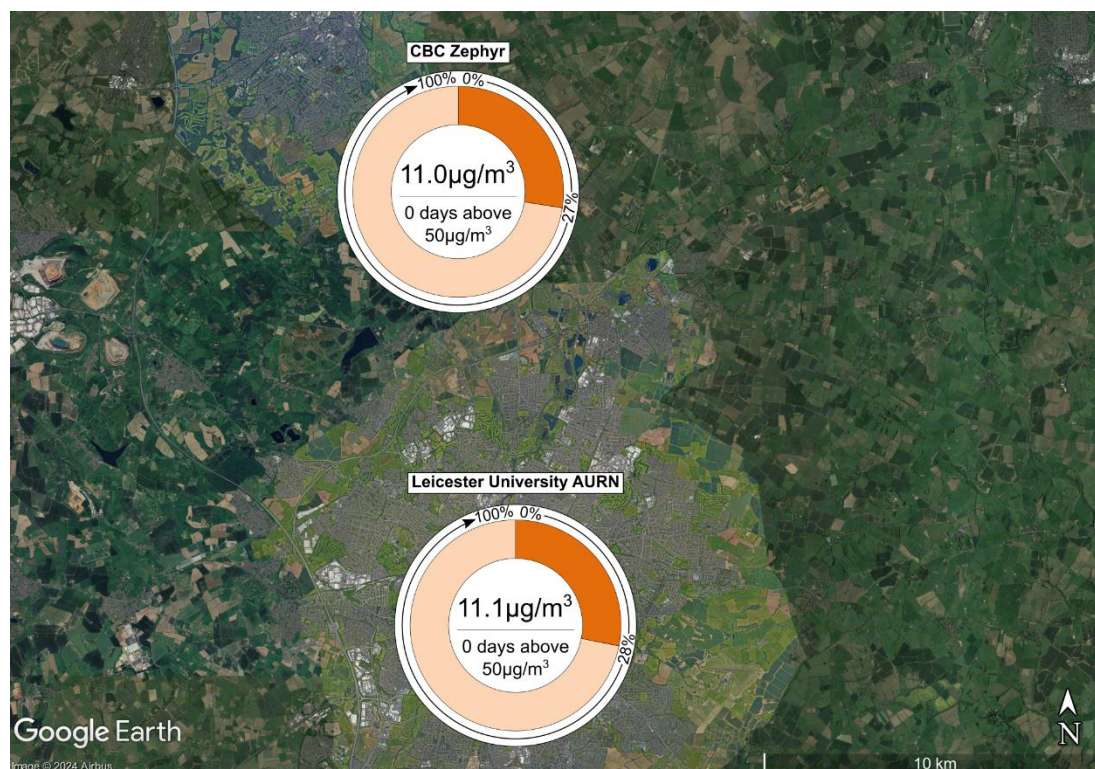


### **Off-site PM<sub>10</sub>**

As shown in Figure 5, PM<sub>10</sub> concentrations recorded at the CBC monitoring station at the southern end of Hawcliffe Road was 11.0 µg/m<sup>3</sup> or 27 % of the AQO (40 µg/m<sup>3</sup>). Concentrations at the Leicester University AURN monitoring station was virtually identical, at 11.1 µg/m<sup>3</sup> or 28 % of the AQO.

No days with an average PM<sub>10</sub> concentration above 50 µg/m<sup>3</sup> were recorded during this quarter.

As with PM<sub>2.5</sub>, the data show that Mountsorrel Quarry was not a significant source of PM<sub>10</sub> during this period.



**Figure 5: PM<sub>10</sub> monitoring summary, CBC and AURN monitoring stations**

### **Complaints**

During the second quarter of 2024 the quarry received no complaints relating to dust or air quality.

**DustScanAQ**  
**July 2024**



# Dust, Particulate Matter and Weather Monitoring Report: March 2024

Mountsorrel Quarry

June, 2024

Tarmac





# Document Control Sheet

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Tarmac	Sarah Boustead	05/06/2024	1

## Disclaimer

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This report may include data obtained from trusted third-party consultants/laboratories that have been supplied to us in good faith. Whilst we do everything we can to ensure the quality of all the data we use, we cannot be held responsible for the accuracy or integrity of third-party data.

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# 1 Introduction

Mountsorrel Quarry has a comprehensive Dust Management and Monitoring Plan (DMMP). The DMMP was developed in 2011 and is subject to regular review and revision, in consultation between Tarmac and the local regulators (Leicestershire County Council (LCC) and Charnwood Borough Council (CBC)).

The DMMP is enacted through the quarry Site Improvement Plan (SIP). The SIP sets out a programme of actions to reduce the environmental impact of specific areas of the site operation, and is updated regularly by quarry management, with support from DustScanAQ through regular site visits and quarterly reviews with LCC and CBC.

Section 7.5 of the DMMP requires that a monthly summary and review of dust and particulate matter monitoring is prepared and circulated with LCC, CBC and the Environment Agency.

This report details the results of dust, particulate matter and weather monitoring around Mountsorrel Quarry during the period 23 February – 27 March 2024.

## 1.1 Report scope

The intention of this report is to summarise dust and particulate matter monitoring results for the given period and compare them against site-specific alert limits and thresholds. This report also details the results of any investigation carried out into elevated dust or particulate matter levels, as prompted by an exceedance of alert limits or thresholds.

## 1.2 Dust definitions

‘Dust’ is generally regarded as particulate matter up to 75 µm (micron) diameter and can be considered in two categories. Fine dust, essentially particles up to 10 µm, is commonly referred to as PM<sub>10</sub> and is measured to agreed standards and forms part of the national Air Quality Objectives (AQO). The AQO for PM<sub>10</sub> is currently 50 µg/m<sup>3</sup> for the 24-hour mean, not to be exceeded 35 times per year and 40 µg/m<sup>3</sup> for the annual mean. Particles up to 2.5 µm in diameter are referred to as PM<sub>2.5</sub>. The interim AQO for PM<sub>2.5</sub> is 12 µg/m<sup>3</sup> for the annual mean (to be achieved by 2028), whilst the legal AQO for PM<sub>2.5</sub> is 10 µg/m<sup>3</sup> for the annual mean (to be achieved by 2040) as per The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023<sup>1</sup>.

It may be noted that the above Regulations relate to average particle concentrations in Local Authority districts thus do not apply to any specific industrial or other operation, such as Mountsorrel Quarry, and are included for reference.

Coarser dust (essentially particles greater than 10 µm) is generally regarded as ‘nuisance dust’ and can be associated with annoyance, although there are no official standards (such as AQO) for dust annoyance.

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<sup>1</sup> Statutory Instrument. (2023), ‘The Environmental Targets (Fine Particulate Matter) (England) Regulations’, No. 96. King’s Printer of Acts of Parliament



## 2 Sampler locations

As shown in Figure 2.1 and Table 2.1, dust, particulate matter and weather conditions are measured at a number of locations around site and the surrounding area:

- Directional and depositional dust: currently monitored at 13 locations;
- Particulate matter: currently monitored at two locations;
- Weather conditions: currently monitored at one location.

The majority of the dust samplers around Mountsorrel Quarry comprise the ‘Frisbee-type’ deposition gauge combined with an adhesive ‘sticky pad’ directional gauge. These samplers are used to monitoring ‘nuisance’ dust and samples from these instruments are collected on a monthly basis.

For particulate matter, Turnkey Osiris samplers are located at Stn 9 (Hawcliffe Road) and at Stn 13 (Quorn House). These recognised and certificated ‘indicative’ real-time devices are connected to their own wind vane and anemometer and provide near-instantaneous directional PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub> data directly to the quarry management team.

A weather station is located at the site offices off Wood Lane and collects a range of weather parameters over fifteen minute intervals. Data from the weather station are available to the quarry management by means of a dedicated modem connection to the internet.

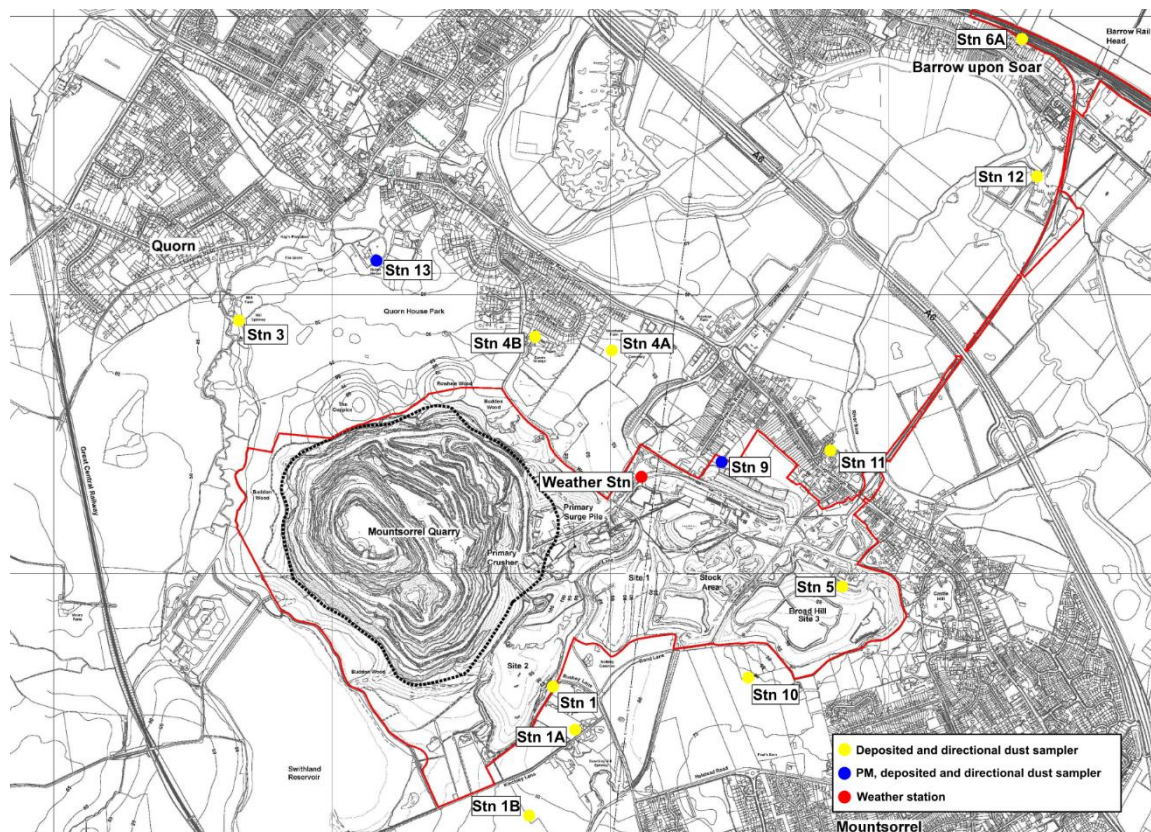


Figure 2.1: Particulate matter, dust and weather monitoring locations, Mountsorrel Quarry

**Table 2.1: Weather, particulate matter and dust monitoring locations, Mountsorrel Quarry**

Sampler reference	Easting	Northing	Locality monitored
Stn 1	456781	314577	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1A	456891	314436	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1B	456715	314109	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 3	455681	315847	Mill Farm; Quorn House
Stn 4A	457000	315805	Woodside Farm; Leicester Road
Stn 4B	456733	315778	Quorn Grange, Unitt Road, Northage Close, Quorn Park
Stn 5	457789	314941	Bond Lane; Crown Lane
Stn 6A	458660	316786	Sileby Road; Huston Close; Sileby Road (commercial)
Stn 9 (inc. PM)	457374	315398	Hawcliffe Road
Stn 10	457487	314626	Glebe Close; Halstead Road (south); Halstead Road (north)
Stn 11	457791	315458	Loughborough Road; River Soar (marina / caravan park)
Stn 12	458575	315459	Meadow Farm Marina and Caravan Park
Stn 13 (inc PM)	456158	316090	Northage Close, Meeting Street
Weather Station	457126	315376	Wood Lane Site Offices

Charnwood Borough Council (CBC) is responsible for the monitoring of air quality within the borough and prepares Air Quality Annual Status Reports (ASRs) for submission to Defra. It operates a Zephyr air quality monitor which is located within the Leicestershire County Council (LCC) depot at the southern end of Hawcliffe Road, in close proximity to the Osiris device at Stn 9. This device measures a number of pollutants including PM<sub>10</sub> and PM<sub>2.5</sub>, allowing CBC to compare concentrations against the relevant AQOs for these pollutants.

For additional context, the latest PM<sub>10</sub> and PM<sub>2.5</sub> monitoring data from CBC are summarised in Appendix A and Appendix B.

## 2.1 Alert thresholds and response procedures

To help the site reduce its impact on the surrounding area, a number of alert thresholds have been calculated, as outlined in Table 2.2.

**Table 2.2: Alert thresholds**

Pollutant	Threshold	Averaging period	Applies to
PM <sub>10</sub>	125 µg/m <sup>3</sup>	15 minutes	Stn 9 (Hawcliffe Road), Stn 13 (Quorn House)
Deposited dust	125 mg/m <sup>2</sup> /day	1 month	All deposited dust monitoring locations

For particulate matter (PM<sub>10</sub>) an alert threshold of 125 µg/m<sup>3</sup> for the 15-minute average has been in use for several years.

Many years of monitoring and research have shown that the quarry is not a significant source of fine particulate matter (PM<sub>2.5</sub>) hence no alert threshold for this size fraction is required.

PM<sub>10</sub> and PM<sub>2.5</sub> concentrations recorded by CBC at the southern end of Hawcliffe Road and by Defra through the Automatic Urban and Rural Network (AURN) at Leicester University are presented in Appendix A and Appendix B respectively. Data from both locations have been compared against relevant Air Quality Objectives (AQOs) for PM<sub>10</sub> and PM<sub>2.5</sub>.

For deposited dust, the DMMP sets out a site-wide deposited dust threshold of 125 mg/m<sup>2</sup>/day 'undissolved solids' as a trigger limit for investigation to identify the potential dust source/s, taking account of the directional data.



### 3 Results

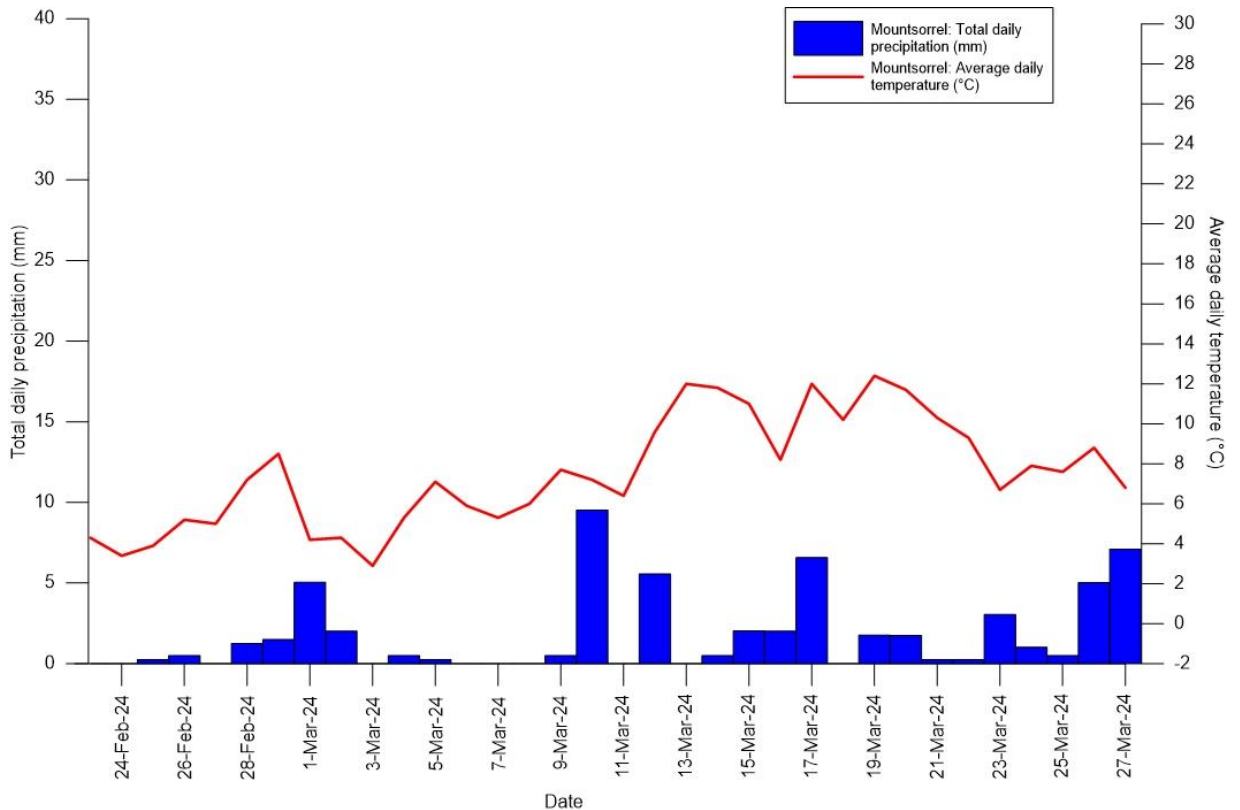
#### 3.1 Weather monitoring

Weather conditions can have a significant effect on the potential for dust propagation from a minerals site. Of particular importance are wind speed, wind direction, and precipitation. Dust can be carried from a source towards receptors (such as nearby homes and other businesses) according to the strength and direction of wind. Precipitation is recognised to suppress dust and 0.2 mm antecedent rainfall is considered sufficient to suppress windblown dust for a number of hours.

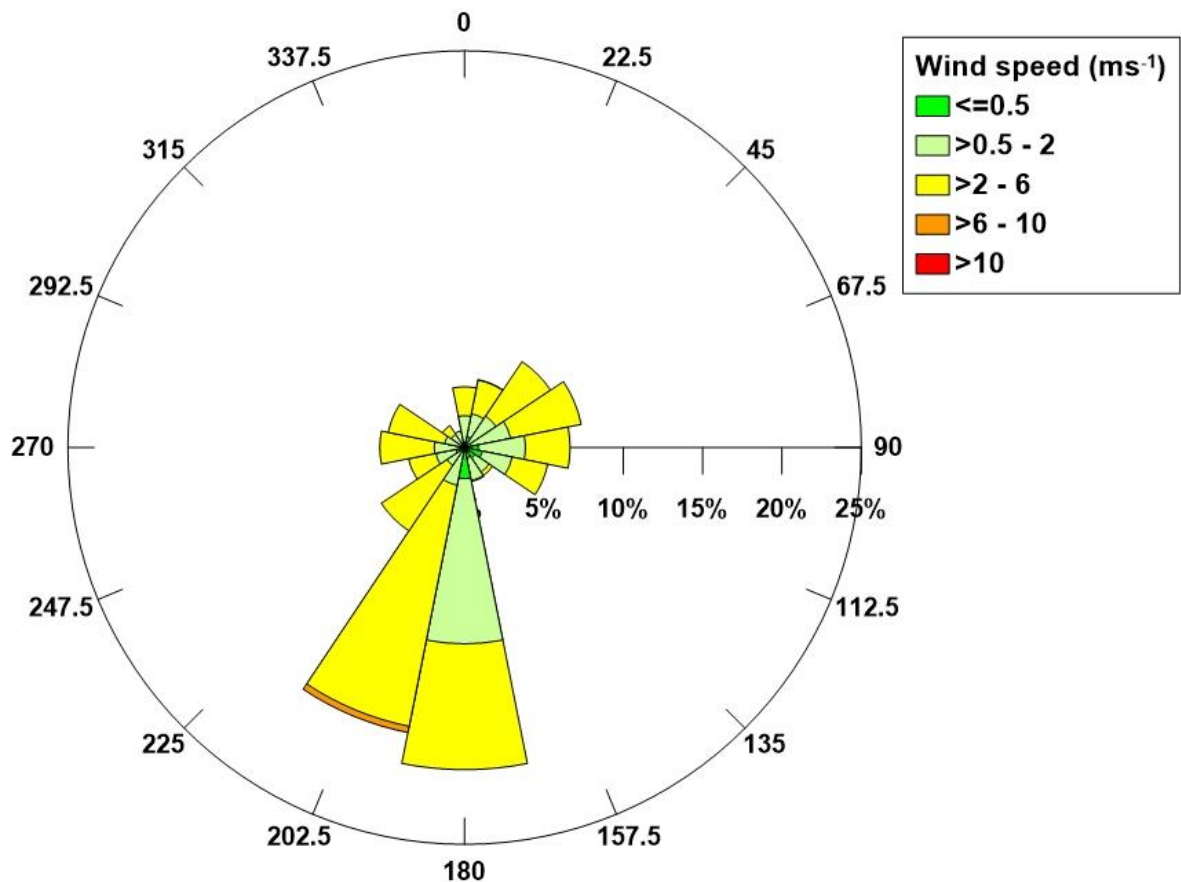
The key weather data which might affect dust propagation (wind speed, wind direction, total daily precipitation and average daily temperature) for this reporting period are summarised in Figure 3.1 and Figure 3.2.

The monitoring period was characterised by generally cool temperatures. The maximum daily average temperature was 12.4 °C recorded 19 March and the minimum daily temperature was 2.9 °C recorded on 03 March.

The monitoring period was generally wet with precipitation recorded on 76% of total days and there was not a dry period of more than three days.



**Figure 3.1: Total daily precipitation and average daily temperature, Mountsorrel Quarry, 23 February – 27 March 2024**



**Figure 3.2: Wind rose, Mountsorrel Quarry, Mountsorrel, 23 February – 27 March 2024**

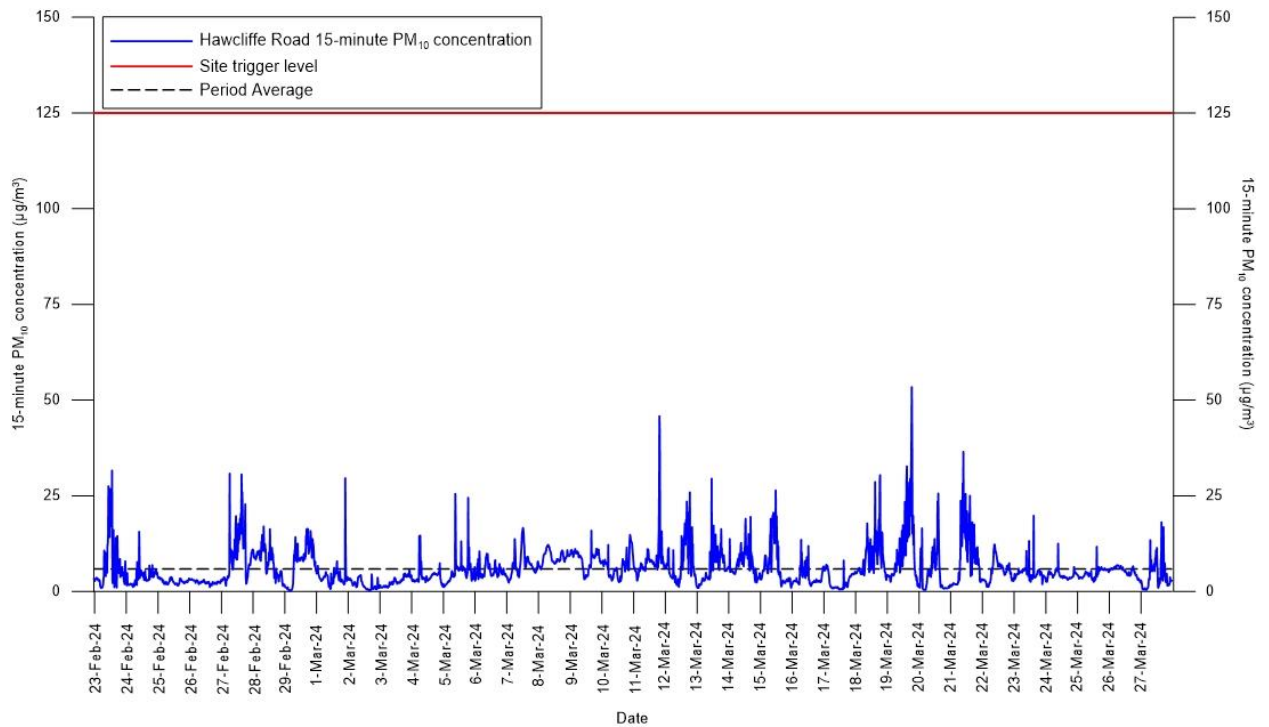
As seen in Figure 3.2, winds for this monitoring period were predominantly moderate in speed ( $>2 - 6$  m/s) and from the south and south-southwest. Consequently, there may have been potential for dust propagation predominantly to the north and north-northeast throughout the monitoring period.

## 3.2 Particulate matter

### 3.2.1 $PM_{10}$

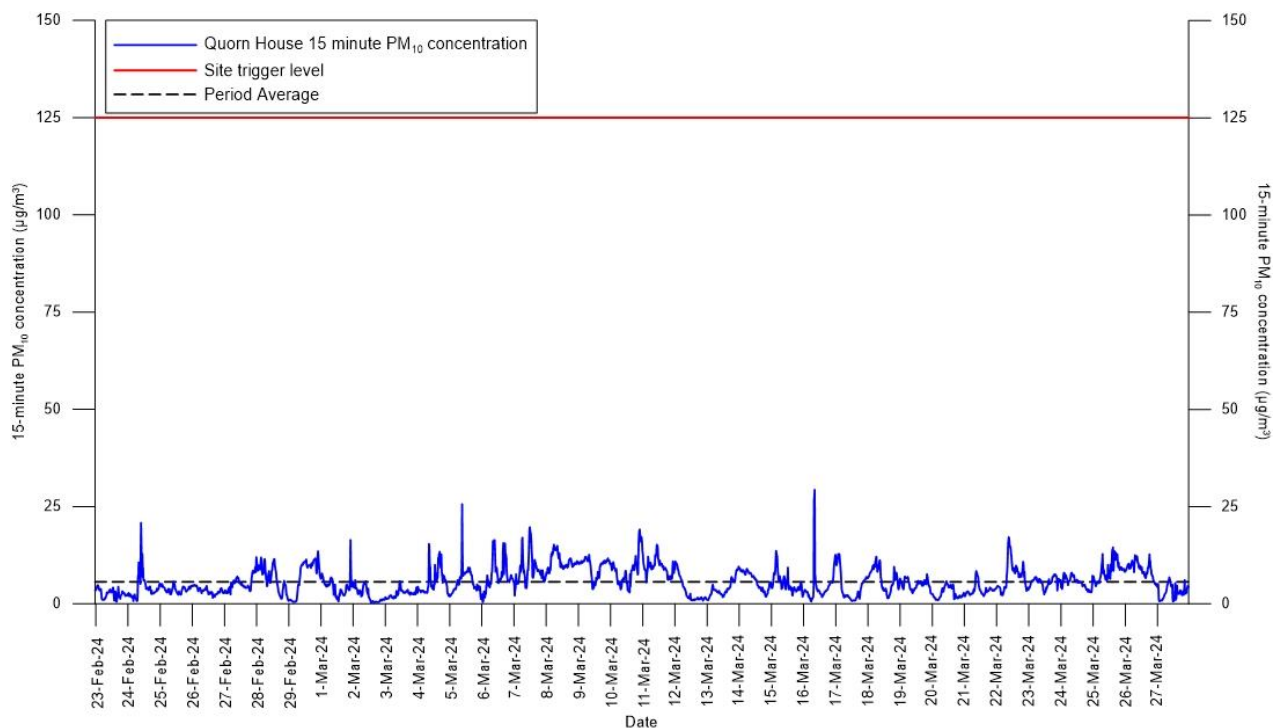
The available 15-minute data from the period of review are presented for both monitoring locations in Figure 3.3 and Figure 3.4. The red line denotes the site trigger level ( $125 \mu\text{g}/\text{m}^3$  over the 15-minute average), whilst the dashed black line denotes the average concentration recorded over this period.

Additional  $PM_{10}$  monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix A.



**Figure 3.3: 15-minute mean PM<sub>10</sub> concentration, Hawcliffe Road, 23 February – 27 March 2024**

Figure 3.3 indicates that there were no exceedances of the site trigger level at Hawcliffe Road during this period, whilst the overall average concentration for this period was 5.9 µg/m<sup>3</sup>.



**Figure 3.4: 15-minute mean PM<sub>10</sub> concentration, Quorn House, 23 February – 27 March 2024**

At Quorn House there were no exceedances of the PM<sub>10</sub> site trigger level, and the overall average concentration for this period was 5.6 µg/m<sup>3</sup>. The general similarity between PM<sub>10</sub>

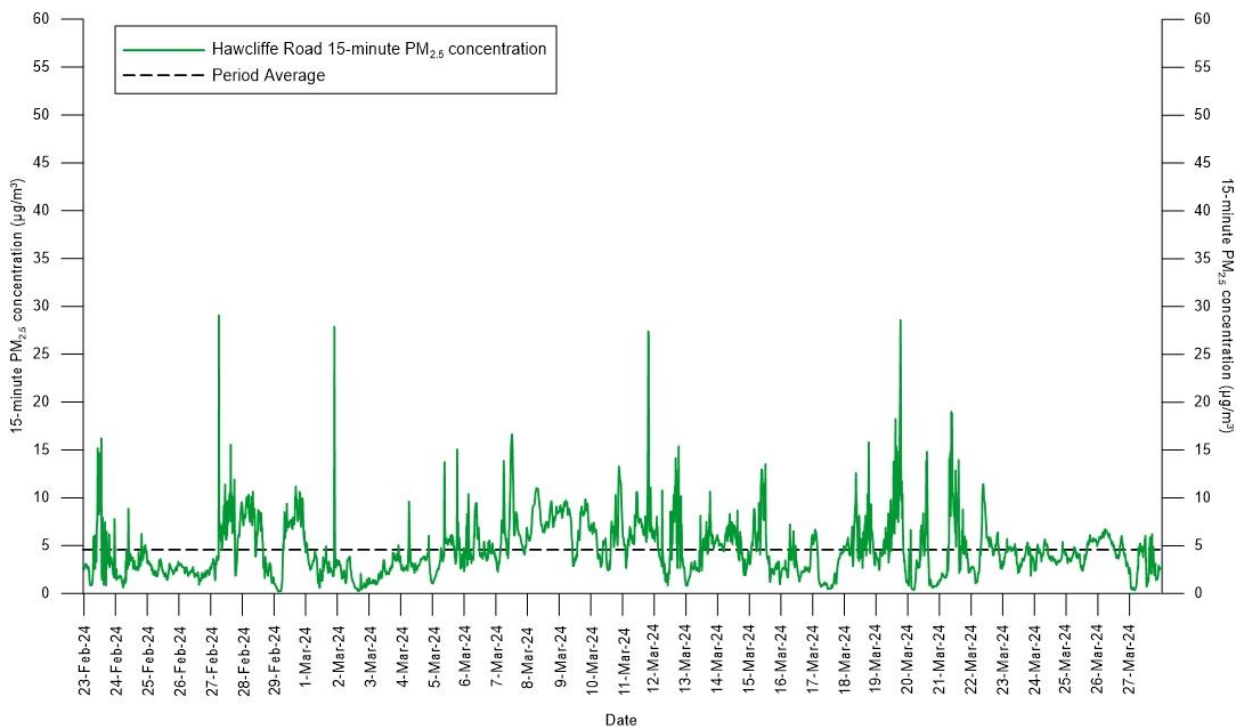


concentrations recorded at both locations suggests that the site was not a significant source of PM<sub>10</sub> at these locations during this period. This is further demonstrated by the off-site PM<sub>10</sub> monitoring results presented in Appendix A.

### 3.2.2 PM<sub>2.5</sub>

The results of PM<sub>2.5</sub> monitoring at Hawcliffe Road and Quorn House are presented in Figure 3.5 and Figure 3.6. The dashed black line denotes the average concentration recorded over this period.

Additional PM<sub>2.5</sub> monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix B.



**Figure 3.5: 15-minute mean PM<sub>2.5</sub> concentration, Hawcliffe Road, 23 February – 27 March 2024**

At Hawcliffe Road, the overall average concentration for this period was 4.6 µg/m<sup>3</sup> whilst at Quorn House, the overall average was 5.1 µg/m<sup>3</sup>. As with the PM<sub>10</sub> concentrations, it is most likely that a local rather than a regional PM<sub>2.5</sub> signal was recorded during this period. This is supported by the CBC and AURN data presented in Appendix B. For this period, 78 % of PM<sub>10</sub> recorded at Hawcliffe Road was formed of PM<sub>2.5</sub>, whilst it made up 91% of PM<sub>10</sub> at Quorn House. This strongly indicates that a regional rather than a local particulate matter signal was recorded during this period.

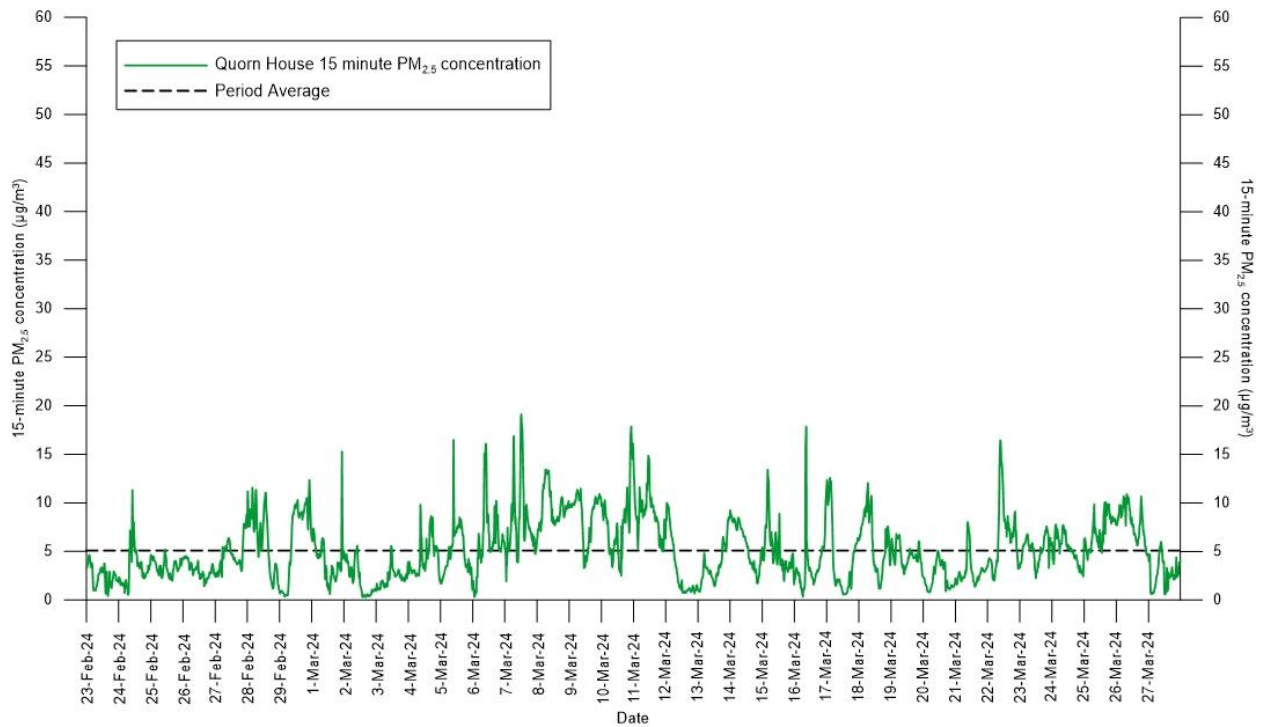


Figure 3.6: 15-minute mean PM<sub>2.5</sub> concentration, Quorn House, 23 February – 27 March 2024

### 3.3 Visible dust

#### 3.3.1 Deposited dust monitoring summary

The deposited dust data for 23 February – 27 March 2024 are summarised in Table 3.1. As outlined earlier, point-specific thresholds have been calculated for investigation to identify the potential dust source/s, taking account of the directional data.

Table 3.1 shows that, for the available data, deposited dust levels during 23 February – 27 March 2024 were all within the site-specific threshold for all stations, although dust levels were approaching the trigger level at Stn 9.

**Table 3.1: Summary of deposited dust (undissolved solids), 23 February – 27 March 2024**

Undissolved solids (mg/m <sup>2</sup> /day)				
This month report start date:		23-Feb-24		
This month report end date:		27-Mar-24		
Receptor location	Nearest / appropriate dust monitoring point	Reported value	Trigger: ≥ 125 <sup>a</sup>	Magnitude <sup>b</sup>
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	17	No	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	11	No	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	8	No	Very Low
Mill Farm; Quorn House	Stn 3	23	No	Very Low
Woodside Farm, Leicester Road	Stn 4A	24	No	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	65	No	Low
Bond Lane; Crown Lane	Stn 5	12	No	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	34	No	Very Low
Hawcliffe Road	Stn 9	114	No	Slightly Elevated
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	14	No	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	27	No	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	30	No	Very Low
Quorn House Park	Stn 13	11	No	Very Low

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

<sup>b</sup> Magnitude of mass deposition rate assessed against typical rate for semi-rural areas (30 - 80 mg/m<sup>2</sup>/day)



Regarding dust deposition over time, the rates across the sampling area have varied considerably. Trends in dust deposition rates (as undissolved solids) for the previous 12 months, together with the site-wide dust threshold are illustrated in Figure 3.7.

In general, as would be expected, dust deposition rates are typically lower in winter months than in summer months. This trend is clearly seen for most monitoring points in Figure 3.7, with some exceptions. Dust deposition rates have been consistently below the ‘trigger limit’ at all sampling locations except Stn 1B and 9, although the exceedances at Stn 1B are known to be related to nearby agricultural activities, rather than on-site processes. There appears to be a general increase in deposited dust levels at Stn 9 which shall be investigated.

In general, as shown in Figure 3.7, higher rates of dust deposition have been recorded near industrial settings (*i.e.* Stn 9) than in more residential areas (*e.g.* Stn 1, Kinchley Lane).

Figure 3.7 show that dust deposition rates were largely well within the site-specific trigger level during the previous 12 months although rates have occasionally been exceeded at Stn 9 and Stn 1B.

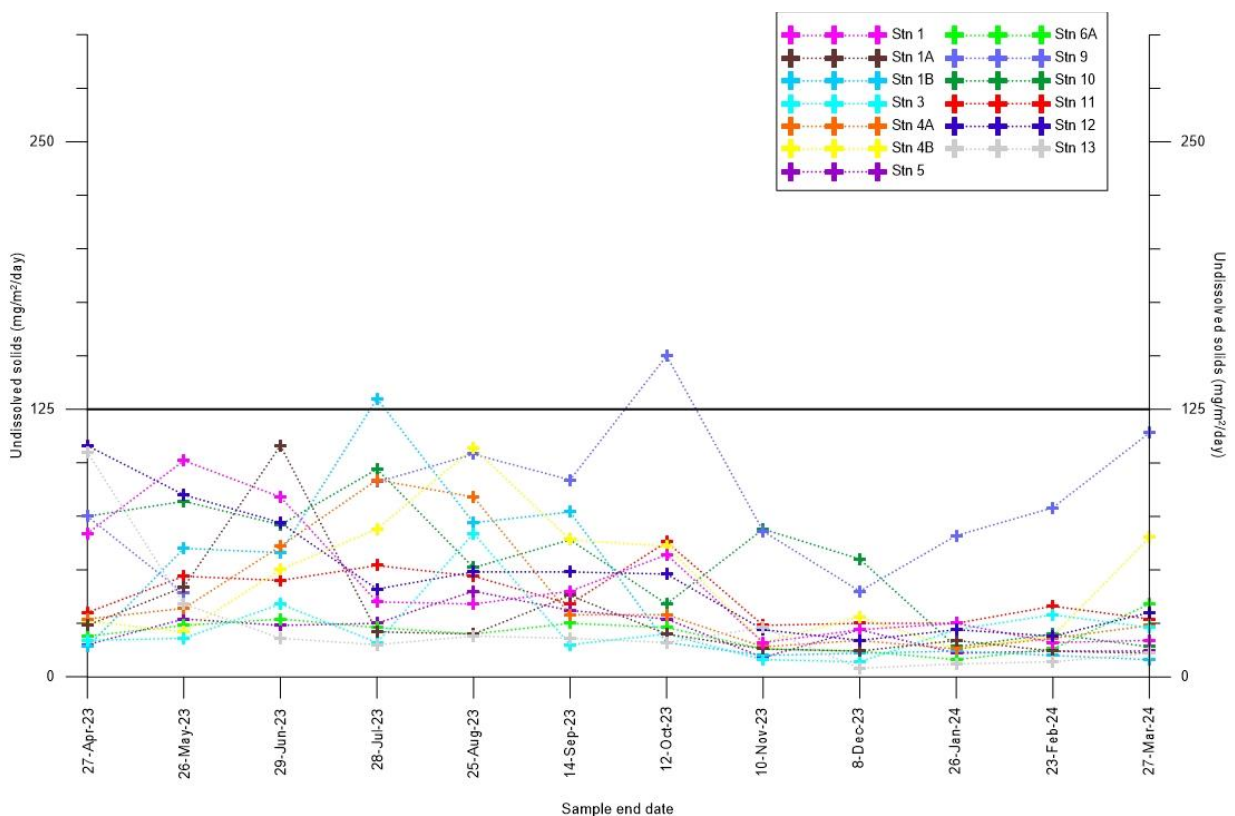


Figure 3.7: Dust deposition rates per sampling location over time (past 12 months)

### 3.3.2 Directional dust monitoring summary

The directional dust data for 23 February – 27 March 2024 are summarised in Table 3.2, and are presented graphically in Figure 3.8. As with deposited dust, the DMMP sets out a site-wide directional dust threshold. For directional dust soiling, 0.5 % effective area

coverage (EAC) per day is a trigger limit for investigation to identify the likely dust source/s, again taking account of the direction.

Table 3.2 and Figure 3.8 show that during 23 February – 27 March 2024, all stations recorded Very Low dust levels from all directions, with the exception of Low dust levels from the east at Stn 6A and the southwest and west at Stn 9.

**Table 3.2: Summary of directional dust soiling, 23 February – 27 March 2024**

Directional dust soiling (%EAC/day) by direction (°)										
This month report start date:		23-Feb-24								
This month report end date:		27-Mar-24								
Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Reported value	0.1	0.1	0.1	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Reported value	0.1	0.1	0.1	0	0	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Reported value	0.1	0.1	0	0	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Reported value	0.1	0.1	0.1	0	0.1	0.1	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Reported value	0	0.1	0.1	0	0	0	0.1	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Reported value	0.1	0	0.1	0.1	0.1	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Reported value	0.1	0.1	0	0	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Reported value	0	0.1	0.2	0.1	0	0.1	0.1	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Reported value	0.1	0.1	0.1	0.1	0	0.2	0.2	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Reported value	0.1	0	0	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Reported value	0.1	0.1	0.1	0.1	0.1	0	0	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Reported value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

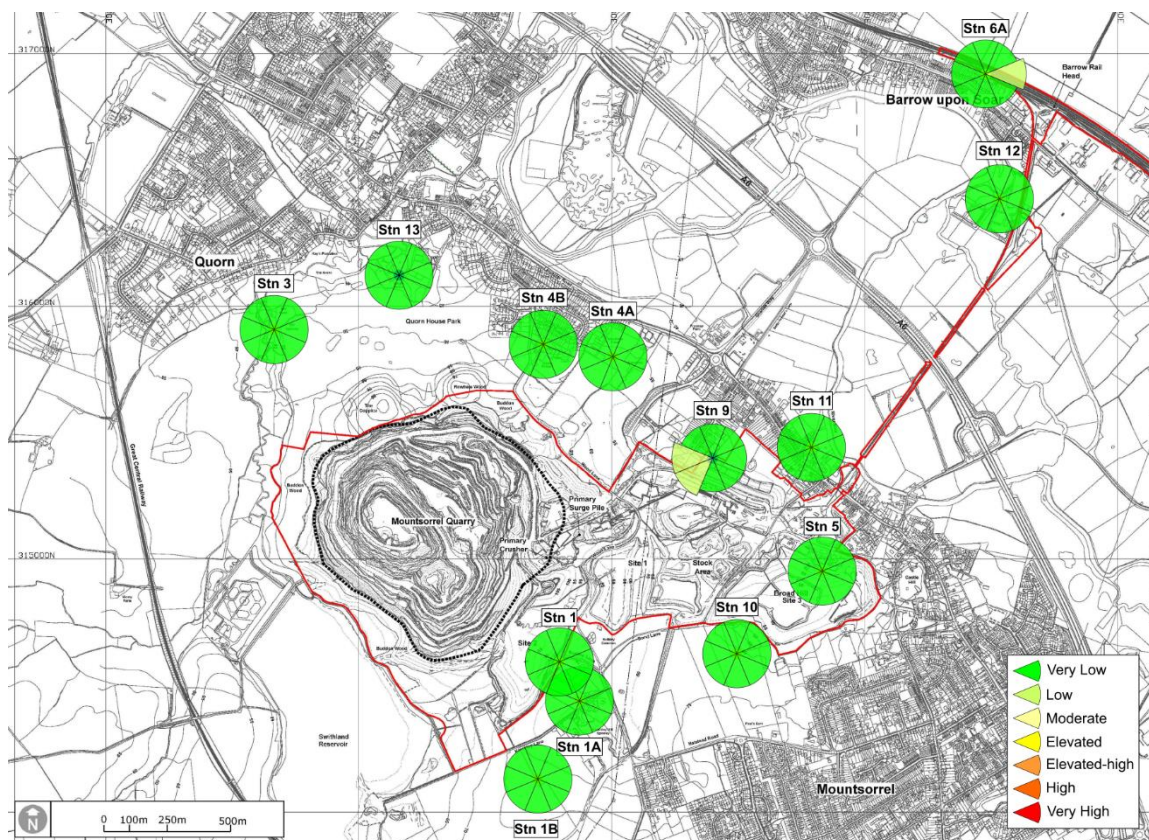
<sup>b</sup> Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

<sup>c</sup> Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

<sup>b</sup> Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

<sup>c</sup> Direction/s not determined for daily EAC below 0.1%/day (very low soiling)



**Figure 3.8: Directional dust soiling rose diagrams, 23 February – 27 March 2024**

Table 3.3 shows that average directional soiling rates have been at very low levels at most monitoring locations, for most directions, over the past year. At Stn 9, the annual average soiling rate to date was 0.2 % EAC/day from the southwest and west resulting in ‘Low’ magnitudes being recorded. The cause or causes of these consistently, but marginally elevated dust soiling rates at this monitoring point are under review, as they may be related to site activities such as operations at the PSV yard, Granite Way and/or the toast rack.



**Table 3.3: Running average directional dust soiling (past 12 months)**

Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Average value	0	0	0	0	0	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Average value	0	0	0	0	0	0	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Average value	0	0	0	0	0.1	0.1	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Average value	0	0	0	0	0	0	0	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Average value	0	0.1	0	0	0	0.1	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Average value	0	0.1	0.1	0	0.1	0	0	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Average value	0.1	0	0	0.1	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Average value	0	0.1	0.1	0	0	0.1	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Average value	0	0.1	0.1	0.1	0	0.2	0.2	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Average value	0.1	0	0	0.1	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Average value	0.1	0	0	0.1	0.1	0.1	0	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Average value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Average value	0	0	0	0	0	0	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

<sup>b</sup> Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

<sup>c</sup> Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

## 4 Complaints

During 23 February – 27 March 2024 no complaints relating to dust were received by the quarry.

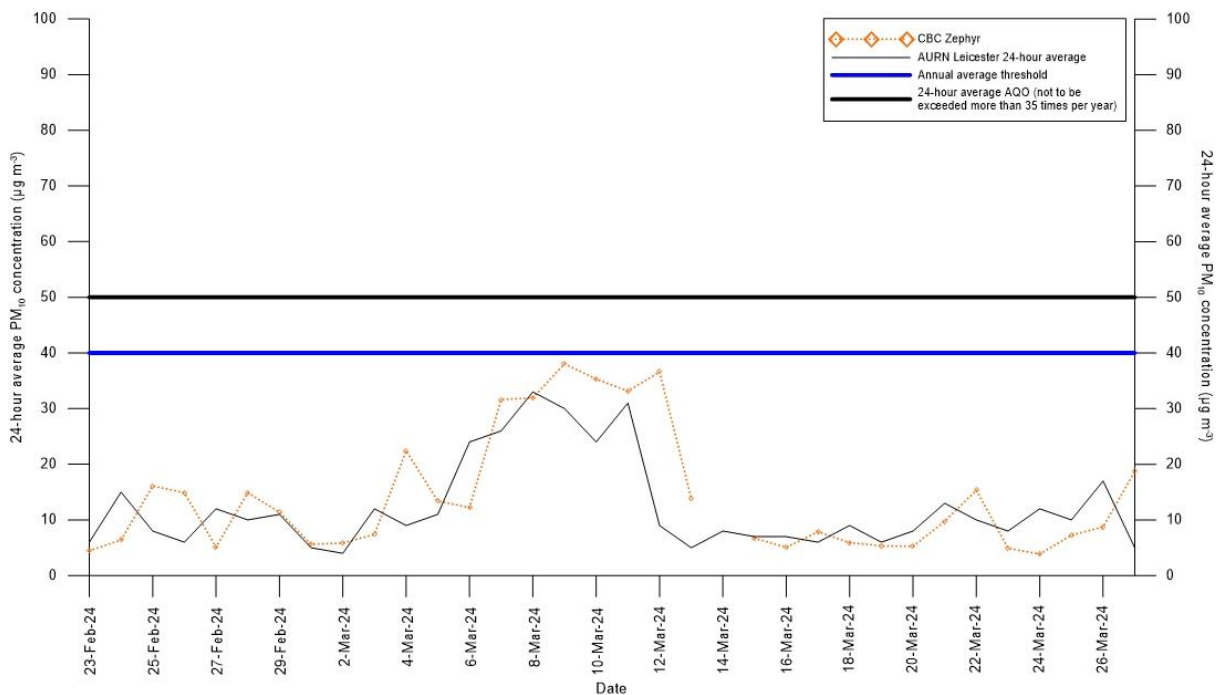
## Appendix A: Off-site PM<sub>10</sub> monitoring (CBC and AURN)

The daily average PM<sub>10</sub> concentrations recorded by the CBC Zephyr are presented below in Figure A.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University<sup>2</sup>.

For the 12 months leading up to 23 February 2024, there were 363 daily PM<sub>10</sub> readings taken by the CBC Zephyr, and 363 daily readings taken by the Leicester AURN, representing a 99% data collection rate at each respective location.

From the available data the annual average daily PM<sub>10</sub> concentration for the 12 months to date at CBC Zephyr was 10.20 µg/m<sup>3</sup>, which is approximately 25.5 % of the annual average PM<sub>10</sub> concentration objective (40 µg/m<sup>3</sup>). At the Leicester AURN the annual average daily PM<sub>10</sub> concentration for the 12 months to date was 10.9 µg/m<sup>3</sup> which is approximately 27.3 % of the annual average PM<sub>10</sub> concentration objective.

For the 12 months up to 23 February 2024 there were no recorded instances where the daily average PM<sub>10</sub> concentrations exceeded 50 µg/m<sup>3</sup> at either location. In summary, for the 12 months up to 23 February 2024 neither the annual nor daily AQO were exceeded.



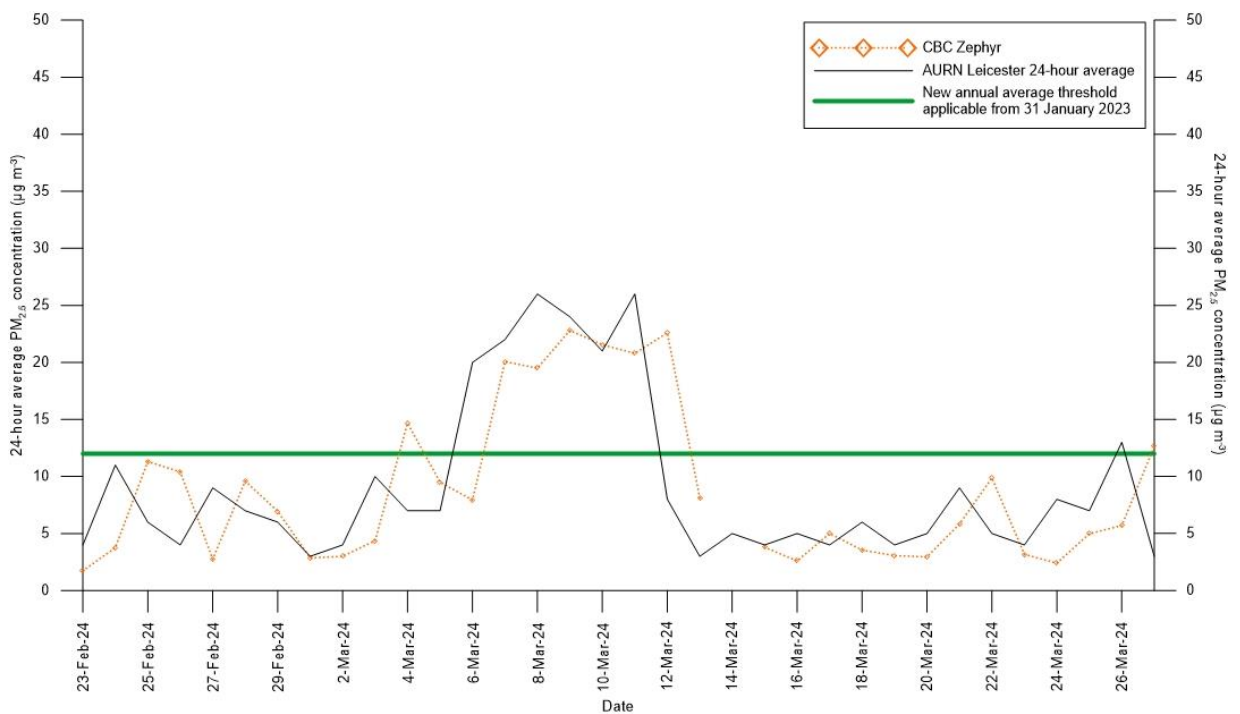
**Figure A.1: Daily average PM<sub>10</sub> concentration, CBC Zephyr and Leicester AURN, 23 February – 27 March 2024**

<sup>2</sup> <http://uk-air.defra.gov.uk/networks/network-info?view=aur>

## Appendix B: Off-site PM<sub>2.5</sub> monitoring (CBC and AURN)

The daily average PM<sub>2.5</sub> concentrations recorded by the CBC Zephyr are presented below in Figure B.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University.

For the 12 months leading up to 23 February 2024, there were 363 daily PM<sub>2.5</sub> readings taken by the CBC Zephyr, and 363 readings taken by the Leicester AURN, representing a 99 % data collection rate respectively. From the available data the annual average daily PM<sub>2.5</sub> concentration for the 12 months at the CBC Zephyr was 6.2 µg/m<sup>3</sup>, which is approximately 52 % of the interim annual average PM<sub>2.5</sub> concentration objective (12 µg/m<sup>3</sup>) applicable from 31 January 2023. At the Leicester AURN the annual average daily concentration was 6.7 µg/m<sup>3</sup>, which is approximately 56 % of the interim annual average PM<sub>2.5</sub> concentration objective.



**Figure B.1: Daily average PM<sub>2.5</sub> concentrations, CBC Zephyr and Leicester AURN, 23 February – 27 March 2024**





# Dust, Particulate Matter and Weather Monitoring Report: April 2024

Mountsorrel Quarry

July, 2024

Tarmac





# Document Control Sheet

## Project Information

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This report may include data obtained from trusted third-party consultants/laboratories that have been supplied to us in good faith. Whilst we do everything we can to ensure the quality of all the data we use, we cannot be held responsible for the accuracy or integrity of third-party data.

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## 1 Introduction

Mountsorrel Quarry has a comprehensive Dust Management and Monitoring Plan (DMMP). The DMMP was developed in 2011 and is subject to regular review and revision, in consultation between Tarmac and the local regulators (Leicestershire County Council (LCC) and Charnwood Borough Council (CBC)).

The DMMP is enacted through the quarry Site Improvement Plan (SIP). The SIP sets out a programme of actions to reduce the environmental impact of specific areas of the site operation, and is updated regularly by quarry management, with support from DustScanAQ through regular site visits and quarterly reviews with LCC and CBC.

Section 7.5 of the DMMP requires that a monthly summary and review of dust and particulate matter monitoring is prepared and circulated with LCC, CBC and the Environment Agency.

This report details the results of dust, particulate matter and weather monitoring around Mountsorrel Quarry during the period 27 March – 26 April 2024.

### 1.1 Report scope

The intention of this report is to summarise dust and particulate matter monitoring results for the given period and compare them against site-specific alert limits and thresholds. This report also details the results of any investigation carried out into elevated dust or particulate matter levels, as prompted by an exceedance of alert limits or thresholds.

### 1.2 Dust definitions

'Dust' is generally regarded as particulate matter up to 75 µm (micron) diameter and can be considered in two categories. Fine dust, essentially particles up to 10 µm, is commonly referred to as PM<sub>10</sub> and is measured to agreed standards and forms part of the national Air Quality Objectives (AQO). The AQO for PM<sub>10</sub> is currently 50 µg/m<sup>3</sup> for the 24-hour mean, not to be exceeded 35 times per year and 40 µg/m<sup>3</sup> for the annual mean. Particles up to 2.5 µm in diameter are referred to as PM<sub>2.5</sub>. The interim AQO for PM<sub>2.5</sub> is 12 µg/m<sup>3</sup> for the annual mean (to be achieved by 2028), whilst the legal AQO for PM<sub>2.5</sub> is 10 µg/m<sup>3</sup> for the annual mean (to be achieved by 2040) as per The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023<sup>1</sup>.

It may be noted that the above Regulations relate to average particle concentrations in Local Authority districts thus do not apply to any specific industrial or other operation, such as Mountsorrel Quarry, and are included for reference.

Coarser dust (essentially particles greater than 10 µm) is generally regarded as 'nuisance dust' and can be associated with annoyance, although there are no official standards (such as AQO) for dust annoyance.

---

<sup>1</sup> Statutory Instrument. (2023), 'The Environmental Targets (Fine Particulate Matter) (England) Regulations', No. 96. King's Printer of Acts of Parliament

## 2 Sampler locations

As shown in Figure 2.1 and Table 2.1, dust, particulate matter and weather conditions are measured at a number of locations around site and the surrounding area:

- Directional and depositional dust: currently monitored at 13 locations;
- Particulate matter: currently monitored at two locations;
- Weather conditions: currently monitored at one location.

The majority of the dust samplers around Mountsorrel Quarry comprise the 'Frisbee-type' deposition gauge combined with an adhesive 'sticky pad' directional gauge. These samplers are used to monitoring 'nuisance' dust and samples from these instruments are collected on a monthly basis.

For particulate matter, Turnkey Osiris samplers are located at Stn 9 (Hawcliffe Road) and at Stn 13 (Quorn House). These recognised and certificated 'indicative' real-time devices are connected to their own wind vane and anemometer and provide near-instantaneous directional PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub> data directly to the quarry management team.

A weather station is located at the site offices off Wood Lane and collects a range of weather parameters over fifteen minute intervals. Data from the weather station are available to the quarry management by means of a dedicated modem connection to the internet.

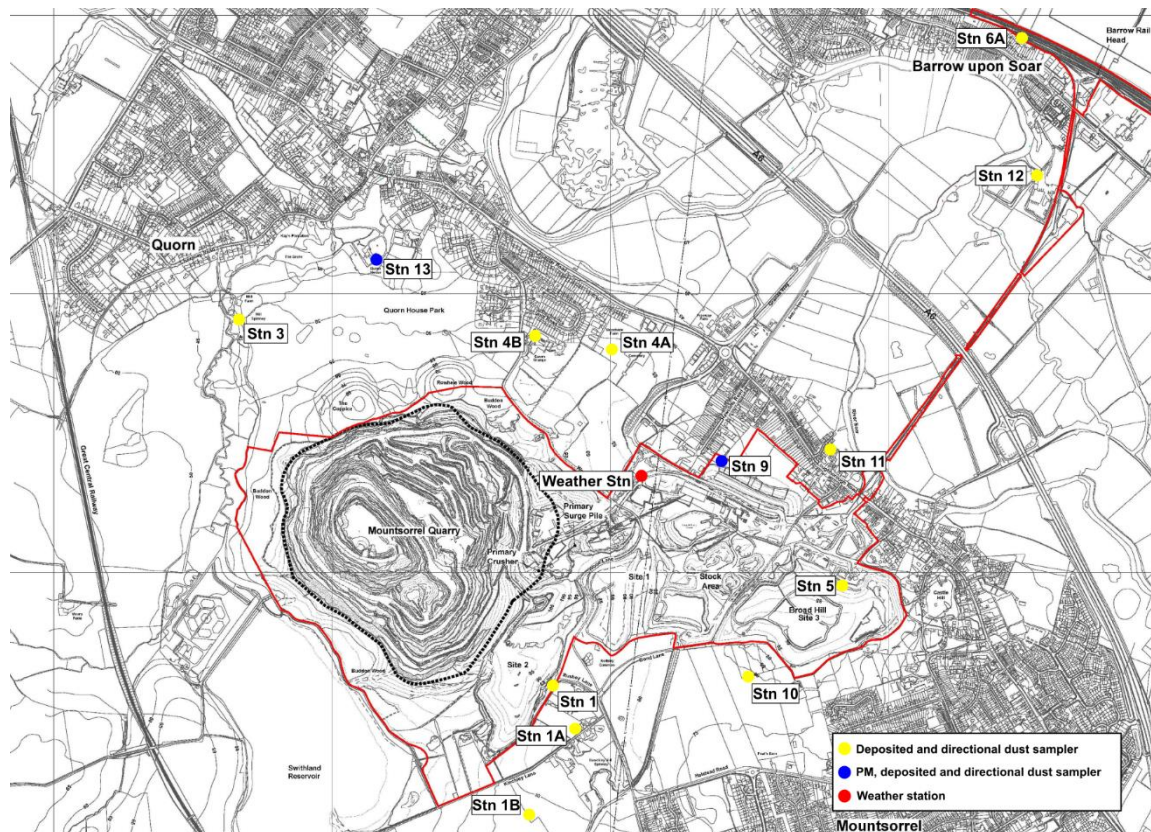


Figure 2.1: Particulate matter, dust and weather monitoring locations, Mountsorrel Quarry

**Table 2.1: Weather, particulate matter and dust monitoring locations, Mountsorrel Quarry**

Sampler reference	Easting	Northing	Locality monitored
Stn 1	456781	314577	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1A	456891	314436	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1B	456715	314109	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 3	455681	315847	Mill Farm; Quorn House
Stn 4A	457000	315805	Woodside Farm; Leicester Road
Stn 4B	456733	315778	Quorn Grange, Unitt Road, Northage Close, Quorn Park
Stn 5	457789	314941	Bond Lane; Crown Lane
Stn 6A	458660	316786	Sileby Road; Huston Close; Sileby Road (commercial)
Stn 9 (inc. PM)	457374	315398	Hawcliffe Road
Stn 10	457487	314626	Glebe Close; Halstead Road (south); Halstead Road (north)
Stn 11	457791	315458	Loughborough Road; River Soar (marina / caravan park)
Stn 12	458575	315459	Meadow Farm Marina and Caravan Park
Stn 13 (incl. PM)	456158	316090	Northage Close, Meeting Street
Weather Station	457126	315376	Wood Lane Site Offices

Charnwood Borough Council (CBC) is responsible for the monitoring of air quality within the borough and prepares Air Quality Annual Status Reports (ASRs) for submission to Defra. It operates a Zephyr air quality monitor which is located within the Leicestershire County Council (LCC) depot at the southern end of Hawcliffe Road, in close proximity to the Osiris device at Stn 9. This device measures a number of pollutants including PM<sub>10</sub> and PM<sub>2.5</sub>, allowing CBC to compare concentrations against the relevant AQOs for these pollutants.

For additional context, the latest PM<sub>10</sub> and PM<sub>2.5</sub> monitoring data from CBC are summarised in Appendix A and Appendix B.



## 2.1 Alert thresholds and response procedures

To help the site reduce its impact on the surrounding area, a number of alert thresholds have been calculated, as outlined in Table 2.2.

**Table 2.2: Alert thresholds**

Pollutant	Threshold	Averaging period	Applies to
PM <sub>10</sub>	125 µg/m <sup>3</sup>	15 minutes	Stn 9 (Hawcliffe Road), Stn 13 (Quorn House)
Deposited dust	125 mg/m <sup>2</sup> /day	1 month	All deposited dust monitoring locations

For particulate matter (PM<sub>10</sub>) an alert threshold of 125 µg/m<sup>3</sup> for the 15-minute average has been in use for several years.

Many years of monitoring and research have shown that the quarry is not a significant source of fine particulate matter (PM<sub>2.5</sub>) hence no alert threshold for this size fraction is required.

PM<sub>10</sub> and PM<sub>2.5</sub> concentrations recorded by CBC at the southern end of Hawcliffe Road and by Defra through the Automatic Urban and Rural Network (AURN) at Leicester University are presented in Appendix A and Appendix B respectively. Data from both locations have been compared against relevant Air Quality Objectives (AQOs) for PM<sub>10</sub> and PM<sub>2.5</sub>.

For deposited dust, the DMMP sets out a site-wide deposited dust threshold of 125 mg/m<sup>2</sup>/day 'undissolved solids' as a trigger limit for investigation to identify the potential dust source/s, taking account of the directional data.

### 3 Results

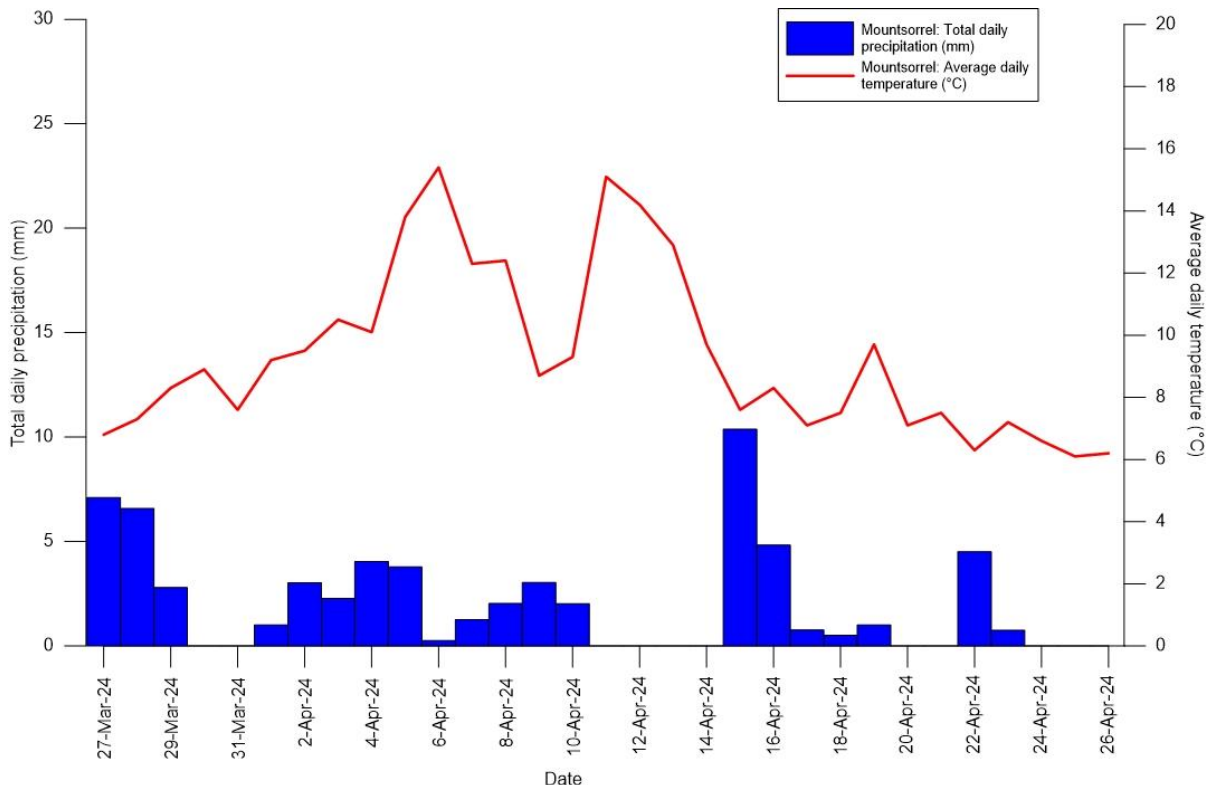
#### 3.1 Weather monitoring

Weather conditions can have a significant effect on the potential for dust propagation from a minerals site. Of particular importance are wind speed, wind direction, and precipitation. Dust can be carried from a source towards receptors (such as nearby homes and other businesses) according to the strength and direction of wind. Precipitation is recognised to suppress dust and 0.2 mm antecedent rainfall is considered sufficient to suppress windblown dust for a number of hours.

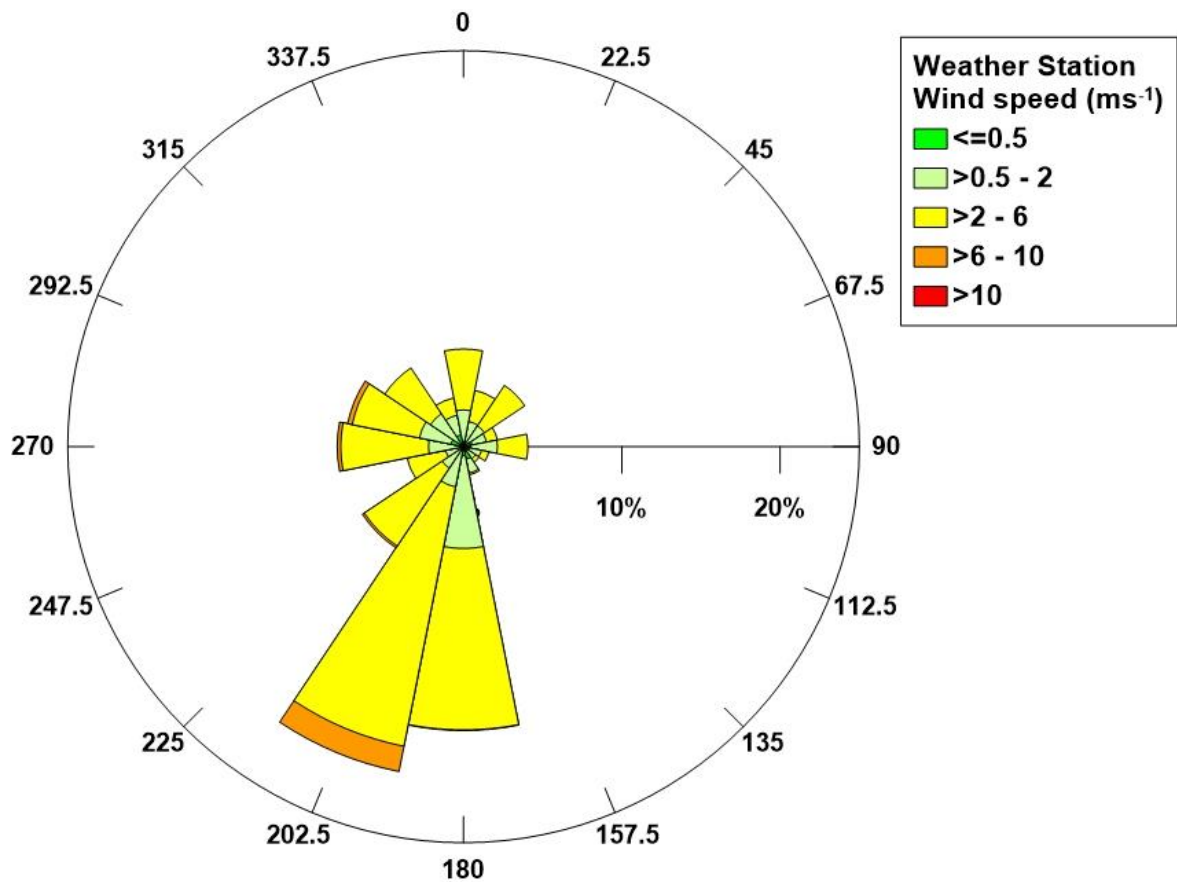
The key weather data which might affect dust propagation (wind speed, wind direction, total daily precipitation and average daily temperature) for this reporting period are summarised in Figure 3.1 and Figure 3.2.

The monitoring period was characterised by generally cool temperatures. The maximum daily average temperature was 15.4 °C recorded on 16 April and the minimum daily temperature was 6.1°C recorded on 25 April.

The monitoring period was generally wet with precipitation recorded on 62% of total days. The driest period (in mid-April) coincided with relatively elevated temperatures.



**Figure 3.1: Total daily precipitation and average daily temperature, Mountsorrel Quarry, 27 March – 26 April 2024**



**Figure 3.2: Wind rose, Mountsorrel Quarry, Mountsorrel, 27 March – 26 April 2024**

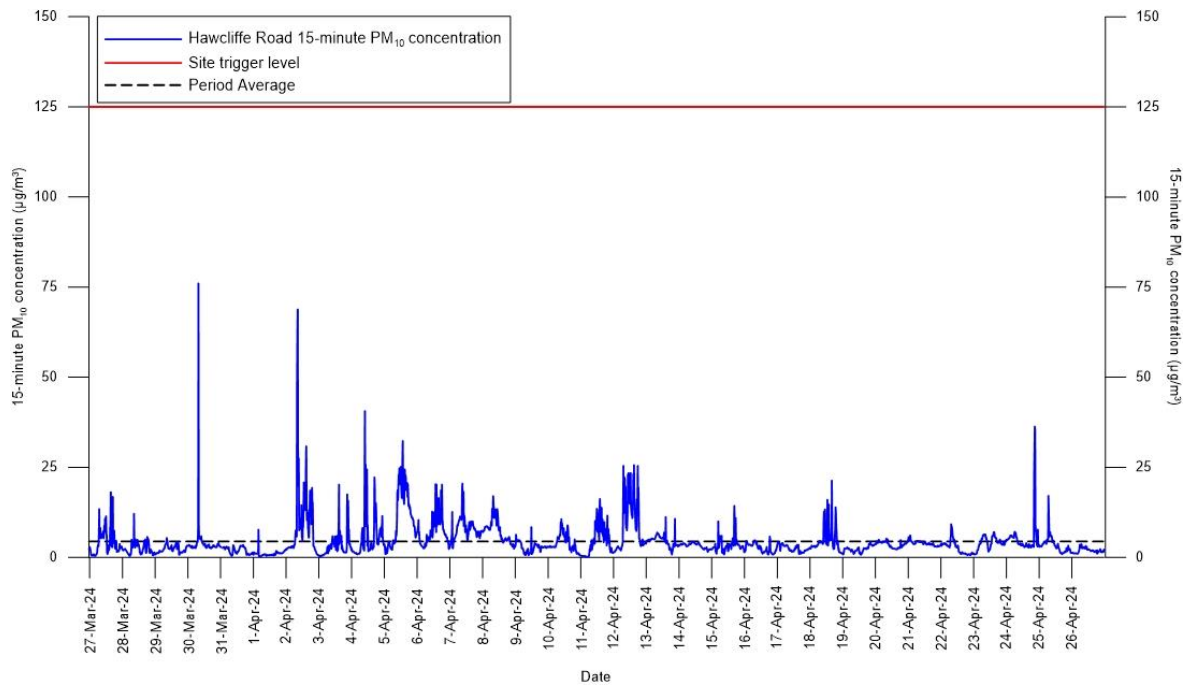
As seen in Figure 3.2, winds for this monitoring period were predominantly moderate in speed ( $>2 - 6$  m/s) and from the south and south-southwest. Consequently, there might have been potential for dust propagation predominantly to the north and north-northeast throughout the monitoring period, although this will have been suppressed by the generally wet weather conditions.

## 3.2 Particulate matter

### 3.2.1 $PM_{10}$

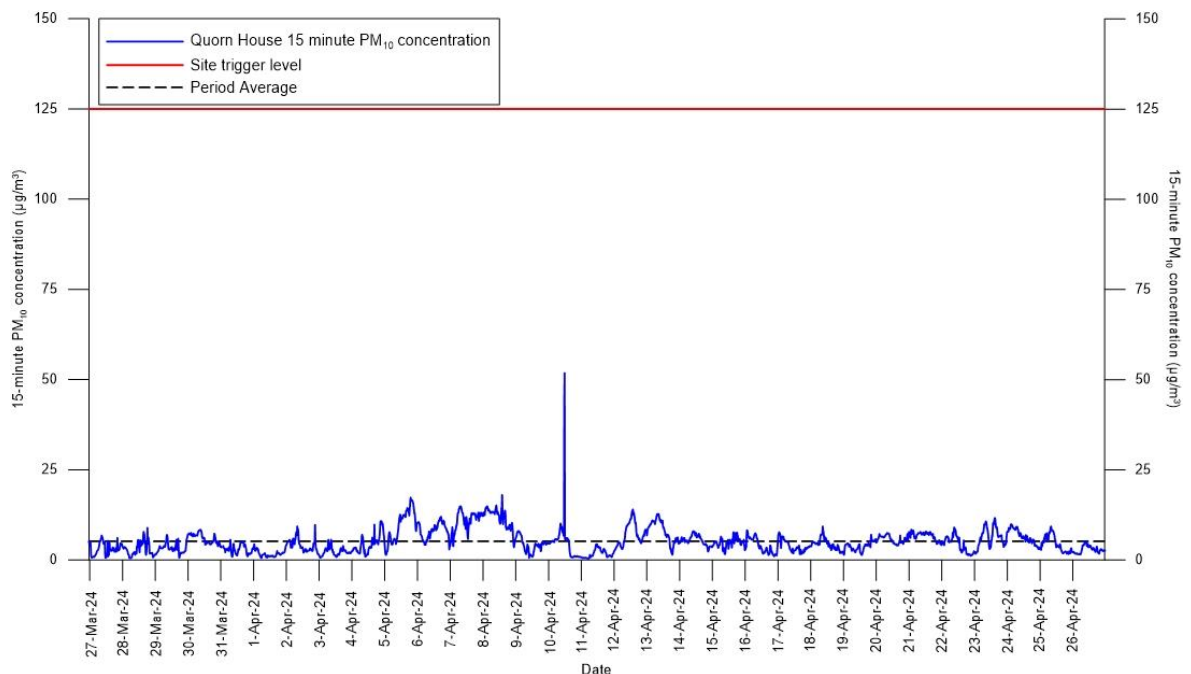
The available 15-minute data from the period of review are presented for both monitoring locations in Figure 3.3 and Figure 3.4. The red line denotes the site trigger level ( $125 \mu\text{g}/\text{m}^3$  over the 15-minute average), whilst the dashed black line denotes the average concentration recorded over this period.

Additional  $PM_{10}$  monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix A.



**Figure 3.3: 15-minute mean PM<sub>10</sub> concentration, Hawcliffe Road, 27 March – 26 April 2024**

Figure 3.3 indicates that there were no exceedances of the site trigger level at Hawcliffe Road during this period, whilst the overall average concentration for this period was 4.4 µg/m<sup>3</sup>. Some slight short-term spikes were recorded in late March and early April, however these did not reach the site trigger level.



**Figure 3.4: 15-minute mean PM<sub>10</sub> concentration, Quorn House, 27 March – 26 April 2024**

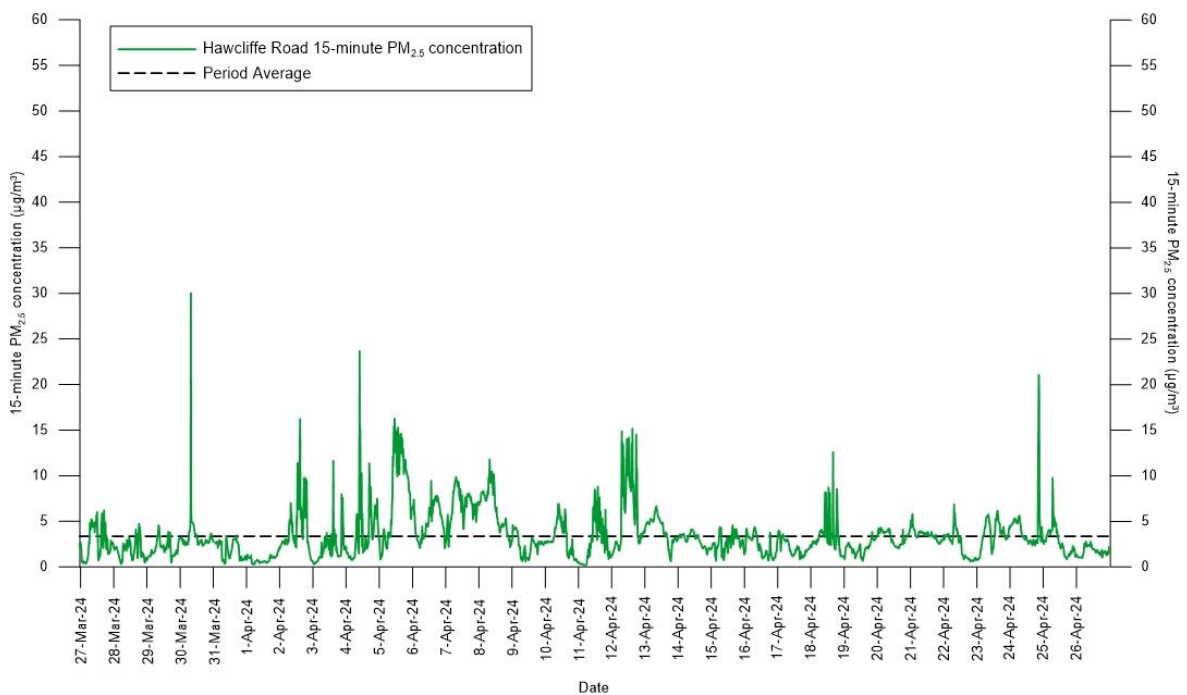
At Quorn House there were no exceedances of the PM<sub>10</sub> site trigger level, and the overall average concentration for this period was 5.2 µg/m<sup>3</sup>. A short-term spike was recorded in mid-April however it did not reach the site trigger level. The general similarity between PM<sub>10</sub>

concentrations recorded at both locations suggests that the site was not a significant source of PM<sub>10</sub> at these locations during this period. This is further demonstrated by the off-site PM<sub>10</sub> monitoring results presented in Appendix A.

### 3.2.2 PM<sub>2.5</sub>

The results of PM<sub>2.5</sub> monitoring at Hawcliffe Road and Quorn House are presented in Figure 3.5 and Figure 3.6. The dashed black line denotes the average concentration recorded over this period.

Additional PM<sub>2.5</sub> monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix B.



**Figure 3.5: 15-minute mean PM<sub>2.5</sub> concentration, Hawcliffe Road, 27 March – 26 April 2024**

At Hawcliffe Road, the overall average concentration for this period was 3.4 µg/m<sup>3</sup> whilst at Quorn House, the overall average was 4.7 µg/m<sup>3</sup>. As with the PM<sub>10</sub> concentrations, it is most likely that a regional rather than local PM<sub>2.5</sub> signal was recorded during this period. This is supported by the CBC and AURN data presented in Appendix B. For this period, 78 % of PM<sub>10</sub> recorded at Hawcliffe Road was formed of PM<sub>2.5</sub>, whilst it made up 91% of PM<sub>10</sub> at Quorn House. This strongly indicates that a regional rather than a local particulate matter signal was recorded during this period.



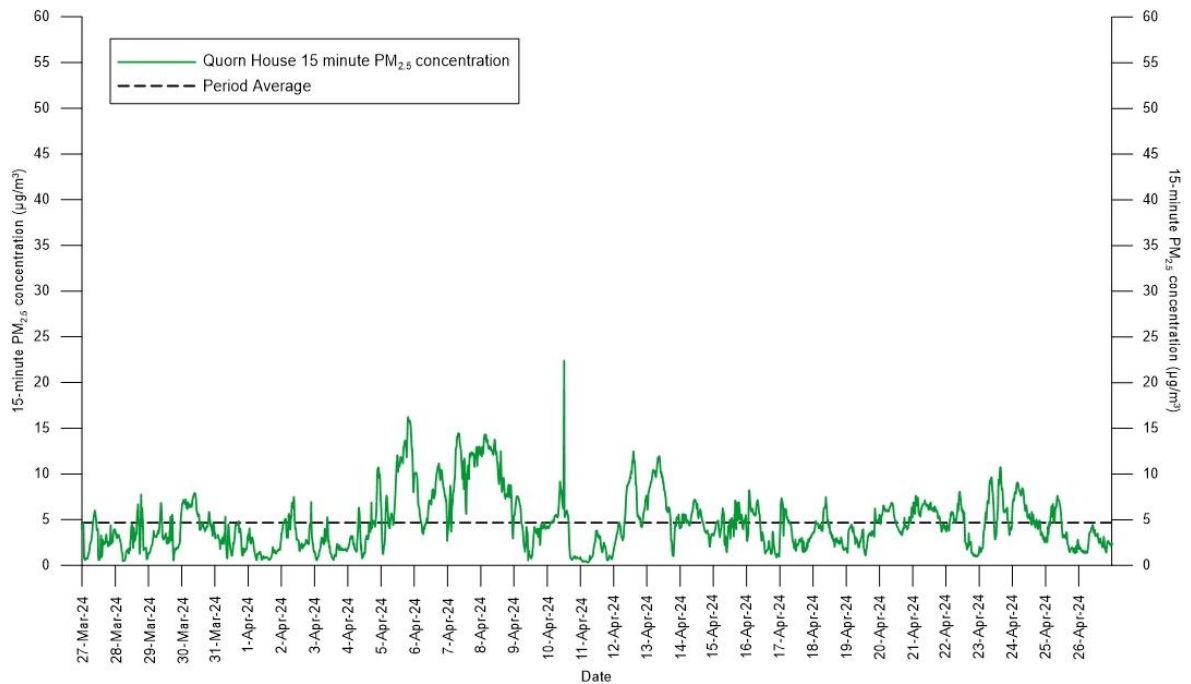


Figure 3.6: 15-minute mean PM<sub>2.5</sub> concentration, Quorn House, 27 March – 26 April 2024

### 3.3 Visible dust

#### 3.3.1 Deposited dust monitoring summary

The deposited dust data for 27 March – 26 April 2024 are summarised in Table 3.1. As outlined earlier, point-specific thresholds have been calculated for investigation to identify the potential dust source/s, taking account of the directional data.

Table 3.1 shows that, for the available data, deposited dust levels during 27 March – 26 April 2024 were all within the site-specific threshold for all stations, although dust levels approached the trigger level at Stn 9.

**Table 3.1: Summary of deposited dust (undissolved solids), 27 March – 26 April 2024**

Undissolved solids (mg/m <sup>2</sup> /day)				
This month report start date:		27-Mar-24		
This month report end date:		26-Apr-24		
Receptor location	Nearest / appropriate dust monitoring point	Reported value	Trigger: $\geq 125^a$	Magnitude <sup>b</sup>
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	44	No	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	31	No	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	28	No	Very Low
Mill Farm; Quorn House	Stn 3	13	No	Very Low
Woodside Farm, Leicester Road	Stn 4A	29	No	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	26	No	Very Low
Bond Lane; Crown Lane	Stn 5	23	No	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	21	No	Very Low
Hawcliffe Road	Stn 9	106	No	Slightly Elevated
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	43	No	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	31	No	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	35	No	Very Low
Quorn House Park	Stn 13	23	No	Very Low

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

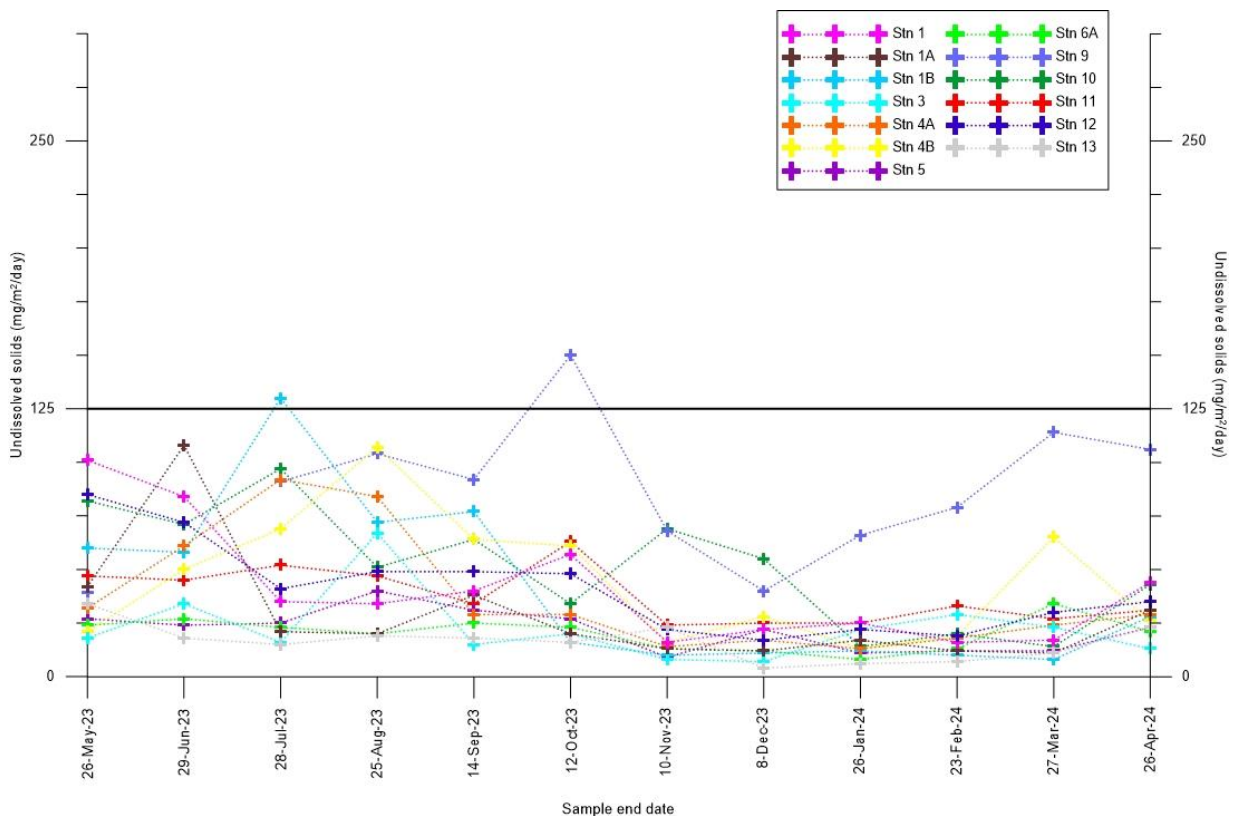
<sup>b</sup> Magnitude of mass deposition rate assessed against typical rate for semi-rural areas (30 - 80 mg/m<sup>2</sup>/day)

Regarding dust deposition over time, the rates across the sampling area have varied considerably. Trends in dust deposition rates (as undissolved solids) for the previous 12 months, together with the site-wide dust threshold are illustrated in Figure 3.7.

In general, as would be expected, dust deposition rates are typically lower in winter months than in summer months. This trend is clearly seen for most monitoring points in Figure 3.7, with some exceptions. Dust deposition rates have been consistently below the ‘trigger limit’ at all sampling locations except Stn 1B and 9, although the exceedance at Stn 1B is known to be related to nearby agricultural activities, rather than on-site processes. There appears to be a general increase in deposited dust levels at Stn 9 since December 2023; this may be simply related to seasonal changes, however if the trend continues it shall be investigated.

In general, as shown in Figure 3.7, higher rates of dust deposition have been recorded near industrial settings (*i.e.* Stn 9) than in more residential areas (*e.g.* Stn 1, Kinchley Lane).

Figure 3.7 show that dust deposition rates were largely well within the site-specific trigger level during the previous 12 months although rates have occasionally exceeded the trigger level at Stn 9 and Stn 1B.



**Figure 3.7: Dust deposition rates per sampling location over time (past 12 months)**

### 3.3.2 Directional dust monitoring summary

The directional dust data for 27 March – 26 April 2024 are summarised in Table 3.2, and are presented graphically in Figure 3.8. As with deposited dust, the DMMP sets out a site-wide directional dust threshold. For directional dust soiling, 0.5 % effective area coverage

(EAC) per day is a trigger limit for investigation to identify the likely dust source/s, again taking account of the direction.

Table 3.2 and Figure 3.8 show that during 27 March – 26 April 2024, all stations recorded Very Low dust levels from all directions, with the exception of Low dust levels at Stn 4A, Stn 5 and Stn 6A, and Moderate levels at Stn 9 and Stn 12.

At Stn 9, the trigger limit was reached from the southwest and south, indicating potential on-site and off-site sources at this location.

At Stn 12, following reports of construction work in the locality of the sampler, a non-site dust source is considered the most likely.

**Table 3.2: Summary of directional dust soiling, 27 March – 26 April 2024**

Directional dust soiling (%EAC/day) by direction (°)										
This month report start date:		27-Mar-24								
This month report end date:		26-Apr-24								
Receptor location	Nearest / appropriate dust monitoring point	Direction (°)								
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Reported value	0.1	0	0	0	0	0.1	0.1	0.1
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Reported value	0	0	0	0	0	0	0.1	0.1
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Reported value	0	0	0	0	0	0.1	0	0
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Reported value	0	0	0	0	0.1	0	0	0
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Reported value	0	0	0.1	0	0	0.1	0.2	0
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Reported value	0	0	0	0	0.1	0.1	0	0
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Reported value	0.1	0	0	0	0.1	0.1	0.1	0.2
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Reported value	0	0	0.1	0	0	0.2	0.1	0.1
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Reported value	0.1	0.1	0.1	0.1	0	0.5	0.5	0.2
		Trigger: $\geq 0.5^a$	No	No	No	No	No	Yes	Yes	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Moderate	Moderate	Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Reported value	0.1	0	0	0	0	0.1	0	0.1
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Reported value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Reported value	0.1	0.1	0.1	0.2	0.4	0.3	0.2	0.1
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Low	Moderate	Low	Low	Very Low
Quorn House Park	Stn 13	Reported value	0	0	0	0	0	0.1	0	0
		Trigger: $\geq 0.5^a$	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

<sup>b</sup> Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

<sup>c</sup> Direction/s not determined for daily EAC below 0.1%/day (very low soiling)



**Figure 3.8: Directional dust soiling rose diagrams, 27 March – 26 April 2024**

Table 3.3 shows that average directional soiling rates have been at very low levels at most monitoring locations, for most directions, over the past year. At Stn 9, the annual average soiling rate to date was 0.2 % EAC/day from the southwest and west resulting in ‘Low’ magnitudes being recorded. The cause or causes of these consistently, but marginally elevated dust soiling rates at this monitoring point are under review, as they may be related to site activities such as operations at the PSV yard, Granite Way and/or the toast rack.



**Table 3.3: Running average directional dust soiling (past 12 months)**

Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Average value	0.1	0	0	0	0	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Average value	0	0	0	0	0	0	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Average value	0	0	0	0	0.1	0.1	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Average value	0	0	0	0	0	0	0	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Average value	0	0	0	0	0	0.1	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Average value	0	0.1	0.1	0	0.1	0	0	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Average value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Average value	0	0.1	0.1	0	0	0.1	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Average value	0.1	0.1	0.1	0.1	0	0.2	0.2	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Average value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Average value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Average value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Average value	0	0	0	0	0	0	0	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

<sup>b</sup> Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

<sup>c</sup> Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

## 4 Complaints

During 27 March – 26 April 2024 no complaints relating to dust were received by the quarry.

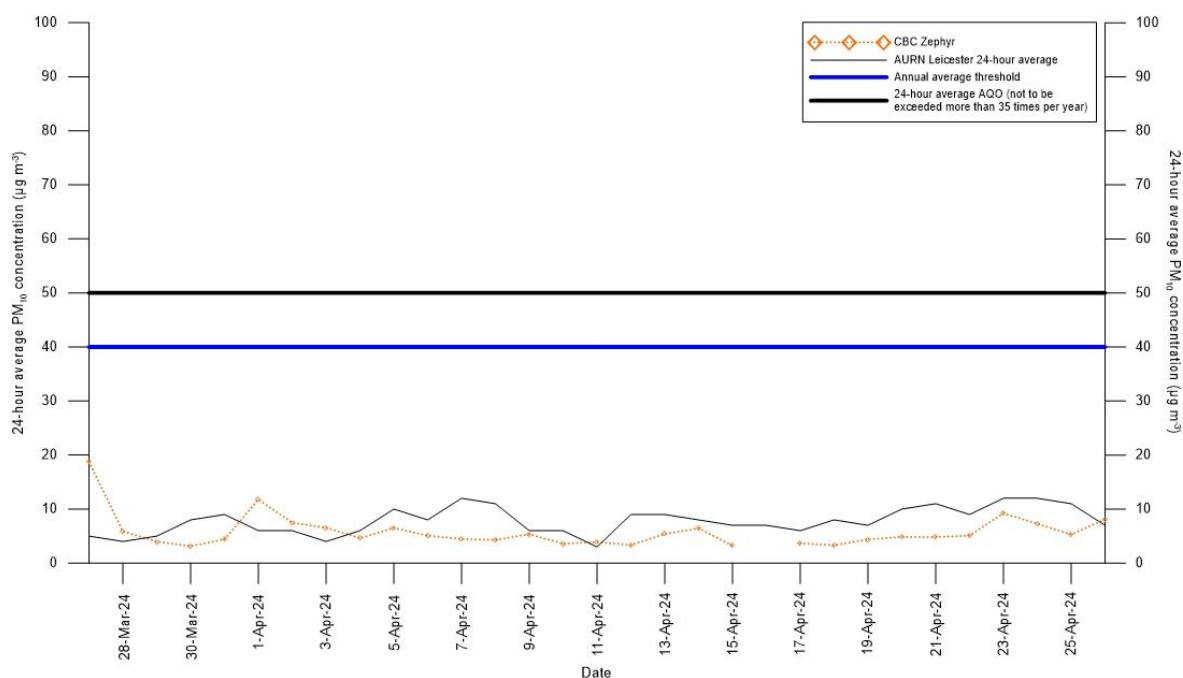
## Appendix A: Off-site PM<sub>10</sub> monitoring (CBC and AURN)

The daily average PM<sub>10</sub> concentrations recorded by the CBC Zephyr are presented below in Figure A.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University<sup>2</sup>.

For the 12 months leading up to 26 April 2024, there were 362 daily PM<sub>10</sub> readings taken by the CBC Zephyr, and 363 daily readings taken by the Leicester AURN, representing a 99% data collection rate at each respective location.

From the available data the annual average daily PM<sub>10</sub> concentration for the 12 months to date at CBC Zephyr was 9.63 µg/m<sup>3</sup>, which is approximately 24.1 % of the annual average PM<sub>10</sub> concentration objective (40 µg/m<sup>3</sup>). At the Leicester AURN the annual average daily PM<sub>10</sub> concentration for the 12 months to date was 10.56 µg/m<sup>3</sup> which is approximately 26.4 % of the annual average PM<sub>10</sub> concentration objective.

For the 12 months up to 26 April 2024 there were no recorded instances where the daily average PM<sub>10</sub> concentrations exceeded 50 µg/m<sup>3</sup> at either location. In summary, for the 12 months up to 23 February 2024 neither the annual nor daily AQO were exceeded.



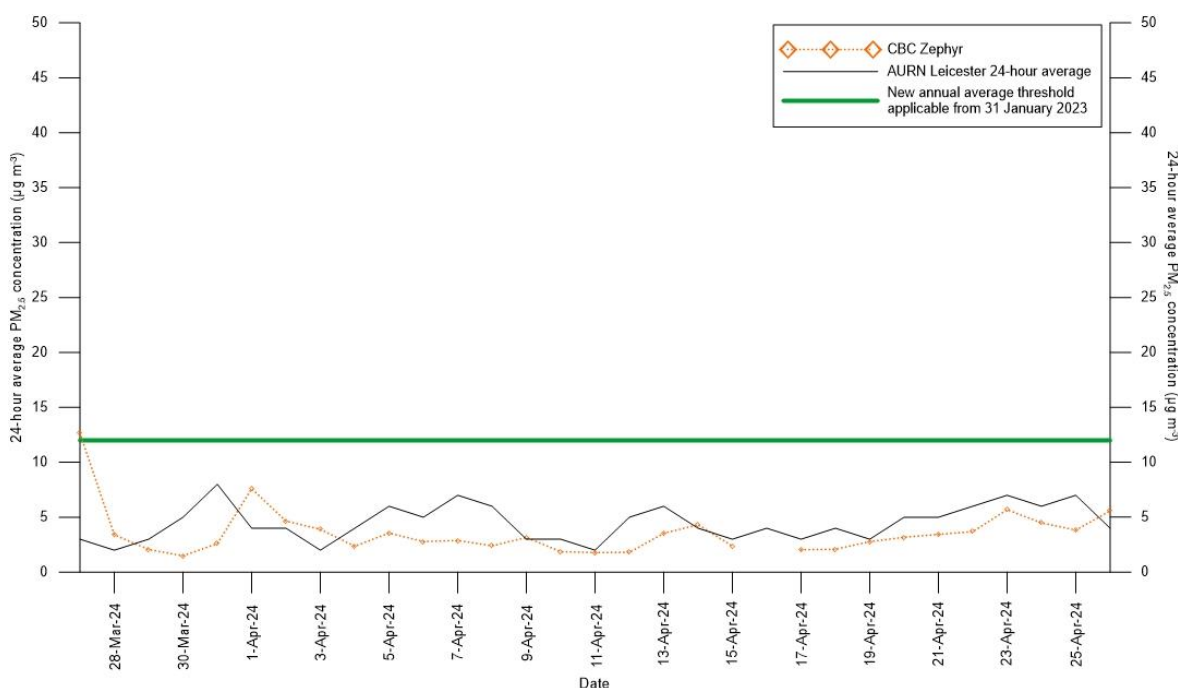
**Figure A.1: Daily average PM<sub>10</sub> concentration, CBC Zephyr and Leicester AURN, 27 March – 26 April 2024**

<sup>2</sup> <http://uk-air.defra.gov.uk/networks/network-info?view=aurn>

## Appendix B: Off-site PM<sub>2.5</sub> monitoring (CBC and AURN)

The daily average PM<sub>2.5</sub> concentrations recorded by the CBC Zephyr are presented below in Figure B.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University.

For the 12 months leading up to 26 April 2024, there were 363 daily PM<sub>2.5</sub> readings taken by the CBC Zephyr, and 363 readings taken by the Leicester AURN, representing a 99 % data collection rate respectively. From the available data the annual average daily PM<sub>2.5</sub> concentration for the 12 months at the CBC Zephyr was 5.82 µg/m<sup>3</sup>, which is approximately 49 % of the interim annual average PM<sub>2.5</sub> concentration objective (12 µg/m<sup>3</sup>) applicable from 31 January 2023. At the Leicester AURN the annual average daily concentration was 6.41 µg/m<sup>3</sup>, which is approximately 53 % of the interim annual average PM<sub>2.5</sub> concentration objective.



**Figure B.1: Daily average PM<sub>2.5</sub> concentrations, CBC Zephyr and Leicester AURN, 27 March – 26 April 2024**



# Dust, Particulate Matter and Weather Monitoring Report: May 2024

Mountsorrel Quarry

July, 2024

Tarmac







# Document Control Sheet

## Project Information

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This report may include data obtained from trusted third-party consultants/laboratories that have been supplied to us in good faith. Whilst we do everything we can to ensure the quality of all the data we use, we cannot be held responsible for the accuracy or integrity of third-party data.

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## 1 Introduction

Mountsorrel Quarry has a comprehensive Dust Management and Monitoring Plan (DMMP). The DMMP was developed in 2011 and is subject to regular review and revision, in consultation between Tarmac and the local regulators (Leicestershire County Council (LCC) and Charnwood Borough Council (CBC)).

The DMMP is enacted through the quarry Site Improvement Plan (SIP). The SIP sets out a programme of actions to reduce the environmental impact of specific areas of the site operation, and is updated regularly by quarry management, with support from DustScanAQ through regular site visits and quarterly reviews with LCC and CBC.

Section 7.5 of the DMMP requires that a monthly summary and review of dust and particulate matter monitoring is prepared and circulated with LCC, CBC and the Environment Agency.

This report details the results of dust, particulate matter and weather monitoring around Mountsorrel Quarry during the period 26 April – 31 May 2024.

### 1.1 Report scope

The intention of this report is to summarise dust and particulate matter monitoring results for the given period and compare them against site-specific alert limits and thresholds. This report also details the results of any investigation carried out into elevated dust or particulate matter levels, as prompted by an exceedance of alert limits or thresholds.

### 1.2 Dust definitions

'Dust' is generally regarded as particulate matter up to 75 µm (micron) diameter and can be considered in two categories. Fine dust, essentially particles up to 10 µm, is commonly referred to as PM<sub>10</sub> and is measured to agreed standards and forms part of the national Air Quality Objectives (AQO). The AQO for PM<sub>10</sub> is currently 50 µg/m<sup>3</sup> for the 24-hour mean, not to be exceeded 35 times per year and 40 µg/m<sup>3</sup> for the annual mean. Particles up to 2.5 µm in diameter are referred to as PM<sub>2.5</sub>. The interim AQO for PM<sub>2.5</sub> is 12 µg/m<sup>3</sup> for the annual mean (to be achieved by 2028), whilst the legal AQO for PM<sub>2.5</sub> is 10 µg/m<sup>3</sup> for the annual mean (to be achieved by 2040) as per The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023<sup>1</sup>.

It may be noted that the above Regulations relate to average particle concentrations in Local Authority districts thus do not apply to any specific industrial or other operation, such as Mountsorrel Quarry, and are included for reference.

Coarser dust (essentially particles greater than 10 µm) is generally regarded as 'nuisance dust' and can be associated with annoyance, although there are no official standards (such as AQO) for dust annoyance.

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<sup>1</sup> Statutory Instrument. (2023), 'The Environmental Targets (Fine Particulate Matter) (England) Regulations', No. 96. King's Printer of Acts of Parliament



## 2 Sampler locations

As shown in Figure 2.1 and Table 2.1, dust, particulate matter and weather conditions are measured at a number of locations around site and the surrounding area:

- Directional and depositional dust: currently monitored at 13 locations;
- Particulate matter: currently monitored at two locations;
- Weather conditions: currently monitored at one location.

The majority of the dust samplers around Mountsorrel Quarry comprise the ‘Frisbee-type’ deposition gauge combined with an adhesive ‘sticky pad’ directional gauge. These samplers are used to monitoring ‘nuisance’ dust and samples from these instruments are collected on a monthly basis.

For particulate matter, Turnkey Osiris samplers are located at Stn 9 (Hawcliffe Road) and at Stn 13 (Quorn House). These recognised and certificated ‘indicative’ real-time devices are connected to their own wind vane and anemometer and provide near-instantaneous directional PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub> data directly to the quarry management team.

A weather station is located at the site offices off Wood Lane and collects a range of weather parameters over fifteen minute intervals. Data from the weather station are available to the quarry management by means of a dedicated modem connection to the internet.

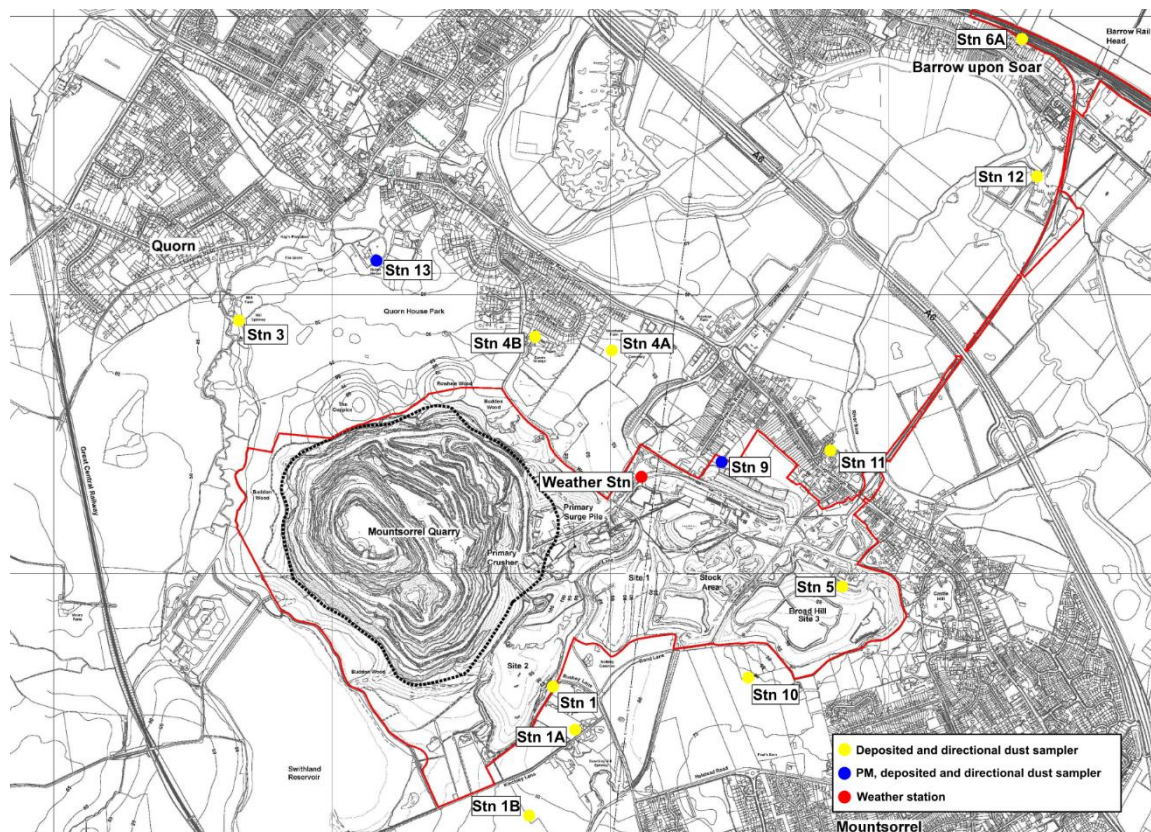


Figure 2.1: Particulate matter, dust and weather monitoring locations, Mountsorrel Quarry

**Table 2.1: Weather, particulate matter and dust monitoring locations, Mountsorrel Quarry**

Sampler reference	Easting	Northing	Locality monitored
Stn 1	456781	314577	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1A	456891	314436	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 1B	456715	314109	Swithland Lane; Rushey Lane; Kinchley Lane
Stn 3	455681	315847	Mill Farm; Quorn House
Stn 4A	457000	315805	Woodside Farm; Leicester Road
Stn 4B	456733	315778	Quorn Grange, Unitt Road, Northage Close, Quorn Park
Stn 5	457789	314941	Bond Lane; Crown Lane
Stn 6A	458660	316786	Sileby Road; Huston Close; Sileby Road (commercial)
Stn 9 (inc. PM)	457374	315398	Hawcliffe Road
Stn 10	457487	314626	Glebe Close; Halstead Road (south); Halstead Road (north)
Stn 11	457791	315458	Loughborough Road; River Soar (marina / caravan park)
Stn 12	458575	315459	Meadow Farm Marina and Caravan Park
Stn 13 (incl. PM)	456158	316090	Northage Close, Meeting Street
Weather Station	457126	315376	Wood Lane Site Offices

Charnwood Borough Council (CBC) is responsible for the monitoring of air quality within the borough and prepares Air Quality Annual Status Reports (ASRs) for submission to Defra. It operates a Zephyr air quality monitor which is located within the Leicestershire County Council (LCC) depot at the southern end of Hawcliffe Road, in close proximity to the Osiris device at Stn 9. This device measures a number of pollutants including PM<sub>10</sub> and PM<sub>2.5</sub>, allowing CBC to compare concentrations against the relevant AQOs for these pollutants.

For additional context, the latest PM<sub>10</sub> and PM<sub>2.5</sub> monitoring data from CBC are summarised in Appendix A and Appendix B.

## 2.1 Alert thresholds and response procedures

To help the site reduce its impact on the surrounding area, a number of alert thresholds have been calculated, as outlined in Table 2.2.

**Table 2.2: Alert thresholds**

Pollutant	Threshold	Averaging period	Applies to
PM <sub>10</sub>	125 µg/m <sup>3</sup>	15 minutes	Stn 9 (Hawcliffe Road), Stn 13 (Quorn House)
Deposited dust	125 mg/m <sup>2</sup> /day	1 month	All deposited dust monitoring locations

For particulate matter (PM<sub>10</sub>) an alert threshold of 125 µg/m<sup>3</sup> for the 15-minute average has been in use for several years.

Many years of monitoring and research have shown that the quarry is not a significant source of fine particulate matter (PM<sub>2.5</sub>) hence no alert threshold for this size fraction is required.

PM<sub>10</sub> and PM<sub>2.5</sub> concentrations recorded by CBC at the southern end of Hawcliffe Road and by Defra through the Automatic Urban and Rural Network (AURN) at Leicester University are presented in Appendix A and Appendix B respectively. Data from both locations have been compared against relevant Air Quality Objectives (AQOs) for PM<sub>10</sub> and PM<sub>2.5</sub>.

For deposited dust, the DMMP sets out a site-wide deposited dust threshold of 125 mg/m<sup>2</sup>/day ‘undissolved solids’ as a trigger limit for investigation to identify the potential dust source/s, taking account of the directional data.

### 3 Results

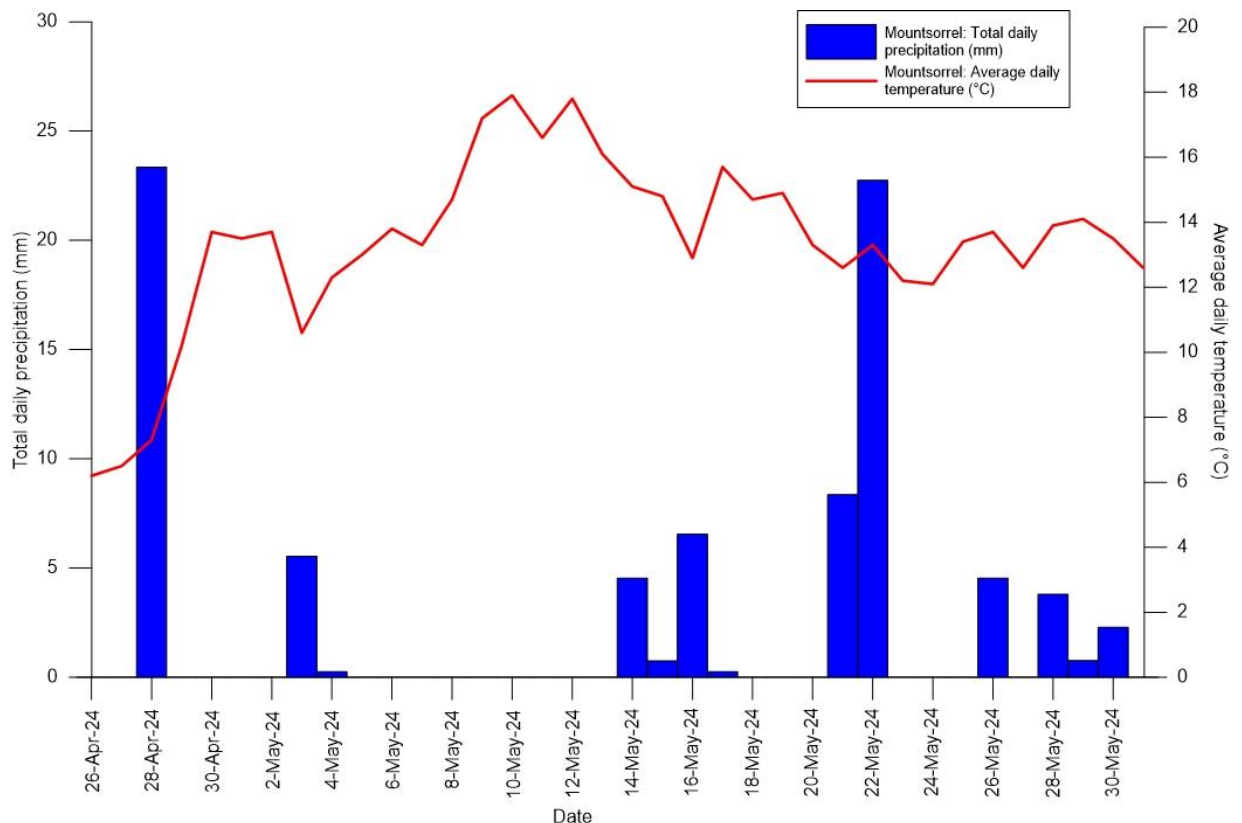
#### 3.1 Weather monitoring

Weather conditions can have a significant effect on the potential for dust propagation from a minerals site. Of particular importance are wind speed, wind direction, and precipitation. Dust can be carried from a source towards receptors (such as nearby homes and other businesses) according to the strength and direction of wind. Precipitation is recognised to suppress dust and 0.2 mm antecedent rainfall is considered sufficient to suppress windblown dust for a number of hours.

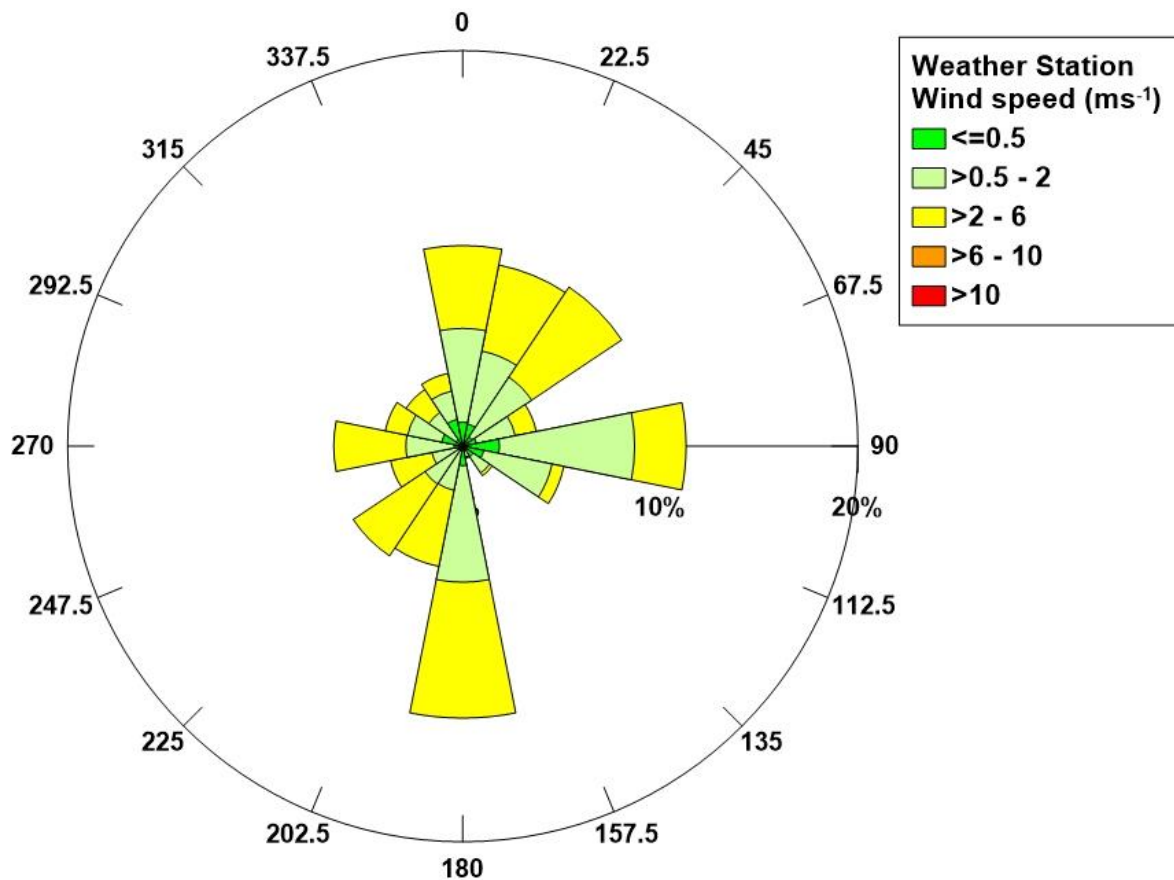
The key weather data which might affect dust propagation (wind speed, wind direction, total daily precipitation and average daily temperature) for this reporting period are summarised in Figure 3.1 and Figure 3.2.

The monitoring period was characterised by generally mild temperatures. The maximum daily average temperature was 17.9 °C recorded on 10 May and the minimum daily temperature was 6.2°C recorded on 26 April.

The monitoring period was generally dry with precipitation recorded on 36% of total days, however there were days which recorded significant amounts of rainfall, such as in late April and late May. A nine-day dry period was recorded from early to mid-May.



**Figure 3.1: Total daily precipitation and average daily temperature, Mountsorrel Quarry, 26 April – 31 May 2024**



**Figure 3.2: Wind rose, Mountsorrel Quarry, Mountsorrel, 26 April – 31 May 2024**

As seen in Figure 3.2, winds for this monitoring period were predominantly calm to moderate in speed ( $>0.5 - 6$  m/s) and from the south, north and east. Consequently, there may have been slight potential for dust propagation predominantly to the north, south and west throughout the monitoring period.

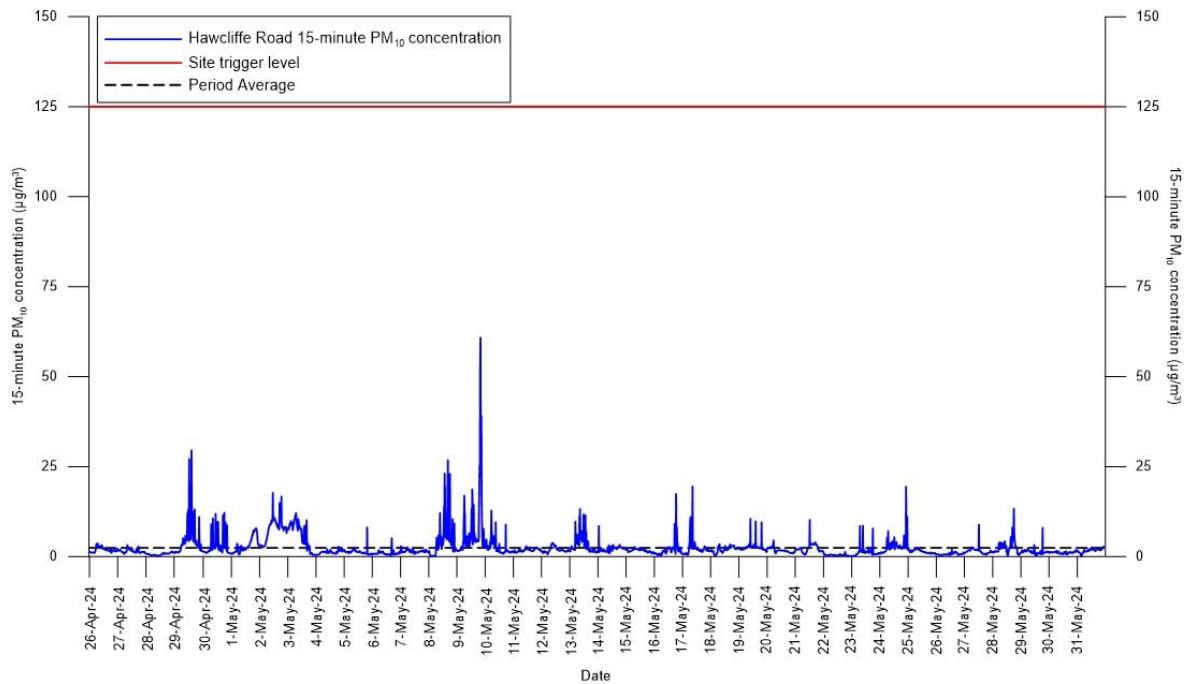
## 3.2 Particulate matter

### 3.2.1 $PM_{10}$

The available 15-minute data from the period of review are presented for both monitoring locations in Figure 3.3 and Figure 3.4. The red line denotes the site trigger level ( $125 \mu\text{g}/\text{m}^3$  over the 15-minute average), whilst the dashed black line denotes the average concentration recorded over this period.

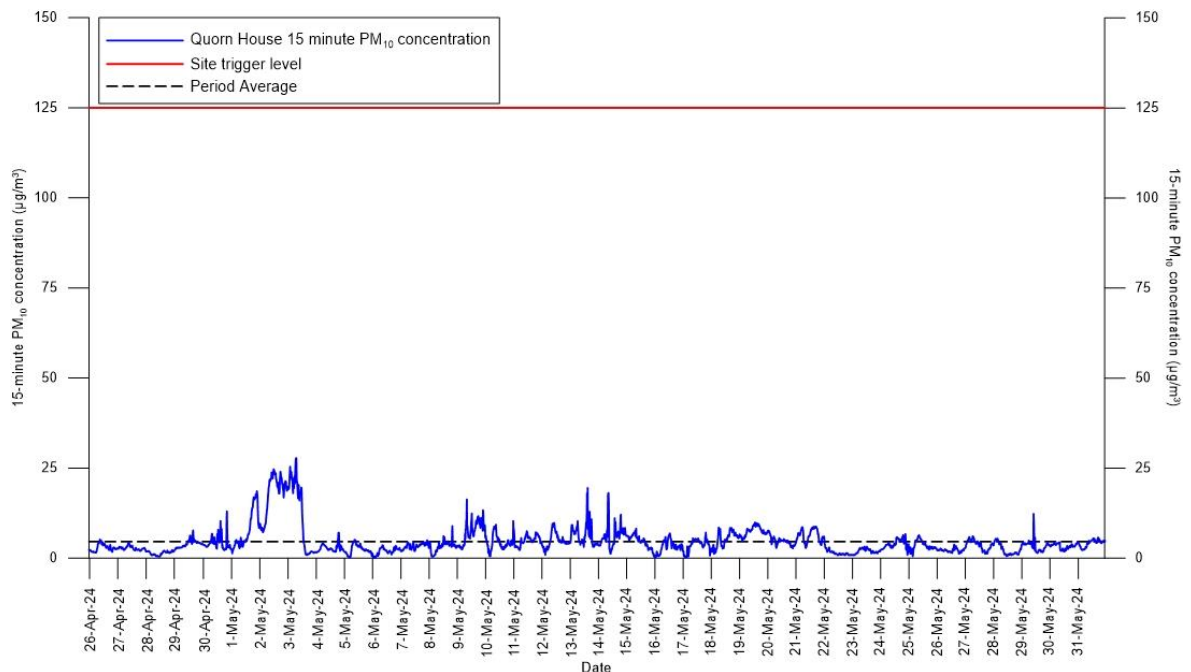
Additional  $PM_{10}$  monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix A.





**Figure 3.3: 15-minute mean PM<sub>10</sub> concentration, Hawcliffe Road, 26 April – 31 May 2024**

Figure 3.3 indicates that there were no exceedances of the site trigger level at Hawcliffe Road during this period, whilst the overall average concentration for this period was 2.4 µg/m<sup>3</sup>. Some short-term spikes were recorded in early May, however concentrations did not approach the site trigger level.



**Figure 3.4: 15-minute mean PM<sub>10</sub> concentration, Quorn House, 26 April – 31 May 2024**

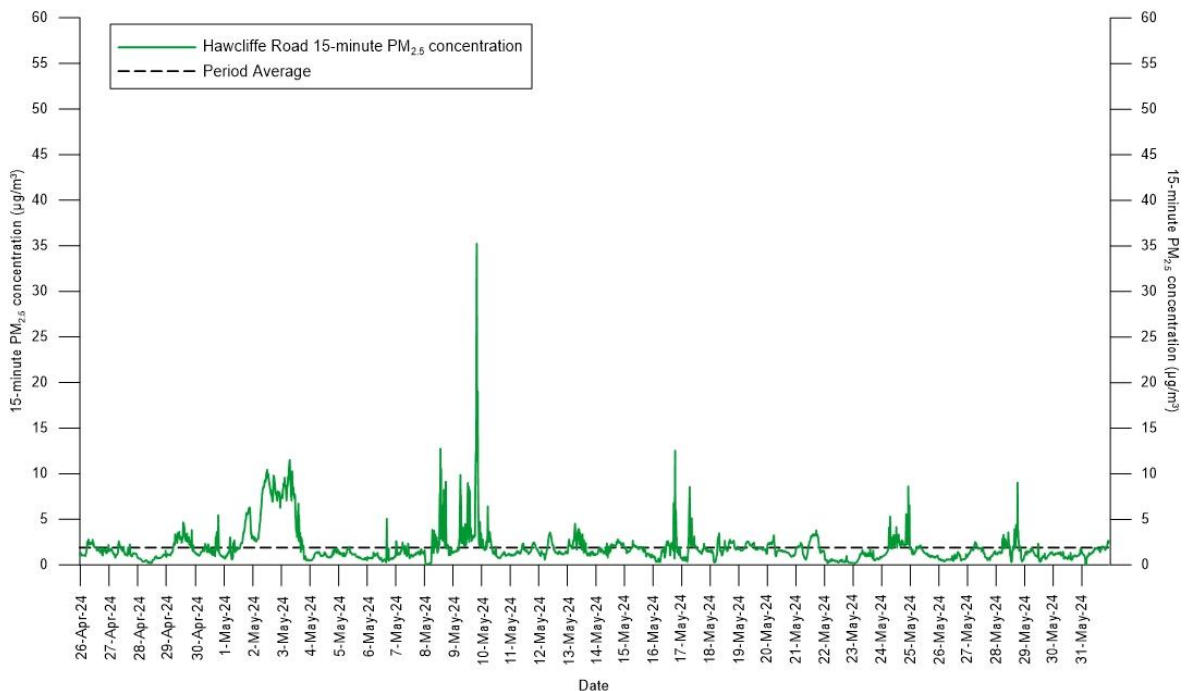
At Quorn House there were no exceedances of the PM<sub>10</sub> site trigger level, and the overall average concentration for this period was 4.6 µg/m<sup>3</sup>. The general similarity between PM<sub>10</sub> concentrations recorded at both locations suggests that the site was not a significant source

of PM<sub>10</sub> at these locations during this period. This is further demonstrated by the off-site PM<sub>10</sub> monitoring results presented in Appendix A.

### 3.2.2 PM<sub>2.5</sub>

The results of PM<sub>2.5</sub> monitoring at Hawcliffe Road and Quorn House are presented in Figure 3.5 and Figure 3.6. The dashed black line denotes the average concentration recorded over this period.

Additional PM<sub>2.5</sub> monitoring data (collected by CBC and the Defra AURN monitoring network) are provided in Appendix B.



**Figure 3.5: 15-minute mean PM<sub>2.5</sub> concentration, Hawcliffe Road, 26 April – 31 May 2024**

At Hawcliffe Road, the overall average concentration for this period was 1.9 µg/m<sup>3</sup> whilst at Quorn House, the overall average was 3.5 µg/m<sup>3</sup>. As with the PM<sub>10</sub> concentrations, it is most likely that a regional rather than local PM<sub>2.5</sub> signal was recorded during this period. This is supported by the CBC and AURN data presented in Appendix B. For this period, 78 % of PM<sub>10</sub> recorded at Hawcliffe Road was formed of PM<sub>2.5</sub>, whilst it made up 91% of PM<sub>10</sub> at Quorn House. This strongly indicates that a regional rather than a local particulate matter signal was recorded during this period.

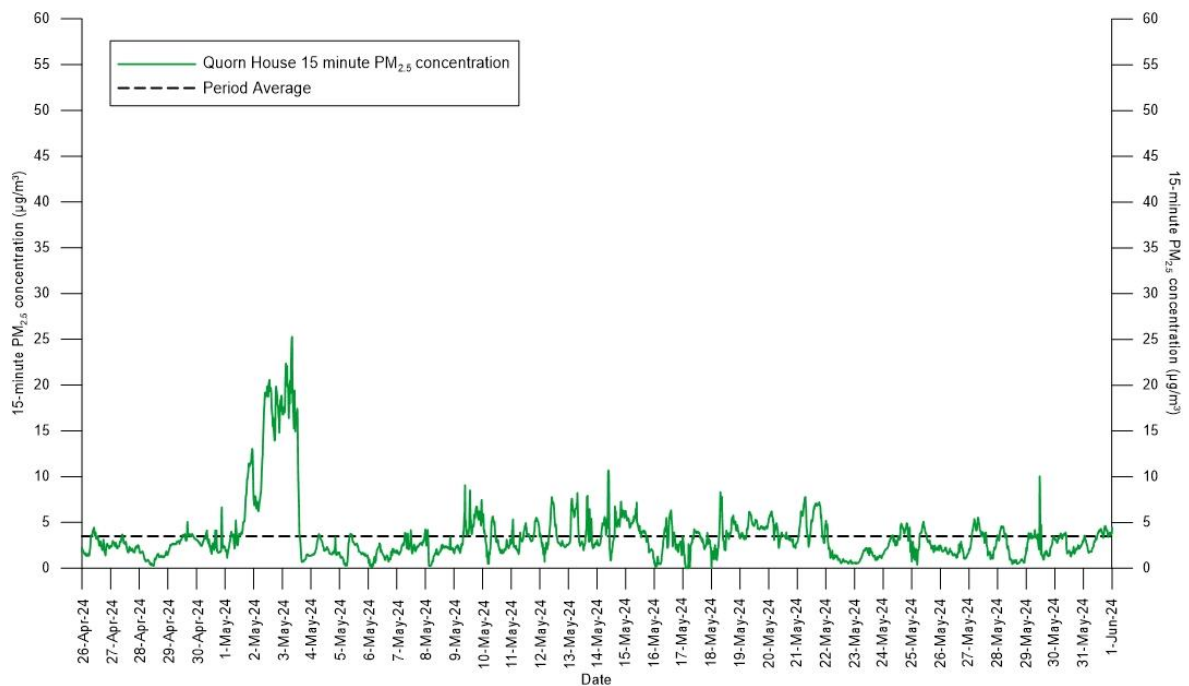


Figure 3.6: 15-minute mean  $PM_{2.5}$  concentration, Quorn House, 26 April – 31 May 2024

### 3.3 Visible dust

#### 3.3.1 Deposited dust monitoring summary

The deposited dust data for 26 April – 31 May 2024 are summarised in Table 3.1. As outlined earlier, point-specific thresholds have been calculated for investigation to identify the potential dust source/s, taking account of the directional data.

Table 3.1 shows that, for the available data, deposited dust levels during 26 April – 31 May 2024 were all within the site-specific threshold for all stations, although dust levels were approaching the trigger level at Stn 1. The sample from Stn 11 was contaminated and could not be processed.

**Table 3.1: Summary of deposited dust (undissolved solids), 26 April – 31 May 2024**

Undissolved solids (mg/m <sup>2</sup> /day)				
This month report start date:		26-Apr-24		
This month report end date:		31-May-24		
Receptor location	Nearest / appropriate dust monitoring point	Reported value	Trigger: ≥ 125 <sup>a</sup>	Magnitude <sup>b</sup>
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	93	No	Slightly Elevated
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	30	No	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	34	No	Very Low
Mill Farm; Quorn House	Stn 3	13	No	Very Low
Woodside Farm, Leicester Road	Stn 4A	19	No	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	21	No	Very Low
Bond Lane; Crown Lane	Stn 5	25	No	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	26	No	Very Low
Hawcliffe Road	Stn 9	46	No	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	40	No	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	no data	no data	no data
Meadow Farm Marina and Caravan Park	Stn 12	54	No	Low
Quorn House Park	Stn 13	15	No	Very Low

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

<sup>b</sup> Magnitude of mass deposition rate assessed against typical rate for semi-rural areas (30 - 80 mg/m<sup>2</sup>/day)

Regarding dust deposition over time, the rates across the sampling area have varied considerably. Trends in dust deposition rates (as undissolved solids) for the previous 12 months, together with the site-wide dust threshold are illustrated in Figure 3.7.

In general, as would be expected, dust deposition rates are typically lower in winter months than in summer months. This trend is clearly seen for most monitoring points in Figure 3.7, with some exceptions. Dust deposition rates have been consistently below the ‘trigger limit’ at all sampling locations except Stn 1B and 9, although the exceedances at Stn 1B are known to be related to nearby agricultural activities, rather than on-site processes.

In general, as shown in Figure 3.7, higher rates of dust deposition have been recorded near industrial settings (*i.e.* Stn 9) than in more residential areas (*e.g.* Stn 1, Kinchley Lane).

Figure 3.7 show that dust deposition rates were largely well within the site-specific trigger level during the previous 12 months although rates have occasionally been exceeded at Stn 9 and Stn 1B.

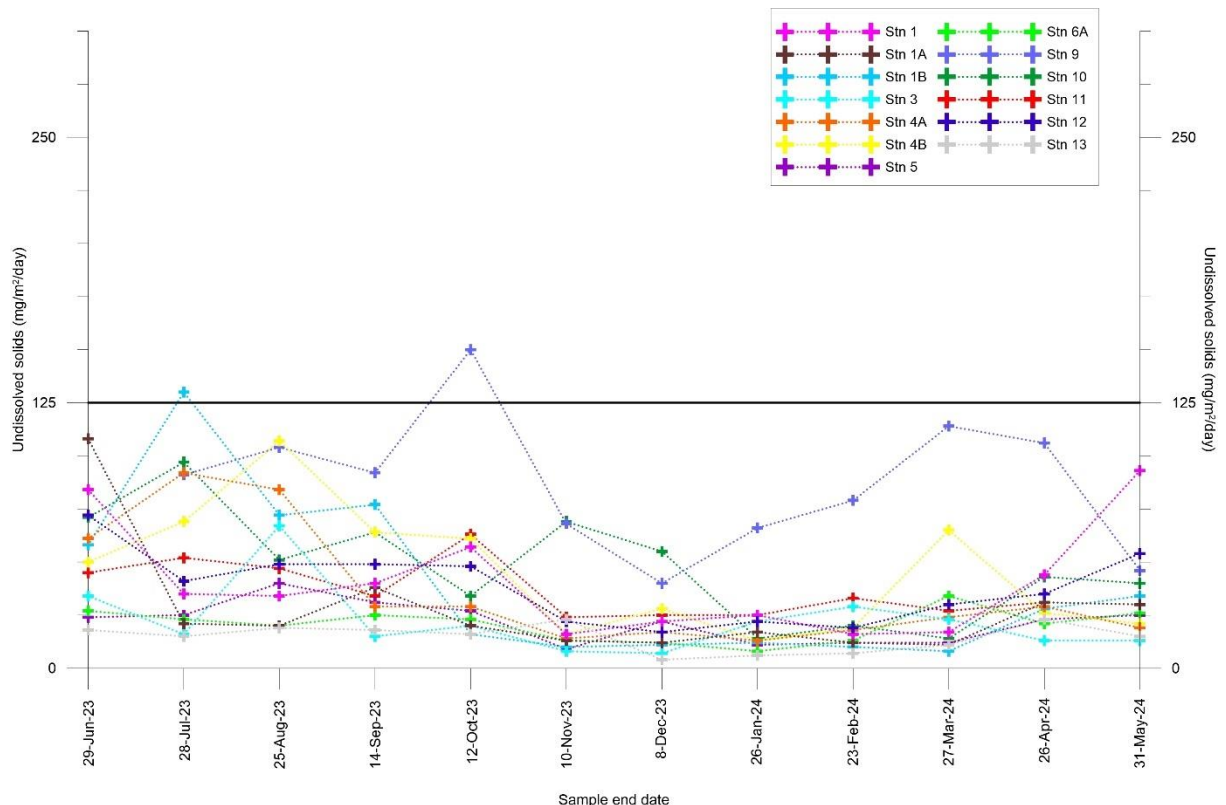


Figure 3.7: Dust deposition rates per sampling location over time (past 12 months)

### 3.3.2 Directional dust monitoring summary

The directional dust data for 26 April – 31 May 2024 are summarised in Table 3.2, and are presented graphically in Figure 3.8. As with deposited dust, the DMMP sets out a site-wide directional dust threshold. For directional dust soiling, 0.5 % effective area coverage (EAC) per day is a trigger limit for investigation to identify the likely dust source/s, again taking account of the direction.



Table 3.2 and Figure 3.8 show that during 26 April – 31 May 2024, all stations recorded Very Low dust levels from all directions, with the exception of Low dust levels at Stn 12 from the northeast and south.

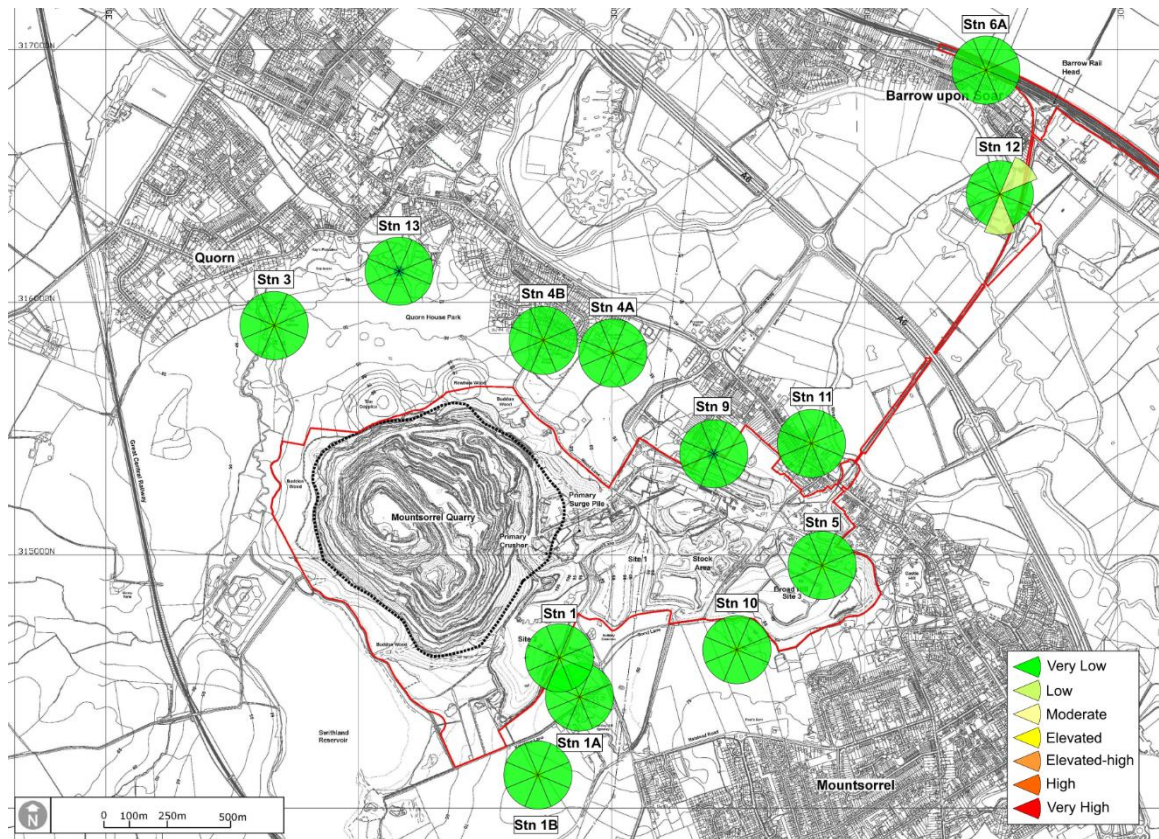
**Table 3.2: Summary of directional dust soiling, 26 April – 31 May 2024**

Directional dust soiling (%EAC/day) by direction (°)										
This month report start date:		26-Apr-24								
This month report end date:		31-May-24								
Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Reported value	0.1	0	0	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Reported value	0	0	0	0	0	0	0.1	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Reported value	0.1	0	0	0	0	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Reported value	0	0	0	0	0.1	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Reported value	0	0.1	0.1	0	0	0.1	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Reported value	0	0.1	0	0	0	0.1	0.1	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Reported value	0	0	0	0	0.1	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Reported value	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Reported value	0	0	0	0	0	0	0	0
		Trigger: ≥ 0.5 <sup>a</sup>	No	No	No	No	No	No	No	No
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

<sup>b</sup> Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

<sup>c</sup> Direction/s not determined for daily EAC below 0.1%/day (very low soiling)



**Figure 3.8: Directional dust soiling rose diagrams, 26 April – 31 May 2024**

Table 3.3 shows that average directional soiling rates have been at very low levels at most monitoring locations, for most directions, over the past year. At Stn 9, the annual average soiling rate to date was 0.2 % EAC/day from the southwest and west resulting in ‘Low’ magnitudes being recorded. The cause or causes of these consistently, but marginally elevated dust soiling rates at this monitoring point are under review, as they may be related to site activities such as operations at the PSV yard, Granite Way and/or the toast rack.

**Table 3.3: Running average directional dust soiling (past 12 months)**

Receptor location	Nearest / appropriate dust monitoring point		Direction (°)							
			0	45	90	135	180	225	270	315
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1	Average value	0.1	0	0	0	0	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1A	Average value	0	0	0	0	0	0	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Swithland Lane; Rushey Lane; Kinchley Lane	Stn 1B	Average value	0	0	0	0	0.1	0.1	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Mill Farm; Quorn House	Stn 3	Average value	0	0	0	0	0	0	0	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Woodside Farm, Leicester Road	Stn 4A	Average value	0	0	0	0	0	0.1	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn Grange, Unitt Road, Northage Close, Quorn Park	Stn 4B	Average value	0	0.1	0.1	0	0.1	0	0	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Bond Lane; Crown Lane	Stn 5	Average value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Sileby Road; Huston Close; Sileby Road (commercial)	Stn 6A	Average value	0	0.1	0.1	0	0	0.1	0.1	0
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Hawcliffe Road	Stn 9	Average value	0.1	0.1	0.1	0.1	0	0.2	0.2	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Very Low
Glebe Close; Halstead Road (south); Halstead Road (north)	Stn 10	Average value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Loughborough Road; River Soar (marina / caravan park)	Stn 11	Average value	0.1	0	0	0	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Meadow Farm Marina and Caravan Park	Stn 12	Average value	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Quorn House Park	Stn 13	Average value	0	0	0	0	0	0	0	0.1
		Magnitude <sup>b</sup>	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

<sup>a</sup> Trigger mass deposition and Effective Area Coverage rates as in Section 7.3, ZLFMS-AG008 Dust Management and Monitoring Plan (Updated), 2015

<sup>b</sup> Magnitude of directional dust soiling derived from Beaman and Kingsbury, 1981

<sup>c</sup> Direction/s not determined for daily EAC below 0.1%/day (very low soiling)

## 4 Complaints

During 26 April – 31 May 2024 no complaints relating to dust were received by the quarry.

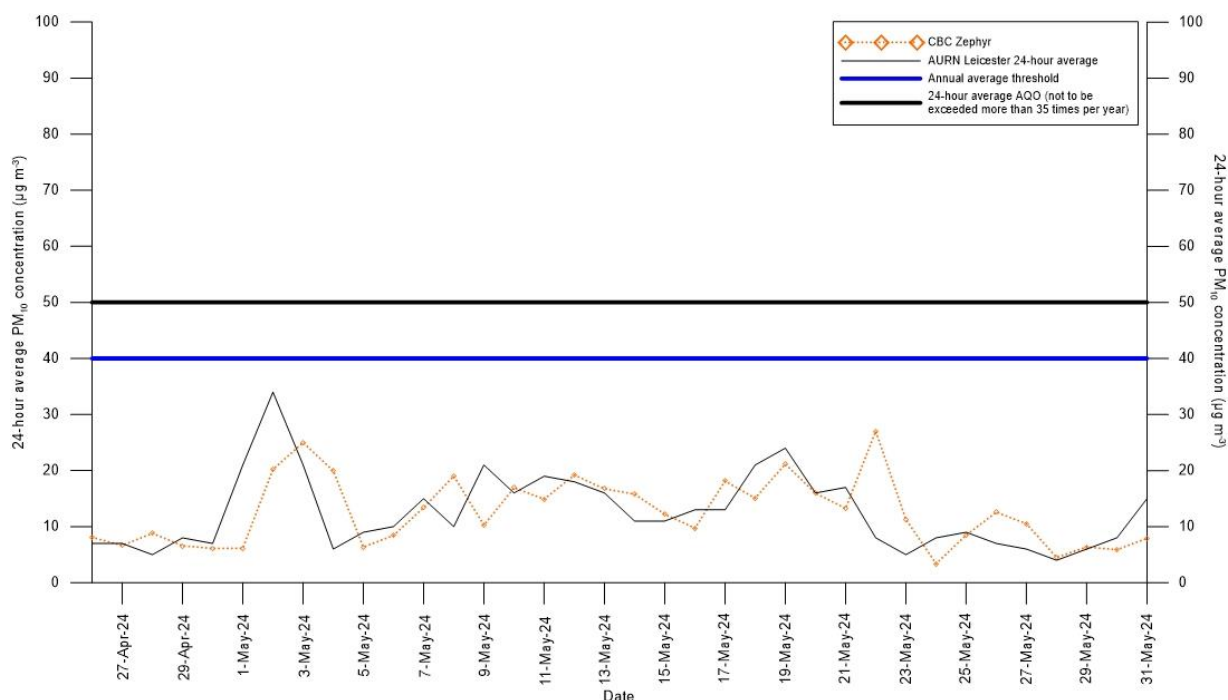
## Appendix A: Off-site PM<sub>10</sub> monitoring (CBC and AURN)

The daily average PM<sub>10</sub> concentrations recorded by the CBC Zephyr are presented below in Figure A.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University<sup>2</sup>.

For the 12 months leading up to 31 May 2024, there were 362 daily PM<sub>10</sub> readings taken by the CBC Zephyr, and 363 daily readings taken by the Leicester AURN, representing a 99% data collection rate at each respective location.

From the available data the annual average daily PM<sub>10</sub> concentration for the 12 months to date at CBC Zephyr was 9.16 µg/m<sup>3</sup>, which is approximately 22.9 % of the annual average PM<sub>10</sub> concentration objective (40 µg/m<sup>3</sup>). At the Leicester AURN the annual average daily PM<sub>10</sub> concentration for the 12 months to date was 10.6 µg/m<sup>3</sup> which is approximately 26.5 % of the annual average PM<sub>10</sub> concentration objective.

For the 12 months up to 31 May 2024 there were no recorded instances where the daily average PM<sub>10</sub> concentrations exceeded 50 µg/m<sup>3</sup> at either location. In summary, for the 12 months up to 23 February 2024 neither the annual nor daily AQO were exceeded.



**Figure A.1: Daily average PM<sub>10</sub> concentration, CBC Zephyr and Leicester AURN, 26 April – 31 May 2024**

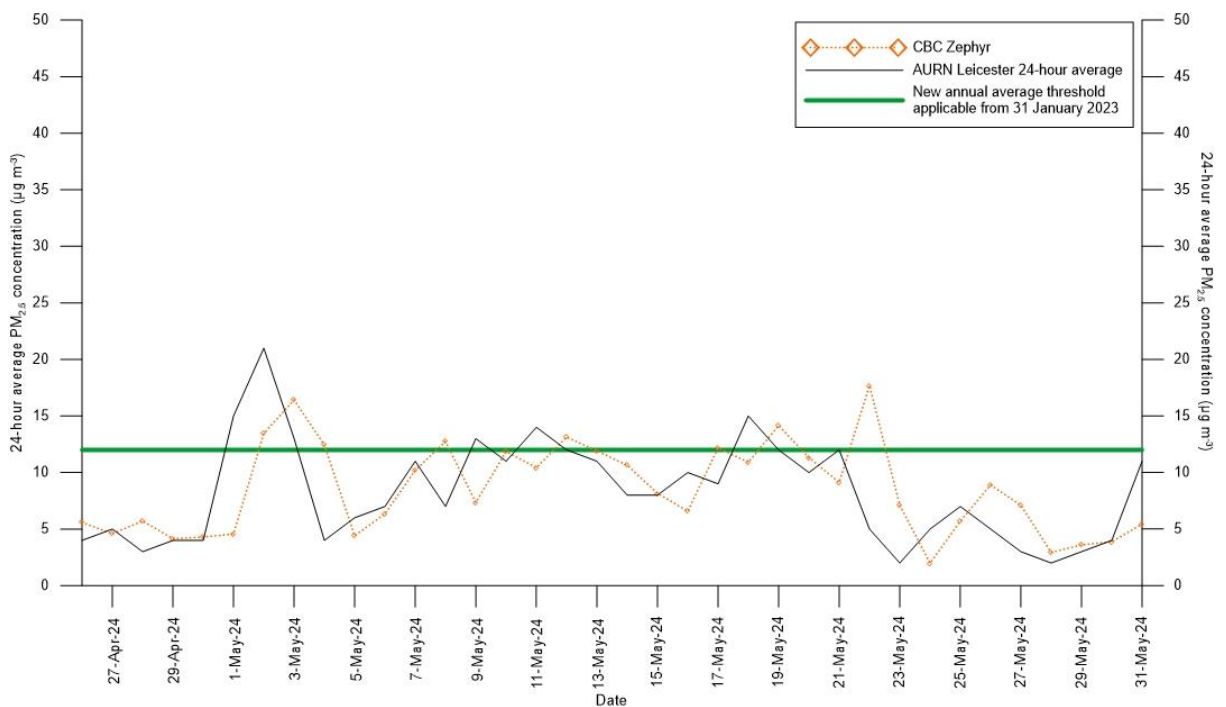
<sup>2</sup> <http://uk-air.defra.gov.uk/networks/network-info?view=aurn>



## Appendix B: Off-site PM<sub>2.5</sub> monitoring (CBC and AURN)

The daily average PM<sub>2.5</sub> concentrations recorded by the CBC Zephyr are presented below in Figure B.1, alongside similar data from the Defra Automatic Urban and Rural Network (AURN) station in Leicester University.

For the 12 months leading up to 31 May 2024, there were 363 daily PM<sub>2.5</sub> readings taken by the CBC Zephyr, and 363 readings taken by the Leicester AURN, representing a 99 % data collection rate respectively. From the available data the annual average daily PM<sub>2.5</sub> concentration for the 12 months at the CBC Zephyr was 5.15 µg/m<sup>3</sup>, which is approximately 43 % of the interim annual average PM<sub>2.5</sub> concentration objective (12 µg/m<sup>3</sup>) applicable from 31 January 2023. At the Leicester AURN the annual average daily concentration was 6.47 µg/m<sup>3</sup>, which is approximately 54 % of the interim annual average PM<sub>2.5</sub> concentration objective.



**Figure B.1: Daily average PM<sub>2.5</sub> concentrations, CBC Zephyr and Leicester AURN, 26 April – 31 May 2024**