

CONTENTS

Introduction	7-1
Scope	7-1
Overview of Current Site Operations.....	7-1
Overview of Proposed Operations	7-2
Guidance and Industry Good Practice	7-2
National Legislation and Guidance.....	7-2
General Nuisance Legislation	7-3
Further Research / Guidance	7-3
Planning Policy	7-4
Assessment methodology.....	7-6
Dust Assessment	7-6
Vehicular Pollutants Assessment.....	7-7
Baseline Environment.....	7-8
Site and Surroundings.....	7-8
Existing Air Quality	7-8
Dust Sensitive Receptors.....	7-9
Meteorology	7-10
Assessment of Effects and Significance	7-11
Traffic Exhaust Emissions.....	7-11
Dust Emissions	7-12
Conclusions	7-22

INTRODUCTION

- 7.1 This chapter of the ES considers the potential air quality impacts as a result of the proposals to import inert waste into Washington Sand Pit for restoration works over a 5 year period. The imported inert waste would undergo screening onsite prior to being deposited.
- 7.2 This air quality assessment considers the impacts associated with the screening and handling of imported inert waste, the restoration works required and the extension of time of operations at the site.
- 7.3 The primary potential impacts from an air quality perspective in relation to the application site relate to the release of dust and traffic exhaust emissions.

Scope

- 7.4 The scope of the assessment has been discussed with the Environmental Protection team of Horsham District Council and to identify any local air quality issues that need to be addressed within the assessment. The key issues identified in terms of air quality are dust emissions from the proposed operations and the impact of exhaust emissions from Heavy Duty vehicles (HDVs). The impact of traffic generated from the proposed activities has particular relevance to the potential impacts on the Storrington Air Quality Management Area located 1.6km to the west of the site.
- 7.5 The scope of the assessment therefore incorporates the following:
- review of baseline conditions and relevant legislation and guidance;
 - assessment of the potential impacts of exhaust emissions from traffic movements generated by the proposal; and
 - assessment of the potential dust impacts and required dust mitigation measures from the proposed activities.
- 7.6 A Section 73 application has been submitted with a proposal to extend the extraction operations at Washington Pit by 2 years. This would extend the extraction of sand and associated activities until 31st December 2015. This application is written in parallel to the Section 73 application; the scenario assessed for the 5 year restoration proposal therefore includes for extraction operations to continue during the first 2 years of the restoration works.

Overview of Current Site Operations

- 7.7 Current operations at Washington Sand Pit include the extraction of sand, onsite screening and stockpiling of the extracted material and subsequent transfer of material offsite by HDVs. Access to the site is at the south-eastern corner of the site where traffic accesses the A283. All HDV traffic is routed to the east with no HDVs travelling through the village of Storrington to the west of the site.

Overview of Proposed Operations

- 7.8 The proposed site operations would involve the extension of operations on site by 5 years with the importation of inert material to allow for the proposed restoration plan of the site. The imported material would undergo screening on site before prior to being deposited.
- 7.9 The restoration of the site would be undertaken in a series of 5 phases, with phase 1 commencing in the south-western corner of the site; with subsequent phases working in a clockwise direction. Infilling of the site to the required levels would be followed by the re-instatement of onsite soils and overburdens before seeding and planting is undertaken.
- 7.10 There are areas of existing woodland along the south-western, southern and eastern boundaries of the site that would be retained and thus provide effective screening to those receptors in proximity to the application site boundary.

GUIDANCE AND INDUSTRY GOOD PRACTICE

National Legislation and Guidance

Air Quality Strategy

- 7.11 The 'Air Quality Strategy for England, Scotland, Wales and Northern Ireland' (AQS) 2007, contains air quality objectives based on the protection of both human health and vegetation (ecosystems). The Air Quality Strategy sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met.
- 7.12 These objectives have been set taking into account the Air Quality Standards defined in the Air Quality Standards Regulations 2010. The AQS objectives relevant to this assessment relate to nitrogen dioxide and particulate matter and are shown in Table 7- 1 below.

**Table 7- 1
Air Quality Strategy Objectives**

Pollutant	Concentration	Measured as	Reference
Nitrogen Dioxide (NO ₂)	40 µg/m ³	Annual mean	AQS
	200µg/m ³	1-hour mean not to be exceeded more than 18 times per year	AQS
Particulate matter (PM ₁₀)	50 µg/m ³	24-hour mean not to be exceeded more than 35 times per year	AQS
	40 µg/m ³	Annual mean	AQS

Local Air Quality Management (LAQM)

- 7.13 Part IV of the Environment Act 1995 requires local authorities to periodically

review and assess the quality of air within their administrative area. The reviews have to consider the present and future air quality and whether any air quality objectives prescribed in regulations are being achieved or are likely to be achieved in the future.

- 7.14 Where any of the prescribed air quality Objectives are not likely to be achieved the authority concerned must designate an Air Quality Management Area (AQMA). For each AQMA the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality Objectives.
- 7.15 Defra has published technical guidance (TG09)¹ for use by local authorities in their review and assessment work.

General Nuisance Legislation

- 7.16 Part III of the Environmental Protection Act (EPA) 1990 (as amended by the Noise and Statutory Nuisance Act 1993) contains the main legislation on Statutory Nuisance and allows local authorities and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance. It also defines accumulation or deposit, which is prejudicial to health as a nuisance.
- 7.17 There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist – 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

Further Research & Guidance

Design Manual for Roads and Bridges

- 7.18 The "Design Manual for Roads and Bridges" (DMRB)² was introduced in 1992 in England and Wales, and subsequently in Scotland and Northern Ireland. It provides a comprehensive manual system which accommodates current Standards, advice notes and other published documents relating to trunk road works. In the UK, particularly in relation to air quality, the DMRB guidance is commonly applied to all potential schemes involving changes to traffic flows and also in LAQM Updating and Screening Assessments.

Environmental Protection UK Guidance

- 7.19 Environmental Protection UK (EPUK) has published guidance³ to help

¹ Department for Environment, Food and Rural Affairs (DEFRA): Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(09), 2009.

² Highways Agency (2007) Design manual for roads and bridges. Version 207/07.

³ Environmental Protection UK 'Development Control: Planning for Air Quality – 2010 Update'.

ensure that air quality is properly accounted for in the development control process. It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed. Importantly it sets out a recommended approach to assess the significance of impacts.

The Mineral Industry Research Organisation (MIRO)

7.20 A publication issued on behalf of MIRO was released in early 2011⁴. The focus of this guide is to assist in the identification, control and management of dust arising from the extractive industries during:

- site design and preparation of planning applications;
- site opening and preparation (soil and overburden removal, handling and storage);
- quarrying for the extraction of minerals;
- extraction and mineral processing; and
- site restoration and closure.

7.21 The guidance provides a useful reference for available methods of mitigation and monitoring.

Planning Policy

National Policy

7.22 The National Planning Policy Framework (NPPF) describes the policy context in relation to pollutants including air pollutants:

'The Government's objective is that planning should help to deliver a healthy natural environment for the benefit of everyone and safe places which promote wellbeing.

To achieve this objective, the planning system should contribute and enhance the natural and local environment by:

[...] preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of land, air, water or noise pollution or land instability.'

7.23 Specifically in terms of development with regard to air quality:

'Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.

7.24 The policy contained within the NPPF relating to air quality is addressed

⁴ Good practice guide: Control and measurement of nuisance dust and PM10 from the extractive industries. Report to The Mineral Industry Research Organisation (MIRO). February 2011. AEAT/ENV/R3140.

within this assessment.

Local Policy

Horsham District Council (HDC) – Local Development Framework

- 7.25 HDC adopted the Core Strategy in 2007, a key document which forms part of the Local Development Framework. The Core Strategy sets out the key elements of the planning framework for the district over the period to 2018. The Core Strategy is currently being revised to take account of the changes to national policy and the updated local housing numbers.

West Sussex County Council: Minerals and Waste Local Plans

- 7.26 Until the submission and adoption of the documents under the Minerals and Waste Development Framework, the current minerals plan is the West Sussex Minerals Local Plan adopted in 2003 (excluding policies that were not saved beyond September 2007).

- 7.27 Applicable policies from the West Sussex Minerals Local Plan 2003 to this assessment include the following:

Policy 19: “In considering planning applications for mineral extraction attention will be given to the effect upon residential and other amenity, and measures to mitigate the impact.”

- 7.28 West Sussex County Council and the South Downs National Park Authority have submitted the West Sussex Waste Local Plan (Regulation 22) in March 2013 to the Secretary of State. It is anticipated that the document will be adopted by the Authorities in October 2013. The Waste Local Plan covers the period up to 2031 and will become the most up to date statement of the Authorities land use planning policy for waste.

- 7.29 The policies contained within the Waste Local Plan (Regulation 22) submission that are considered relevant to this assessment include Policy W16: Air, Soil, and Water which states:

“Proposals for waste development will be permitted provided that:

a) there are no unacceptable impacts on the intrinsic quality.....of air, soil and water resources....

b) there are no unacceptable impacts on the management and protection of such resources, including any adverse impacts on Air Quality Management Areas and Source Protection Zones.....”

- 7.30 The Waste Local Plan submission goes on to say “...waste developments are likely to make a relatively minor contribution to overall pollution from traffic (and emissions from individual facilities are closely monitored and controlled by the Environment Agency)”.

ASSESSMENT METHODOLOGY

Dust Assessment

Deposited Dust

- 7.31 A semi-quantitative assessment of fugitive emissions from the proposed restoration activities has been undertaken. The assessment has constructed a conceptual model that takes into consideration the potential sources, surrounding receptors and the pathway between the source and receptor in order to assess the magnitude of risk.
- 7.32 The distance from the source to receptor is crucial, with the vast majority of particles responsible for annoyance deposited within 100m of the source⁵ and hence it is in this zone that the risk of problems from dust is highest.
- 7.33 To allow for this effect of distance, buffer zones are often defined by mineral and waste planning authorities around potentially dusty activities to ensure sufficient protection is provided. The 1995 Department of Environment Guidance⁶ recommends a stand-off distance of 100-200m from significant dust sources (excluding short-term sources) although it is recognised that these distances can be reduced if effective mitigation measures are identified and implemented.
- 7.34 The area occupied by the infill operations would not simultaneously occupy the entire application area, but would instead be limited to a number of smaller areas whereby infilling, stockpiles and screening would take place. However, given that the extraction operations would continue onsite for the first 2 years of the proposal the entire application area has been assessed as a potential dust source. This enables a cumulative impact assessment of any areas where extraction would be undertaken simultaneously with restoration works.
- 7.35 The initial risk screening stage (tier 1) focuses upon the potential for dust generation within the application area and the distance between the source and the receptors. Representative receptors in each direction from the application site are identified up to a maximum of 1km distance.
- 7.36 Further assessment is then undertaken for those receptors within 500m of dust generating activities. This is considered to be a precautionary approach on the basis of the 200m stand-off given in the DoE guidance⁶. Receptors within 500m of dust generating activities progress onto a tier 2 assessment.
- 7.37 Tier 2 involves the identification of a source-pathway-receptor linkage and undertakes a semi-quantitative assessment on the likelihood and magnitude of the risk of dust impacts occurring. The assessment takes into account:

⁵ Management, mitigation and monitoring of nuisance dust and PM₁₀ emissions arising from the extractive industries. Report to The Mineral Industry Research Organisation (MIRO). February 2011. AEAT/ENV/R3141.

⁶ Based upon Research document – DETR, The environmental effects of dust from surface mineral workings, December 1995.

- wind direction and speed data (to estimate likelihood of exposure);
 - proximity to source (to estimate magnitude of exposure);
 - sensitivity of receptor; and
 - occurrence of natural dust suppression (rainfall patterns).
- 7.38 This information informs an assessment of the risk of impact and is based upon professional experience of the assessor in quarry and inert waste infilling activities. The issue of dust nuisance on local receptors is a subjective issue, where public perception on what constitutes 'acceptable' levels varies from one person to the next.
- 7.39 Subsequently, recommendations for any further mitigation measures on site have been made and the residual impacts following the implementation of such measures re-assessed.

Suspended Dust

- 7.40 The assessment of suspended dust is concerned with the activities on site with the potential to release or generate significant volumes of PM₁₀, the existing levels of PM₁₀ in the local area, and the proximity of communities and other sensitive receptors. The potential for the operations to increase ambient particulate concentrations above the relevant AQS objectives is then assessed.
- 7.41 Representative baseline PM₁₀ data has been sought from local authority monitoring data, AURN monitoring sites in proximity and estimated concentrations provided on a 1km x 1km grid by Defra. A review of any dust complaints with regard to emissions and track out will also be included.
- 7.42 An approach is detailed within LAQM/TG(09)⁷ (Box 5.10) for the assessment of dust emissions from fugitive and uncontrolled sources. The initial phase of the assessment established where there is relevant exposure 'near' to the source(s) of emissions.
- 7.43 If there is 'near' exposure the requirement for detailed assessments of PM₁₀ is dependent on whether there are any dust concerns associated with facility using complaints data and visual dust emissions.

Vehicular Pollutants Assessment

- 7.44 Vehicular emissions related to the proposed operations are primarily associated with the exhaust emissions from HDVs. The decision as to whether an assessment of potential impact is required is based upon the criteria set out in the DMRB.
- 7.45 The criterion for assessment of air quality contained within the latest DMRB (207/07) focuses on roads with relatively high flows of HDV traffic. 'Affected roads' are those that meet any of the following criteria:

⁷ DEFRA 2009. Local Air Quality Management, technical Guidance LAQM.TG(09).

- road alignment will change by 5m or more; or
 - daily traffic flows will change by 1,000 AADT or more; or
 - Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
 - daily average speed will change by 10 km/hr or more; or
 - peak hour speed will change by 20 km/hr or more.
- 7.46 The DMRB considers any receptor within 200m of an 'affected road' by that operation. If none of the roads in the network meet any of the traffic/alignment criteria or there are no properties or relevant Designated Sites near the affected roads, then the impact of the scheme can be considered to be neutral in terms of local air quality and no further air quality assessment is required.

BASELINE ENVIRONMENT

Site and Surroundings

- 7.47 The site is located directly north of the A283 and approximately 2km east of Storrington, West Sussex. The Site comprises of a small active sand pit whilst to the west there is a larger sand pit which is operated by CEMEX.
- 7.48 There are a number of residential properties in close proximity to the site. Isolated properties are located along the southern and eastern boundaries of the site, along the A283 and Hampers Lane, respectively. Areas of built up residential areas are located approximately 150m to the north of the site.

Existing Air Quality

Local Review and Assessment of Air Quality

- 7.49 The application site is situated within the administrative area of Horsham District Council. The council are required to review and assess their air quality from time to time under the Environment Act 1995 of which the last updating and Screening Assessment (USA) was reported in October 2012.
- 7.50 Horsham have declared two Air Quality Management Areas (AQMAs) within its area. Both AQMAs have been declared on the basis of NO₂ concentrations and are located along major road networks in the towns of Storrington and Cowfold. The closest AQMA is at Storrington, approximately 1.6km west of the site (as illustrated on Drawing AQ1).
- 7.51 Monitoring is undertaken at three locations within the administrative area of Horsham, the closest of which to Washington Sand Pit is a roadside monitor within Storrington village. This monitor is affiliated to the Automatic Urban and Rural Network, and monitors for NO₂, PM₁₀ and PM_{2.5}. Due to the monitors' roadside location it is considered that this monitor is unlikely to be representative of the air quality experienced at the site.
- 7.52 Within the 2012 USA Horsham DC confirmed that there are no new significant potential sources of fugitive particulate matter emissions in the

Local Authority Area.

Air Quality Background Maps

- 7.53 Background pollutant concentration data on a 1km x 1km spatial resolution is provided by Defra and is routinely used to support LAQM and Air Quality Assessments.
- 7.54 Mapped background concentrations for NO₂ and PM₁₀ were downloaded for the grid squares 510500,114500 and 510500,113500 which contains the Site, from the 2010 based background maps (updated August 2012). These are presented in Table 7- 2. The background concentrations, which are an average of the two grid squares, are ‘well below’⁸ the respective limit values.

Table 7- 2
Estimated Annual Mean Background Concentrations

Pollutant	2014 (µg/m ³)	2020 (µg/m ³)	AQS Limit (µg/m ³)
Average PM ₁₀ Concentration	14.6	14.1	40.0
Average NO ₂ Concentration	10.1	8.0	40.0

Complaints

- 7.55 Through communication with Horsham District Council and the site, there have been no records of complaints received during the last two years in relation to dust emissions.

Local Sources

- 7.56 There is a sand quarry adjacent to the application site on the western side, operated by CEMEX. Limited information is available on the operations of this site. At its closest point it is approximately 300m from Washington Pit.

Dust Sensitive Receptors

- 7.57 Sensitive locations are those where the public may be exposed to dust from the site. Locations with high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classes as moderately sensitive include schools, offices, residential areas and food retailers.
- 7.58 There are a number of residential receptors on the land surrounding the application site. Isolated properties are situated along the south-western and southern perimeters, whilst built up residential areas are located along Badgers Holt to the northeast.

⁸ Environmental Protection UK. Development Control; Planning for Air Quality (2010 Update)

7.59 The closest receptors include the following:

- Chanctonbury Lodge (adjacent to the southern boundary)
- residence on Hampers Lane (adjacent to eastern boundary)
- residence on Barns Farm Lane (approx. 80m south of the site)
- residence on A283 (approx. 70m west of site)
- residential area along Badgers Holt (approx. 160m north of the site)

Ecological Receptors

7.60 In terms of designated ecological sites surrounding the proposed development, there are two Sites of Special Scientific Interest within 1km of Washington Sand Pit. Sullington Warren SSSI and Chantry Mill SSSI are both located to the west of the site at a distance of approximately 550m and 800m respectively.

Meteorology

7.61 The generation, release and dispersion of fugitive dust is particularly dependent upon weather conditions and the nature of the handled material. The prevailing meteorological conditions at any site would be dependent upon many factors including its location in relation to macroclimatic conditions as well as more site specific, microclimatic conditions. The most important climatic parameters governing the emission and magnitude of impact of dust are:

- wind direction which determines the broad transport of the emission and the direction in which it is dispersed; and
- wind speed will affect ground level emissions by increasing the initial dilution of pollutants in the emission; it will also affect the potential for dust entrainment.

7.62 Rainfall is also an important climatological parameter in the generation of dust; sufficient amounts of rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to US-EPA⁹ rainfall greater than 0.25mm per day is sufficient to suppress dust emissions.

Wind Speed and Direction Data

7.63 A meteorological station considered representative of local site conditions with available data is located at Gatwick Airport, approximately 31km northeast of the site. A five year average data set for this station has been used for this purpose. A windrose for the Gatwick observation station is presented in Figure 7-1.

⁹ USEPA 2011. AP42 Fifth Edition. Volume 1. Chapter 13. Miscellaneous Sources. Section 13.2.2

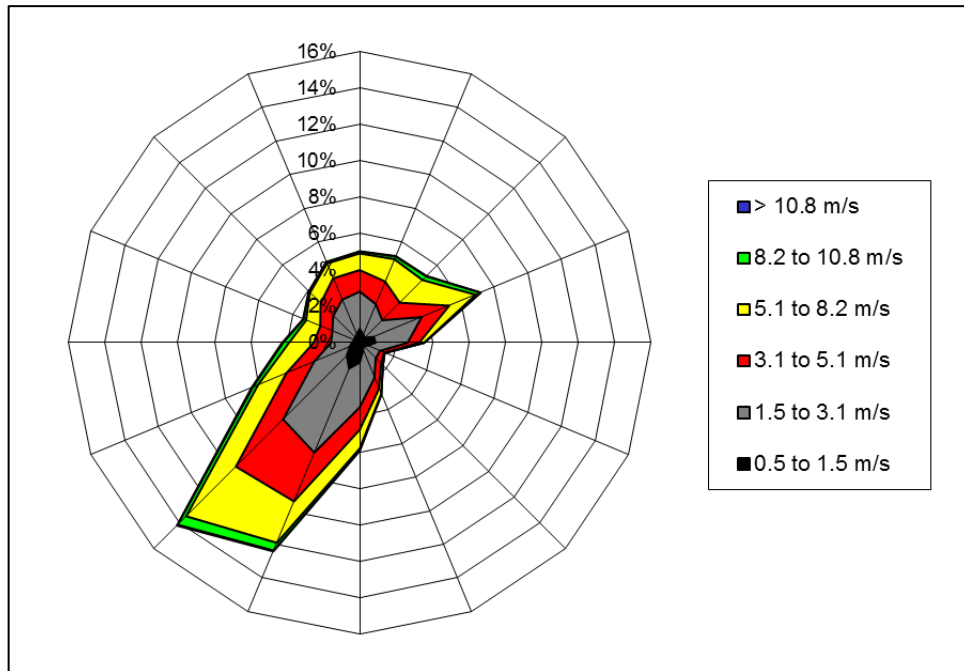


Figure 7-1
Windrose for Gatwick Observation Station

7.64 From Figure 7-1 it can be seen that the majority of winds are from the southwest with winds from this sector occurring for approximately 32% of the year. On this basis, it is receptors to the northeast which have the highest potential for impacts from any dust emissions originating from the site.

Rainfall

7.65 Average rainfall data has been obtained for the Bognor Regis meteorological observation station, located approximately 22km southwest of the site. Average data records (1981 to 2010) indicate that the average number of rainfall days per year (days with rainfall >1mm) is 111.5, which equates to 31% of the year whereby rainfall is sufficient to suppress dust emissions.

ASSESSMENT OF EFFECTS AND SIGNIFICANCE

7.66 This chapter presents the potential sources of impact associated with dust generation and vehicle exhaust emissions from the proposed restoration plans for the application site.

Traffic Exhaust Emissions

7.67 A staged assessment of the potential significant of the emissions from road vehicles associated with the proposed 5 year restoration plans has been undertaken as follows:

Trip Generation

- 7.68 The access point to the site would be located in the south-eastern corner with direct access onto the A283. During the first two years of the five year restoration plans, traffic from both the extraction activities and the restoration work would be generated. For the final three years the traffic would be limited to that generated by the restoration works alone.
- 7.69 During the first 2 years of the proposed development, the extraction and the restoration works would together generate a maximum AADT of 53 HDV movements. Following the completion of the extraction activities, this number would reduce to a maximum AADT of 40 HDV movements for the remaining 3 years.

Trip Routing

- 7.70 All HDV traffic will continue to be routed along the A283 eastbound towards the junction with the A24. There would be no HDV traffic generated through the village of Storrington.

Impact

- 7.71 Taking into account the predicted trip generation and the routing associated with the proposed operations; the impacts are below the thresholds defined in the DMRB guidance (of 200 HDV AADT) and can therefore be classified as 'neutral' with no further assessment required.
- 7.72 In relation to the Storrington AQMA, the proposed operations would not cause an impact on the local air quality in the vicinity of the AQMA. All HDV traffic would be routed eastbound along the A283 with no HDVs associated with the site travelling through Storrington.

Mitigation

- 7.73 Based upon the impact of traffic being assessed as 'neutral', no further mitigation measures are considered to be required.

Particulate Emissions

- 7.74 The proposed restoration proposals would not introduce any additional sources of dust than those that are currently present on site during the extraction operations and the restoration proposals approved under the current permission. The revised restoration proposal would not itself cause an increase in the generation of dust but would result in an extension in time in which the dust sources would be present on site.

Sources of Dust

- 7.75 Activities that would have the potential to generate dust during the 5 year

restoration proposals are presented in Table 7- 3.

**Table 7- 3
Potential Dust Sources**

Activity	Duration of Activity	Potential for Dust Generation (without mitigation)
Material Handling and infilling of Inert Material	Ongoing	Moderate to High
Screening of Inert Material	Variable	High if unmitigated. Controlled thought EPR permit
Storage (inert material)	Ongoing	Moderate - High (dependant on condition of material)
Transport within site	Ongoing	Moderate to High (dependant on vehicles and road surface)
Transport offsite	Ongoing	Low (potential at site exit in absence of mitigation)

Material Handling & Infilling

7.76 Imported inert materials would be transferred to site and following the screening process, suitable material would be transferred into the void using dump trucks. Following the completion of the infilling activities overburden and soil stored in stockpiles on site would be re-instated to allow for seeding and planting to be completed. Material handling therefore includes the following activities onsite:

- unloading of imported material received onsite into stock piles;
- transfer of material onto the screening plant conveyors for processing;
- loading of processed material onto dump trucks and subsequent unloading into restoration areas;
- loading of soils and overburden from onsite storage piles and subsequent unloading into restoration areas; and
- spreading and compaction of infill materials, overburden and soils to achieve required levels.

7.77 The infilling activities using inert materials and the reinstatement of overburden and soils would involve dumping, spreading, shaping and compaction activities. Although such activities would be intermittent in nature, due to the frequency of the activities there is the potential for moderate to high levels of dust emissions.

7.78 The restoration of the site would be undertaken in a series of phases, with works commencing in the south-western corner of the site and working in a clockwise direction. The majority of the handling activities associated with the infilling would therefore be focussed on designated parcels of land to minimise the magnitude of dust generation. Storage of soils, overburden and imported material onsite would generally be located in Phase 5 adjacent to the site entrance; it would be in this area that the loading of material (soils,

overburden and inert material) into dump trucks would be undertaken for internal haulage to the restoration area.

- 7.79 These intermittent yet intensive operations have an increased potential for dust generation during dry and windy meteorological conditions. Dust sensitive receptors located close to the area of operations would be at a greater risk of impact.

Screening of inert material

- 7.80 Imported inert material received on site would be processed through the onsite screening plant before being transferred to the restoration area. The plant itself is mobile and would therefore have the advantage of being moved if required. The location of the plant would be central within the application area to maximise the distance to the receptors around the site boundary.
- 7.81 The screening plant is already in operation on the site for the processing of excavated materials and is operated under an Environmental Permit which includes a number of strict dust control measures that must be adhered to at all times.
- 7.82 In the absence of dust control measures, the screening of dry material has the potential to generate high emissions of particulates.

Storage

- 7.83 Storage on site would involve the storage of imported materials (pre and post-processing), and the existing stockpiles of overburden and soils which would be reinstated during the restoration proposals.
- 7.84 The period of stockpiling for the imported material is considered to be relatively short, with material continuously being removed from the stockpile to the restoration area with more material subsequently added. The stockpiles of overburden and soils are already in-situ at the existing site following their removal during excavation works across the site.
- 7.85 Stockpiles of imported material, overburden and soils would be located within the south-eastern corner of the site in proximity to the site entrance (Phase 5).
- 7.86 The potential for dust generations would be as a result of wind passing across the surface of the stockpiles, the tipping and removal of material from the stockpiles (described within 'material handling') and the traversing of vehicles in proximity to the base of the stockpiles.
- 7.87 On the basis that the stockpiles of infill material and soils likely to be short term, the potential for dispersion of loose material on the surface or on the adjacent ground areas is considered to be moderate to high. The existing stockpiles of overburden and soils would have either formed a 'crust' or have been seeded which reduces the effect of wind whipping.

Internal transport movements: unpaved surfaces

- 7.88 As described previously, the inert infill material and the restoration soils would need to be transferred across site depending on the area and stage of the restoration operations. Material would be transferred using dump trucks or loading shovels and would be undertaken across unpaved haulage routes within the site boundary.
- 7.89 The potential for dust emissions from unpaved haulage routes is dependent on the weight, speed and number of wheels in contact with the road surface. Particulate emissions from unpaved roads have been found to be greater at higher vehicle speeds¹⁰.
- 7.90 In addition to the generation of dust from the passage of vehicles, any loose material across the road surface can also become entrained by wind blow. This source of dust is dependent on the wind speed, the condition of the surface, rainfall and size of the particles. The potential for dust generation from unpaved haulage routes is therefore considered to be high in the absence of mitigation measures.

Internal transport movements: paved surfaces

- 7.91 The access road to the site is accessed from the south-eastern corner and is hard paved up to the area of the weighbridge.
- 7.92 The potential for dust emissions from paved road surfaces are significantly less in comparison to unpaved surfaces due to the fact the road base does not erode. The main factor in the production of dust emissions is the re-suspension of loose material on the surface which has been deposited by vehicles either through spillages or track out. In addition to the passage of vehicles, any loose material which has been deposited on the access road can become entrained by wind blow with the level of entrainment dependent on wind speeds, rainfall and the size of the dust particles.
- 7.93 Considering the frequent passage of vehicles that may have traversed on the unpaved areas within the site prior to exiting the site, the potential for dust emissions from the paved access road in the absence of mitigation is considered to be moderate.

Transport movements offsite

- 7.94 The dispersion of dust particles beyond the site boundary is not only caused by airborne emissions but also by track out of material is carried out from the site onto the local road network. This is directly related to the amount of material that vehicles exiting the site have entrained on their wheels on the undercarriage. Typically, track out occurs for up to 500m¹¹ from the site entrance. Considering the routing arrangements for HDV's exiting the site,

¹⁰ Williams, D.S et al, 2008. Particulate matter emissions by a vehicle running on unpaved roads. Atmospheric Environment (2008) doi: 10.1016/j.atmosenv.2008.02.003

¹¹ Institute of Air Quality Management (IAQM), 2011. Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance. December 2011.

track out could only occur to the east of the site.

- 7.95 In the absence of any mitigation measures to control the level of dust on the access road or the amount of dust carried offsite on the wheels or undercarriage of exiting vehicles, the potential for dust deposition on the local road network is considered to be moderate.

Risk of Impacts – Suspended Dust

- 7.96 To ensure a robust assessment of suspended particulates, the approach recommended in LAQM.TG(09) has been followed. As there are receptors located within 1km of the application boundary, further assessment has been undertaken to investigate the likelihood of the AQS being exceeded during the proposed restoration activities.
- 7.97 The existing air quality in terms of annual PM₁₀ has been taken from the Defra Air Quality background maps. The background PM₁₀ concentrations in 2014 when the restoration operations would commence is 14.6µg/m³. In accordance with LAQM.TG(09) considering the existing background levels and the proximity of receptors within 200m of the site there is considered to be relevant exposure ‘near’ to the sources of dust emissions. There have however been no records of complaints in relation to dust issues during the past 2 years and therefore dust is not considered to be a concern during current site activities. A detailed assessment is therefore not required.
- 7.98 The proposed activities on site would commence once the existing extraction operations and associated works have been completed. The sources of dust that are present during the current sand extraction activities are comparable to those sources that would be generated during the proposed (and approved) restoration works (material handling, screening, stockpiles, haulage). The proposed operations would therefore not expect to increase current PM₁₀ levels than the current levels.

Risk of Impacts – Deposited Dust

- 7.99 A semi-quantitative assessment of fugitive emissions from the proposed restoration plans has been undertaken. The assessment has been undertaken as per the methodology described earlier in this chapter.

Tier 1 Risk Screening

- 7.100 Table 7-4 identifies a representative section of receptors in each direction from the application site, allowing for the receptors within 500m of the site boundary to be identified and progress to Tier 2 of the assessment.

Table 7- 4
Identified Sensitive Receptors

Receptor	Sensitivity to Dust ¹²	OS X, Y(approx.)	Distance from site boundary (approx.)	Direction from centre of site (°)	
R1	Badgers Holt Residence	Medium	510622 114289	230m	350°
R2	Residence off Hampers lane	Medium	510807 114086	75m	020°
R3	Recreation Ground	Low	510839 113899	<50m	020°
R4	Cadrona Residence	Medium	510887 113811	<50m	090°
R5	Chanctonbury Lodge	Medium	510750 113664	<50m	170°
R6	Residence on Barns Farm Lane	Medium	510606 113653	100m	220°
R7	Sandgate Lodge	Medium	510421 113818	130m	270°
R8	Water Lane Residence	Medium	509906 114032	688m	285°
R9	Water Lane Residence	Medium	510043 114423	685m	310°

7.101 Receptors R8 and R9 are located at distances greater than 500m from the development footprint and can therefore be assessed as having an insignificant risk of impact.

Tier 2 Assessment

7.102 The potential for the generation of airborne dust will increase with wind speed, with winds greater than 3m/s capable of carrying dust. A windrose showing the frequency of higher winds (greater than 3m/s) is presented in Figure 7-2 with the individual frequencies for each compass sector used within the assessment.

¹² Communities and Government. Technical Guidance to the National Planning Policy Framework. March 2012.

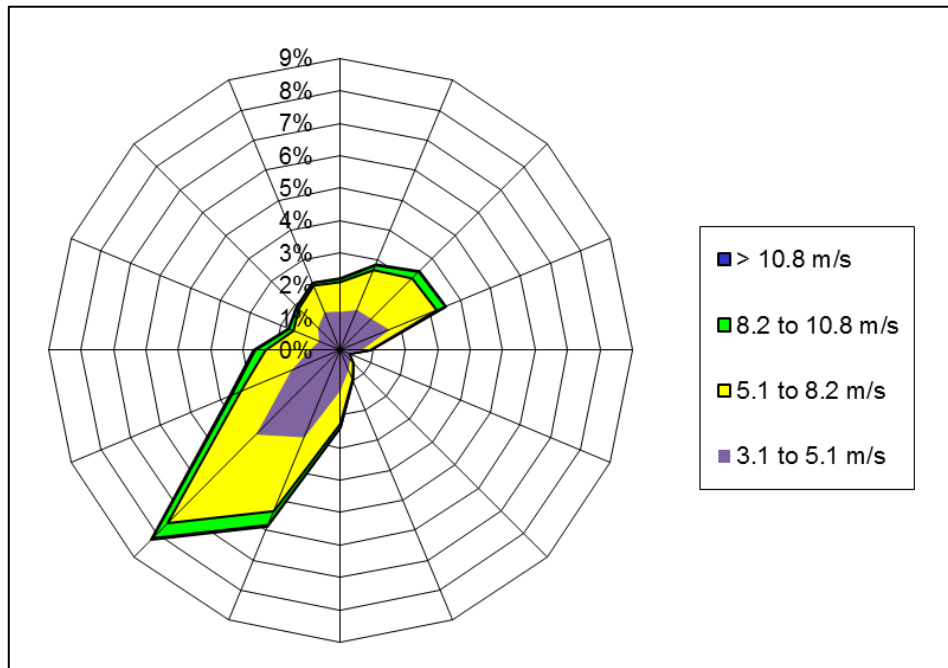


Figure 7-2: Windrose for Gatwick Observation Station – High Wind Speeds (>3 m/s)

- 7.103 As described earlier, the assessment adopts a precautionary approach by assessing the entire application area as a potential dust source. In reality of course, the potentially dusty activities would be confined to the areas whereby stockpiles are located, internal haulage routes and operations where material handling and infilling taking place. By assessing the entire application area the assessment is adopting a worst case scenario and all extraction-related activities that would be operational during the first 2 years of the proposed restoration would be included within the assessment area.
- 7.104 The full outcome of the assessment can be seen in Appendix AQ2. A summary of the final assessment in terms of potential dust impacts in the absence of mitigation on site is presented in Table 7-5.

**Table 7- 5
Assessment of Dust Impacts (Without Mitigation)**

Receptor	Distance to site boundary	% High winds from direction of site	Risk Category
R1	Badgers Holt Residence 230m	6.2%	Acceptable
R2	Residence off Hampers lane <100m	26.9%	Mitigation Required
R3	Recreation Ground <50m	37.1%	Mitigation Required
R4	Cadrona Residence <50m	25.6%	Mitigation Required
R5	Chanctonbury Lodge <50m	24.1%	Mitigation Required

R6	Residence on Barns Farm Lane	100m	18.0%	Mitigation Required
R7	Sandgate Lodge	130m	12.0%	Mitigation Required

7.105 From Table 7-5 it can be seen that in the absence of mitigation measures on site there would be a risk of unacceptable dust impact at receptors R2 to R7, all of which are located within 130m of the site boundary.

7.106 These assessed risks of impact do not take into account the phased nature of the restoration proposals which would mean that the infilling operations would be restricted to a designated area of working. Operations in the remaining areas would be restricted to the following:

- use of internal haulage routes;
- mobile screening plant;
- transfer of materials from stockpiles (located in phase 5); and
- extraction activities (within phases 1 and 2 during the first 2 years).

7.107 Furthermore, there is an area of retained woodland along the south-western, southern and eastern boundaries of the site that would increase the distance of sensitive receptors as well as providing a very effective barrier to capture airborne dust before it transfers beyond the site boundary.

Risk of Impact: Ecological Receptors

7.108 The effects of particulate matter have not been subject to extensive research and therefore little published guidance is available. A majority of the research undertaken has focussed on the chemical effects of alkaline dusts. A summary of a review of available research on behalf of the DETR¹³ concluded that:

'the issue of dust on ecological receptors is largely confined to the associated chemical effect of dust, and particularly the effect of acidic or alkaline dust influencing vegetation through soils.'

7.109 Considering the inert nature of the material being imported to site to complete the restoration proposals the risk of any chemical effects on the surrounding plants within the SSSI's is considered to be low.

7.110 With regard to current levels of dust deposition on the surrounding habitats, Washington Pit and the adjacent working pit to the west are both operational sites. The site condition reports for the SSSI's^{14,15,16} have been reviewed and none of the reports refer to any issues regarding detriment from dust. As a result it can be assumed that the present habitats are not highly sensitive to, or adversely affected by, the levels of dust at the site.

¹³ Department of the Environment, Transport and the Regions (DETR) 1995: *The Environmental Effects of Dust from Surface Mineral Workings – Volume Two*.

¹⁴ <http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?report=sdrt13&category=S&reference=1001370>

¹⁵ <http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?report=sdrt13&category=S&reference=1003394>

¹⁶ <http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?report=sdrt13&category=S&reference=1003969>

- 7.111 An Interim Advice Note (IAN) prepared as a supplement for Volume 11, Section 3, part 1 of the Design Manual for Roads and Bridges (and now incorporated into HA207/07¹⁷) suggests that only dust deposition levels above 1,000 mg/m²/day are likely to affect sensitive ecological receptors. This level of dust deposition is approximately five times greater than the level at which most dust deposition may start to cause a perceptible nuisance to humans. It states that most species appear to be unaffected until dust deposition rates are at levels considerably higher than this¹⁸.
- 7.112 By ensuring dust levels are kept to levels whereby perceptible nuisance to humans is not apparent (200mg/m²/day); levels of dust are expected to be significantly below the suggested level at which ecological receptors would be affected. The ecological receptors are at a significantly greater distance from the application site than the identified human receptors. By ensuring that sources of dust are controlled using good practice mitigation measures for the amenity of nearby residences, the impact on nearby ecological receptors would be considered negligible.

Mitigation Measures

- 7.113 The dust impact assessment has identified the need for additional mitigation measures to reduce the risk of impact at receptors R2 through to R6, all of which are located within 100m of the site boundary. Due to the assessment using the entire application area as a potential dust source, the percentage of winds which would blow from the direction of Washington Pit towards each respective receptor are significantly higher than if the assessment used the areas of potentially dusty activities alone. Due to the lack of knowledge of these activities over the 5 year period a worst case scenario has therefore been undertaken.
- 7.114 Mitigation measures would therefore be required on site to reduce the risk of the generation of fugitive dust, or to minimise the transfer of airborne dust beyond the site boundary.
- 7.115 As the site is currently operational as an active sand quarry, a number of dust mitigation measures employed on site would continue to be employed during the proposed restoration works. These would include the following:
- minimise drop heights during unloading activities;
 - use of water sprays on material as and when required;
 - temporary storage mounds of soil to be a maximum of 2m in height;
 - soil stripping and replacement to be undertaken in strips to minimise the area of disturbed / exposed soils;
 - no heavy wheeled machinery / plant to run over in-situ. undisturbed or replaced soils;
 - seeding / planting of restored areas as soon as practicable;
 - routine inspection and maintenance of plant dust suppression equipment;

¹⁷ Design Manual for Roads and Bridges. Volume 11, Section 3. Part 1 HA207/07. Annex F.

¹⁸ Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSI's (Supplement to DMRB 11.3.1), Interim Advice Note 61/04, March 2005

- limit the construction of stockpiles during dry and windy weather;
- locate stockpiles away from internal haulage routes;
- locate stockpiles away from site boundary and sensitive receptors where practicable;
- avoidance of prolonged storage of materials onsite prior to use / disposal;
- aggregation of stockpiles where possible to avoid the generation of many, smaller stockpiles;
- seeding of all long-term stockpiles of soils or overburden;
- location of mobile screening plant in a central location, away from the site boundaries;
- water source on site at all times to moisten surfaces of stockpiles during dry and windy weather conditions;
- speed controls implemented and enforced on all internal haul roads;
- routine maintenance of all onsite vehicles;
- regular inspection and maintenance of internal haulage roads and access road;
- wheel wash located at weighbridge to be used by all exiting vehicles;
- regular inspection for signs of track-out on local roads in vicinity of site access to and removal of any dust deposits;
- temporary cessation of site activities in the event that unacceptable dust emissions can be seen crossing the site boundary in the direction of sensitive receptors;
- a trained site manager (or his deputy) on site during working hours responsible for the effective implementation of dust control measures.

7.116 Additional measures that have been identified as effective mitigation measures during the proposed restoration works are the retention of the existing woodland along the south-western, southern and eastern boundaries and the working of the application site in a five distinct phases.

7.117 As described previously in this chapter, there have been no complaints received with Horsham District Council or Britannia Crest Recycling Ltd in the last 2 years in relation to dust emissions. It is therefore considered appropriate to assume that the current dust control measures are effective in suppressing any dust generated from the existing activities on site. Although the proposed activities involve inert waste deposition to complete the revised restoration plan, the activities that would be undertaken on site are directly comparable to those currently in operation in relation to the sand extraction.

Residual Impacts

7.118 Given that there are no known dust issues with no record of complaints received by with the site or Horsham District Council, the existing mitigation measures in place on site are considered to be suitably effective in ensuring that dust impacts beyond the site boundary at local receptors are avoided.

7.119 Based upon the effectiveness of the existing mitigation measures in place; and on the provision that these measures are continued throughout the proposed five year restoration proposal the risk of dust impacts is considered to reduce to an acceptable level, as presented in Table 7-5.

**Table 7- 6
Assessment of Dust Impacts (With Mitigation)**

Receptor		Risk Category Without Mitigation	Risk Category with Mitigation Measures
R1	Badgers Holt Residence	Acceptable	Insignificant
R2	Residence off Hampers lane	Mitigation Required	Acceptable
R3	Recreation Ground	Mitigation Required	Acceptable
R4	Cadrona Residence	Mitigation Required	Acceptable
R5	Chanctonbury Lodge	Mitigation Required	Acceptable
R6	Residence on Barns Farm Lane	Mitigation Required	Acceptable
R7	Sandgate Lodge	Mitigation Required	Acceptable

Cumulative Impacts

- 7.120 Surrounding operations that introduce the potential for cumulative impacts include the neighbouring quarry operated by CEMEX to the west of the application site.
- 7.121 Activities associated with the extraction, storage and screening of sand at the application site have operated in tandem with the adjacent CEMEX quarry for a number of years. Over this period no significant cumulative impacts have been experienced by local receptors.

CONCLUSIONS

- 7.122 This assessment has considered the potential impacts of the proposed restoration proposals for Washington Pit. A separate application has proposed for the extension of the extraction works in which sand extraction would continue for the first two years of the proposed five year restoration plan. The simultaneous operations of both excavation and restoration have been acknowledged within the assessment.
- 7.123 Impacts on local air quality from traffic emissions have been assessed using the DMRB criteria. Based upon the calculated traffic generation throughout the five year proposal, HDVs associated with the application site would remain at levels by which the impact on local air quality would be 'neutral'.
- 7.124 The transport scheme for the proposed development would ensure that all HDV traffic associated with the works would access and exit the site from the east. This would ensure that no HDV traffic is allowed to access or travel through the village of Storrington and the Storrington AQMA.
- 7.125 The potential dust impacts of the development have been assessed in terms

of the risk of PM₁₀ impact for which Air Quality Standards exist, and the risk of fugitive dust impact which is associated with amenity issues.

- 7.126 An assessment of PM₁₀ has been completed following guidance within LAQM.TG(09) which takes into consideration background PM₁₀ levels and distance to receptors. On the basis of the low background levels and that there is no record of complaints to Horsham District Council or the operator, it is considered that the proposed restoration works would generate an insignificant impact on local PM₁₀ levels.
- 7.127 A semi-quantitative assessment of deposited dust was undertaken to identify whether any of the identified receptors in the area surrounding the application site were at risk of dust impact from the proposed activities. Consideration within the assessment was given to the distance of the receptor from the site boundary, the frequency of wind directions that would increase the risk of dust impact and rainfall patterns that would assist in dust suppression.
- 7.128 Five of the seven receptors located within 500m of the application boundary were found to be at risk of dust impact in the absence of dust control measures being employed on site. The potential for dust impacts on the nearby ecological sites were assessed with the potential dust impacts assessed as insignificant on the basis that effective dust control was implemented on site.
- 7.129 Mitigation measures currently employed on site have been reviewed and are providing they are continued to be implemented on site throughout the five year restoration proposals, are considered to be adequate in reducing the dust impacts at local receptors to an acceptable level.
- 7.130 All potential dust impacts from the proposed restoration scheme are considered to be reversible i.e. the risk of impact will cease on completion of activities on site. The magnitude of release is comparable to those within the approved 2 year restoration scheme but over a longer period of an additional 3 years.
- 7.131 The impacts are considered to be medium term (reflecting the proposed 5 year duration) with no significant impacts on the local air quality.

APPENDIX AQ1: Risk Screening Methodology

- 7.132 The methodology applied in the assessment is a semi-quantitative risk assessment methodology, in which the probability of an impact occurring and the magnitude of the impact, if it were to occur, are considered. This methodology is the Tier 2 assessment of the dust assessment methodology. In the event that identified dust sensitive receptors are not screened out within Tier 1, this approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the development.
- 7.133 The magnitude of the potential risk at each receptor is classified depending on the frequency of exposure and the distance from the site to the receptor. Frequency of exposure is represented by the percentage of moderate to high winds (over 4m/s) from the direction of the site.
- 7.134 The screening assessment tool assesses the significance of the distance from site and the frequency of exposure of each receptor by assigning a ranked number. Receptors with a higher potential for dust impacts would therefore result in a higher value whilst receptors with lower potential would expect to carry a lower value. The value corresponding to an evaluation of risk is a product of the significance of the distance and frequency of exposure, each assigned a value representing its significance. The multiplication of the two values assigned gives a total, which is then corresponded to a qualitative term of risk magnitude.

Frequency of Exposure Criterion

- 7.135 The potential for any site to emit dust is greatly influenced by weather. Increased wind speed increases the potential for the generation of airborne dust due to the suspension and entrainment of particles in airflow. A worst case situation would be strong, warm, drying winds which increase the rate at which dust is lifted from an untreated surface and emitted into the air. Wind can also have the effect of spreading dust over a large area. Conversely, rainfall decreases dust emissions, due to both surface wetting and increasing the rate at which airborne dust is removed from air. In accordance with US-EPA, rainfall greater than 0.25mm per day⁹ is considered sufficient to effectively suppress wind blown dust emissions.
- 7.136 The frequency of exposure to dust emissions represents the percentage of time that wind speeds capable of carrying airborne dust (greater than 3 m/s) are blowing from the site to the direction of the receptor. Frequencies would be calculated based on averaged meteorological data over a five year period at Gatwick observation station. The frequency of exposure at this point would provide an overestimate of risk given that during days of rainfall no dust emissions would occur despite wind speed values.
- 7.137 For the screening assessment, a value of 1mm would be used for the criteria to classify days as 'dry' or 'wet'; four times the recommended value, using annual average rainfall data for the period 1981 to 2010 at the Bognor Regis observation station. The average number of days when rainfall exceeds

1.0mm would be provided for each month, and calculated over the year to provide an average.

- 7.138 The resulting frequency of moderate to high wind speeds with the potential of carrying airborne dust towards receptors would then be classified into the criteria in Table AQ1-1 with the respective rank value assigned.

**Table AQ1-1:
Frequency of Exposure - Risk Classification**

Risk Category	Criteria
1	Frequency of winds (>3.1m/s) from the direction of the dust source on dry days are less than 3%
2	The frequency of winds (>3.1m/s) from the direction of the dust source on dry days are between 3% and 6%
3	The frequency of winds (>3.1m/s) from the direction of the dust source on dry days are between 6% and 9%
4	The frequency of winds (>3.1m/s) from the direction of the dust source on dry days are between 9% and 12%
5	The frequency of winds (>3.1m/s) from the direction of the dust source on dry days are between 12% and 15%
6	The frequency of winds (>3.1m/s) from the direction of the dust source on dry days are greater than 15%

Distance to Source Criterion

- 7.139 In assessing dust impacts, the distance from the source to the sensitive location is crucial, as airborne and deposited dust tend to settle out close to the emission source. Smaller dust particles remain airborne for longer, dispersing widely and depositing more slowly over a wider area.
- 7.140 Guidance indicates that larger dust particles (greater than 30µm) will largely deposit within 100m of sources. Smaller particles (less than 10µm) are only deposited slowly. Concentrations decrease rapidly on moving away from the source, due to dispersion and dilution.
- 7.141 To allow for this effect of distance, buffer zones are often defined by mineral planning authorities around potentially dusty activities to ensure that sufficient protection is provided. They have not been established in any rigorous scientific way, but usually range from 50 to 200m. The 1995 DoE Guidance on dust from surface mineral workings, however, recommends a stand-off distance of 100-200m from significant dust sources (excluding short-term sources), although it is recognised that these distances can be reduced if effective mitigation measures are identified and implemented. In terms of identifying sensitive locations therefore, and to represent an extreme worst case scenario, consideration only needs to be given to sensitive receptors within 500m of the site boundary. Receptors at a distance greater than 500m have therefore been screened out in Tier 1 of the assessment.

7.142 The criteria for classifying the distance from receptor to source and thus assigning a rank value has therefore been based on the various references to dust behaviour described above. The rank classifications are presented below in Table AQ1-2. A risk category is maintained for receptors in excess of 500m for circumstances where although a receptor is beyond 500m from the dust source, its sensitivity for example is seen sufficient enough for it to be taken onto a Tier 2 assessment. For example, a painting industry located at 510m from the boundary.

**Table AQ1-2:
Distance to Source - Risk Classification**

Risk Category	Criteria
1	Receptor is more than 500m from the dust source
2	Receptor is between 400m and 500m from the dust source
3	Receptor is between 300m and 400m from the dust source
4	Receptor is between 200m and 300m from the dust source
5	Receptor is between 100m and 200m from the dust source
8	Receptor is less than 100m from the dust source

Sensitivity of Receptors

7.143 Sensitive locations are those where the public may be exposed to dust from the site. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas and food retailers. Table AQ1-3 below¹⁹ shows examples of dust sensitive facilities.

**Table AQ1-3:
Examples of Dust Sensitive Facilities**

High Sensitivity	Medium Sensitivity	Low Sensitivity
Hospitals and clinics	Schools and residential areas	Farms
Retirement homes	Food retailers	Light and heavy industry
Hi-tech industries	Greenhouses and nurseries	Outdoor storage
Painting and furnishing	Horticultural land	
Food processing	Offices	

Evaluation of Risk

7.144 Once a rank value has been assigned to the frequency of exposure and distance to source, an overall risk can be evaluated by combining the two risk categories, along with consideration of the sensitivity of the receptor. For low sensitivity receptors the risk of dust impact are considered to be significantly lower than for medium and high sensitive receptors. Therefore a factor of 0.5 would be applied to the final risk evaluation ranking.

¹⁹ Ireland M. (1992) "Dust: Does the EPA go far enough?", Quarry Management, pp23-24.

- 7.145 For each receptor, the relative magnitude of risk is given by identifying which of the score categories in Table AQ1-4 it falls into. This final evaluation represents the risk of dust impacts prior to control and mitigation measures being employed on site.

**Table AQ1-4
Risk Evaluation Ranking**

Magnitude of Risk	Score
Insignificant	6 or less
Acceptable	8 to 12
Further Mitigation Required	15 or more

APPENDIX AQ2: SEMI-QUANTITATIVE ASSESSMENT RESULTS

Receptor	Receptor Name	Distance from site boundary	Rel. Winds	% Relative Mod- High winds	% Relative winds amended for dry days only	Receptor Sensitivity Factor	Distance Rank	Relative winds (dry days)Rank	Multiplied Rank
R1	Badgers Holt Residence	230m	157-180	9.0	6.2	1	4	3	12 Acceptable
R2	Residence off Hampers lane	>100m	180-247	39.0	26.9	1	8	6	48 Mitigation Required
R3	Recreation Ground	<50m	157-315	53.7	37.1	0.5	8	6	24 Mitigation Required
R4	Cadrona Residence	<50m	225-337	37.1	25.6	1	8	6	48 Mitigation Required
R5	Chanctonbury Lodge	<50m	315-090	34.9	24.1	1	8	6	48 Mitigation Required
R6	Residence on Barns Farm Lane	100m	000-090	26.2	18.0	1	5	6	30 Mitigation Required
R7	Sandgate Lodge	130m	045-112	17.4	12.0	1	5	4	20 Mitigation Required

