Dust Monitoring and Management Plan

Bow Farm Quarry

January, 2025

Cullimore Group Ltd

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Document Control Sheet

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Report Prepared By

DustScanAQ
Unit 8 Nimrod
De Havilland Way
Witney
Oxon
OX29 0YG
Tel: + 44 (0) 1608 810110
E-mail: info@dustscan.co.uk
Web: www.DustScan.co.uk

Table of Contents

List of Tables

1 Introduction

1.1 Overview

Cullimore Group Ltd (herein Cullimore) has obtained planning permission (subject to conditions) for the development of a sand and gravel quarry on land at Bow Farm, south of Ripple, within the administrative boundaries of Worcestershire and Gloucestershire.

In November 2022, Worcestershire County Council granted planning permission (ref. 19/00048/CM), facilitating mineral extraction.

Appeal permission APP/T1600/W/23/3324695 was issued in January 2024 relating to the associated processing and haulage on land within Gloucestershire.

Condition 41 of the Worcestershire permission and condition 42 of the Appeal decision requires the submission and approval of a Dust Management and Monitoring Plan (DMMP). The conditions state:

> *"No soil stripping operations shall take place until a scheme for continuous dust monitoring has been submitted to and approved in writing by the Mineral Planning Authority. The scheme shall include method, nature, frequency, duration and locations of monitoring, trigger levels and contingency and mitigation proposals should a trigger level be breached. Thereafter monitoring shall be carried out in accordance with the approved scheme."*

This report comprises the DMMP for Bow Farm, covering both the management and monitoring of dust for the operation, and mitigation methods for the site.

1.2 Site setting

Bow Farm is located in open countryside in the parish of Twyning, north Gloucestershire, and is immediately south of the M50 and approximately 3.6 km south-west of junction 8 of the M5. The site lies in both Worcestershire to the west, where mineral extraction will be undertaken, and Gloucestershire, to the east, where the mineral processing area and the external haul route will be. Tewkesbury is approximately 3.5 km south-east of the site, the village of Twyning is located 2.1 km east of the extraction area and the village of Ripple is situated approximately 650 m to the north, beyond the M50.

The extraction area is bounded to the north by the M50, to the east by existing vegetation and Bow Lane, to the south by agricultural land, and to the west (Phases 1 – 9) and north (Flexible Working Phases A – B) by Ripple Quarry, which is currently undergoing restoration. The River Severn also lies to the west of the site and bounds Flexible Working Phase B.

The closest properties to the site lie on Bow Lane, east of the mineral extraction area, including the Grade II listed Puck Cottage. The residential properties at Bow Farm, off Bow Lane, and at Fairfields Bungalow, off the access to the A38, lie within the site and both are owned by Cullimore. Other nearby properties include those on the A38 to the south, those

on Page Lane to the east of the site entrance and those on Puckrup Lane, including The Hilton Puckrup Hall Hotel and Golf Course, to the north of the haul road and mineral processing area.

There are no SSSI, SAC, or SPRA designations within 500 m of the site, although both the Ripple Lake & The Napps Local Wildlife Site (LWS) and the Ripple Meadow LWS are located within the site boundary. The River Severn LWS also runs along the western boundary of the site.

1.3 Planned development

In summary, the mineral workings will be over an area of 52.9 ha with approximately 1.4 million tonnes of sand and gravel extracted over a seven year period at a rate of 250,000 tonnes per annum.

The vast majority of the extraction area lies within Worcestershire, with the site planned to be worked over a series of at least nine phases progressing from north to south. Soils and overburden will be stripped from the initial phases and will be used to construct screening bunds at perimeter locations. Extracted material will be transported via a conveyor along the western boundary of the mineral extraction area, away from receptors on Bow Lane, before being transported to the screening and washing plant in the eastern area of the application site.

Mineral extraction will be undertaken dry, achieved through construction of a clay cut off wall along the site perimeter.

Following completion of mineral extraction at each phase, imported inert and site derived materials will be used to restore the site to pre-extraction levels and to a combination of agricultural and nature conservation after uses.

2 Potential for emissions

2.1 Disamenity dust

'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_{10} and is measured to agreed standards and forms part of the Air Quality Objectives (AQO).

Coarser dust (essentially particles greater than 10 µm) is generally regarded as 'disamenity dust' (or 'nuisance') and can be associated with annoyance, although there are no official standards (such as AQO) for dust annoyance[1].

Although it is a widespread environmental phenomenon, dust is also generated through many human activities. This includes at minerals sites and surface mines, and also by heavy industry, waste management, construction and demolition, agriculture (especially arable farming) and road transport.

Dust is generally produced by mechanical action on materials and is carried by moving air when there is sufficient energy in the airstream. More energy is required for dust to become airborne than for it to remain suspended. Dust is removed through gravitational settling (sedimentation), washout (for example during rainfall or by wetting) and by impaction on surfaces (e.g. on vegetative screening). Dust can be re-suspended where conditions allow, such as from bare ground.

Dust emissions from a minerals site, its propagation and potential impacts can be considered in terms of 'source-pathway-receptor' relationships. Dust can arise from a variety of processes and locations within a site and can be difficult to quantify.

The common pathway for dust propagation is by air. Dust propagation depends on particle size, wind energy and disturbance activities. Large dust particles generally travel shorter distances than small particles. It is often considered that particles greater than 30 µm will largely deposit within 100 metres of sources, those between 10 – 30 µm will travel up to 250 – 500 metres and particles less than 10 µm will travel up to 1 km from sources.

Disamenity dust impacts from the site were assessed in a dust and air quality assessment (DAQA)[2] using the Institute of Air Quality Management (IAQM) 2016 Minerals Guidance[3]. The assessment found that some receptors could be anticipated to experience up to Moderate Adverse Effects from dust during soil stripping and bund construction. However, these activities will be short-term. All other quarry operations were predicted to have no greater than Slight Adverse Impacts on offsite receptors.

[1] The expression 'disamenity dust' has been recently promoted as a suitable expression for 'nuisance' dust, *i.e.* generally visible particulate matter' rather than specifically and in a legal sense to statutory nuisance, as defined in Section 79 of the Environmental Protection Act 1990
[2] Report reference: ZCGBF_DAQA_D
[3] Institute of Air Quality Management (2016). *Guidance on the Assessment of Mineral Dust Impacts for Planning (v1.1)*

Consequently, mitigation and monitoring measures for managing disamenity dust emissions at Bow Farm have been considered in this report.

2.2 PM_{10} and $PM_{2.5}$

Fine dust, essentially particles up to 10 µm in diameter, is commonly referred to as PM_{10}. PM_{10} is measured to agreed standards and, through the National Air Quality Strategy (NAQS) objectives to be achieved for a range of pollutants, forms part of the Air Quality Objectives (AQO).

The AQOs for PM_{10} are 50 µg/m^3 averaged over 24 hours, not to be exceeded more than 35 times per year, and 40 µg/m^3 as an annual mean. The AQO for $PM_{2.5}$ was recently updated in the new Environmental Targets (Fine Particulate Matter) (England) Regulations (2023), with a new interim target of 12 µg/m^3 until 2028, and an annual mean target of 10 µg/m^3 to be achieved by 2040.

The Defra predicted background concentrations[4] for the grid squares at the site are currently (2024) 12.6 and 7.6 µg/m^3 for PM_{10} and $PM_{2.5}$ respectively. In accordance with the IAQM guidance, when background PM_{10} concentrations are below 17 µg/m^3 it is considered unlikely that the quarry process contribution would lead to an exceedance of the annual mean objective.

The impacts on PM_{10} and $PM_{2.5}$ from Heavy Goods Vehicle (HGV) traffic generated by the proposed quarry were also assessed in a detailed air quality assessment[5]. The assessment found that the AQOs at the façade of all existing receptors would be met with or without the quarry in place and no further air quality mitigation measures were recommended for the operational phase of the proposed development.

Although the risk of impacts from site emissions of PM_{10} and $PM_{2.5}$ is therefore very low, Condition 42 of the Appeal decision states that a "*scheme for continuous dust monitoring"* is required. This DMMP therefore sets out a scheme for PM_{10} and $PM_{2.5}$ monitoring on the site boundary at selected locations.

2.3 Respirable Crystaline Silica (RCS)

Crystalline silica is found everywhere, most commonly as the mineral quartz, which is a major component of numerous abundant rock types. As a result of its ubiquity, it can be found in many quarried materials, such as granites, sandstones and unconsolidated minerals such as sand and gravel.

Fine silica can have a crystalline structure, making individual particles very strong with sharp edges. These particles, when of a respirable size (roughly PM_4), are commonly referred to as RCS and can become wedged deep down inside the lungs and cause irreversible damage. Continued exposure can lead to the development of lung diseases such as

[4] Department for Environmental Food and Rural Affairs. Accessible at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018
[5] Report reference: ZMCCBF_AQA_Final

silicosis and Chronic Obstructive Pulmonary Disease (COPD)[6], hence why exposure to RCS is tightly controlled by the Health and Safety Executive (HSE).

The risk of elevated RCS concentrations is dependent on the presence of crystalline silica of a particular size (PM_4). From experience, there is increased potential for the generation of respirable-sized particles as a result of high-energy mineral processing activities, notably crushing. Other on-site activities, such as material screening and handling, do not tend to generate as many particles in the respirable fraction.

At Bow Farm, it is understood that no crushing will be taking place. The Mineral Products Association (MPA) recognise the importance of particulate matter and RCS in their publication on 'Quarries and Dust'[7]. Occupational exposure to RCS is regulated by the HSE, and a Workplace Exposure Limit (WEL) exists for RCS as outlined in COSHH EH40[8].

The exposure of the population living near to quarries to RCS has also emerged as an issue since the Bengeo Public Inquiry, where the risk of RCS was one of the reasons given for refusal for the proposed sand and gravel quarry in Hertfordshire. Similarly, in the case of a recently proposed sand and gravel extraction at Wasperton in Warwickshire (planning still to be determined as of 2024), local community opposition centred on the risk of RCS, to the extent that the local MP, Matt Western, promoted a private members bill to parliament, the Quarries (Planning) Bill. The long title of the bill[9] was 'A Bill to introduce a presumption in planning decision-making against approving quarry development in close proximity to settlements; to require the risks of proposed quarrying sites to health and the environment, including through silica dust, to be assessed as part of the planning process; to make provision about the use of quarries for waste disposal; and for connected purposes'. The bill failed to become law in 2022.

The resultant use of an ambient benchmark level of RCS of 3 µg/m^3, which is currently used in US states such as California and Minnesota, and is based on research carried out by the US Environmental Protection Agency, is starting to become common in the UK as best practice for assessing the long-term risk to communities near potential sources of RCS. A period of monitoring to this standard is therefore proposed at Bow Farm in order to provide assurance to local residents.

2.4 Dust sources

As set out in the 2020 DAQA there is a potential for dust emissions to occur at various stages of the operation, but these can generally be controlled by good practice. Potential sources or site activities likely to give rise to dust at Bow Farm are:

- Soil stripping, storage and reinstatement;
- Overburden removal, storage and reinstatement (including imported material infilling);

[6] HSE INDG463 (2013) - Control of exposure to silica dust: A guide for Employees.
[7] Available at: https://mineralproducts.org/MPA/media/root/Publications/2022/MPA_Quarries_and_Dust_Air_Emissions_2022.pdf
[8] Available at: https://www.hse.gov.uk/pubns/priced/eh40.pdf
[9] Available at: https://bills.parliament.uk/bills/3080

- Mineral extraction and handling;
- Mineral and material processing;
- Mobile plant (on-site and off-site vehicle movements); and
- Wind scouring of exposed surfaces and stockpiles.

The potential dust sources are considered further below in Section 3.3 and Appendix B, with reference to the recommended control measures.

2.5 Receptors

Dust receptors can be within or beyond a quarry site boundary. Whilst dust generation within a minerals site is primarily of concern to its operator, staff and visitors, dust can propagate beyond the site boundary to affect people and properties beyond, unless adequate control measures are in place. It is important to recognise that there may be other dust sources in the vicinity of a quarry (such as road traffic or arable farmland).

As determined in the dust and air quality assessment, there are High sensitivity residential receptors within 250 m of the site. As stated in the updated assessment, this includes the Hilton Puckrup Hotel. The façade of Hilton Puckrup Golf Course was considered as a Medium sensitivity receptor.

The principal dust receptors in the vicinity of the site are set out in Table 2.1, together with the minimum distance (in metres) to the working areas, the principal direction (or directions) to the receptor from the phase of quarry workings and the sensitivity level of the receptor, as set out in the IAQM guidance.

Table 2.1 Principal dust receptor locations

Receptor	Dust source locations	Primary direction/s to dust sources (°)	Minimum distance (m)
Puck Cottage	Mineral extraction area	195 - 315	60
The Threshing Bow	Mineral extraction area	225 - 315	65
Bow Cottage	Mineral extraction area	225 - 315	85
Bowfields	Mineral extraction area	165 - 285	60
Bow Farm	Mineral extraction area	135 - 045	50
Dadsley Cottage	Mineral extraction area	195 - 255	200
Fairfields	Haul road and mineral processing area	105 – 285	20

Receptor	Dust source locations	Primary direction/s to dust sources (°)	Minimum distance (m)
Far End	Haul road and mineral processing area	255 - 045	115
Sion House	Haul road	225 - 255	200
A38 Properties	Haul road	345 - 015	230
Church End Nursery	Haul road and mineral processing area	255 - 075	60
Hilton Puckrup Hotel	Haul road and mineral processing area	135 - 225	250
Hilton Puckrup Golf Course	Haul road and mineral processing area	075 - 225	50

The distances shown in Table 2.1 are the minimum between each potential receptor and the closest stage of site operations and thus can be considered to represent a ‘worst case’ evaluation.

3 Dust management

Standard good practice on dust control is set out in various publications, including PGN 3/08(12)[10] which sets out at Section 4 a summary of best available techniques for dust control at minerals sites. In accordance with good practice guidance, potentially unacceptable dust emissions from minerals sites can be addressed through a dust management plan[11].

3.1 General requirements

Unacceptable dust emissions can be mitigated by ensuring that routine checks of plant and machinery are carried out and that regular staff training is provided.

All activities with the potential to cause either airborne or wind-blown dust emissions will be monitored appropriately. This should include a visual assessment of any potential impacts at downwind receptors.

Should visible dust be generated, the source/s of the dust will be identified, and the necessary corrective action will be taken. Each event, its cause and the action taken will be recorded in the site logbook.

If necessary, to avoid disamenity impacts at off-site receptors, site operations causing visible dust emissions across the site boundary towards a sensitive receptor will be reduced or suspended until the emissions can be controlled.

Site personnel will be empowered to take appropriate action whenever visible dust emissions are observed, or appear likely to occur, as a result of any operation or process on the site.

3.2 Weather conditions

A trigger system should be adopted to identify those weather conditions when there is an increased or high risk of wind-blown dust. Suggested weather trigger levels are detailed in Table 3.1**.**

[10] Process Guidance Note (PGN) 3/08 (12) *Statutory guidance for quarry processes* (Defra, 2012)
[11] AEA Technology, 2011: *Good practice guide: control and measurement of nuisance dust and PM_{10} from the extractive industries*

Table 3.1: Weather conditions and corresponding dust 'risk' conditions

Wind speed		Precipitation		
m/s	Beaufort Scale	Dry	Showers	Heavy Rain
> 6	4+ Dust and loose paper raised. Small branches begin to move.	**Red**	**Amber**	**Green**
2 – 6	2 – 3 Wind felt on exposed skin. Leaves rustle. Wind vanes begin to move.	**Amber**	**Green**	**Green**
< 2	0 – 1 Smoke drift indicates wind direction. Leaves and win vanes are stationary.	**Green**	**Green**	**Green**

Interpretation of the weather trigger levels should be on the basis of:

- Red: All exposed areas of loose bare ground and stockpiles will be inspected and treated as necessary;
- Amber: Loose bare ground and stockpiles within 100 m of the site boundary will be inspected and treated as necessary, and
- Green: no action necessary.

As an overriding requirement, during dry windy weather, i.e. 'red' conditions as defined in Table 3.1, if any operations are identified as causing or likely to cause visible emissions across the site boundaries, or if abnormal emissions are observed within the site, the Site Manager should immediately modify, reduce or suspend those operations until either effective remedial actions can be taken or the weather conditions giving rise to the emissions have moderated.

3.3 Process controls

The table in Appendix B: Process controls, sets out the source, pathway, receptors, potential impact and controls for specific processes recognised as having the potential to generate dust at Bow Farm.

Extra care should be taken during soil stripping and soil bund construction, particularly when working close to the site boundary, as the Dust Assessment has identified these activities as the most likely to cause dust nuisance impacts at offsite receptors.

General matters and the management of the site can affect the likelihood of significant dust emissions. These include:

- The use of clean water for dust suppression to avoid re-circulating fine material;
- High standards of housekeeping to minimise track-out and wind-blown dust;
- Minimise working materials in very dry, windy conditions; and

- Effective staff training in respect of the causes and prevention of dust.

The water supply to any dust suppression installations will be protected against frost to ensure its availability at all times.

As stated in Section 2.1, dust propagation is affected by many factors including particle size. The ratio of sand to gravel that will be handled at the site is not known. As sand is finer than gravel, there could be an increased risk of dust propagation when excavating and handling mineral with a high sand to gravel ratio.

Extra precaution should be taken when working a high ratio of sand to gravel, particularly near the site boundary or within 100 m of receptors. Minerals should be worked wet with water sprays used in dry, windy conditions.

3.4 Maintenance

Effective control of airborne dust emissions requires the maintenance and proper operation of all plant and equipment, including fixed and mobile dust extraction and suppression equipment.

A programme of planned maintenance should be carried out on all plant and equipment in accordance with the manufacturers' recommendations to ensure that it operates at optimum efficiency. Stocks of essential spares and consumable items should be held at the site or kept readily available for use at short notice.

Any malfunction or breakdown leading to abnormal emissions will be dealt with promptly and operations will be modified or suspended until normal working can be restored. All such malfunctions and the actions taken will be recorded in the site logbook.

3.5 Site management

The Site Manager will exercise, either personally or by delegation to suitably trained and responsible staff, day-to-day control of the site. They will be responsible for the satisfactory working of the whole site and for ensuring full compliance with this dust management and monitoring plan. Staff at all levels should receive the necessary training and instruction in their duties relating to all operations and the potential sources of dust emissions. Particular emphasis should be given to plant and equipment malfunctions and abnormal conditions.

The Site Manager should ensure that customers and suppliers are aware of the need to comply with the provisions of this plan so far as they are relevant to their activities on site. Specifically, an information sheet summarising the requirements in respect of road transport should be handed to drivers employed by external haulers. The drivers should be asked to sign for the sheet, acknowledging that they have read and understood the requirements.

Any member of staff who fails to comply with the provisions of the dust management and monitoring plan will be re-trained as necessary and may also be subject to disciplinary action. External haulers failing to observe the requirements in respect of vehicle operations will be asked to leave the site.

4 Monitoring

Dust emissions at Bow Farm will be monitored routinely by visual means and using dust and air quality monitoring equipment.

4.1 Visual

All activities with the potential to cause either airborne or wind-blown dust emissions will be monitored appropriately. This will include a visual assessment of any potential impacts at downwind receptors.

A daily site inspection should be carried out by the Site Manager (or other suitably qualified person) at the start of the day. The current weather conditions should be recorded and the Site Manager should determine the appropriate control measures to deploy to reduce dust emissions. A portable anemometer should be held on site to record wind speeds when required.

Should visible dust be generated, the source/s of the dust will be identified, and the necessary corrective action will be taken.

Each event, its cause and the action taken will be recorded in the site logbook. If necessary to avoid nuisance, the Quarry Manager will instruct the reduction or suspension of any operation or process causing visible dust emissions across the site boundary towards a sensitive receptor until the emissions can be controlled.

4.1.1 Response

Additional mitigation measures, such as increasing water suppression, suspending or ceasing certain activities, will be applied where visible dust emissions are logged or there is an increased potential for emissions, such as dry, windy conditions.

If dust emissions are the result of equipment failure, the faulty items of the plant will be identified, and the nature of repair will be recorded.

4.2 PM_{10}, $PM_{2.5}$ and RCS

As summarised in Section 2.2, impacts on the PM_{10} and $PM_{2.5}$ AQOs from site emissions are anticipated to be Negligible. However, Condition 42 states that "*a scheme for continuous dust monitoring"* is required. A proposed scheme is therefore set out below.

4.2.1 PM_{10} and $PM_{2.5}$ monitoring

A real-time PM_{10} and $PM_{2.5}$ monitor is proposed to be continuously installed at the site boundary of the highest risk site area on an ongoing basis, based on the location of potential dust generating activities and their proximity to local receptors. A period of 3 months baseline monitoring is also recommended prior to work commences on site, to enable a suitable comparison with existing conditions.

Given the size of the site and spread of activities over a wide area, it is recommended that this monitor is located:

- Initially on the eastern site boundary towards Church End Nursery, to monitor emissions from the plant site and haul route; and
- At later phases (Phase 4 onwards) on the extraction area site boundary, to monitor extraction area emissions towards receptors in Bow Lane.

The monitoring equipment used will satisfy the Environment Agency's Indicative MCERTS standard. Concentrations of PM_{10} and $PM_{2.5}$ recorded by such equipment are typically measured every 10 seconds, and recorded as 15 minute or 1-hour averages.

The equipment will be capable of instantly sending an email alert when an agreed site threshold is breached, and all data can be viewed by the operator in a real-time dashboard.

In the absence of any site threshold levels developed specifically for the mineral industry, a Site Action Level of 190 µg/m^3 as a 1-hour mean is recommended. This threshold level was developed for construction site monitoring in a study by Kings College evaluating reference-equivalent data from nine construction sites, and is indicative of a localised dust source.

This Site Action Level will be reviewed regularly in comparison with baseline and average concentration levels and any complaints from local receptors.

If the Site Action Level is breached, an email alert will instantly be sent to the Site Manager to enable action to be taken. A regular report reviewing any breaches of the Site Action Levels, the suspected cause and the resultant action will be produced and made available to the MPA as required.

4.2.2 RCS monitoring

RCS is proposed to be monitored for an initial period of 3 months, starting just prior to works begin on site, to enable both a baseline concentration and potential site contribution to be assessed. It is recommended that the monitor is located on the eastern site boundary towards Church End Nursery, to monitor emissions from the plant site and haul route.

Concentrations of airborne PM_4 (essentially respirable dust) will be measured using a modified DustScanAQ DS500X filter reference gravimetric sampler. The DS500X uses a size-selective inlet jet impactor system to sample PM_4 from a large quantity of ambient air[12] (over typically a seven or fourteen day period) and retains it for subsequent quantification. This allows the measurement of RCS concentrations at a detection limit of 0.1 – 0.2 µg/m^3, dependant on sample duration[13].

Consequently, the DS500X is not a 'real time' sampler; however, the collection of a physical sample enables analysis to determine RCS concentrations. Whilst the PM_{10} impactor used

[12] Occupational monitoring of RCS to COSHH standards is well established, but is unsuitable for environmental sampling of RCS due to the volume of air that needs to be sampled to measure at lower concentrations.
[13] By comparison, occupational monitoring detection limits for RCS are typically 10-20 µg/m^3, which are sufficient given that the current WEL for RCS is 0.1 mg/m^3 (100 µg/m^3)

in the standard DS500X has been extensively tested and verified, the PM_4 variant is a prototype device and has yet to go through independent verification. However, the impactor design is based on well understood mathematics and has been precisely designed to capture PM_4; there is currently no validated UK method for measuring ambient RCS.

Following the completion of the monitoring programme, samples are sent to an accredited laboratory for X-Ray Diffraction (XRD) analysis to determine the total mass of RCS present. From this, an ambient airborne concentration of RCS is calculated which can be compared against the ambient benchmark level of RCS of 3 $\mu g/m^3$.

A report will then be produced summarising the results and assessing any need for future RCS monitoring on site. This will include recommendations on whether additional monitoring or mitigation measures are required, or if further monitoring is unnecessary. The report will be provided to the MPA for review.

5 Emergency response

An emergency response procedure, to be followed in the event of a major dust emission, will be kept at the site office.

For the purposes of emergency response, major dust emissions will be defined as including:

- visible dust crossing the site boundaries;
- persistent fugitive dust from mineral extraction and handling;
- persistent fugitive dust from mineral processing;
- persistent fugitive dust when loading or tipping soils, minerals or inert waste;
- persistent fugitive dust from transport or plant movements; and
- persistent wind-blown dust.

The contact details of key personnel and organisations will be listed in the procedure.

6 Complaints

All complaints regarding dust emissions will be recorded and reported to the Site Manager, who will investigate the circumstances and ensure that the necessary corrective measures are taken.

In the event of a complaint from a member of the public regarding dust emissions from the site, a record will be kept and made available to the MPA as required.

All complaints will be investigated as soon as possible and the complainant kept informed throughout the investigation. All complaints should be logged in the format described in Appendix A. The MPA will be kept informed of the results of any subsequent investigation.

In the event of any dust complaint substantiated after consultation with the MPA, the effectiveness of the dust management and monitoring plan will be reviewed.

7 Review and update

The continuing effectiveness of this dust management and monitoring plan should be reviewed at least annually in consultation with the MPA and with reference to any ongoing monitoring. The reviews will take into account compliance records, any complaints history, monitoring records and any recent sensitive developments on neighbouring land.

Reviews of the plan will also be undertaken in the event of:

- changes to the AQO for PM_{10} and/or $PM_{2.5}$;
- dust complaints from nearby residents or businesses; or
- exceedances of the benchmark values for RCS, PM_{10} and $PM_{2.5}$ from site monitoring as a result of site activities.

The plan will be amended as necessary, including any changes to the monitoring methods and control measures which may be agreed.

Appendix A: Proposed complaints log format, Bow Farm

Customer Details	
Name	
Address Postcode	
Contact Details	
Tel	
Email	
Date	
Complaint Ref No.	
Complaint Details	

Investigation Details	
Investigation carried out by	
Position	
Date & time investigation carried out	
Weather conditions	
Wind direction and speed	
Investigation findings	
Feedback given to Environment Agency and/or local authority	
Date feedback given	
Feedback given to public	
Date feedback given	

Review and Improve	
Improvements needed to prevent a reoccurrence	
Proposed date for completion of the improvements	
Actual date for completion	
If different insert reason for delay	
DMP update required?	
Date of DMP update	

Closure	
Site manager review date	
Site manager signature to confirm no further action required	

Appendix B: Process controls

Source	Pathway	Receptors	Potential Impact	Controls
Unloading, tipping and handling imported materials from HGV tipper trucks	Windblown dust and suspension from tipping and handling dry materials	Local residents	Dust soiling and possible complaints from local residents	Inspect all loads before tipping. Wet down freshly tipped loads of dry and friable material in dry, windy weather conditions. Suspend tipping of dry and friable material if visible dust emissions appear high.
Discharge points	Windblown dust from conveyors, transfer points and discharge points	Local residents	Dust soiling and possible complaints from local residents	Keep discharge points as low as reasonably practicable. When required, transfer points will be enclosed with wind whipping boards.
Material handling and loading	Windblown dust: depends on material handled	Local residents	Dust soiling and possible complaints from local residents	Keep drop heights to as low as possible. Suspend handling of dry and friable material if visible dust emissions appear high.
Soil stripping	Windblown dust and suspension of material from excavating soil	Local residents	Dust soiling and possible complaints from local residents	Minimise working of soils in very dry, windy conditions. Additional control measures, such as the use of water sprays or should be considered where there is a risk of wind-blow across the site boundary towards off-site receptors.
Construction of soil bunds	Windblown dust from exposed surfaces and handling dry materials	Local residents	Dust soiling and possible complaints from local residents	Soil storage bunds will be stabilised by seeding and maintained appropriately.
Mineral extraction	Windblown dust and suspension of material from mineral extraction	Local residents	Dust soiling and possible complaints from local residents	Minimise working very dry material in windy conditions. Water suppression, such as water sprays, should be used if there is a risk of visible dust emissions.

Source	Pathway	Receptors	Potential Impact	Controls
Mineral processing	Windblown dust and suspension of material from screening and grading	Local residents	Dust soiling and possible complaints from local residents	Mineral processing activities, including screening and grading, should be undertaken within the plant site and away from site boundaries and offsite receptors. Water sprays should be used in dry, windy conditions.
Wind scouring of exposed surfaces	Windblown dust from exposed ground and surfaces	Local residents	Dust soiling and possible complaints from local residents	Site entrance is surfaced with concrete: ensure any damage is promptly repaired.
Wind scouring of stockpiles	Windblown dust from dry, unconsolidated material	Local residents	Dust soiling and possible complaints from local residents	No stockpiles of processed or unprocessed aggregate within the plant area will exceed a height of 5 metres. Stockpiles should be managed in accordance with the Quarries Regulations 1999 and, where practicable, formed to maintain a smooth profile to minimise the spreading of loose material. Keep stockpiles consolidated and clear up any loose material. Wet down stockpiles of dry material if visible dust emissions appear high.
Onsite vehicle movements	Resuspension of dust on internal haul routes from mobile plant movements	Local residents	Dust soiling and possible complaints from local residents	Mobile plant with upward or sideways exhausts will be used and all site haulage will keep to designated haul routes. A water bowser should be used for damping down roads around the quarry. Unmade access roads will be kept in good repair. Vehicle speed limits determined by the Site Manager will be enforced. Speed limits may

Source	Pathway	Receptors	Potential Impact	Controls
				according to the site and weather conditions pertaining at the time.
HGVs (1)	Track-out onto public highway from loose deposits from inadequately cleaned vehicles	Local residents and other road users	Dust soiling and possible complaints from local residents	All departing HGVs should pass through the wheel-wash and should be inspected and, if necessary, cleaned to remove loose deposits;
HGVs (2)	Wind-blown dust from un-sheeted loads	Local residents	Dust soiling and possible complaints from local residents	All departing HGVs must be sheeted
HGVs (3)	Track-out onto Long Lane	Local residents	Dust soiling and possible complaints from local residents	All spillages at the site entrance should be cleared as quickly as possible. Spill kits should be made available on site for immediate use in this situation.