Dust Management Plan

Greetham Quarry

Client: Mick George Ltd

Reference: 3682-1r3

Date: 16th October 2020

Report Issue

Report Title: Dust Management Plan - Greetham Quarry

Report Reference: 3682-1

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Comments	Draft for Comment	-	-	

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Mick George Ltd to produce a Dust Management Plan (DMP) to identify and formalise the measures for controlling potential impacts associated with the proposed extension to Greetham Quarry.

1.1.2 The purpose of this DMP is to:

- Establish the likely sources of dust emissions arising at the quarry;
- Set out the procedures which will be followed at the site in order to prevent or minimise dust emissions; and,
- Formalise the procedures for dealing with any complaints.

1.1.3 This DMP has been designed to:

- Employ appropriate methods, including contingencies, to control and minimise dust emissions;
- Prevent unacceptable dust related pollution at all times; and,
- Reduce the risk of dust releasing incidents or accidents by anticipating them and planning accordingly.

1.1.4 This DMP has considered sources, releases and impacts, and used these to identify opportunities for emissions management.

1.2 Site Location and Context

1.2.1 Greetham Quarry is located on land north of Stretton Road, Greetham, at National Grid Reference (NGR): 492942, 315098. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals include an extension to the existing quarry in order to extract 3 million tonnes of limestone over the course of circa 20 years. Reference should be made to Figure 2 for a site layout plan.

1.2.3 A planning application for the extension of Greetham Quarry was submitted to Rutland County Council (RCC) (ref: 2020/0297/MIN). Subsequent to submission, RCC have raised concerns over the potential for the site to cause adverse impacts as a result of fugitive dust emissions associated with the extraction, processing, re-contouring and transfer of materials. A DMP was therefore produced in order to formalise suitable measures for ensuring impacts are effectively controlled.

1.2.4 Alongside the DMP, a Dust Assessment[1] and associated Addendum[2] have also produced by Redmore Environmental Ltd. These determine baseline conditions in the vicinity of the scheme and consider potential effects associated with the proposed works. In accordance with the Institute of Air Quality Management (IAQM) guidance[3], air quality impacts as a result of fugitive dust emissions from the development were predicted to be not significant, subject to the inclusion of specified mitigation measures. Reference should be made to the Dust Assessment and associated Addendum for a full description of assessment methodology and results.

1.2.5 In order to ensure potential impacts are reduced as far as practicable, the mitigation measures determined through production of the initial Dust Assessment and associated Addendum will be formalised in the following DMP.

1 Dust Assessment, Greetham Quarry, 3682, Redmore Environmental Ltd, 2020.

2 Dust Assessment Addendum, Greetham Quarry, 3682-3, Redmore Environmental Ltd, 2020.

3 Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

2.0 SITE CHARACTERISTICS

2.1.1 The characteristics of the quarry and site location are considered in Table 1.

Table 1 Site Characteristics

Characteristics	Details
Site Extent	The quarry is located in a semi-rural setting to the north of the village of Greetham The proposed extension is located immediately west of the existing quarry void. Green Lane borders the site to the east with Thistleton Lane to the north. A residential property known as The White House lies adjacent to the north-eastern corner of the extension with further dwellings to the south-west within Greetham Agricultural land lies further afield of Great Lane and Thistleton Lane Access to the site will be established off Thistleton Lane, to the north of the site
Existing Site Operations	The current land use is agricultural fields
Scale and Duration	Based on the magnitude of the mineral reference and the anticipated annual output, the site will require up to 20 years of mineral extraction. Restoration works may take up to a further year to complete. As such, the site is likely to be operational for up to 22 years, allowing time to establish site infrastructure and subsequent removal There will be five phases of excavation and restoration. Works will commence in Phase 1 along the eastern boundary of the site, move in an anti-clockwise direction and finish in the same location as part of Phase 5. Reference should be made to Figure 2 for a broad sequence of working
Type and Location of Processing Activities	All mineral processing operations will take place below the rim of the quarry The mineral will be processed using a mobile crusher and screens similar to those previously utilised at the adjacent quarry. The plant will be located on the quarry pavement and repositioned as workings progress at the site No processing will take place within the confines of Phase 4 or anywhere within 350m of Greetham Village. This material will be excavated and transported to the processing plant via dump trucks
Mineral Type and Characteristics	The mineral to be extracted is limestone, classed as 'hard rock' within the IAQM guidance[4]
Production Rate	The mineral production rate will be circa 150,000tpa

[4] Guidance on the Assessment of Mineral Dust Impacts for Planning V1.1, IAQM, 2016.

Characteristics	Details
Method of Working	The mineral will be extracted by a 360-degree tracked excavator which will load directly into the mobile crusher or dump trucks. Extraction will be phased to allow topsoil from each area to be placed in several stockpiles within the site. Reference should be made to Figure 3 for a map of the site features A rubber type loading shovel will be used to load processed limestone into road-borne Heavy Goods Vehicles (HGVs) before being removed from site
Methods of Material Handling	During site preparation and restoration, soil will only be handled when in a suitable condition, as determined by the 'worm test'. The soil will be extracted using a Dozer and HGV and loaded into dumper trucks to transport the material for use in the construction and development of environmental bunds throughout the site A 360-degree tracked excavator will be used to acquire the mineral and load directly into the mobile crusher or dump trucks
Location of Storage Areas and Stockpiles	Stockpiling will occur to the south and along the eastern and western boundaries, as shown in Figure 3
Location and Number of Access Routes and Haul Roads	It is proposed to establish a new site access onto Thistleton Lane, as shown in Figure 3 HGVs will pass through a wheel cleaning unit prior to leaving the site It is anticipated that 64 HGV movements will be generated daily when the site is operational (32 in and 32 out)
Reclamation and Restoration	Progressive restoration of the site will take place throughout the operation of the site. Material will be deposited at the site at a typical rate of 30,000tpa to 35,000tpa. This will be strictly inert and will be controlled under the provisions of a separate Environmental Permit administered by the Environment Agency

3.0 DUST MANAGEMENT PLAN

3.1 Overview

3.1.1 The DMP for the quarry follows and addresses the various activities which have the potential to create dust. The following steps were undertaken in order to produce the DMP:

- Identification of dust sources;
- Consideration of site location and sensitive locations potentially affected by dust emissions;
- Identification of control measures;
- Review of complaints handling procedure; and,
- Production of DMP modification procedure.

3.1.2 The results are detailed in the following Sections.

3.2 Sources

3.2.1 The following potential sources of dust emissions were identified as part of the operation of the quarry:

- Site preparation/restoration (including soil and overburden handling);
- Mineral extraction;
- Material handling;
- On-site transportation;
- Mineral processing;
- Stockpiling/exposed surfaces; and,
- Off-site transportation.

3.3 Location

3.3.1 The site lies in Greetham, on land off Thistleton Lane. The centre of the village of Greetham is approximately 380m to the south of the quarry.

3.3.2 The surrounding land use is mainly agricultural, with the existing Greetham Quarry void immediately east of the site.

3.3.3 A desk-top study was undertaken in order to identify receptor locations in the vicinity of the site that may be sensitive to dust emissions from the quarry. These are summarised in Table 2.

Table 2 Sensitive Receptors

Receptor		NGR (m)		Distance from Boundary (m)	Direction from Boundary
		X	Y		
R1	48 Great Lane	492746.5	314708.0	90	South-west
R2	Greetham Community Centre	492759.7	314748.5	45	South-west
R3	Sports Pitches, Great Lane	492763.4	314811.3	20	West
R4	Rutland Caravan and Camping	492490.0	314965.8	300	West
R5	White House, Thistleton Lane	493225.3	315147.9	40	North-east
R6	24 Stretton Road	493114.9	314444.6	180	South-east
R7	Fir Tree Cottage, Stretton Road	493016.8	314448.4	330	South-east
R8	56 - 58 Main Street	492912.7	314418.0	340	South
R9	Manor Farm Poultry Units	492891.4	314691.2	75	South
R10	Holly Cottage Farm	492834.6	314566.1	205	South
R11	Shepherds Cottage	492514.4	314778.1	270	West

3.3.4 As shown in Table 2, there are several sensitive locations in the vicinity of the site that may be affected by potential dust emissions without appropriate mitigation. These are mainly located to the south through west in the village of Greetham. Reference should be made to Figure 4 for a graphical representation of the identified receptors.

3.4 Meteorology

3.4.1 The potential for dust to impact at sensitive locations depends significantly on the meteorology, particularly wind direction, during emissions.

3.4.2 In order to consider prevailing conditions at the site, review of potential sources of meteorological data was undertaken. This indicated that three observation stations are located in the vicinity of the proposed scheme. These are summarised in Table 3, along with the relevant distance and direction from Greetham Quarry.

Table 3 Meteorological Stations

Station Name	Approximate Distance from Greetham Quarry (km)	Direction from Greetham Quarry
RAF Wittering	16.6	South-east
Cranwell	34.7	North-east
East Midlands Airport	48.2	North-west

3.4.3 Based on the distance between RAF Wittering and Greetham Quarry, it was considered that meteorological conditions were likely to be reasonably similar at the two locations and more representative than the other two potential data sources. As such, it was selected for use throughout the project. This approach was discussed and agreed with Andrew Woodhouse, Environmental Protection Officer at RCC, in June 2020[5].

3.4.4 Meteorological data from RAF Wittering over the period 1st January 2015 to 31st December 2019 (inclusive) was reviewed. The frequency of wind from the 12 sectors which best describe the directions which may cause impacts in the vicinity of the site is shown in Table 4. Reference should be made to Figure 5 for a proportional wind rose of the meteorological data.

Table 4 Wind Frequency Data

Wind Direction (°)	Total Frequency of Wind (%)	Total Frequency of Potentially Dusty Winds (%)[(a)]
345 - 15	5.3	1.4
15 - 45	6.7	2.4
45 - 75	5.7	2.2
75 - 105	2.6	0.5
105 - 135	3.9	0.5

5 Email correspondence with Andrew Woodhouse at RCC, 2020.

Wind Direction (°)	Total Frequency of Wind (%)	Total Frequency of Potentially Dusty Winds (%)[a]
135 - 165	5.6	0.9
165 - 195	8.5	3.2
195 - 225	13.8	8.1
225 - 255	16.3	10.1
255 - 285	12.7	5.8
285 - 315	8.7	3.6
315 - 345	5.8	1.5
Sub-Total	95.5	40.2
Calms	0.8	56.2
Missing/Incomplete	3.7	3.6

Note: (a) Winds with speed greater than 5m/s on days with no precipitation

3.4.5 As shown in Table 4, the prevailing wind direction at the site is from the south-west. It is noted that one receptor is located to the north-east of the boundary, R5 - White House, Thistleton Lane. As the property is located downwind of quarry operations, additional consideration to suitable mitigation measures has been provided when producing the DMP.

3.4.6 All meteorological data used in the assessment was provided by Atmospheric Dispersion Modelling Ltd, which is an established distributor of meteorological data within the UK.

3.5 Mitigation

3.5.1 In order to control potential dust emissions to acceptable levels a number of mitigation measures are proposed for the quarry. Dust control has been considered by the operator through good process and site design, as well as identification of good housekeeping procedures. The control methods to be employed at the proposed quarry are based on:

- Good operating and management practices to avoid emissions arising from extraction activities;
- Good process design to minimise emissions;
- Abatement or control to reduce dust emissions; and,

- Disrupting the emission pathway to sensitive receptors.

3.5.2 Following review of the outcome of the Dust Assessment and Dust Assessment Addendum, the proposed design measures can be summarised as follows:

- No mineral extraction will take place within 150m of any residential dwelling within Greetham Village; and,
- No mineral processing will take place within the confines of Phase 4 or within 350m of Greetham village.

3.5.3 The design measures have been defined to provide physical separation between dust emissions and receptors and will therefore effectively increase the dispersion pathway at all times.

3.5.4 The proposed management measures can be summarised as follows:

- All departing vehicles will be inspected for cleanliness prior to leaving the site;
- Sheeting will be provided for all trucks leaving the site;
- A wheel cleaning unit will be installed before the site entrance;
- Provision of a metalled road between the site reception area and Thistleton Lane;
- Site access road will be inspected on a daily basis;
- A water bowser and road sweeper will be made available to spray the site access road and clean any deposits from the road as and when necessary;
- Existing hedgerows along the north-eastern and western boundaries will be subject to a management plan involving the planting up of any gaps and the introduction of hedgerow trees;
- A species rich hedgerow will be planted along the southern boundary of the site, along with a narrow strip of broadleaf trees during the first available planting season;
- Topsoils will only be stored in temporary stockpiles/mounds to a maximum height of 3m;
- The outer face of topsoil mound T2 will be tree planted
- Subsoil and soil-forming material storage mounds will be limited to 5m in height;
- Where topsoils will be stored for at least one growing season the storage mounds will be sown with grass in order to minimise the effects of wind blow;
- Stripped areas will be minimised as far as practicable and will be smoothed and compacted to seal the surface;

- During dry conditions, water will be applied as necessary to stabilise any loose bare surfaces;
- Daily inspections will be undertaken with an observation log completed to record any occurrences of dust or the onset of potential dust generating conditions;
- Drop heights of material from excavators to dump trucks and loading shovels will be minimised;
- Site staff will receive training on the potential dust sources and how to prevent emissions;
- All vehicles loaded with imported fill materials or processed mineral will be sheeted in order to minimise spillages or wind whipping of loose material; and,
- A fine spray mister or 'Dust Buster' will be employed during the mineral processing operations. These units spray a fine mist up to 30m and can be targeted to the working area.

3.5.5 The results of the Dust Assessment[6] indicated the potential for impacts at the R5 - White House, Thistleton Lane, receptor during Phase 1 and 5 of the works. As such, the following specific mitigation measures will be implemented:

- Solid fencing to be constructed along the north-eastern border of the site, adjacent to White House; and,
- Phased mitigation during specific meteorological conditions when dust generating activities take place within 110m of the site boundary during Phase 1 and 5.

3.5.6 Should strong north-easterly winds (above 5m/s) arise during Phase 1 and 5 works, phased mitigation will take place within the 110m control zone. This will comprise of initial visual inspection by the site manager to determine the intensity of any emissions, should this indicate significant releases then dampening using a water bowser will be undertaken to reduce dust. If this process is not sufficient, operations will cease until suitable meteorological conditions return.

3.5.7 Critical conditions may also occur during the operation of the quarry extension. These could include the following:

- High wind speeds;

6 Dust Assessment, Greetham Quarry, 3682, Redmore Environmental Ltd, 2020

- Predominantly north-easterly winds blowing towards Greetham village;
- Increased number of days with no precipitation; and,
- Quarry operations taking place within close proximity to the site boundary.

3.5.8 During these conditions, the following additional measures will also be taken by the site manager or other nominated person:

- Speed limit reduced to 5mph on internal haul roads;
- Site activities will be moved to an alternative location further from Greetham Village until suitable weather conditions return;
- Additional bowsers will be used to dampen materials and road surfaces; and,
- Cessation of operations causing dust generation.

3.5.9 Any use of the additional measures will be entered in the log book to provide record of utilisation and effectiveness.

3.6 Site Management

3.6.1 Management will provide training of all staff and contractors to be employed at the site and communicate the contents of the DMP to all personnel. The training will outline the potential nuisance dust sources and set out the benefits of employing good practice for staff and neighbours. Records of the relevant training will be kept throughout the operational period.

3.6.2 Management shall ensure that personnel are aware of their obligations in line with the relevant planning permission and conditions attached therein. The operator will also provide resources to ensure employees are trained in the minimisation of dust and the correct use of dust control equipment.

3.7 Community Engagement

3.7.1 A community liaison group will be developed for the purpose of providing a means of communication between local residents and the quarry operators. This will allow any necessary information to be discussed openly with the aim of minimising concerns and complaints.

3.8 Monitoring of Meteorological Conditions

3.8.1 A weather station will be installed outside of the quarry basin in order to provide a quantitative analysis of weather patterns throughout the lifetime of the scheme. The unit will measure real-time wind speed, temperature and humidity data and act as a trigger for the Site Manager to take appropriate action should adverse conditions, defined as wind speeds of greater than 5m/s from the north-east during operational hours on dry days, develop. Data will be recorded electronically for use in investigations, should they be necessary.

3.9 Dust Monitoring

3.9.1 Dust monitoring will be undertaken throughout the lifetime of the quarry using four Frisbee dust deposition gauges. The gauges will be suitably mounted and be of a calibrated cross sectional area to allow for accurate calculation of dust deposition rates. Suitable monitoring locations will be agreed with the Mineral Planning Authority prior to installation.

3.9.2 Recorded dust deposition rates will be compared with a trigger level of 160mg/m^2/day which is below the level of 200mg/m^2/day recommended by the IAQM for construction sites. Should exceedences of the criteria be identified then an investigation into the causes will be undertaken. This will include review of meteorological data recorded by the on-site weather station, as well as operational activities during the relevant period. The results would be reviewed by the Management Team and any additional control measures required to reduce the risk of further exceedences identified and implemented.

3.9.3 Daily visual inspection will also be undertaken by site personnel to assess potential dust releases. In the event that significant dust emissions are observed at the boundaries of the operational areas, further action will be taken to suppress the dust. This would include dampening down or cessation of certain activities if practicable. A record of the inspection findings and remedial action taken will be made in the site diary. Should subsequent inspection indicate continued fugitive dust impacts, or if continued complaints are received, additional monitoring would be undertaken to determine the magnitude of effect and identify further appropriate mitigation measures.

3.9.4 A programme of continuous active monitoring of PM_{10} concentrations will be undertaken at a single location along Great Lane in order to define baseline conditions in the local area prior to the quarry operation. Monitoring will be undertaken using a Turnkey Instruments Osiris air quality sampler over a period of 3-months, as agreed by RCC.

3.10 Dust Complaint Procedure

3.10.1 Any received dust complains will be dealt with by the specific complaints department that will monitor and act upon any concerns made known. This will allow complaints to be dealt with in a timely manner and persistent issues to be tracked so as to activate additional mitigation measures which will prevent any issues arising repeatedly.

3.10.2 The process is outlined below:

- A complaint is received via email, using a specific address for recording issues;
- The complaint is passed to the Customer Care Team who log the complaint and pass it to the relevant manager;
- The complaint is managed by the relevant team through to a resolution, during which time the Customer Care Team will monitor the situation to ensure a prompt turnaround; and,
- A response is sent to the complainant by the Customer Care Team explaining the result of any investigations and associated resolutions.

3.10.3 Where an investigation identifies a dust issue, remedial action will promptly be implemented. The exact measures will be determined based on the dust source and likelihood of incident reoccurrence, though may include the following:

- Additional dampening down of specific areas;
- Increased detail of vehicle inspection before leaving site;
- Further staff training;
- Amendments to operating practices; or,
- Cessation of specific activities until additional control measures can be employed or meteorological conditions become more favourable.

3.10.4 If changes are made, Improvement Programmes will be recorded in the format shown in Appendix 1 and the DMP will be amended accordingly.

3.11 Water Consumption

3.11.1 Water consumption for all plant being used throughout the day, such as dust busters and crushers, will be calculated along with any usage of a bowser in order to establish the volume of water required to provide 110% of one days supply.

3.12 Record Keeping

3.12.1 All complaints and associated reporting forms, as well as any remedial actions or dust survey results, will be kept within a dedicated file. This will form a permanent record of dust issues associated with the site and can be used should investigation of complaints or other concerns be necessary. The file will be kept on-site at all times and will be available for inspection.

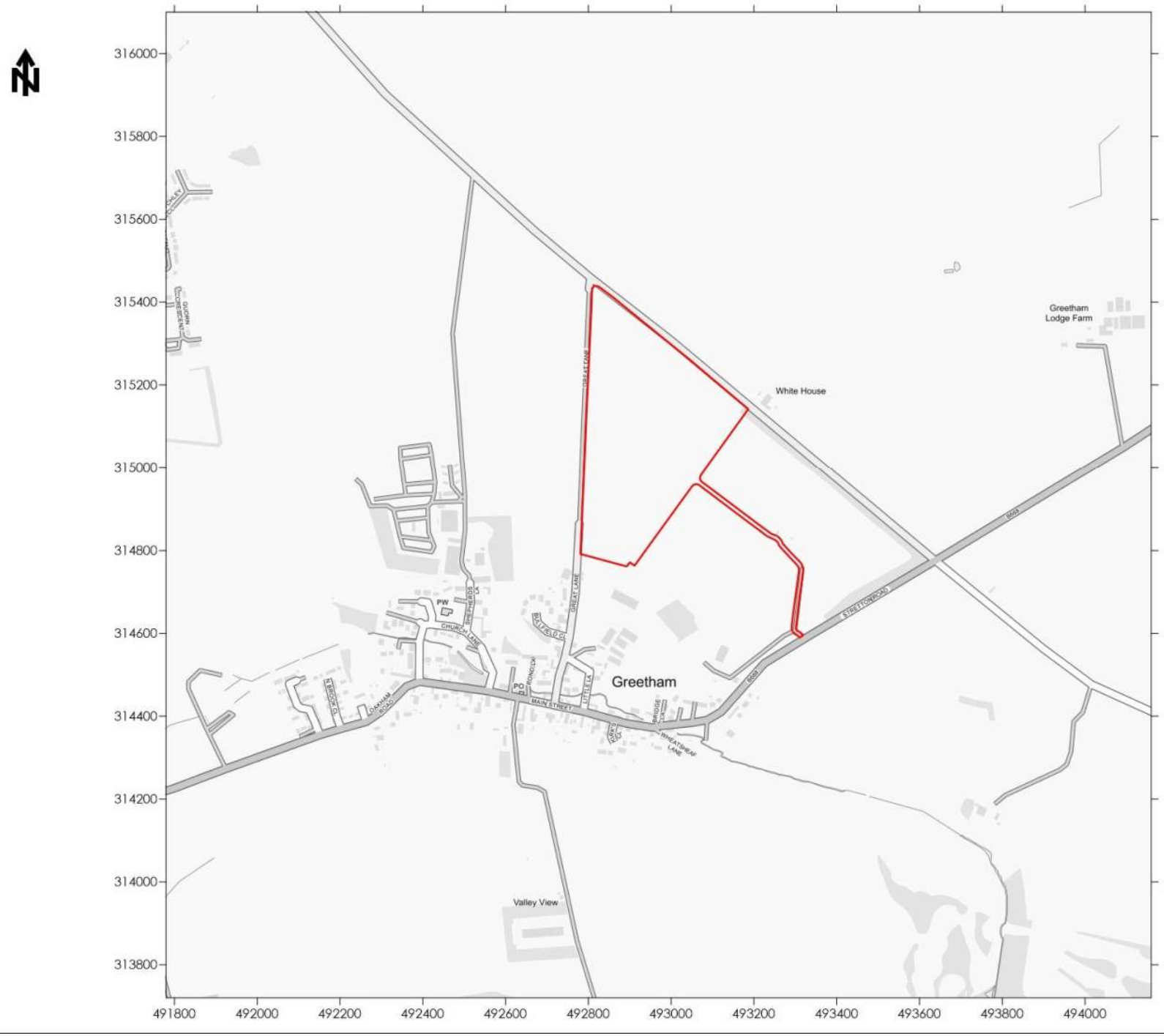
3.13 Dust Management Plan Review Procedure

3.13.1 The DMP shall be reviewed at least annually, when a new phase of work commences or as soon as practicable after a complaint (whichever is the earlier) and changes recorded in the format shown in Appendix 1.

4.0 ABBREVIATIONS

DEFRA	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EA	Environment Agency
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
NGR	National Grid Reference
RCC	Rutland County Council

Figures



Legend

Site Boundary

Title
Figure 1 - Site Location

Project
Dust Management Plan
Greetham Quarry

Project Reference
3682-1

Client
Mick George Ltd

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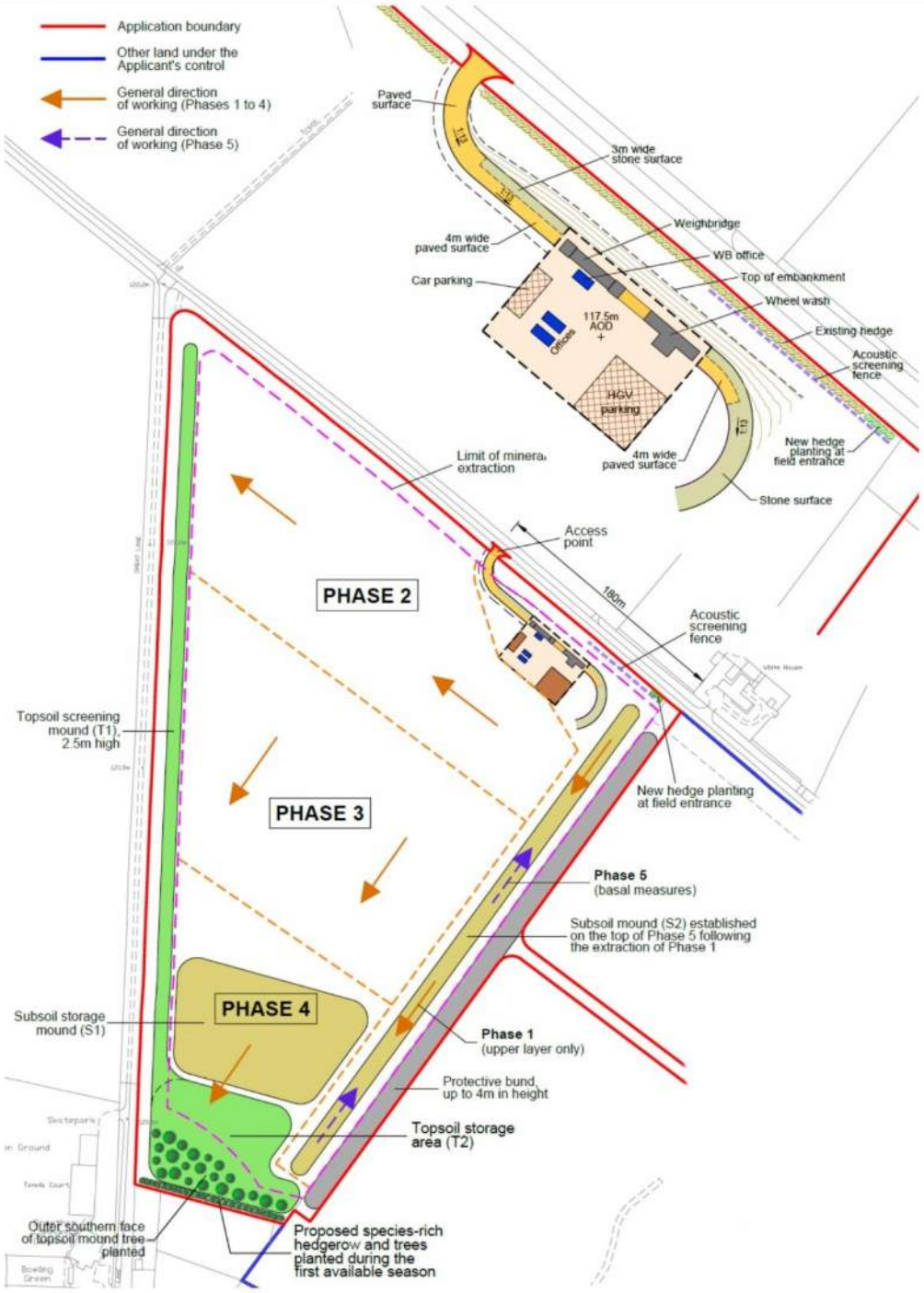

Legend

Title
Figure 2 - Site Layout Plan

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Legend

- Site Boundary
- Working Area
- Subsoil/Topsoil Storage Mounds
- Site Access
- Bund

Title
Figure 3 - Site Features

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Greetham Quarry

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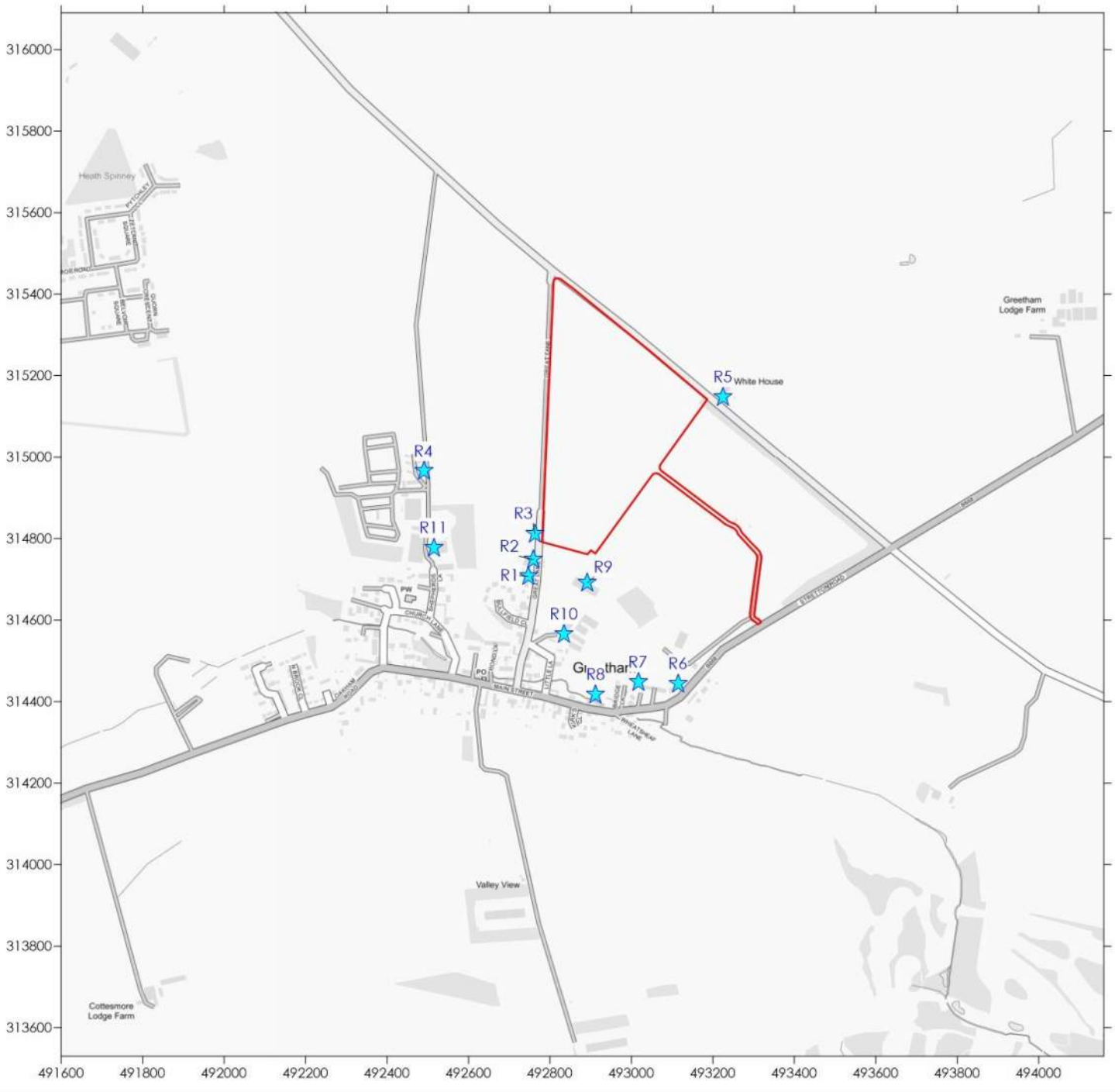

Legend

Site Boundary

Receptor

Title
Figure 4 - Fugitive Dust Disamenity Sensitive Receptor Locations

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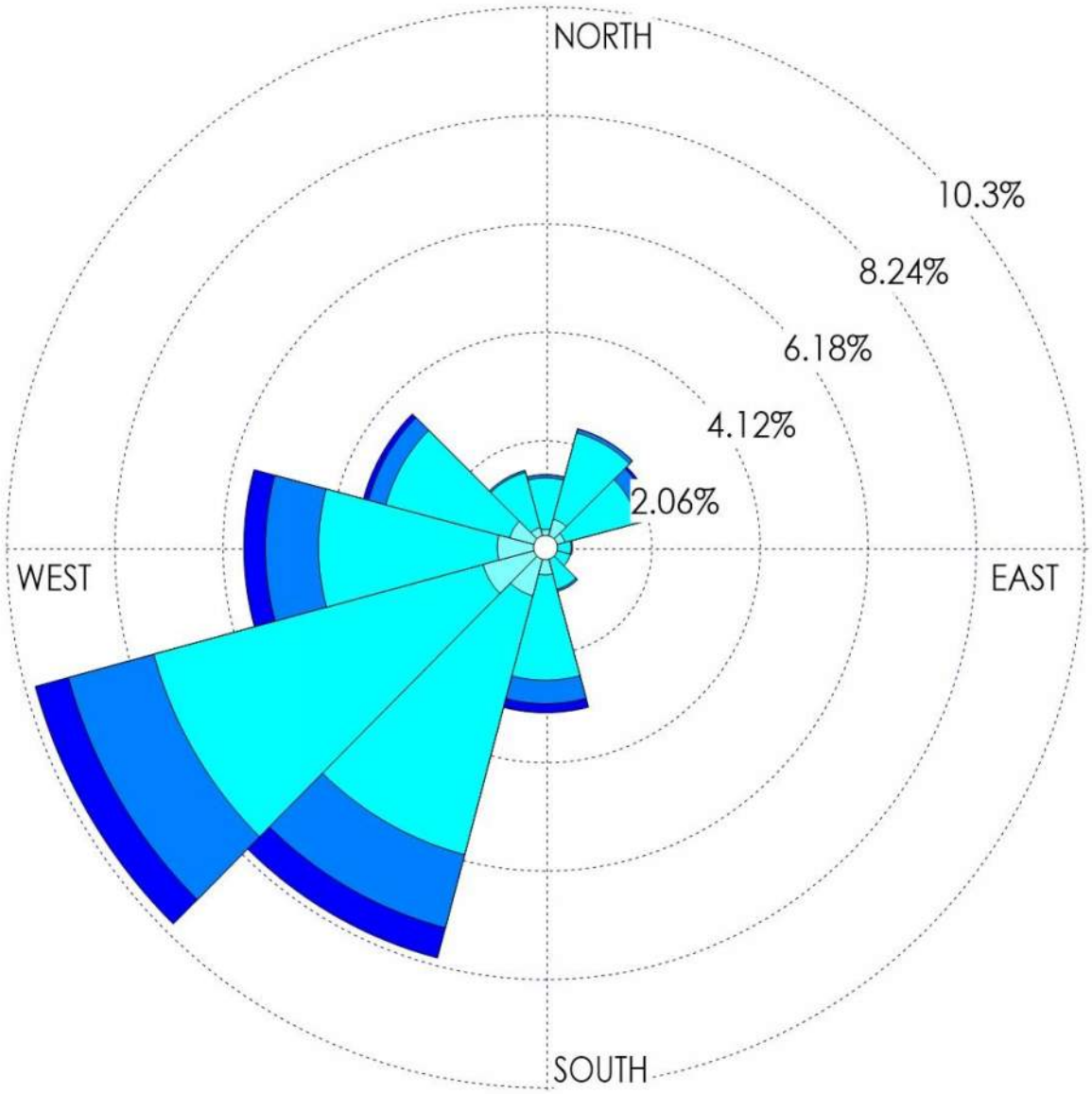

Legend

WIND SPEED (m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 5.00 - 5.70

Calms: 56.22%

Title
Figure 5 - Proportional Wind Rose of 2015-2019 RAF Wittering Meteorological Data

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Appendix 1 - Reporting Form

DUST MANAGEMENT PLAN AMENDMENT FORM

NOTE: This form should be used for recording details of any amendments to the Dust Management Plan. All fields should be completed in full.

Date of Review	Detail of Amendment	Signature