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Introduction

Background

- 8.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential effects of a planned extension to Rossmore Quarry on air quality. The existing quarry is located at Rossmore, Carrigtwohill, Co. Cork.
- 8.2 The proposed development being applied for under this planning application is shown on EIAR Figure 2-2 and will consist of:
- extension of the existing quarry over an extraction area of c. 12.5 hectares to a level of minus 35mOD;
 - extraction and processing of limestone using the industry standard blasting and processing techniques in place at the existing quarry;
 - provision of overburden storage area;
 - provision of a vehicular tunnel underneath the local private road to link the extension area to the existing quarry;
 - operational landscaping including perimeter screening berms around the proposed extension area;
 - restoration of the quarry to natural habitat after-uses; and
 - all related ancillary site works within an overall application area of c. 22.3 hectares, and all for a period of 35 years and a further 2 years to complete final restoration of the site.

The proposed development, in conjunction with the existing quarry permitted under planning ref. 21/6983 (ACP Ref. ABP-313-903-22), will result in a combined extraction capacity of 500,000 tonnes per annum. The permitted extraction capacity of the existing quarry area will remain unchanged.

- 8.3 Further information on the proposed development, site activities, environmental management systems and controls at the application site is provided in the Chapter 2 of this EIAR.
- 8.4 The proposed development at Rossmore Quarry will have the potential to generate fugitive dust emissions and particulates (PM₁₀), which may result in impacts on local air quality. Combustion emissions (primary PM₁₀, and oxides of nitrogen) from vehicle exhaust emissions associated with the extraction and transportation of aggregates may also have the potential to impact on local air pollution.
- 8.5 The proposed development in combination with the existing quarry will have a maximum annual extraction rate of c. 500,000 tonnes per year. Based on this output level all of the existing quarry and the proposed development operations (including the existing concrete plant and asphalt plant) will generate a maximum of c. 110 HGV trips per day, refer to EIAR Chapter 14 – Traffic. The development will also continue to generate some light vehicular traffic, principally by employees and visitors travelling to and from the quarry.

Scope of Work

- 8.6 The focus of this assessment is the potential impact on local residential amenity of fugitive dust emissions and particulate matter generated by the proposed development. Dust emissions are likely to arise during the following activities:

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- soil stripping, earthworks, and topsoil stockpiling (site preparation and restoration works)
- handling and processing of excavated rock
- transfer, end-tipping and stockpiling of aggregates.
- trafficking by heavy goods vehicles (HGVs) over paved / unpaved surfaces
- landscaping and final restoration activities.

8.7 With respect to the potential for air quality impacts, the key objective at the application site is to manage activities to ensure that air emissions are prevented where possible, and the effects of any residual releases are minimised.

8.8 This EIAR chapter describes and assesses the existing air quality baseline characteristics of the area at and around Rossmore Quarry based on site specific surveys and EPA data. Impacts on air quality arising from the proposed development are assessed. Mitigation measures are identified where required, to eliminate and reduce these impacts insofar as practical.

8.9 The following sections of this chapter describe the potential air quality impacts associated with the planned development activities. The following issues are addressed separately:

- relevant legislation, standards, and guidance;
- baseline conditions pertaining to measured (or estimated) existing air quality levels around the existing quarry footprint;
- methodology used to assess the potential impacts of planned activities on air quality at local properties;
- assessment of the impacts;
- description of mitigation measures that are incorporated into the construction, design and operation of the proposed development to eliminate or reduce the potential for increased air quality impacts (if required);
- summary of any residual impacts and reinstatement;
- summary of cumulative impacts; and
- monitoring proposals.

Consultations / Consultees

8.10 Following a review of published development plans and site surveys, it was considered that there was no requirement for any further formal external consultations to be carried out in respect of air quality for the purposes of this assessment.

Contributors / Author(s)

8.11 The air quality impact assessment presented in this Chapter was prepared by SLR Consulting Ireland. The lead consultant for the study was Tim Paul MSc CEng MIEI MICS MIQ.

Limitations / Difficulties Encountered

8.12 This assessment is compiled based on published regional and local data, guidance documents, and site-specific field surveys. No difficulties were encountered in compiling the required information.

Regulatory Background

- 8.13 The following sections describe the main legislative policy requirements in respect of air quality associated with the proposed development.

Legislation

Air Quality Standards

- 8.14 The Government's policy on air quality within Ireland is set out in the Air Quality Standards (AQS) Regulations 2011. The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the EPA Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 (S.I. No. 33 of 1999). The 4th Daughter Directive was transposed by the Arsenic, Cadmium, Mercury, Nickel, and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I.no. 58 of 2009).
- 8.15 The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in Ireland.
- 8.16 The AQS sets standards and objectives for ten priority pollutants. Standards establish concentrations of pollutants in the atmosphere which can broadly be taken to provide a certain level of environmental quality. Objectives are policy targets, often expressed as maximum concentrations, not to be exceeded (either without exception, or with a limited number of exceedances within a specified timescale).
- 8.17 Under the AQS, the following pollutants are monitored and controlled:
- nitrogen oxides
 - sulphur dioxide
 - carbon monoxide
 - ozone
 - particulate matter (PM₁₀, PM_{2.5} and black smoke)
 - benzene and volatile organic compounds
 - heavy metals; and
 - polycyclic aromatic hydrocarbons.
- 8.18 These pollutants are monitored at 32 stations across the country and together they form the national ambient air quality network. A summary of relevant air quality limit values in relation to human health are presented in Table 8-1. Air quality limit values in relation to vegetation protection are presented separately in Table 8-2.
- 8.19 The air quality monitoring network is coordinated and managed by the EPA, as the National Reference Laboratory for air quality. The results of the monitoring are compared to limit values set out in EU and national legislation on ambient air quality. Map-based assessments of air quality are prepared and published by the EPA.

Table 8-1 Relevant Air Quality Limit Values for Protection of Human Health

Human Health	Limit or Target Value			Information and Alert (where applicable)	Long Term Objective
Pollutant	Averaging Period	Value	Maximum Number of Allowed Occurrences	Period	Threshold Value
Nitrogen Dioxide (NO ₂)	Hour	200 µg/m ³	18	1 hour alert	400 µg/m ³ Exceeded for 3 consecutive hours
	Year	40 µg/m ³	0		
Sulphur Dioxide (SO ₂)	Hour	350 µg/m ³	24	1 hour alert	500 µg/m ³ Exceeded for 3 consecutive hours
	Day	125 µg/m ³	3		
Particulate matter with aerodynamic diameter of less than 10 µm (PM ₁₀)	Day	50 µg/m ³	35		
	Year	40 µg/m ³	0		
		20 µg/m ³ (ECO)			

Table 8-2 Summary of Air Quality Limit Values: Protection of Vegetation

Vegetation		Critical level or Target Value		Long-term Objective
Pollutant	Averaging Period	Value	Value	Date
Nitrogen dioxide (NO _x)	Calendar year	30 µg/m ³		
Sulphur Dioxide (SO ₂)	Calendar year and winter (October to March)	20 µg/m ³		

Planning Policy and Development Control

National Spatial Strategy (NSS) / National Planning Framework – Project Ireland 2040

8.20 The National Planning Framework 2040 (published in February 2018) is a national planning framework for Ireland. The framework provides the policies for all regional and local plans. In the framework, the extractive industries are recognised as important for the supply of aggregates and construction materials to variety of sectors. It emphasises that the planning process will play a key role in realising the potential of the extractive industries and protecting

reserves of aggregates and minerals. Aggregates and minerals will continue to be enabled where this is compatible with protection of the environments.

- 8.21 There are no specific policies in relation to air emissions in NPF for extractive or production of construction aggregates and materials. The general objective is to facilitate development and to protect the environment at the same time.

Guidelines Extractive Industry Emissions Limit Values

- 8.22 Section 261 of the Planning and Development Act 2000 (as amended), which regulated a significant proportion of established extractive development, came into effect in April 2004. The planning guidelines¹ for the extractive industries '*Quarries and Ancillary Activities – Guidelines for Planning Authorities*' were published by the Department of the Environment, Heritage, and Local Government at around the same time.
- 8.23 Separately, in 2006, the EPA published complementary guidance aimed at quarry operators, planning authorities and the general public *Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*².
- 8.24 The Irish Concrete Federation (ICF), the trade body representing the interests of quarry operators and producers of construction materials, has also published the ICF Environmental Code to provide guidance for its members on best practice in the environmental management of quarries. The document was last updated in 2005.

Site Specific Dust Deposition Emission Limit Values

- 8.25 Condition 11 (a) attached to planning permission ABP Ref. 313903 (Plan. Ref. 21/6983) for the existing quarry states:

Dust levels at the site boundary shall not exceed 350 milligrams per square metre per day averaged over 30 days over a continuous period of 30 days (Bergerhoff Gauge). Details of a monitoring programme for dust shall be submitted to, and agreed in writing with, the planning authority within six months of the date of this Order.

Guidance Relating to Air Quality / Dust Nuisance

- 8.26 A range of monitoring techniques exists for dust deposition rates (i.e., Bergerhoff and Frisbee gauges). There is currently no Irish, European Union (EU) or World Health Organisation (WHO) statutory standards or limits appropriate for the assessment of deposited dust and its propensity to generate annoyance.
- 8.27 Industry standard criteria levels for the gravimetric assessment of dust deposition from extractive industry in Ireland are set out in the DoEHLG (2004) planning guidelines for the extractive industry, the ICF Guidelines (2005) and EPA (2006) Environmental Management Guidelines. Each of these Guidelines recommend the use of the Bergerhoff method for measuring dust deposition. In line with this approach, the guidelines recommend the TA Luft dust deposition limit value of 350 mg/m²/day (total dust deposition averaged over a 30-day

¹ Quarries and Ancillary Activities – Guidelines for Planning Authorities (DoEHLG, 2004)

² https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

period), measured at site boundaries, as per Condition 11 (a) attached to planning permission ACP Ref. 313903 (Plan. Ref. 21/6983) for the existing quarry.

- 8.28 When the rate of accumulation of the coarser fraction of dust (referred to as deposited dust) is sufficiently rapid to cause fouling or discolouration, then it is generally considered to introduce a nuisance. The point at which an individual perceives dust deposition as a nuisance and causes a complaint is highly subjective.
- 8.29 The action of wind over dry ground will carry dust particles into the air. Although large emissions of dust occur naturally, man-made dust events are caused by a range of activities including agriculture, road traffic, construction works (including the handling and storage of soils and particulate matter) and by vehicles using paved and unpaved haul roads.
- 8.30 For operations involving the mechanical break up of solids, the most common concern regarding dust emissions is the potential nuisance effect from the larger fractions of dust.

Guidance on Assessment of Mineral Dust Impacts for Planning

- 8.31 Guidance on the assessment of the impacts of extractive operations on air quality has been prepared by the Institute of Air Quality Management (IAQM, 2016)³. This guidance uses a simple distance-based screening process to identify those operations where the dust impacts are unlikely to be significant and therefore require no further assessment. Where more detailed assessment is required, a basic assessment framework is presented which employs the Source-Pathway-Receptor approach to evaluate risk of impacts and effects.

Air Quality and Ecological Receptors

- 8.32 Much of the research on the effects of particulate matter on vegetation has focussed on the chemical effects of alkaline dusts. A summary of a review of available research on behalf of the UK's Department for the Environment Transport and Regions (DETR) 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."
- 8.33 An Interim Advice Note (IAN) prepared as a supplement for Volume 11, Section 3, Part 1 of the UK DMRB (Design Manual for Roads and Bridges) and now incorporated into LA 105) 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 this.
- 8.34 Guidance on the assessment of the air quality impacts of development on designated nature conservation sites prepared by the Institute of Air Quality Management (IAQM, 2019). This guidance is also useful to evaluate the effects of air pollution on habitats and species using air quality assessment.
- 8.35 The predicted scale of dust effects may be classified as either 'significant', or not 'significant'. Where effects are predicted to be 'significant', further mitigation is likely required before the proposals are to be acceptable under planning policy.

³ http://www.iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf

Air Quality and Health Effects

- 8.36 The main health effects of air pollution can include stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma. These conditions can lead to sickness and ill health as well as premature mortality.
- 8.37 The recent EPA reports, Air Quality in Ireland 2021 detail the main air quality trends based on monitoring from the national ambient air quality network.
- 8.38 Ireland met all the EU legal requirements in 2021 but failed to meet the WHO guidance levels for health in 2021. Selected pollutants that failed the WHO AQG levels in 2021 were: PM₁₀, PM_{2.5}, NO₂, Ozone, SO₂, and PAHs.
- 8.39 Europe as part of the Green Deal and the EU's Zero pollution visions for 2050 is revising its air quality standards to align them closely with the lower WHO recommendations.

Receiving Environment

Study Area

- 8.40 The application site is located in a coastal setting and on a local county road approximately 2km south of Carrigtwohill and 6km southwest of Middleton, Co. Cork. It is located approximately 2km south of N25 National Primary Road (E-30 European Route) which links Cork city to Rosslare Europort.
- 8.41 The site is located in the townland of Rossmore, Carrigtwohill, Co. Cork. Access to the lands is via an existing access to the public road to the north which connects to the N25 National Primary Road to the north. This local county road forms the northern boundary of the landholding and links the R624 Regional Road to the west at Fota and the N25 National Primary Road at Middleton. Beyond the southern boundary of the landholding is an access right of way to the adjacent Kilsaran quarry and Rossmore Bay, part of the Cork Harbour channel.
- 8.42 The application site covers an area of c. 22.3 hectares. It is bounded to the west by the existing quarry operated by Breedon, to the north by a greenfield buffer zone and residential dwellings located along the east-west local public road, to the east by agricultural lands, and to the south by a local access road / natural habitat land. The East Cork Civic Amenity site is located c. 0.25km south of the site. Residential development in the vicinity of the subject site is confined to single houses located along the local LP3619-0 road and other minor public roads. The lands within the application site are currently predominantly in agricultural use. The application site is not subject to any statutory or non-statutory nature conservation designations.
- 8.43 The nearest dwellings to the application site boundary are shown in Figure 8-2.

Baseline Study Methodology

Baseline Dust Monitoring

- 8.44 Ongoing, baseline dust monitoring has been undertaken by TMS Environment Ltd. to measure compliance with the 350 mg/m²/day emission limit around the existing quarry footprint.
- 8.45 Monitoring is undertaken using the 'Bergerhoff method' referred to in the TA Luft Air Quality Standard. The 'Bergerhoff' dust deposition gauge used in the survey comprises a plastic collection bottle with protective basket, mounted on a post and set at 1500 mm above ground level. The input of atmospheric borne particulate material into the collection bottle takes place over a pre-determined measurement period (usually one month) by exposing it to the environment. The total dust collected in the bottle is expressed as deposition of total particulate matter (mg/m²/day) arising from human activity in the area surrounding the application site.

PM₁₀ Monitoring

- 8.46 The application site and surrounding area fall into Air Quality Zone D, categorised as rural Ireland by the EPA. The nearest PM₁₀ air quality monitoring location within a similar Zone D area is located at Mallow, Co. Cork. As such, it is considered the most appropriate dataset available for assessment of air quality baseline concentrations within the study area.

Sources of Information

- 8.47 A desk study was carried out to examine all relevant information relating to air quality conditions around the application site. Met Eireann, the National Meteorological Service, was consulted in relation to the climate / weather data in respect of the study area (<https://www.met.ie/climate-ireland/1971-2000/rosslare.html>). The EPA website was examined to note information on baseline air monitoring data around the application site (<http://www.epa.ie/air/quality/data/>).
- 8.48 Information published on its website by the National Parks and Wildlife Service (NPWS) (<http://webgis.npws.ie/npwsviewer/>), (part of the Department of the Environment, Community and Local Government, DoECLG), in respect of designated ecological sites, protected habitats and species was also reviewed, together with Ordnance Survey maps and aerial photography (<http://map.geohive.ie/mapviewer.html>).

Field Survey / Monitoring / Inspection Works

- 8.49 Dust deposition surveys are undertaken at and around the application site by TMS Environment Ltd., at monitoring locations shown in Figure 8-2. The dust deposition monitoring results recorded over the period 2024 to 2025 are presented and reviewed as part of this assessment. A survey of the extent of existing residential housing around the application site was also undertaken.
- 8.50 The locations of baseline dust deposition monitors are shown on Figure 8-2 are as follows:
- D1 – located at the north-western landholding boundary
 - D2 – located at the western boundary
 - D3 –located at the north-eastern boundary

- D4 –located at the eastern boundary
- D5 – located at the southern boundary

Background Air Quality

8.51 As previously noted, the closest air quality monitoring location to the quarry in a similar Zone D area is located at Mallow, Co. Cork. Monitoring stations continuously monitor concentrations of particulate matter with an aerodynamic diameter of less than 10 µm (PM₁₀). Recent annual mean concentrations monitored at Mallow (published on the EPA website⁴) are presented in Table 8-3 below.

Table 8-3 Background PM₁₀ Concentrations Mallow, Co. Cork (Source: EPA)

Year	Annual Mean (µg/m ³)	Number of Days >50 µg/m ³
2022	13.5	1

8.52 Table 8-3 above indicates that PM₁₀ concentrations monitored at the Mallow monitoring site are below the annual mean Air Quality Standards (AQS) of 40 µg/m³ and comply with the requirement that a 24-hour mean of 50 µg/m³ should not be exceeded more than 35 times in a calendar year.

8.53 For rural areas, such as those surrounding the application site, the primary source of PM₁₀ would be residential solid fuel emissions and local agricultural or rural based activities for deposited dust.

Dust Deposition Monitoring

8.54 The results of the monthly dust deposition monitoring undertaken by TMS Environment Ltd. between January 2024 and June 2025 are presented in Table 8-4 below.

Table 8-4 Dust Deposition Monitoring Results

Period	Sample Date	D1 (mg/m ² /day)	D2 (mg/m ² /day)	D3 (mg/m ² /day)	D4 (mg/m ² /day)	D5 (mg/m ² /day)
2024	January	99	66	18	292	146
	February	17	21	35	74	10
	March	95	83	88	134	210
	April	54	10	38	72	5
	May	78	16	36	108	69
	June	101	39	31	16	8
	July	140	61	248	123	224
	August	199	70	40	68	55

⁴ Secure Archive for Environmental Research Data – <http://erc.epa.ie/safer/>.

Period	Sample Date	D1 (mg/m ² /day)	D2 (mg/m ² /day)	D3 (mg/m ² /day)	D4 (mg/m ² /day)	D5 (mg/m ² /day)
	September	349	349	Note 1	Note 1	18
	October	14	24	108	78	84
	November	258	338	260	272	297
	December	51	Note 1	285	72	210
2025	January	287	205	186	198	2
	February	235	315	133	198	275
	March	44	46	29	81	17
	April	21	40	14	131	157
	May	45	52	136	34	16
	June	214	92	56	59	16

Note 1: Sample contaminated with organic matter

8.55 The recorded dust deposition rates at Rossmore Quarry for the period 2024 to 2025 are below the dust deposition limit of 350 mg/m²/ day measured at the site boundary.

Meteorology: Dispersion of Emissions

8.56 The most important climatological parameters governing the atmospheric dispersion of particles are as follows:

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

8.57 Rainfall is also an important climatological parameter in the generation of dust; enough rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995)⁵, rainfall greater than 0.2 mm per day is sufficient to suppress dust emissions.

Local Wind Speed and Direction Data

8.58 The closest weather station with sufficient records of wind direction and wind speed considered representative of conditions experienced at the application site is Cork Airport Meteorological Station. A windrose for the average conditions recorded at Cork Airport over an 18-year period is presented in Figure 8-1. The predominant wind direction is from the south-western quadrant.

⁵ Arup Environmental, Ove Arup and Partners (1995) The Environmental Effects of Dust from Surface Mineral Workings, HMSO, London (ISBN 11 75 3186 3)

Rainfall Data

- 8.59 Relevant rainfall data applicable to the site has been obtained from the Irish Meteorological Service website for the Cork Airport station (1981 – 2010). The annual average days with rainfall greater than 0.2 mm are 204 days per year. Natural dust suppression (from rainfall) is therefore considered to be effective for 55% of the year.

Sensitive Receptors

Ecological Receptors

- 8.60 The application site is not subject to any statutory nature conservation designation.
- 8.61 A number of nature conservation sites are located within the study area, i.e. one Special Area of Conservation (SAC), one Special Protection Area (SPA) and one proposed Natural Heritage Area (pNHA), as detailed below and see also EIAR Figures 5-2 and -53.

Table 8-5 Natura 2000 or Designated Site(s) within a 2 km of Application Site

Natura 2000 Site	Site Code	Location at Closest Point to Extraction Area Site (m)
Great Island Channel SAC	001058	c. 140m southwest
Cork Harbour SPA	004300	c. 140 m southwest
Great Island Channel pNHA	001058	c. 140m southwest

Human Receptors

- 8.62 Sensitive locations are those where people may be exposed to dust from existing or planned activities. 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.
- 8.63 There nearest sensitive receptors to the extension extraction area are detailed in Table 8-6 below

Table 8-6 Nearest Sensitive Receptors to the Extraction Area

Receptor reference	Receptor	Sensitivity	Distance (m) / Direction Extraction boundary from site
R01	Residential	Medium	215 / N
R02	Residential	Medium	180 / N

R03	Residential	Medium	275 / NW
R04	Residential	Medium	345 / NW
R05	Residential	Medium	375 / NW
R06	Residential	Medium	410 / NW
R07	Residential	Medium	445 / NW
R08	Residential	Medium	530 / NW
R09	Residential	Medium	230 / NE
R10	Residential	Medium	245 / NE
R11	Residential	Medium	275 / NE
R12	Residential	Medium	335 / NE
R13	Residential	Medium	355 / NE
R14	Residential	Medium	350 / NE
R15	Residential	Medium	365 / NE
R16	Residential	Medium	380 / NE
R17	Residential	Medium	405 / NE
R18	Residential	Medium	400 / NE
R19	Residential	Medium	425 / NE
R20	Residential	Medium	445 / NE
R21	Residential	Medium	460 / NE
R22	Residential	Medium	475 / NE
R23	Residential	Medium	410 / NE
R24	Residential	Medium	450 / NE

Scoping

Evaluation Methodology

- 8.64 Fugitive dust emissions and particulate matter arising from the application site activities have the potential to affect existing sensitive receptors in the area due to a potential increase in airborne dust deposition.

- 8.65 Increased combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the proposed development also have the potential to contribute to local air pollution.
- 8.66 The significance of impacts due to emissions from the application site are dependent upon the magnitude of the emissions, the prevailing meteorological conditions for the location, and the proximity of sensitive locations to the emission sources.
- 8.67 This impact assessment is based upon a comparison of the baseline (both current and projected without the new development proposals) situation against the air quality impacts resulting from the 'with development' proposal scenario. The potential for 'in-combination' effects from other planned or proposed sources or air pollutants in the area has also been considered.
- 8.68 Each of the activities associated with extraction development have been assessed for potential air quality impacts including:
- emission from preparatory works, including demolition, construction and stripping, placement and stockpiling of soil (construction stage earthworks / trackout);
 - emissions from rock extraction and processing ;
 - emissions from the transfer, end-tipping and stockpiling of aggregates;
 - PM₁₀ contribution from operational activities; and
 - traffic exhaust emissions.
- 8.69 The methodology used in each assessment is presented in the sub-sections below which also provide an explanation of the significance criteria to describe the impacts of the proposed development on air quality.
- 8.70 For the purposes of environmental assessment of releases of dust from construction and mineral activities, the classifications of PM₁₀ and 'deposited dust' are typically applied. The impacts associated with PM₁₀ are related to potential health impacts while deposited dust is related to potential nuisance effects. The assessment of the potential impacts of each fraction has, therefore, been undertaken separately.

Significance Criteria

- 8.71 The following air quality specific significance criteria have been used to assess the significance of air quality impacts in preference to overall descriptors of significance.
- 8.72 To determine the significance of particulate matter effects associated with the development, an evaluation of the sensitivity of the surrounding area is required. Receptors can demonstrate different sensitivities to changes in environment and are classified as per Table 8-7 below (and IAQM Construction Dust Guidance).

Table 8-7 Methodology for Defining Sensitivity to Dust and PM₁₀ Effects

Sensitivity of Area	Human receptors	Ecological Receptors(a)
Very High	Very densely populated area More than 100 dwellings within 20 m Local annual mean PM ₁₀ concentrations exceed the Objective.	European Designated sites

Sensitivity of Area	Human receptors	Ecological Receptors(a)
	Works continuing in one area of the site for more than 1-year	
High	Densely populated area. 10-100 dwellings within 20 m of site. Local annual mean PM ₁₀ concentrations close to the Objective (36 – 40 µg/m ³)	Nationally Designated sites
Medium	Suburban or edge of town Less than 10 receptors within 20 m Local annual mean PM ₁₀ concentrations below the Objective (30 – 36 µg/m ³)	Locally designated sites
Low	Rural area; industrial area No receptors within 20 m Local annual mean PM ₁₀ concentrations well below the Objective (<30 µg/m ³) Wooded area between site and receptors	No designations
Very High	Very densely populated area More than 100 dwellings within 20 m Local annual mean PM ₁₀ concentrations exceed the Objective. Works continuing in one area of the site for more than 1-year	European Designated sites

Notes: (a)-Only applicable if ecological habitats are present which may be sensitive to dust effects.

8.73 Table 8-8 below illustrates how the interaction of magnitude and sensitivity results in the significance of an environmental effect, with the application of mitigation measures as per the IAQM Construction Dust Guidance.

Table 8-8 Impact Significance Matrix – Dust Effects (With Mitigation)

Sensitivity of Surrounding Area	Risk of Site Giving Rise to Dust or PM ₁₀ Effects		
	High	Medium	Low
Very High	Slight Adverse	Slight Adverse	Negligible
High	Slight Adverse	Negligible	Negligible
Medium	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Negligible

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Construction Stage Dust Impacts - Methodology

- 8.74 The Institute of Air Quality Management (IAQM) assessment of risk at construction stage is determined by considering the predicted change in conditions because of the proposed development. The risk category for potential effects arising from preparatory site works is divided into two potential activities:
- earthworks
 - trackout.
- 8.75 Based on the scale and nature of the works including areas, soils and operations at the site, a dust emission class is defined for each of the activities. These dust emission classes are then used to determine the risk categories presented below. These risk categories determine the potential risk of dust soiling effects assuming no mitigation measures are applied.
- 8.76 Table 8-9 illustrates how the interaction of distance to the nearest receptor and the dust emission class results in the determination of risk category from **earthworks activities**.

Table 8-9 Determination of Risk Category from Earthworks Activities

Distance To Nearest Receptor		Dust Emission Class		
Human (m)	Ecological (m)	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 50	-	High Risk Site	Medium Risk Site	Low Risk Site
50 – 100	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20 – 40	Medium Risk Site	Low Risk Site	Negligible
200 – 350	40 – 100	Low Risk Site	Low Risk Site	Negligible

- 8.77 Table 8-10 illustrates how the interaction of distance to the nearest receptor and the dust emission class results in the determination of risk category from **trackout movements**.

Table 8-10 Determination of Risk Category from Trackout Movements

Distance To Nearest Receptor		Dust Emission Class		
Human (m)	Ecological (m)	Large	Medium	Small
<20	-	High Risk Site	Medium Risk Site	Medium Risk Site
20 – 50	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
50 – 100	20 – 100	Low Risk Site	Low Risk Site	Negligible

- 8.78 Mitigation measures are recommended based on the evaluation of risk in accordance with the IAQM Dust and Air Emissions Mitigation Measures Guidance.

Operation Stage Dust Impacts - Methodology

- 8.79 A staged approach has been adopted to the assessment of operations stage impacts generated by the proposed development. This ensures that the approach taken for the assessment of risk is proportional to the risk of an unacceptable impact being caused. As such, where a simple review of the situation shows that risk of a health or nuisance impact is negligible, this will be sufficient. In cases where the risk cannot be regarded as insignificant, a more detailed assessment may be required, such as a quantitative screening assessment or an advanced dispersion modelling exercise, as appropriate.
- 8.80 Guidance on the assessment of the impacts of extractive operations on air quality has been prepared by the Institute of Air Quality Management (IAQM). This guidance uses a simple distance-based screening process to identify those operations where the dust impacts are unlikely to be significant and therefore require no further assessment. Where assessment that is more detailed is required, a basic assessment framework is presented which employs the Source-Pathway-Receptor approach to evaluate risk of impacts and effects.
- 8.81 The predicted scale of dust effects may be classified as either 'significant', or not 'significant'. Where effects are predicted to be 'significant', further mitigation is likely required before the proposals are to be acceptable under planning policy.
- 8.82 A semi-quantitative assessment of fugitive dust emissions from the proposed development has been undertaken. The assessment has been undertaken by constructing a conceptual model that takes into consideration the potential sources, surrounding receptors, and the pathway between source and receptor to assess the magnitude of risk of impact on local amenities.
- 8.83 The distance from the source to the sensitive receptor is crucial. The initial risk screening stage (Tier 1) focuses upon the potential for dust generation at the site and the distance between source and receptors. In Tier 1 of the assessment, a representative selection of dust sensitive receptors in each direction of the application site is identified within the 1 km study area.
- 8.84 Further assessment is required for those nearest receptors within 500 m of dust generating activities (i.e. the extension extraction area). Receptors within 500 m of dust generating processes progress onto a Tier 2 assessment. Other residential receptors beyond 500 m are considered too far away to be impacted by potential dust from the site and not considered any further in this assessment.
- 8.85 Tier 2 involves identifying source-pathway-receptor linkages and a semi-quantitative assessment of the likelihood and magnitude of any effects that could be associated with each pollutant linkage. This assessment takes account of:
- wind direction and speed data (to estimate frequency of exposure)
 - proximity to source (to estimate magnitude of exposure)
 - sensitivity of receptor
 - occurrence of natural dust suppression (rainfall patterns).
- 8.86 This information is used to inform a semi-quantitative assessment of the likely magnitude of impact and is based upon professional experience of the assessor as 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. Assigning significance to nuisance impacts is qualitative and involves a judgement based on the likely magnitude, frequency, duration, and reversibility (or recovery) of the impact. In this context, significant impact is taken to mean what is generally not publicly acceptable and desirable.

- 8.87 Note that the Tier 2 risk screening assessment **does not consider proposed mitigation measures** to be implemented at the proposed development. These will include provision of perimeter screening berms, dust suppression measures etc., identified in the section dealing with Mitigation Measures later in this Chapter.
- 8.88 Following the results of the risk assessment, mitigation measures are detailed, and the residual impact assessed. The detailed methodology used within the assessment is described in more detail in Appendix 8-A.

PM₁₀ Contribution from Site-Based Activities: Methodology

- 8.89 In terms of whether the PM₁₀ concentration in the local area is likely to exceed the AQS, the following information has been reviewed:
- existing PM₁₀ concentrations
 - expected additional contribution of PM₁₀ from site operations.
- 8.90 In terms of estimating the potential magnitude of impact from site operations, a UK edition of the LAQM Technical Guidance (LAQM.TG (03)) stated that fugitive dust from stockpiles and quarry operations can potentially contribute up to 5 µg/m³ towards annual mean background concentrations of the coarse fraction of particulates (2.5 – 10 µm diameters) in the surrounding area.
- 8.91 Given the nature and scale of proposed activities, the potential PM₁₀ impact of increased intake is similar or lower. However, to ensure a robust assessment of potential PM₁₀ impacts, the upper limit of 5 µg/m³ has been applied to represent the development contribution to annual ambient PM₁₀ concentrations. This value has then been added to existing background levels to assess whether the Air Quality Standards objective is likely to be exceeded.

Traffic Emissions - Methodology

- 8.92 Atmospheric emissions related to site proposals are primarily associated with the exhaust emissions from heavy duty vehicles (HDVs also termed heavy goods vehicles HGV's). The decision as to whether an assessment of potential impact is required is based upon the criteria set out in the DMRB.
- 8.93 The criterion for assessment of air quality contained within the latest DMRB guidance (LA 105) focuses on roads with relatively high changes in flows or high proportion of HDV / HGV traffic.
- 8.94 The following traffic scoping criteria shall be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the do something traffic (with the project) compared to the do minimum traffic (without the project) in the opening year:
- annual average daily traffic (AADT) >= 1,000; or
 - heavy duty vehicle (HDV) AADT >= 200; or
 - a change in speed band; or
 - a change in carriageway alignment by >= 5 m.

Assessment of Impacts

Construction Stage & Restoration Stage Impacts – Assessment

8.95 An overview of the sources and processes associated with the preparatory site works (topsoil and overburden removal), construction / infrastructure (access tunnel) and restoration activities, and their respective potential for dust deposition (both dust and smaller particles), is presented in Table 8-11.

Table 8-11 Construction & Restoration Activities: Sources of Dust Emissions

Activity	Source	Dust Emission potential	Comments
Earthworks and Trackout	Excavators / Dozers / HGVs	Large - dry or fine materials during strong windy weather	Temporary, variable from day to day depending on prevailing meteorological conditions, level, and location of activity. Soils immediately used to construct berms, used in restoration works or placed in stockpiles.
		Small – coarse or wet materials during conditions of low wind speed	

8.96 A summary of the determined risk category for proposed operation identified is presented in Table 8-12, based on risk categorisation methodology outlined in Table 8-9.

Table 8-12 Construction & Restoration Stage Activities: Risk of Dust Emissions

Source	Human Receptors	Ecological Receptors
Earthworks	Low to Negligible	Low to Negligible
Trackout	Low to Negligible	Low to Negligible

8.97 While the overall risk category has been assessed as 'low risk' to 'negligible', if the soils stripping activities were not mitigated, the effects of dust during dry and windy conditions could possibly lead to occasional increases in nuisance dust immediately surrounding the extraction area. However, these are not considered to be significant given the limited duration of such meteorological conditions, and the effectiveness of the existing dust mitigation measures that is demonstrated by the dust deposition monitoring results at the site boundary.

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Operational Stage Dust Impact – Assessment

8.98 When commenced and operational, the principal air quality impacts generated by the proposed development will be dust and traffic related emissions. An overview of the sources and processes associated with the extraction activities, and their respective potential for dust deposition, is presented in table 8-13 below.

Table 8-13 Sources of Particulate Emissions

Activity	Source	Emission potential	Comments
Material transfer to processing area	On-site vehicle, Dry loose material.	High when dry material being handled during strong windy weather	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Processing of rock	Processing plant, Dry loose material	High when dry material being processed during strong windy weather	Emissions due to prevailing meteorological conditions (high winds).
Material transfer to storage area	On-site vehicle, Dry loose material	High when dry material being handled during strong windy weather	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Material storage	Dry loose material in stockpiles	High when dry material being stored during strong windy weather	Emissions due to prevailing meteorological conditions (high winds).
Material loading to HGV	On-site vehicle, Dry loose material	High when dry material being handled during strong windy weather	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Transfer off site / traffic off site	HGV / Road vehicles	Low - on paved road surfaces	Dependent on the amount of loose material on road surface available for re-suspension and track out.

Human Receptors

8.99 Representative receptors were identified within the c.1 km study area around the application site. Using the tiered assessment methodology, 24 of these receptors located within 500 m of the extraction area have progressed onto a Tier 2 assessment as they are considered to have a greater risk of dust impact, refer to Figure 8-2. Each receptor is assessed against the frequency of exposure and the distance from the source to the receptor (i.e., the pathway) in accordance with the methodology described in **Appendix 8-A**.

8.100 The frequency of exposure of each receptor is based upon the frequency of winds capable of carrying dust particles blowing in the direction, from the source to the receptor, on days when rainfall does not inhibit dust from becoming airborne. Representative data on the local wind climate is therefore required for this section of the assessment.

8.101 A wind-rose for the site is presented in Figure 8-1 for Cork Airport Meteorological Station and illustrates the predominant wind directions from the south-west. The potential for the

generation of airborne dust will increase with wind speed, with winds greater than 3 m/s capable of carrying airborne dust⁶.

8.102 A wind rose showing the frequency of winds at wind speeds of greater than 2 m/s is presented in Figure 8-1 with the individual frequencies for each 10-degree compass sector used within the assessment. In this assessment, wind speeds over 2 m/s were used as this is how the data on percentage occurrence of wind frequency and wind speed is calculated and presented by Met Eireann. For this reason, the impact assessment presented herein is conservative.

8.103 A summary of the risk assessment of dust impacts at the selected Tier 2 properties / locations arising from the proposed development activities (in the absence of any mitigation measures) is presented in Table 8-14 below.

Table 8-14 Dust Risk Assessment Screening (Without Mitigation Measures)

Receptor Reference	Distance From Operations (m)	Relevant Wind Direction (A)	Potential Exposure Duration (B)	Relative Wind Exposure / Distance Rank (C)	Dust Risk Evaluation
R1	215 N	170-190	2.0	1 / 4	(4) Insignificant
R2	180 N	170 -190	2.0	1 / 5	(5) Insignificant
R3	275 NW	125-145	1.0	1 / 4	(4) Insignificant
R4	345 NW	125-145	1.0	1 / 3	(3) Insignificant
R5	375 NW	125-145	1.0	1 / 3	(3) Insignificant
R6	410 NW	125-145	1.0	1 / 2	(3) Insignificant
R7	445 NW	125-145	1.0	1 / 2	(2) Insignificant
R8	530 NW	125-145	1.0	1 / 1	(2) Insignificant
R9	445 NW	125-145	1.0	1 / 2	(2) Insignificant
R10	530 NW	125-145	1.0	8 / 1	(1) Insignificant
R11	230 NE	215-235	7.5	3 / 4	(12) Acceptable
R12	245 NE	215-235	7.5	3 / 4	(12) Acceptable
R13	275 NE	215-235	7.5	3 / 4	(12) Acceptable
R14	335 NE	215-235	7.5	3 / 3	(9) Acceptable
R15	355 NE	215-235	7.5	3 / 3	(9) Acceptable
R16	350 NE	215-235	7.5	3 / 3	(9) Acceptable
R17	365 NE	215-235	7.5	3 / 3	(9) Acceptable
R18	380 NE	215-235	7.5	3 / 3	(9) Acceptable
R19	405 NE	215-235	7.5	3 / 2	(6) Insignificant
R20	400 NE	215-235	7.5	3 / 2	(6) Insignificant
R21	425 / NE	215-235	7.5	3 / 2	(6) Insignificant

⁶ Department of the Environment, Transport, and the Regions, 1995. *The Environmental Effects of Dust from Surface Mineral Workings* – Volume 2. Technical Report. December 1995.

Receptor Reference	Distance From Operations (m)	Relevant Wind Direction ^(A)	Potential Exposure Duration ^(B)	Relative Wind Exposure / Distance Rank ^(C)	Dust Risk Evaluation	
R22	445 / NE	215-235	7.5	3 / 2	(6) Insignificant	
R23	460 / N	170-190	2.0	1 / 2	(2) Insignificant	
R24	475 / N	170-190	2.0	1 / 2	(2) Insignificant	
(A) – relevant wind direction based on upwind sector which would potentially convey from site towards the receptor.						410 / NE
(B) – Potential duration of exposure based on frequency of moderate to high wind speed (adjusted for dry days only) as described in the methodology in Appendix 8-A.						450 / NE
(C) – Ranking as per methodology in Appendix 8-A Refer to Figure 8-2 for Receptor Locations						

8.104 From Table 8-14 above, it is observed that the risk of impact from dust emissions associated with the proposed development at Rossmore (without any mitigation measures in place) varies from Insignificant to Acceptable at receptors R1 to R24. For other receptors located at a greater distance from the proposed development than R1 to R24 the risk of impact from dust emissions will be lower.

Note that this assessment does not consider implementation of mitigation measures within the proposed development that include provision of perimeter screening berms and strengthened boundary vegetation / screen planting, dust suppression measures etc. (as outlined in the section of Mitigation Measures section below).

Ecological Receptors

8.105 The quarry and application site are not subject to any statutory nature conservation designation. The nearest designated sites are c. 140m south of the extension extraction area. Dust deposition monitoring results confirm that the existing quarry and the proposed extension operations can comply with the dust deposition emission limit value of 350 mg/m²/day measured at the site boundary (condition 11(a) attached to the existing planning permission.

The dust deposition levels arising from the existing quarry and proposed extension operations be well below the level of 1,000 mg/m²/day above which there are likely to be effects on sensitive ecological receptors, refer to Section 8.33 above.

Traffic Emissions – Assessment

8.106 For the purposes of assessment, the projected traffic movements associated with the existing quarry, concrete plant, asphalt plant and the proposed development will generate a maximum of 110 HGV trips per day, although levels on most days will likely be less than this. In view of

- the existing development and associated HGV traffic movements across the local road network
- the fact that none of the roads in the surrounding local road network meet any of the traffic / alignment criteria set out in LA 105.

It is considered that the extent of any change and the likely impact of the proposed development can be deemed 'negligible' in terms of local air quality and that no further air quality assessment is necessary.

- 8.107 On this basis, the impact of the proposed development can be screened out and combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the transportation of materials will not have the potential to contribute to local air pollution.

PM₁₀ Contribution from Extraction / Production Activities - Assessment

- 8.108 In terms of PM₁₀, the maximum annual mean measured baseline background concentration was 13.5µg/m³ in 2022 at Mallow, Co. Cork monitoring station. Therefore, the potential contribution up of 5 µg/m³ towards annual mean background concentrations of the coarse fraction (2.5 – 10 µm diameters) of particulates (in the immediate area of the site) is insignificant and well below the annual objective of 40 µg/m³.
- 8.109 Therefore, the potential impacts in relation to increase in ambient PM₁₀ concentrations can be classified as 'negligible' when the limited duration of conditions and the magnitude of change in the extent and scale of activities are considered to significantly reduce the generation of airborne PM₁₀ beyond the site development boundary.
- 8.110 Given the limited magnitude of change in the extent and scale of planned activities at the quarry, the available monitoring data are taken to be representative of ambient PM₁₀ concentrations likely to arise over the life of the proposed quarry extension. As such, any potential future impact in relation to increased ambient PM₁₀ concentrations is classified as 'negligible'.

Unplanned Events (i.e., Accidents)

- 8.111 Accidents, malfunctions, and unplanned events refer to events or upset conditions that are not part of any activity or normal operation of the proposed development planned by the Applicant. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions, or unplanned events to occur during the proposed development operations.
- 8.112 Many accidents, malfunctions and unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation. In terms of air quality impact, the following unplanned events could influence the local area:
- equipment malfunction
 - vehicle collision
 - dry and windy weather conditions with dust suppression equipment malfunction
 - accidental material spillages during transport.
- 8.113 In relation to air quality, the impacts of any unplanned events are negligible. If unplanned events were not mitigated, the effects of dust during dry and windy conditions could possibly lead to occasional increases in nuisance dust and 24-hour mean PM₁₀ concentration immediately surrounding the quarry and application site. However, these are not considered

to be significant given the limited duration of such meteorological conditions and the likely limited scale of any incident.

Cumulative / Synergistic Impacts

- 8.114 In essence, cumulative impacts are those which result from incremental changes caused by other past, present, or reasonably foreseeable actions together with those generated by the proposed development. Therefore, the potential impacts of the proposed development cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.
- 8.115 The dust deposition monitoring results take into account the cumulative activities in the vicinity of the existing quarry and the proposed development. These monitoring results and the air quality impact assessment herein indicates that the proposed development will not contribute to a significant increase in local air pollution by way of excessive air / dust emissions. The cumulative impact of the proposed development is therefore classified as insignificant.

Interaction with Other Impacts

- 8.116 The potential impact on air quality by the project on sensitive receptors including sensitive ecological receptors and people living in the area has been fully assessed in this chapter. The overall impact of the project on these receptors is further considered in Chapter 4 Population and Human Health and Chapter 5 Biodiversity.

Mitigation Measures

8.117 A range of dust mitigation and management measures will continue to be implemented at Rossmore Quarry and the proposed extension area. These include the measures listed in Table 8-15 below:

Table 8-15 Particulate Emission Mitigation Measures

Source Receptor	Emission Potential	Recommended Mitigation Measures	Effectiveness
Excavators / HGV Loading	High – dry or fine material during strong windy weather	Minimise drop heights when handling materials. Maximise use of excavated soil in construction of vegetated screening berms or in quarry restoration works. Dampen materials using mist cannon, sprinklers, or water bowser	High
	Low – material of high moisture content during conditions of low wind speed	Minimise drop heights when handling material. Protect from wind where possible.	High
On-site Vehicles	High when travelling over un-surfaced and dry site roads.	Minimise length of on-site haul routes.	High
		Use of mist cannon / sprinklers / water bowser to dampen haul routes during dry weather periods.	High
		Restrict vehicle speeds to less than 20kph. Install signage and undertake staff training.	High
		Routing of traffic and away from any surrounding sensitive receptors.	High
Road Vehicles (transfer off-site)	Low / Moderate on paved road surfaces	Use of road sweeper to reduce the amount of material available for re-suspension.	Moderate / High
		Travel over paved surfaces / access road.	High
		Direct all HGVs through wheelwash facility	High
Stockpiles	High when dry or fine material being stored or handled during strong windy weather	Seed / vegetate surfaces of completed perimeter mounds and stockpiles of restoration soils.	High
		Locate stockpiles to take advantage of any available shelter from wind.	
		Use of mist cannon / sprinklers / bowser to moisten materials during periods of dry and windy weather	
		Limit mechanical disturbance of materials more likely to become airborne and/or time operations having regard to expected weather conditions	High

Source Receptor	Emission Potential	Recommended Mitigation Measures	Effectiveness
Moderate and Slight Adverse Risk Receptors	High – during dry and strong windy weather	Hardstanding areas/site roads, stockpiles with the potential to give rise to dust will be regularly watered as appropriate during dry and/or windy conditions by dust cannon, sprinklers, or water bowser. Mechanical road sweeper utilised to clean internal paved surfaces, and the public road.	High

Trackout Measures

- 8.118 When adverse conditions apply (dry, windy weather), water from a bowser will be sprayed on dry unpaved road surfaces to minimize dust rise. Any paved surfaces around the site and/or along the access road leading in and out of the quarry will also be sprayed as required.
- 8.119 All heavy goods vehicles leaving the application site will be routed through the existing wheelwash facility to remove and / or dampen any particulate materials attaching to the undercarriage and to prevent transport of fine particulates off-site, onto the local public road network.

Residual Impact Assessment

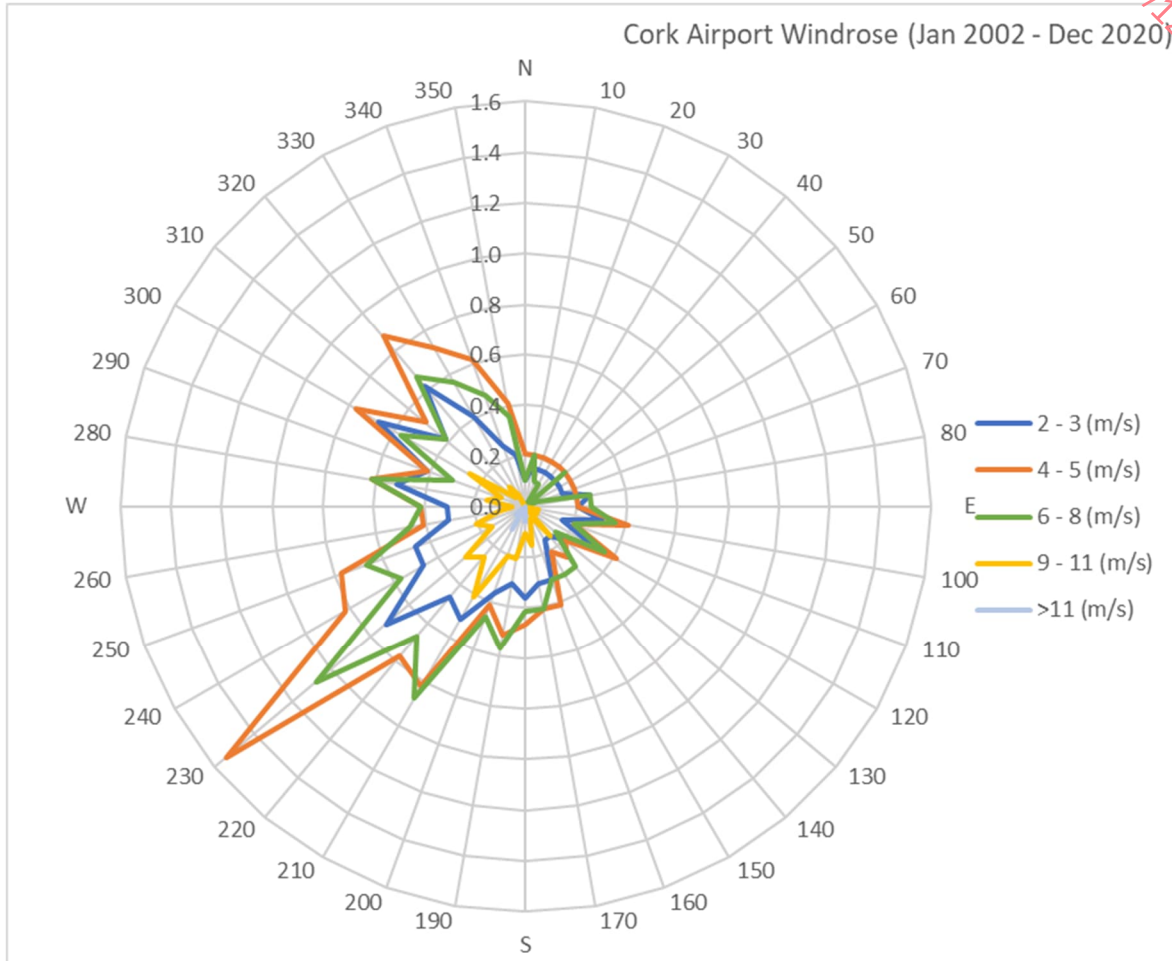
- 8.120 With the range of mitigation and management measures to be implemented, it is considered that the risk of dust impact at receptors from the proposed development will be further reduced from that assessed in Section 8.103 above, to Insignificant - Negligible or less.

Monitoring

- 8.121 Dust deposition monitoring will continue to be undertaken at Rossmore Quarry for the duration of extraction activities at the proposed development (in accordance with conditions attached to the existing / future planning permission and in line with the EPA and DoEHLG guidelines). Dust monitoring will be undertaken at the existing monitoring locations D1 to D5 on a monthly basis using the Bergerhoff Method. Two additional dust monitoring location D6 and D7 will be added on the northern and northeastern boundaries of the proposed extension area, refer to Figure 8-2.
- 8.122 Dust monitoring locations shall be reviewed and revised where and as / when necessary, as the proposed development progresses. The results of the dust monitoring will continue to be submitted to Cork County Council on a quarterly basis for review and record purpose.

Figures

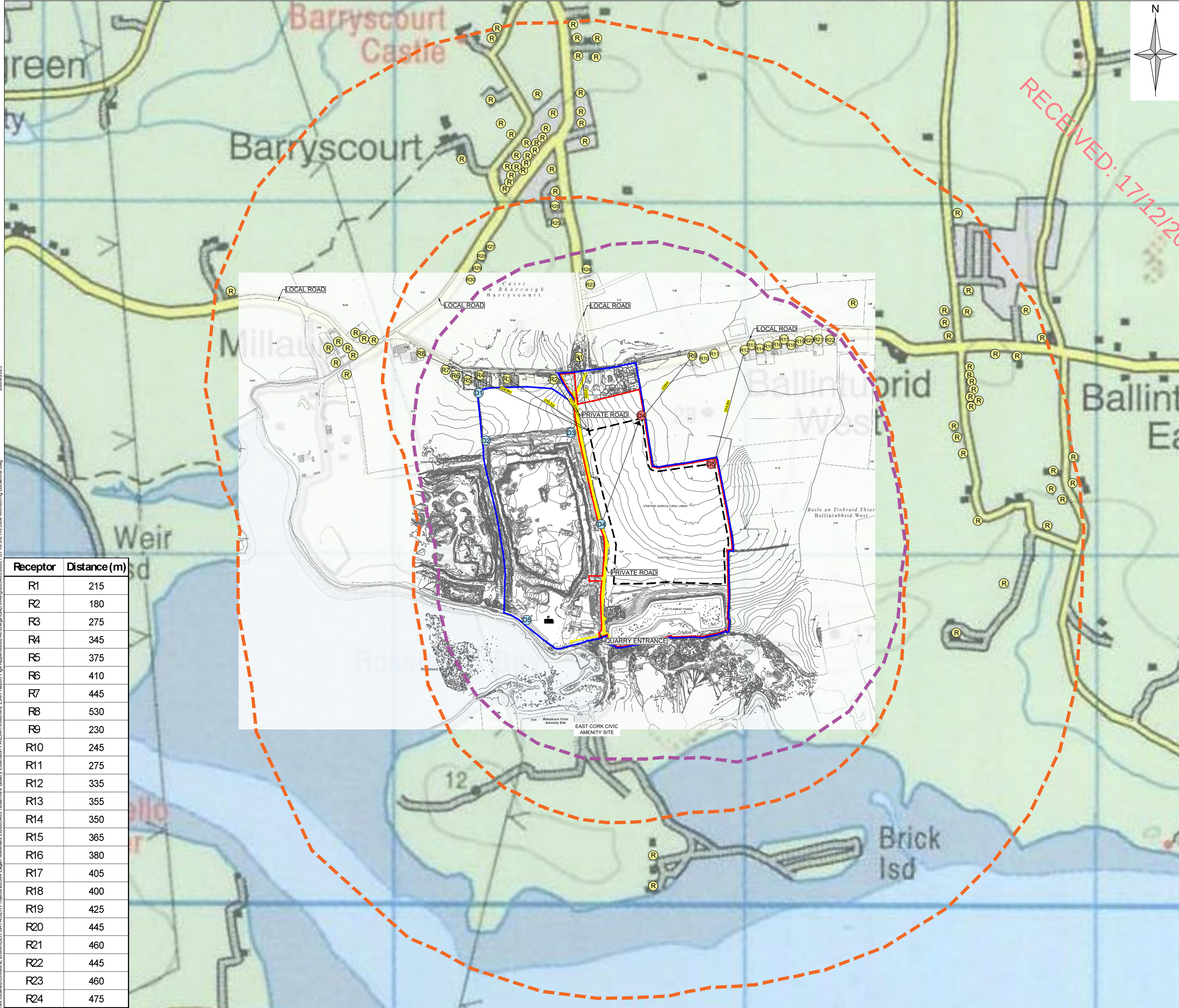
Figure 8-1 Windrose for Cork Airport Meteorological Station 2002 – 2020



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Figure 8-2 Receptor and Dust Monitoring Locations

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Notes:

1. FOR PLANNING PURPOSED ONLY.

2. MAPPING EXTRACT FROM DIGITAL ORDNANCE SURVEY 1:2,500 SCALE MAPPING.

MAP SERIES:
1:2,500
1:2,500
1:2,500
1:2,500

MAP SHEETS:
6386-A
6386-B
6386-C
6386-D

- Legend:**
- LAND INTEREST BOUNDARY (c. 43.7 Ha)
 - PLANNING APPLICATION AREA (c. 22.3 Ha)
 - EXISTING WAYLEAVE
 - PROPOSED EXTRACTION AREA (c. 12.5 Ha)
 - 500m / 1,000m RADIUS FROM APPLICATION AREA
 - 500m RADIUS FROM EXTRACTION AREA
 - RESIDENTIAL LOCATIONS
 - DUST MONITORING LOCATIONS
 - PROPOSED DUST MONITORING LOCATIONS

Receptor	Distance (m)
R1	215
R2	180
R3	275
R4	345
R5	375
R6	410
R7	445
R8	530
R9	230
R10	245
R11	275
R12	335
R13	355
R14	350
R15	365
R16	380
R17	405
R18	400
R19	425
R20	445
R21	460
R22	445
R23	460
R24	475

Rev	Amendments	Date	By	Chk	Auth
 www.slrconsulting.com					
Drawing Status & Suitability Code FINAL					
Client BREEDON MATERIALS LTD.					
Project QUARRY EXTENSION AT ROSSMORE QUARRY, ROSSMORE, CARRIGTWOHILL, CO. CORK					
Drawing Title DUST MONITORING LOCATIONS					
Scale 1:10,000 @ A3		SLR Project No. 065403.00001			
Designed EW	Drawn EW	Checked TP	Authorised TP		
Date 09/25	Date 09/25	Date 09/25	Date 09/25		
Drawing Number FIGURE 8-2					Rev. 0

Appendices

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Appendix 8 A: Dust Risk Screening Assessment Methodology

DUST RISK SCREENING ASSESSMENT METHODOLOGY

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. If 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, (i.e., the assessment does not take account of proposed mitigation being put in place).

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 3 m/s) from the direction of the site.

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 is 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.

A.1.1 Frequency of Exposure Criterion

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. An article on dust generation from quarry/pit operations⁷ suggests that rainfall of greater than 0.2 mm per day is considered sufficient to effectively suppress windblown dust emissions.

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 are calculated based on meteorological data. For screening assessment wind speeds greater than 2 m/s were considered as this is how data on percentage occurrence of wind frequency and wind speed is calculated and presented by Met Eireann. For this reason, the assessment is conservative.

For the screening assessment, a value of 1 mm would be used for the criteria to classify days as 'dry' or 'wet'; five times the recommended value, using annual average rainfall data. The average number of days when rainfall exceeds 1 mm would be provided for each month and calculated over the year to provide an average.

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 8 A-1 with the respective rank value assigned.

⁷ Leeds University. Good Quarry. <http://www.goodquarry.com/article.aspx?id=55&navid=2>

Table 8 A-1 Frequency of Exposure – Risk Classification

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

A.1.2 Distance to Source Criterion

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.

Guidance indicates that larger dust particles (greater than 30 µm) will largely deposit within 100 m of sources. Smaller particles (less than 10 µm) are only deposited slowly. Concentrations decrease rapidly on moving away from the source, due to dispersion and dilution.

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 m to 200 m. The 1995 UK DoE Guidance on dust from surface mineral working's, however, recommends a stand-off distance of 100-200 m 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 500 m of the site boundary. Receptors at a distance greater than 500 m have therefore been screened out in Tier 1 of the assessment.

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 8 A-2. A risk category is maintained for receptors more than 500 m for circumstances where although a receptor is beyond 500 m from the dust source, its sensitivity for example is sufficient for it to be taken onto a Tier 2 assessment.

Table 8 A-2 Distance to Source – Risk Classification

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

A.1.3 Sensitivity of Receptors

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 8 A-3 below⁸ shows examples of dust sensitive facilities.

Table 8 A-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	

A.1.4 Evaluation of Risk

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 is 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.

For each receptor, the relative magnitude of risk is given by identifying which of the score categories in Table 8 A-4 it falls into. This final evaluation represents the risk of dust impacts prior to control and mitigation measures being employed on site.

⁸ Ireland M. (1992) "Dust: Does the EPA go far enough?", Quarry Management, pp23-24.

Table 8 A-4 Risk Evaluation Ranking (Without Mitigation)

Magnitude of Risk	Score
Insignificant	7 or less
Acceptable	8 to 14
Slight Adverse	15 to 24
Moderate Adverse	25 or more

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