1. Introduction

1.1 Background

This report considers the likely effects in terms of air quality and dust issues associated with the proposed development at Finmere Quarry, Banbury Road, Finmere in Oxfordshire. The purpose of this report is to assess the air quality impacts of the proposed work. This process will enable a conclusion to be drawn on how the proposed development will affect the air quality of the surrounding area.

A qualitative assessment has been undertaken of the potential for significant effects to occur as a consequence of uncontrolled emissions of coarse dusts and particulate matter (as PM_{10}) from the site. The assessment has been carried out in accordance with local planning policy, National Planning Policy Framework (NPPF) and national air quality standards. The guidance provided in the Institute of Air Quality Management's (IAQM) Guidance on the Assessment of Mineral Dust Impacts for Planning[1] has also been taken into account.

Consideration has also been given to the effects associated with road traffic emissions arising from the proposed development.

1.2 Scope of Work

The scope of this work concerns qualitative assessment of dust and PM_{10}, in terms of disamenity, health effects on humans and likely effects on ecological receptors as a consequence of the proposed development at the Finmere Quarry site, the scheme extent is shown on Figure FQ/ES/001 appended to the ES. The applications seek permission to:

- extend the area approved for sand and gravel extraction to include land between the existing non-hazardous waste landfill and the A421 (Banbury Road), retain the previously approved processing plant and compound and erect a concrete batching plant – all for a further temporary period;
- extend the area to be landfilled with non-hazardous waste to include land between Finmere Plantation and the area safeguarded for the development of HS2;
- enable the sand and gravel mineral processing plant to also be used for the recovery of secondary aggregate from incoming inert waste materials;
- extend the area approved for the extraction of clay for use in on-site landfill engineering (and incidental deposits of sand and gravel for processing and sale to customers) to include the land to the south of Foxley Fields Farm;
- continue the operation of the approved material recovery facility (MRF) until landfilling is completed; and
- enable the current clay extraction area to be used in accordance with an alternative scheme and to be restored to broadleaved woodland, nature conservation and a pond - instead of to agriculture

Emissions associated with the operation of the proposed development have the potential to impact upon local air quality at locations near to the access route used by off-site road traffic. The potential change to emissions would occur as a result of a change in the number of HGV movements from the development on the local road network as a result of the new activities at the site.

The resumed operation of the material recovery facility (MRF) and continuation of non-hazardous landfilling within the site means that potentially odorous materials may be accepted into the site for processing and disposal. However, MRF operations would be carried out within the facility building, landfilling operations would take place no closer than 350 metres to the nearest properties and landfill gas will continue to be collected and used for power generation – as at present. Furthermore, there is no recent history of complaints associated with the currently operational site regarding odour. Accordingly, consideration of odour impacts has not been included within the scope of this assessment.

[1] IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning, v1.1, 2016

2. Legislation and Planning Policy

2.1 National Policy

2.1.1 National Planning Policy Framework

The NPPF (update 2019), states that the Government's policy on planning is a material consideration for local planning authorities when determining applications. Paragraph 170 of the NPPF states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) Preventing new and existing development from contributing to, being out at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability."

There are both national and local policies for the control of air pollution and local action plans for the management of local air quality within the Oxfordshire County Council (OCC) area. Paragraph 181 of the NPPF states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

Paragraph 205 of the NPPF states that:

"When determining planning applications, great weight should be given to the benefits of mineral extraction, including to the economy. In considering proposals for mineral extraction, minerals planning authorities should:

a) as far as is practical, provide for maintenance of landbanks of non-energy minerals from outside National Parks, the Broads, Areas of Outstanding Natural Beauty and World Heritage Sites, scheduled monuments and conservation areas;

b) ensure that there are no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, and take into account the cumulative effect of multiple impacts from individual sites and / or from a number of sites in the locality;

c) ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to noise sensitive properties;…"

2.1.2 Planning Practice Guidance

The Planning Practice Guidance (PPG) gives recommendations on how mineral operators may minimise dust emissions as follows:

"Where dust emissions are likely to arise, mineral operators are expected to prepare a dust assessment study, which should be undertaken by a competent person/organisation with acknowledged experience of undertaking this type of work."

The guidance continues to outline the key stages of a dust assessment, which will be followed in this assessment:

"There are five key stages to a dust assessment study:

- *establish baseline conditions of the existing dust climate around the site of the proposed operations;*
- *identify site activities that could lead to dust emission without mitigation;*

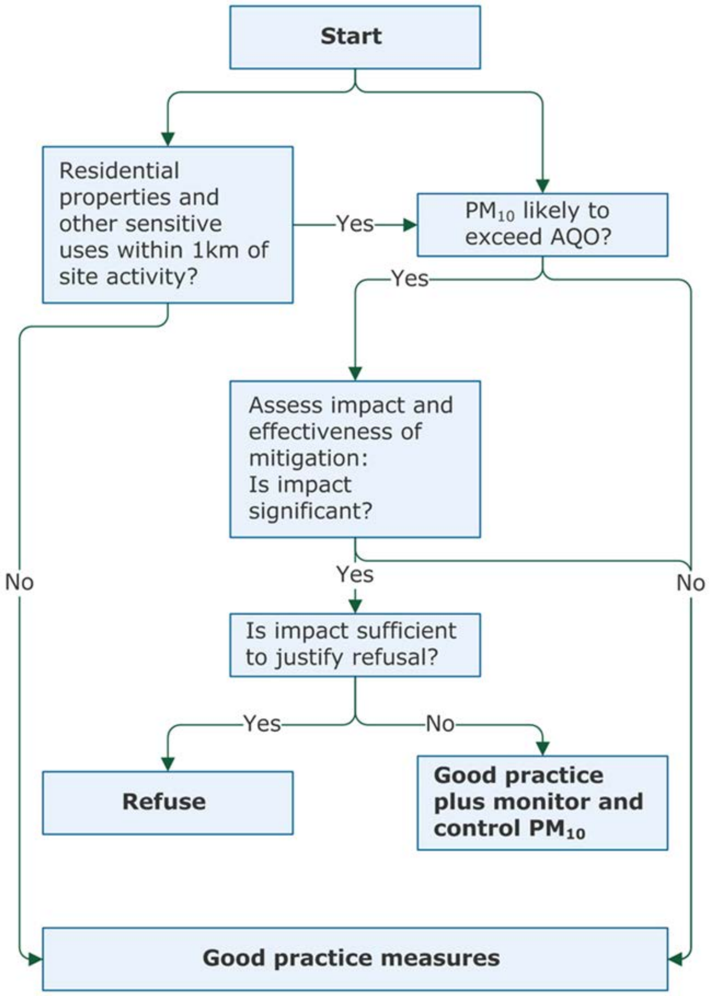
- *identify site parameters which may increase potential impacts from dust;*
- *recommend mitigation measures, including modification of site design; and*
- *make proposals to monitor and report dust emissions to ensure compliance with appropriate environmental standards and to enable an effective response to complaints."*

The PPG summarises the earlier more comprehensive dust risk assessment guidelines found in the (now superseded) Minerals Policy Statement 2 (MPS2) 'Controlling and Mitigating the Environmental Effects of Mineral Extraction in England Annex 1: Dust'[2] . The IAQM guidance published in 2016**Error! Bookmark not defined.** and referred to in this assessment broadly follows this approach.

In this assessment the term 'dust' is used to mean particulate matter in the size fraction 1µm - 75µm in diameter, as defined in BS 6069:1994[3] . Dust impacts are considered in terms of the change in airborne concentration and the change in the rate of deposition of dust onto surfaces.

The PPG provides a process flow chart for a dust assessment (reproduced as Figure 2.1). The approach recognises that if air quality objectives for PM_{10} particulates are likely to be met then it is likely that significant adverse effects on amenity can be avoided by adopting the right combination of good practices measures to control dust emissions.

Figure 2.1: Dust Assessment Flow Chart



[2] Office of the Deputy Prime Minister (2005) Minerals Policy Statement 2 (MPS2) 'Controlling and Mitigating the Environmental Effects of Mineral Extraction in England Annex 1: Dust'
[3] BSI (1995), BSI, BS6069 (Part 2) Characterization of Air Quality - Glossary

2.1.3 National Air Quality Objectives

The Clean Air for Europe (CAFE) programme revisited the management of Air Quality within the EU and replaced the EU Framework Directive 96/62/EC[4], its associated Daughter Directives 1999/30/EC[5], 2000/69/EC[6], 2002/3/EC[7], and the Council Decision 97/101/EC[8] with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC[9].

Directive 2008/50/EC is currently transcribed into UK legislation by the Air Quality Standards Regulations 2010[10], which came into force on 11th June 2010. These limit values are binding on the UK and have been set with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole.

The UK National Air Quality Strategy[11] was initially published in 2000, under the requirements of the Environment Act 1995[12]. The most recent revision of the strategy[13] sets objective values for key pollutants as a tool to help Local Authorities manage local air quality improvements in accordance with the EU Air Quality Framework Directive. Some of these objective values have subsequently been laid out within the Air Quality (England) Regulations 2000[14] and later amendments[15].

The air quality objective values referred to below have been set down in regulation solely for the purposes of local air quality management. Under the local air quality management regime, OCC have a duty to carry out regular assessments of air quality against the objective values and if it is unlikely that the objective values will be met in the given timescale, they must designate an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) with the aim of achieving the objective values. The boundary of an AQMA is set by the governing local authority to define the geographical area that is to be subject to the management measures to be set out in a subsequent action plan. Consequently it is not unusual for the boundary of an AQMA to include within it, relevant locations where air quality is not at risk of exceeding an air quality objective.

The UK's national air quality objective values for the pollutants of relevance to this assessment are displayed in Table 2.1.

Table 2.1: Air Quality Objective Values

Pollutant	Averaging Period	Value	Maximum Permitted Exceedances	Target Date
Nitrogen Dioxide (NO_2)	Annual Mean	40µg/m^3	None	31/12/2005
	Hourly Mean	200µg/m^3	18 times per year	31/12/2005
Particulate Matter (PM_{10})	Annual Mean	40µg/m^3	None	31/12/2004
	24-hour	50µg/m^3	35 times per year	31/12/2004
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	25µg/m^3	None	01/01/2015

[4] Council of European Communities (1996), Framework Directive on ambient air quality assessment and management, European Council, 96/62/EC
[5] Council of European Communities (1999), First Daughter Directive on limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air, 1999/30/EC
[6] Council of European Communities (2000), Second Daughter Directive on limit values for benzene and carbon monoxide in ambient air, 2000/69/EC
[7] Council of European Communities (2002), Third Daughter Directive on ozone in ambient air, 2002/3/EC
[8] Council of European Communities (1997), Council Decision 97/1010/EC on exchange of information and data from as amended by Commission Decision 2001/752/EC
[9] Council of European Communities (2008), Ambient Air Quality and Cleaner Air for Europe Directive, 2008/50/EC
[10] H.M. Government (2010), The Air Quality Standards Regulations, SI 1001, the Stationary Office
[11] Department for Environment Food and Rural Affairs (Defra) (2000), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland
[12] H.M. Government (1995), The Environment Act
[13] Department for Environment Food and Rural Affairs (Defra) (2007), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.
[14] H.M. Government (2000), The Air Quality (England) Regulations 2000, Statutory Instrument No 928, The Stationary Office
[15] H.M. Government (2002), The Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument No 3043, The Stationary Office

2.2 Local Planning Policy

2.2.1 Minerals and Waste Core Strategy

Oxfordshire County Council (OCC) adopted a new planning strategy and policies for minerals and waste development as of September 2017. In this document, section 6.25 states:

"Issues of noise, dust, air quality and vibration should be taken into account when considering proposals for mineral development. Pollution from associated traffic and visual impact are also relevant and in some cases issues associated with tip and quarry-slope stability, differential settlement of quarry backfill and subsidence may also arise. A buffer zone can help to mitigate potential harm from workings. Standard distances for buffer zones between workings and sensitive receptors are not specified as they can lead to unnecessary restriction and sterilisation of mineral resources: they may also result in inadequate protection measures for affected property. In line with the National Planning Practice Guidance on Minerals (paragraph 018), the extent of any buffer zone should be decided on a case by case basis at the planning application stage."

2.2.2 Local Air Quality Management

OCC has designated eight AQMAs in the city of Oxford, in the centre of the county. Each of the AQMAs were designated based on their failure to meet air quality objectives for NO_2. As Finmere Quarry is located in the far north of the county it is considered that activities at this site will not cause a perceptible contribution to pollution in these AQMAs.

3. Assessment Methodology

3.1 Overview

There is currently no statutory guidance on the method by which an air quality impact assessment should be undertaken. Several non-statutory bodies have published their own guidance relating to dust effects on air quality[1,16]. This report has been produced applying existing national regulations, guidance and good practice.

This section explains the methods used to assess the impact of mineral dust associated with the development and operation of Finmere Quarry and the significance thereof. This process follows the source-pathway-receptor approach. In this manner, the significance of each source, pathway effectiveness and sensitivity of each receptor is considered to ultimately assess the magnitude of the change in air quality at each receptor.

3.2 Air Quality Sensitive Receptors

As described in the IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning[1], a receptor is defined as:

"A location itself, or as a proxy for people which might be affected by dust emissions during mineral activities. Human receptors include locations where people spend time and where property may be damaged by dust. Ecological receptors are habitats that might be sensitive to dust."

As discussed in section 1.2, it is also necessary to consider ecological receptors; however, there are no locally, nationally or internationally designated ecologically sensitive areas within 250 metres of the proposed site boundary. The nearest designated Special Area of Conservation is located 26 km to the south east of the site. In terms of Non-Statutory protected sites, Spilsmere Woods Local Wildlife Site is approximately 1.1km to the south west of the site. Accordingly, the effect of dust and particulate matter on ecological receptors is considered unlikely to be significant and has therefore been scoped out of this assessment.

Figure 3.1 (see Annex D1 of this report), indicates the location of the closest sensitive receptors in each direction, relative to the site. Table 3.1 outlines distances from the site and activities (current and proposed) to receptors, including primary haul routes.

Table 3.1: Receptor Site Distances from Current and Proposed Activities within the Quarry Site

Receptor	Description	Distance to Land Ownership Boundary (m)	Distance to Currently Permitted Activities (m)	Distance to Proposed Extension Activities (m)
R1	Widmore Farm	<1	220	350
R2	Glanwin Meadow	20	165	140
R3	Foxley Fields	<1	90	175
R4	Boundary Farm	<1	<1	180
R5	Barleyfields Barn Farm	440	440	440
R6	Barley Fields	440	440	540
R7	Warren Farm	210	250	250

3.3 Dust Impact Assessment Method

3.3.1 Overview

During the operational phase, airborne particulate matter can be produced as a result of abrasive forces on materials. Effects arise due to an increase in airborne dust and also in deposition levels on surfaces, such as cars and windows, in sufficient amounts to create a noticeable surface soiling. The deposition of large amounts of dust can also affect vegetation by blocking stomata and reducing growth. Such accumulations are usually only significant very close to the source and rates of deposition are highly dependent on local factors e.g. weather.

[16] IAQM Guidance on the assessment of dust from demolition and construction, 2014

Large and intermediate sized particles (with a diameter greater than 10 µm) make up the greatest proportion of the airborne dust generated by activities such as soil and overburden stripping, handling and storage of materials, and the movement of equipment on unsurfaced areas. Due to the size of these particles, they settle out within approximately 500 metres of the source. As such dust emissions are the most likely size to be generated at the site, this assessment focusses on this size range in particular

Potential health risks due to emissions of large and intermediate sized particles are not considered to constitute a significant health risk outside of the occupational health risk zone (workers close to source) as they do not have the potential to penetrate deep into the lungs. Accordingly such potential effects are not considered further in this report.

Fine particulate matter (PM_{10}) is defined as particles of less than 10 µm in diameter and is the size fraction of greatest concern in terms of potential impacts on human health as they can more readily enter the lungs. The principal sources of PM_{10} particulates are exhaust emissions from combustion processes and the formation of secondary aerosols. Airborne dust generated by mineral activities is composed of a mixture of particles, the majority of which are more than 10µm in diameter, therefore increased levels of visible dust in the air do not necessarily equate to an increase in levels of PM_{10} particulates or an increased health risk at off-site receptors.

Any dust incidents are highly dependent upon local weather conditions, with the combination of extended periods of dry weather and winds blowing from the dust source to a sensitive receptor being the conditions that significant dust related impacts are most likely to occur. These conditions would need to be combined with an activity creating dust being close enough to the receptor for increases in dust soiling rates to be perceived. However, this would only be the case when there is an inadequate application of the mitigation measures being employed on site.

The emphasis of the regulation and control of dust and PM_{10} particulate generation should be the adoption of good working practices as standard, the implementation of which seeks to avoid the potential for adverse effects. This approach assumes that this environmental management, beyond the embedded mitigation included in the proposed design, will be implemented during works to ensure potential significant adverse effects do not occur.

3.3.2 Screen the Need for a Detailed Assessment

The proposed development includes the following activities within the planning application boundaries:

- extension to the sand and gravel extraction area;
- extension to the clay extraction area;
- extension to the non-hazardous landfill area;
- a secondary aggregate processing plant site;
- retention of the MRF; and
- revisions to the restoration of the current clay extraction area.

The IAQM minerals guidance makes a distinction between different types of site when making a screening decision on the potential for impacts on amenity to occur. Dust impacts from sand and gravel sites are uncommon beyond 250 metres of the nearest dust generating activity, whereas for a hard rock quarry (such as granite) the distance is 400 metres. The sand and gravel and clay extraction activities are not hard rock processes, so a screening distance of 250 metres would apply to these activities.

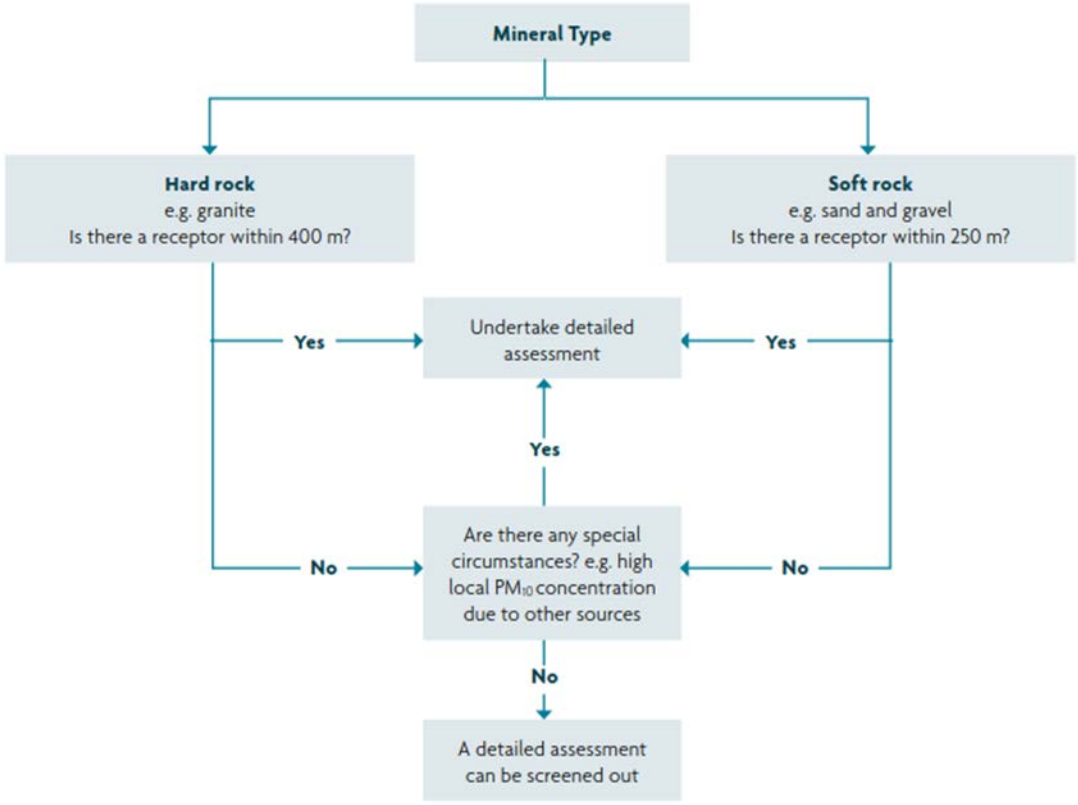
Of the other processes, the MRF operations would take place largely within the facility building, and the non-hazardous landfill and aggregate processing activities are not considered to represent a similar dust generation potential as a hard rock quarrying and processing operation. The greatest potential for dust emissions would occur as a result of activities common to other mineral operations, namely the use of haul routes and the handling or processing of materials.

Overall, it is therefore considered that a screening distance of 250 metres is appropriate for use in relation to the consideration of all of the activities proposed, and that the assessment method set out in the IAQM minerals guidance is appropriate for assessing the effects of the proposed development.

The potential for particulate matter impacts associated with an operational mineral working activity is greatly reduced beyond 100 metres of a source of emissions. Some particulate matter may travel up to 400 metres from the point of release, where occasional elevated rates of dust deposition and elevated concentrations of PM_{10} particulates may be possible. Emissions of PM_{10} particulates have the potential to persist beyond 400 metres of the point of release, but are unlikely to have an effect of significance, due to dispersion and dilution over such a distance. Therefore, it is possible to screen out the need for a detailed assessment based on the distance from a mineral site to the nearest potentially sensitive receptors.

The IAQM Guidance provides a screening flow chart to determine the need to proceed to a detailed assessment, as shown in Figure 3.2. In this case, there are receptors within 250 metres of the proposed operational areas so a detailed assessment has been carried out, using the process outlined below.

Figure 3.2: Screening Flow Chart



3.3.3 Step 1: Method for Characterising the Site and Baseline Conditions

Where a detailed assessment of dust impacts is required, due to the proximity of dust sensitive receptors to the site operations, some characteristics of the site and local environment have been considered. These include details such as the area of the site and relevant redline boundary, current land use at the site and surrounding area, and local topography.

The location and nature of dust sensitive receptors within 250 metres of the site boundary is also summarised, along with the distance of representative worst case receptors from the site boundary or relevant site activities (in this particular instance). The sensitivity of individual receptors is defined on a scale of low, medium or high, based on descriptions provided within the guidance and summarised in Table 3-2.

Table 3.2: Defining Receptor Sensitivity

Sensitivity	Impact Type	Description	Examples
High	Dust Soiling (amenity)	Users can reasonably expect enjoyment of a high level of amenity or, the appearance, aesthetics or value of their property would be diminished by soiling. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.	Residential dwellings, medium and long-term car parks and car show-rooms
	PM_{10} (human health)	locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	Residential properties, hospitals, schools and residential care homes
	Ecology	Locations with an international designation and the designated features may be affected by dust soiling, or locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain.	Relevant Special Areas of Conservation
Medium	Dust Soiling (amenity)	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home, or the appearance, aesthetics or value of their property could be diminished by soiling. The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.	Places of work
	PM_{10} (human health)	locations where people are occupationally exposed over a full working day	Places of work
	Ecology	locations where there is a particularly important plant	Ecology
Low	Dust Soiling (amenity)	Enjoyment of amenity would not reasonably be expected, or there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.	Playing fields, farmland
	PM_{10} (human health)	Locations where human exposure is transient.	Public footpaths, playing fields, parks and shopping streets
	Ecology	Locations with a local designation where the features may be affected by dust deposition.	Relevant Local Nature Reserve

Baseline conditions are summarised by describing nearby existing sources of dust, referencing any existing monitoring data and background PM_{10} particulate concentrations. Local weather conditions are also summarised with particular reference to wind speed, wind direction and precipitation rates.

Factors such as site operations, including phasing, type and location of processing activities, mineral type and characteristics, methods of working, material handling, storage areas and stockpiles and location of access roads and haul roads have also been described where information was available.

3.3.4 Step 2: Method for Evaluating Dust Impact Risk

The risk of particulate emissions arising in sufficient quantities to cause harm to amenity and/or health effects (referred to as 'dust impact risk') is determined, based on the scale of the residual source emissions and the effectiveness of the pathway between the source and the receptor.

1. Residual Source Emissions

The residual source emissions magnitude is often determined for the activities with the highest potential to generate fugitive dust emissions, as outlined in IAQM guidance[1]:

- site preparation / restoration;
- mineral extraction;
- materials handling;
- on-site transportation;
- material processing;

- stockpiling / exposed surfaces; and
- off-site transportation

When undertaking the assessment the embedded mitigation measures such as the location of particular activities on the site and the landscaping at the site boundary were taken into consideration when determining the magnitude of the residual source emissions.

Following examples provided within the IAQM Guidance[1], factors considered are listed in Table 3.3 and are classified by magnitude to potentially generate emissions as small, medium or large. Where detailed site information is not available, a cautious approach has been adopted.

Table 3.3: Determining Residual Source Emissions

Activity	Dust Emission Magnitude Small ← Medium → Large	Notes
Site Preparation / Restoration	Working area Bund height Bund seal Volume of material movement Number of heavy plant Dustiness of material	An example of a large potential dust magnitude from site may include factors such as a working area >10ha, bunds >8 m in height, >100,000 m^3 material movement, >10 heavy plant simultaneously active, bunds un-seeded, fine grained and friable material. Conversely, a small potential dust magnitude may include a site with a working area <2.5ha, bunds <4 m in height, <20,000 m^3 material movement, <5 heavy plant simultaneously active, all bunds seeded, material with a high moisture content.
Mineral Extraction	Working area Energy of extraction method Dustiness of material Extraction rate	An example of a large potential dust magnitude may include a working area >100 ha, drilling and blasting frequently used, dusty mineral of small particle size and/or low moisture content, 1,000,000 tpa extraction rate. A small potential magnitude may include working area <20 ha, hydraulic excavator, coarse material and/or high moisture content, <200,000 tpa extraction rate.
Material Handling	Number of heavy plant Ground conditions Distance to site boundary Dustiness of material	An example of a large potential dust magnitude may include factors such as >10 loading plant within 50 m of a site boundary, transferring material of a high dust potential and/or low moisture content on dry, poorly surfaced ground. Conversely, a small potential dust magnitude may include <5 plant, more than 100 m of a site boundary, within the quarry void or clean hardstanding, transferring material of low dust potential and/or high moisture content.
On-site Transportation	Method of transporting material across site Haul road surface Dustiness of haul road surface Number of HDV movements Length of haul roads Speed limit	An example of a large potential dust magnitude could include >250 movements in any one day on unpaved surfaces of potentially dusty material. A small potential magnitude may include the employment of covered conveyors used for the majority of the on-site transportation of material, <100 movements of vehicles per day, with surface materials of compacted aggregate, <500 m in length and a maximum speed of 15 mph.
Mineral Processing	Dustiness of raw material Dustiness of end product Complexity of processes and processing plant Volume of material processed	An example of a large potential dust magnitude may include factors such as a mobile crusher and screener with concrete batching plant on-site, processing >1,000,000 tpa of material with a high dust potential and/or low moisture content e.g. hard rock. Conversely, a small potential dust magnitude may include a site with a fixed screening plant with effective design in dust control, processing <200,000 tpa of material with a low dust potential and/or high moisture content e.g. wet sand and gravel.
Stockpiles / Exposed Surfaces	Duration of stockpile Frequency of material transfers Dustiness of material Ground conditions Distance to site boundary Area of exposed surfaces Wind speed threshold by dustiness of material	An example of a large potential dust magnitude could include a stockpile with a total exposed area >10 ha in an area exposed to high wind speeds located <50 m of the site boundary. Daily transfer of material with high dust potential and/or low moisture content. Stockpile duration >12 months and quarry production >1,000,000 tpa. A small potential magnitude may include stockpile duration of <1 month with a total area <2.5 ha in an area of low wind speeds, located >100 m from the site boundary. Weekly transfers of material with low dust potential and/or high moisture content. Quarry production <200,000 tpa.
Off-site Transportation	Number of HDV movements	An example of a large potential dust could include total HDV >200 movements in any one day on unsurfaced site access road <20 m in length with no HDV cleaning facilities. No road sweeper available. A small potential magnitude may include <25 HDV movements per day, paved surfaced site access road >50 m in length, with effective HDV cleaning facilities and procedures, the employment of an effective road sweeper.

2. Deposited Dust Pathway Effectiveness

Pathway effectiveness is determined taking into account site specific factors. As recommended in the IAQM minerals guidance[1], wind speed, wind direction and precipitation rate are all considered to assign frequency of potentially dusty winds (Table 3.4). Once the receptor distance from the source is taken into account (Table 3.5), pathway effectiveness can then be determined (Table 3.6).

Table 3.4: Categorisation of Frequency of Potentially Dusty Winds

Frequency Category	Criteria
Infrequent	Frequency of winds (>5 m/s) from the direction of the dust source on all days are less than 5 %
Moderately Frequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 5 % and 12 %
Frequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 12 % and 20 %
Very Frequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are greater than 20%

Table 3.5: Categorisation of Receptor Distance from Source

Category	Criteria
Distant	Receptor is between 150 m and 250 m from dust source
Intermediate	Receptor is between 50 m and 150 m from dust source
Close	Receptor is less than 50 m from dust source

Table 3.6: Pathway Effectiveness

		Frequency of Potentially Dusty Winds			
Receptor Distance Category		Infrequent	Moderately Frequent	Frequent	Very Frequent
	Close	Ineffective	Moderately Effective	Highly Effective	Highly Effective
	Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
	Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

The dust impact risk is then ascertained by considering the residual source emission and pathway effectiveness at each receptor location, as set out in Table 3.7.

Table 3.7: Estimation of Dust Impact Risk

		Residual Source Emissions		
Pathway Effectiveness		Small	Medium	Large
	Highly Effective	Low Risk	Medium Risk	High Risk
	Moderately Effective	Negligible Risk	Low Risk	Medium Risk
	Ineffective	Negligible Risk	Negligible Risk	Low Risk

3.3.5 Step 3: Method for Estimation of Magnitude of Effect

The 'sensitivity' of the receptors (Step 1) has then been considered together with the likely 'dust impact risk' predicted at each receptor (Step 2), to give the likely magnitude of the effect that will be experienced, using the descriptors detailed in Table 3.8.

For harm to amenity, gauging the magnitude of the effect that could result from the predicted dust impact on a receptor of a particular sensitivity is a matter of judgement, rather than scientific method. However, it is generally accepted that a high sensitivity receptor subjected to a high dust impact will experience a substantial adverse effect, and a low sensitivity receptor subjected to a low dust impact will experience a negligible effect. However, between these extremes the various combinations will give rise to a gradation of severity of effects.

The IAQM proposes the following framework of descriptors for the magnitude of 'disamenity' effect for receptors of different sensitivities, but that this should be clarified through the professional judgement of a suitably qualified and experienced practitioner.

Table 3.8: Descriptors for Magnitude of Dust Effects

		Receptor Sensitivity		
		Low	Medium	High
Dust Impact Risk	High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
	Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
	Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
	Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

Having predicted the magnitude of the likely effect from dust deposition at individual receptors, the next step is to estimate the overall effect from dust deposition on the surrounding area.

3.3.6 Step 4: Mitigation Measures

Mitigation measures to be implemented to reduce dust emission impacts are then considered. Well managed minerals sites encompass a degree of dust mitigation as part of normal working practice. If the outcome of the assessment is that the air quality effect is 'not significant' then it is likely that these controls will be sufficient. Where the assessment shows, however, that there is the potential for a dust impact which is significant, further mitigation must be considered.

Mitigation measures are therefore divided into the two following categories

- basic good practice mitigation measures; and
- site specific mitigation measures: The dust risk categories for each of the seven activities considered to have the highest potential to generate fugitive emissions will be used to define the appropriate, site-specific mitigation measures to be adopted.

3.4 Method for Assessing Health Effects from Concentrations of Particulate Matter

The magnitude of potential effects of airborne particulates cannot be assessed in the same manner outlined for deposited dust in section 3.3 and subsections within. The minerals section of the PPG states that if there are residential properties (or other sensitive uses) in close proximity to the source of emissions (e.g. haul roads, crushers, stockpiles, etc.) on a mineral site, then concentrations of dust particulates suspended in the air (PM_{10}) that can potentially have effects on human health must be considered.

In the absence of direct measurement data, the IAQM minerals guidance[1] recommends that ambient PM_{10} concentrations should be obtained from a location which is representative of the site. The guidance states "*If the long term background PM10 concentration is less than 17 µg m-3, there is little risk that the Process Contribution would lead to an exceedance of the annual mean objective*."

Details of this process applied to this project are outlined in Section 5.2 of this report.

3.5 Method for Assessing the Effect of Road Traffic Emissions

Exhaust emissions from road vehicles could affect the concentrations of principal pollutants of concern associated with traffic, NO_2 PM_{10} and $PM_{2.5}$, particulates at sensitive receptors in the vicinity of the development.

IAQM guidance[17] has criteria for which a detailed air quality assessment would be required for operational road traffic vehicle movements. As the proposed development site is outside of an AQMA then a detailed air quality assessment would be required should there be a change of Heavy Duty Vehicles[18] of more than 100 Annual Average Daily Traffic.

[17] Institute of Air Quality Management (IAQM) (2017), Land-Use Planning & Development Control: Planning for Air Quality, version 1.2 January 2017
[18] Heavy Duty Vehicle are defined as freight vehicles of more than 3.5 tonnes (trucks) or passenger transport vehicles of more than 8 seats (buses and coaches).

4. Baseline Conditions

4.1 Complaints

It is understood that there is no recent history of complaints associated with the site as it currently operates, regarding dust, odour or air quality.

4.2 Meteorological data

Figure 4.1 shows a series of wind rose plots obtained from the meteorological station located at Birmingham International Airport. This station is representative of the meteorological conditions experienced at the site.

The plots show that during the period 2012 to 2016, winds blow most frequently from the south west, which is typical of conditions across much of the country. This means that wind is most frequently blowing towards receptors located in the direction of Finmere village.

During the course of the year wind will blow from all directions. As such, receptors located in any direction can be expected to be downwind of dust generating activities at some point during the works.

Figure 4.1 also gives an indication of the variation in wind speed over the 6 year period. The average wind speed during the representative period was 4.1 m/s. Wind speeds of 4.1 m/s or less are unlikely to pick up dust from surfaces such as the ground and stockpiles, and will transport fine particulate matter if already airborne. During adverse meteorological conditions when wind speeds are elevated well above average, there is the potential for gusts to disturb and pick up particulates from surfaces.

Table 4-1 indicates the percentage of days for each calendar year where the precipitation rate was <0.2 mm and when the wind speed was >5 m/s for wind direction sectors, as described in IAQM guidance. The results are presented as a percentage of total days. An overall judgement is then made to determine the frequency of winds from a particular sector to be adopted for the assessment.

Table 4.1: Birmingham Airport Meteorological Station (2012 to 2016), Wind Direction on dry days, with Wind Speed >5 m/s (%)

Year	Percentage per Mean wind direction											
	Sec 1	Sec 2	Sec 3	Sec 4	Sec 5	Sec 6	Sec 7	Sec 8	Sec 9	Sec 10	Sec 11	Sec 12
2012	3 (I)	5 (MF)	6 (MF)	2 (I)	1 (I)	1 (I)	3 (I)	14 (F)	17 (F)	13 (F)	22 (VF)	13 (F)
2013	2 (I)	11 (MF)	12 (F)	7 (MF)	5 (MF)	2 (I)	5 (MF)	10 (MF)	12 (F)	9 (MF)	13 (F)	11 (MF)
2014	4 (I)	5 (MF)	4 (I)	3 (I)	5 (I)	9 (MF)	6 (MF)	7 (MF)	9 (MF)	10 (MF)	18 (F)	9 (MF)
2015	4 (I)	7 (MF)	6 (MF)	4 (I)	2 (I)	7 (MF)	7 (MF)	14 (F)	8 (MF)	9 (MF)	16 (F)	16 (F)
2016	5 (MF)	12 (F)	13 (F)	6 (MF)	3 (I)	3 (I)	8 (MF)	8 (MF)	10 (MF)	13 (F)	5 (MF)	15 (F)
Frequency adopted for this assessment	I	MF	MF	I	I	I	MF	MF	MF	MF	F	F

Notes: Sector 1 = 345-15º, Sector 2 = 15-45º, Sector 3 = 45-75º, Sector 4 = 75-105º, Sector 5 = 105-135º, Sector 6 = 135-165º, Sector 7 = 165-195º, Sector 8 = 195-225º, Sector 9 = 225-255º, Sector 10 = 255-285º, Sector 11 = 285-315º, Sector 12 = 315-345º. Frequency category shown in parenthesis as 'I' (Infrequent), 'MF' (Moderately Frequent), 'F' (Frequent) and 'VF' (Very Frequent).

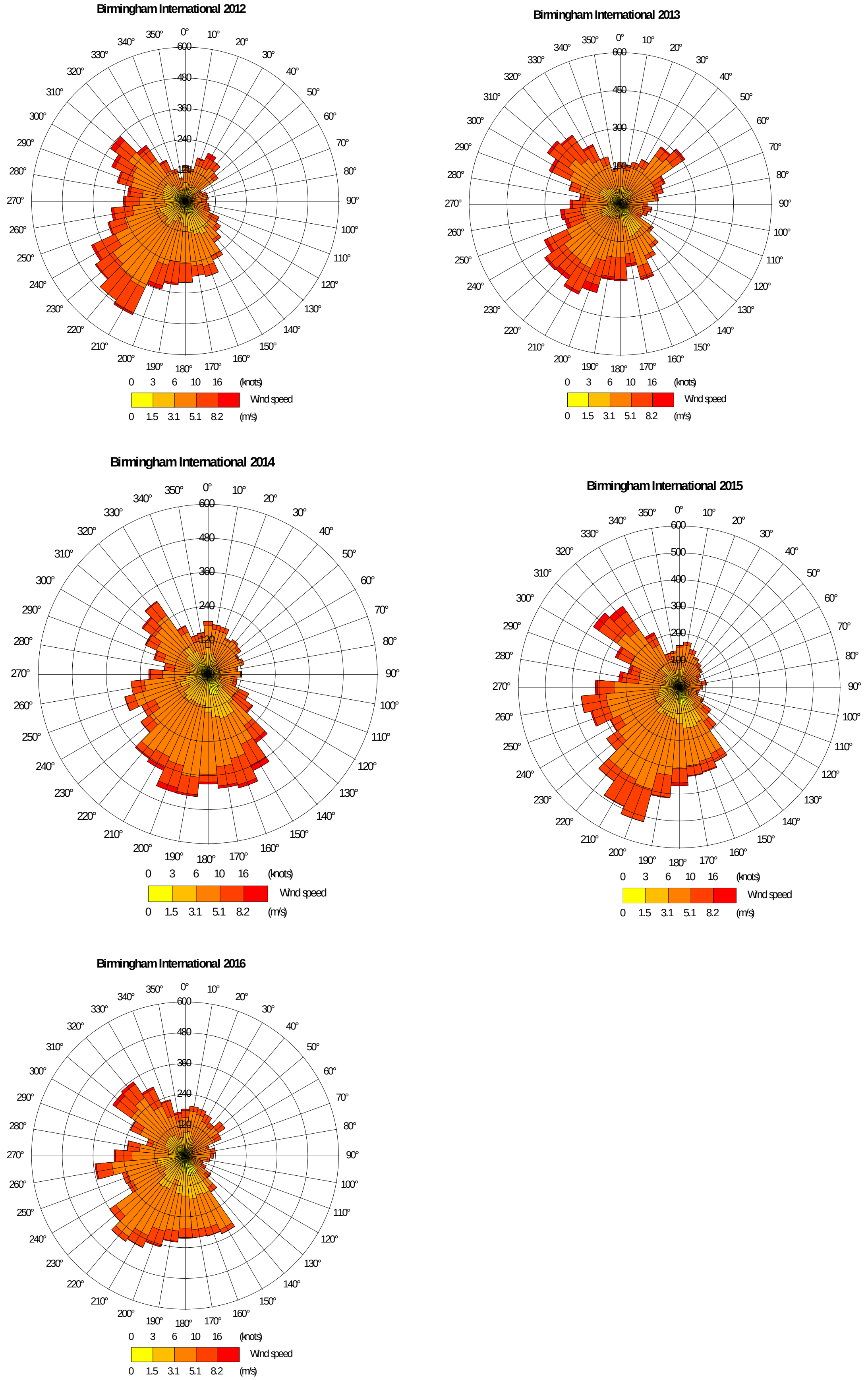


Figure 4.1: Wind Roses for Birmingham International Airport Met Station

4.3 Baseline Dust Deposition Rate

A background level of dust exists in all urban and rural locations in the UK. Dust can be generated on a local scale from vehicle movements and from the action of wind on exposed soils and surfaces. Dust levels can also be affected by long range transport of dust from distant sources into the local vicinity.

Residents currently experience dust deposition at a rate that is determined by the contributions of local and distant sources. This baseline rate of soiling is considered normal and varies dependent on prevailing climatic conditions. The tolerance of individuals to deposited dust is therefore shaped by their experience of baseline conditions.

Existing local sources of particulate matter from outside the site include windblown dust from agricultural land, exhaust emissions from energy plant and road vehicles, break and tyre wear from road vehicles and the long-range transport of material from outside the study area. The site as it currently exists contributes to deposited dust and particulate matter due to site activities, the movement of HGVs and other operational sources.

4.4 Baseline Particulate Matter Concentrations

To gain an understanding of the current PM_{10} particulate concentrations at the Finmere Quarry site, a proxy was selected from the air monitoring stations featured on the Defra website because there is currently no air monitoring site in the immediate vicinity of Finmere Quarry. For an air monitoring site to be representative of a separate location, it is necessary that the two sites have similar geographical characteristics. Defra characterise each of their air monitoring sites as rural, suburban or urban, within each of these categories, they are further categorised as background, industrial or traffic. The preferred site type to represent Finmere Quarry would be either rural industrial or rural background, however there are no with PM_{10} particulate data which Defra classify as rural industrial. Accordingly, a rural background site was selected to represent a lower bound estimate, and a local urban background site was selected to act as an upper bound estimate for the Finmere Quarry site.

Chilbolton Observatory air monitoring site was selected as the rural background site to act as a lower bound proxy for Finmere Quarry. Chilbolton is located in Hampshire, 96 km from Finmere Quarry, 80 metres above sea level. The nearest settlements are Andover 6.6 km away and Winchester, 9.6 km away. Additionally, the air monitoring facility is located 8.2 km from a small quarry. Oxford St. Ebbes urban background air monitoring site was selected as the upper bound estimate. Oxford is the nearest city to the site, located 25.5 km away. Annual mean PM_{10} concentrations at these two sites are presented in Table 4.2. The numbers of exceedances of the 24-hour objective of 50 µg/m^3 observed during the available data are presented in Table 4.3.

Despite the differences in site type at Chilbolton and Oxford, mass concentrations of PM_{10} particulates are markedly similar in terms of mean and median concentrations, both of which fall well below the annual average limit of 40 µg/m^3 as set out in the national Air Quality Strategy.

Table 4.2: Annual mean PM_{10} Concentrations for Chilbolton and St. Ebbes Monitoring Sites

Site	Type	Annual Mean PM_{10} mass concentrations (µg/m^{3})	
		2016	2017
Chilbolton	Rural Background	14.8[a]	13.3
St. Ebbes	Urban Background	No data	12.5[b]

Table 4.3: 24-hour Mean Particulate Matter Exceedances for Chilbolton and St. Ebbes Monitoring Sites

Site	Type	Particulate Matter number of days 24-hour mean greater than 50 µg/m^3	
		2016	2017
Chilbolton	Rural Background	2a	1
St. Ebbes	Urban Background	No data	2b

[a] Data from 19/1/2016 to 30/12/2016

[b] Data from 9/1/2017 to 30/12/2017

4.5 Traffic Generation

The HGV traffic generation arising as a result of the exiting approvals is summarised in Table 4.4 below.

Table 4.4: Trip Generation of Existing Finmere Quarry Approvals

(green) Approved Activity (or assumed to be approved – see notes 2 and 3 below)

ACTIVITY / YEAR[1]	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sand and gravel extraction[2]		21	21	21	21	21							
Inert waste landfill[3]			22.5	22.5	22.5	22.5	22.5						
Non-hazardous waste landfill	35.5	35.5	35.5	35.5	35.5	35.5							
Clay extraction	0	0	0	0	0	0	0	0	0	0	0	0	0
MRF (current activity)	42	42*	42*										
TOTAL AVERAGE DAILY HGVs	**77.5**	**98.5**	**121**	**79**	**79**	**79**	**22.5**	**0**	**0**	**0**	**0**	**0**	**0**

1. The durations shown do not include restoration timescales - this table shows operational duration only.

2. This activity is as proposed in application number MW.0142/16 (subject to removal of the current HS2 holding objection and approval by OCC). For the purposes of identifying the maximum potential average daily HGV movements it has been assumed that this application will be approved.

3. This activity is as proposed in application number MW.0142/16 (subject to removal of the current HS2 holding objection and approval by OCC). For the purposes of identifying the maximum potential average daily HGV movements it has been assumed that this application will be approved.

5. Predicted Operational Impacts and Effects

5.1 Dust Impact Assessment

The proposed development has the potential to generate emissions of airborne particulate matter that could result in short-lived dust episodes, during which sufficient particulate matter could be transported beyond the site boundary as fugitive dust to increase surface soiling rates or elevate PM_{10} particulate concentrations at nearby sensitive receptors.

The methodology outlined in Section 3 has been followed to determine the significance of dust effects.

5.1.1 Step 1: Site and Baseline Conditions

The baseline conditions are summarised in Section 4.

Due to the rural nature of the area, dust and PM_{10} sensitive receptors within the zone of potential impacts considered in this assessment are limited to a very small number of residential properties. The location of these receptors is shown on Figure 3.1 (see Annex D1 to this report) and details are provided in Table 3.1. Each of the receptors chosen represents the maximum level of exposure that could be experienced at other receptors in their vicinity. As the receptors are residential properties they have been classified as being of high sensitivity to dust emissions.

5.1.2 Step 2: Dust Impact Risk

Deposited Dust Residual Source Emissions

To determine the residual source emissions the following were taken into consideration:

- potential mineral extraction activities that may generate dust include preparation of new extraction areas, including the removal of topsoil, mineral extraction, loading minerals onto haul trucks, mineral processing and off-site transportation leading to track out onto the external road network;
- sand and gravel will be quarried at the site using a 360° excavator. The material is likely to have an inherently high moisture content, which can cause particles to adhere and thereby affords a high degree of natural mitigation. However, this does not negate the potential for fugitive emissions from this material if it dries out, especially during high wind conditions. It is envisaged that extraction from the proposed sand and gravel extension will cease by 2029.
- the sand and gravel void will be backfilled using imported inert waste and on-site material. It is envisaged that the proposed backfilling will be completed by 2029.
- the non-hazardous waste landfill cells will be filled in a phased programme, with progressive capping and restoration. The cells will be filled at a rate of around 120,000 m^3 per annum with MRF residual wastes and non-hazardous C&I wastes. It is envisaged that landfilling will cease by 2029.
- the processing of secondary aggregate from incoming inert waste material would be carried out within the sand and gravel processing area.
- the MRF is limited to an annual throughput of 150,000 tonnes. Of this, it is expected that 30,000 tonnes would be recovered for export to re-processors and the remainder will be disposed of at the adjacent non-hazardous waste landfill.
- clay extracted from the proposed extension would be worked by excavation with a single 360° excavator, prior to storage and use in cell engineering and capping works within the non-hazardous waste landfill site.
- as detailed in Appendix C (Transport) to the ES, the trip generation associated with the existing planning approvals creates the largest number of HGVs in a single year, but the proposed development creates a larger average number of HGVs over a longer time frame (i.e. 108.5 over a 5 year period from 2020).

Taking the above factors into account in conjunction with the examples set out in Table 3.3, the overall residual source emissions for the site have been designated as Medium.

5.1.3 Dust Pathway Effectiveness

The primary factor influencing the pathway effectiveness is the distance between the sensitive receptor and the potential dust sources. Dust that will become suspended in the air will eventually dilute, disperse and deposit, with resultant airborne particulate decreasing rapidly with distance from the source. However, other factors, such as the orientation of receptors relative to the prevailing wind direction, meteorological conditions and topography also need to be considered.

Wind data was considered to assign a frequency of potentially dusty winds at the site. According to Figure 4.1, the prevailing wind direction is from the south-westerly and westerly sectors, and therefore receptors located to the north and north east of the dust generating activities are generally downwind. When precipitation information is taken into account to identify dry and windy days, the data indicates that potentially dusty winds are moderately frequent when blowing from the north eastern and south western sectors, and frequent from the north western sector. Properties to the south east are therefore at the highest risk of impacts occurring.

In this instance, the site and surrounding area is generally flat with areas of woodland. The topography is therefore unlikely to influence the dispersion of dust.

The effectiveness of the pathway for each receptor is summarised in Table 5.1.

Table 5.1: Pathway Effectiveness

Receptor	Distance to closest location where proposed activities would take place	Frequency of potentially dusty winds blowing from source	Receptor distance category	Pathway Effectiveness
R1 - Widmore Farm	350 m	Infrequent	>250 m	Ineffective
R2 - Glanwin Meadow	140 m	Moderately frequent	Intermediate	Moderately effective
R3 - Foxley Fields	175 m	Moderately frequent	Distant	Ineffective
R4 - Boundary Farm	180 m	Moderately frequent	Distant	Ineffective
R5 - Barleyfields Barn Farm	440 m	Moderately frequent	>250 m	Ineffective
R6 - Barley Fields	540 m	Infrequent to Moderately frequent	>250 m	Ineffective
R7 - Warren Farm	250 m	Infrequent to Moderately frequent	Distant	Ineffective

When the frequency of dusty winds is considered, along with the receptor distance from the source, the resultant pathway effectiveness is classified as moderately effective in the case of one receptor, Glanwin Meadow. At the other receptors, the pathway is classified as ineffective.

Deposited Dust Impact Risk

In accordance with Table 3.2 in Section 3.3.3, the impact risk for deposited dust has been assigned as low at one receptor (R2 – Glanwin Meadow), because of the medium residual source emission and the moderately pathway effectiveness. At the other receptors the impact risk has been determined to be negligible.

5.1.4 Step 3: Magnitude of Effect

Magnitude was assessed based on the high receptor sensitivity for residential properties, as set out in Section 3.3.3, and the dust impact risk, as determined in Section 5.1.3. This is summarised in Table 5.2.

Table 5.2: Magnitude of Dust Effect

Receptor Identification	Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R1 - Widmore Farm	Negligible	High	Negligible
R2 - Glanwin Meadow	Low risk	High	Slight adverse
R3 - Foxley Fields	Negligible	High	Negligible
R4 - Boundary Farm	Negligible	High	Negligible
R5 - Barleyfields Barn Farm	Negligible	High	Negligible
R6 - Barley Fields	Negligible	High	Negligible
R7 - Warren Farm	Negligible	High	Negligible

The resulting magnitude for effects of deposited dust is therefore judged to be slight adverse at one receptor, and negligible in other areas. Despite this, the mitigation measures consistent with good practice should be implemented at this site during the proposed development, these are outlined in Section 5.3.

5.2 Health Effects from Concentrations of Particulate Matter

The two Defra air monitoring sites deemed to be suitably representative of Finmere Quarry report mean background PM_{10} particulate concentrations of less than 17 µg/m^3. This is less than half of the annual mean air quality objective and provides evidence that the background is consistent with that found in rural areas. Therefore, there is little risk that the contribution of particulates (also referred to as the Process Contribution) made by the proposed development would lead to an exceedance of the annual mean PM_{10} objective, in accordance with IAQM guidance[1].

5.3 Effects from Road Traffic Emissions

IAQM guidance[19] has criteria for which a detailed air quality assessment would be required for operational road traffic vehicle movements. As the proposed development site is outside of an AQMA then a detailed air quality assessment would be required should there be a change of Heavy Duty Vehicles[20] of more than 100 Annual Average Daily Traffic.

The magnitude of road traffic movements have been evaluated for the proposed development (see Annex D2) and it is predicted that the existing approvals create the largest number of daily average HGV movements in a single year (120 per day). From 2019 to 2020 there is a reduction of 13 HGV daily movements compared to the current existing movements. However, from 2021 to 2023 there is an additional 30 HGV movements per day. Between 2024 and 2028 there is an additional 86 HGV movements per day. All of the additional vehicle movements are below the IAQM threshold for a detailed assessment of operational road traffic vehicle movements. On this basis it is not considered necessary to proceed with a quantitative assessment of the effect of road traffic on local air quality, and this matter is not considered further.

5.4 Mitigation Measures

The low magnitude residual risk predicted for both deposited dust and PM_{10} is dependent on the implementation of mitigation measures consistent with good practice during the normal operation of the site. Such standard measures have been embedded in the proposed development design. The embedded mitigation measures are summarised below:

- maintenance of a record of dust and air quality complaints, should they occur. In the event a complaint is received, work would be done to identify the cause(s) and take appropriate measures to reduce emissions in a timely manner;
- training site personnel in dust mitigation;

[19] Institute of Air Quality Management (IAQM) (2017), Land-Use Planning & Development Control: Planning for Air Quality, version 1.2 January 2017
[20] Heavy Duty Vehicle are defined as freight vehicles of more than 3.5 tonnes (trucks) or passenger transport vehicles of more than 8 seats (buses and coaches).

- maintain an ongoing visual awareness of dust emissions across the site boundary, and taking steps to reduce emissions where necessary;
- monitor weather conditions and take extra mitigation steps when necessary e.g. if strong winds are forecast, cover vulnerable material which would otherwise be exposed; spraying roads if dry conditions are expected;
- on site vehicle movements should be speed limited;
- cleaning HGVs before they leave the site using wheel washing measures;
- cleaning and maintenance of the hard surfaced access route, such that it would not become a major source of re-suspended dust and to minimise the track out of material onto external roads;
- dampening of materials, exposed surfaces and unsurfaced haul routes using water sprays or mists, as necessary, during periods of dry and windy weather;
- potentially introducing a paved car park for off-site vehicles, including staff cars;
- dampen material prior to crushing, where applicable;
- enclosing equipment with the potential to generate dust emissions;
- maintaining equipment in accordance with manufacturer's recommendations;
- minimise drop heights of feed hoppers;
- taking care to minimise and dampen emissions during the emplacement and compaction of wastes during landfilling operations;
- carrying out handling of and processing of wastes only within the MRF building; and
- maintaining existing trees and hedgerows around the site.

As the above embedded mitigation measures are judged to be sufficient to ensure that the effects predicted are not significant, no further mitigation is considered to be necessary. Provided that a significant escalation of complaints does not occur, ongoing visual monitoring of dust emissions from the site by staff, with corrective action taken in the event that an issue is seen to arise is considered to be sufficient and no further operational monitoring is considered to be necessary.

6. Residual Effects

The implementation of standard good practice embedded mitigation measures would be sufficient to control emissions, to the extent that the magnitude of dust effect is negligible to slight adverse at all receptors considered within the assessment. The overall effect of the proposed development on local air quality is considered to be not significant.

7. Conclusions

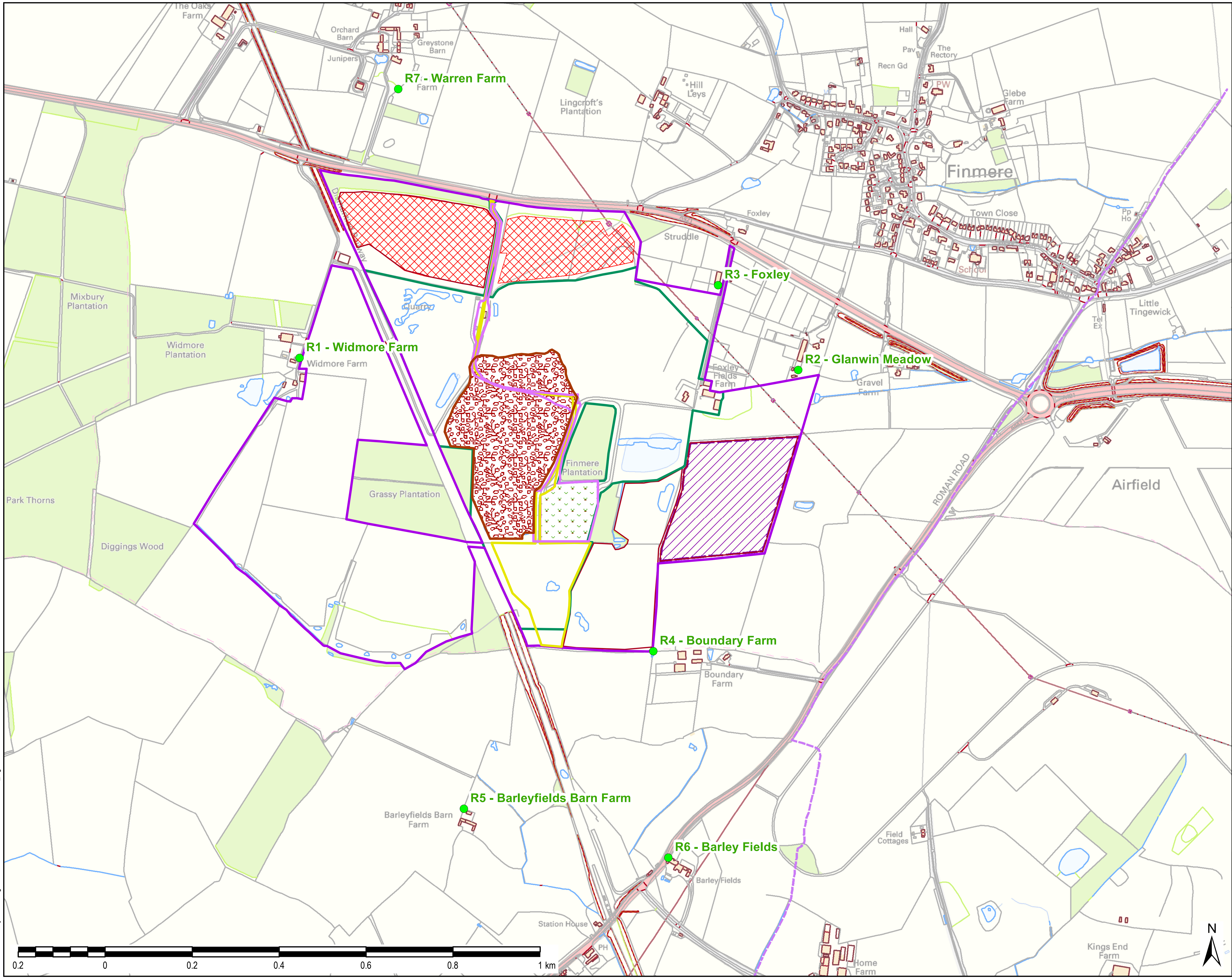
A fugitive dust and particulate matter assessment has considered the effect of the proposed development on the amenity and health of residents near to the quarry.

The proposed development has the potential to impact on the level particulate matter at sensitive receptor locations near to the site boundary. However providing that standard good practice particulate control measures are implemented it is concluded that potential impacts should be adequately controlled such that significant effects will not occur.

Background concentrations of PM_{10} are low in the area around the site and are below the screening criteria at which an assessment of the contribution made by the site to overall concentrations is necessary. Therefore, there is little risk that the Process Contribution would lead to an exceedance of the annual mean PM_{10} objective.

The overall effect of the proposed development on local air quality is considered to be not significant and is consistent with both national and local planning policies that relate to the protection of local air quality and public amenity.

Annex D1 – Figure 3.1



THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

LEGEND

- RECEPTORS
- LANDOWNERSHIP BOUNDARY
- SECONDARY AGGREGATE PROCESSING PLANT SITE
- NON-HAZARDOUS LANDFILL EXTENSION
- SAND AND GRAVEL EXTRACTION EXTENSION
- NON-HAZARDOUS LANDFILL EXTENSION
- PLANNING PERMISSION BOUNDARY OF THE NON HAZARDOUSE WASTE LANDFILL 13/00973/CM
- PLANNING PERMISSION BOUNDARY OF THE SOUTH EASTERN CLAY EXTRACTION (10/01515/CM)
- RETENTION OF MRF
- PLANNING PERMISSION BOUNDARY OF THE MRF (15/02059/OCC)
- CLAY EXTRACTION EXTENSION

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue
FOR INFORMATION

Client
AT CONTRACTING & PLANT HIRE LTD.

Project Title
FINMERE QUARRY

Drawing Title
AIR QUALITY SENSITIVE RECEPTORS

Drawn	Checked	Approved	Date
JM	DD	GG	19/03/2018

AECOM Internal Project No.	Scale @ A3
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FIGURE 3.1

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Annex D2 – Average Daily HGV Generation

Table C.4: Average Daily HGV Generation and Duration Scenarios

Approved Activity i.e. do nothing (or assumed to be approved – see note 2 and 4 below)

Proposed Activity

ACTIVITY / YEAR[1]	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sand and gravel extraction[2]		21	21	21	21	21							
Sand and gravel extraction extension[3]							21	21	21	21	21		
Inert waste landfill[4]			22.5	22.5	22.5	22.5	22.5						
Inert waste landfill extension (backfilling with site materials)								0	0	0	0		
Non-hazardous waste landfill	35.5	35.5	35.5	35.5	35.5	35.5							
Non-hazardous waste landfill extension							35.5	35.5	35.5	35.5	35.5		
Secondary aggregate recovery		15	15	15	15	15	15	15	15	15	15		
Clay extraction	0	0	0	0	0	0	0	0	0	0	0	0	0
Clay extraction extension[5]	0	0	0	0	0	0	0	0	0	0	0	0	0
MRF[6]	42	42*	42*										
Retention of MRF[6]		14.5*	14.5*	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5		
TOTAL AVERAGE DAILY HGVs (DO NOTHING)	77.5	98.5	121	79	79	79	22.5	0	0	0	0	0	0
TOTAL AVERAGE DAILY HGVs (AS NOW PROPOSED)	77.5	86	108.5	108.5	108.5	108.5	108.5	86	86	86	86	0	0
TOTAL DIFFERENCE	**0**	**-12.5**	**-12.5**	**29.5**	**29.5**	**29.5**	**86**	**86**	**86**	**86**	**86**	**0**	**0**

1. The durations shown do not include restoration timescales - this table shows operational duration only.

2. This activity is as proposed in application number MW.0142/16 (subject to removal of the current HS2 holding objection and approval by OCC). For the purposes of identifying the maximum potential average daily HGV movements it has been assumed that this application will be approved.

3. This assumes that this activity will follow on from the sand and gravel extraction proposed as part of pending application MW.0142/16. If MW.0142/16 is not approved then this activity would commence in 2019 (or once approved – whichever is earlier).

4. This activity is as proposed in application number MW.0142/16 (subject to removal of the current HS2 holding objection and approval by OCC). For the purposes of identifying the maximum potential average daily HGV movements it has been assumed that this application will be approved.

5. It is likely that the proposed clay extraction extension will be progressed once the existing clay extraction area is exhausted however it is not known when this will be – as there are no off0site HGV movement associated with either activity these are shown as both taking place in parallel in the above table.

6.**If the proposed development for the MRF is approved then the average HGV numbers associated with the MRF will reduce from 42 to 14.5 per day in 2019. An overlap is shown in the table for the purposes of demonstrating that during 2019 and 2020 the proposed development for the MRF would result in a reduction in average daily HGV movements.

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