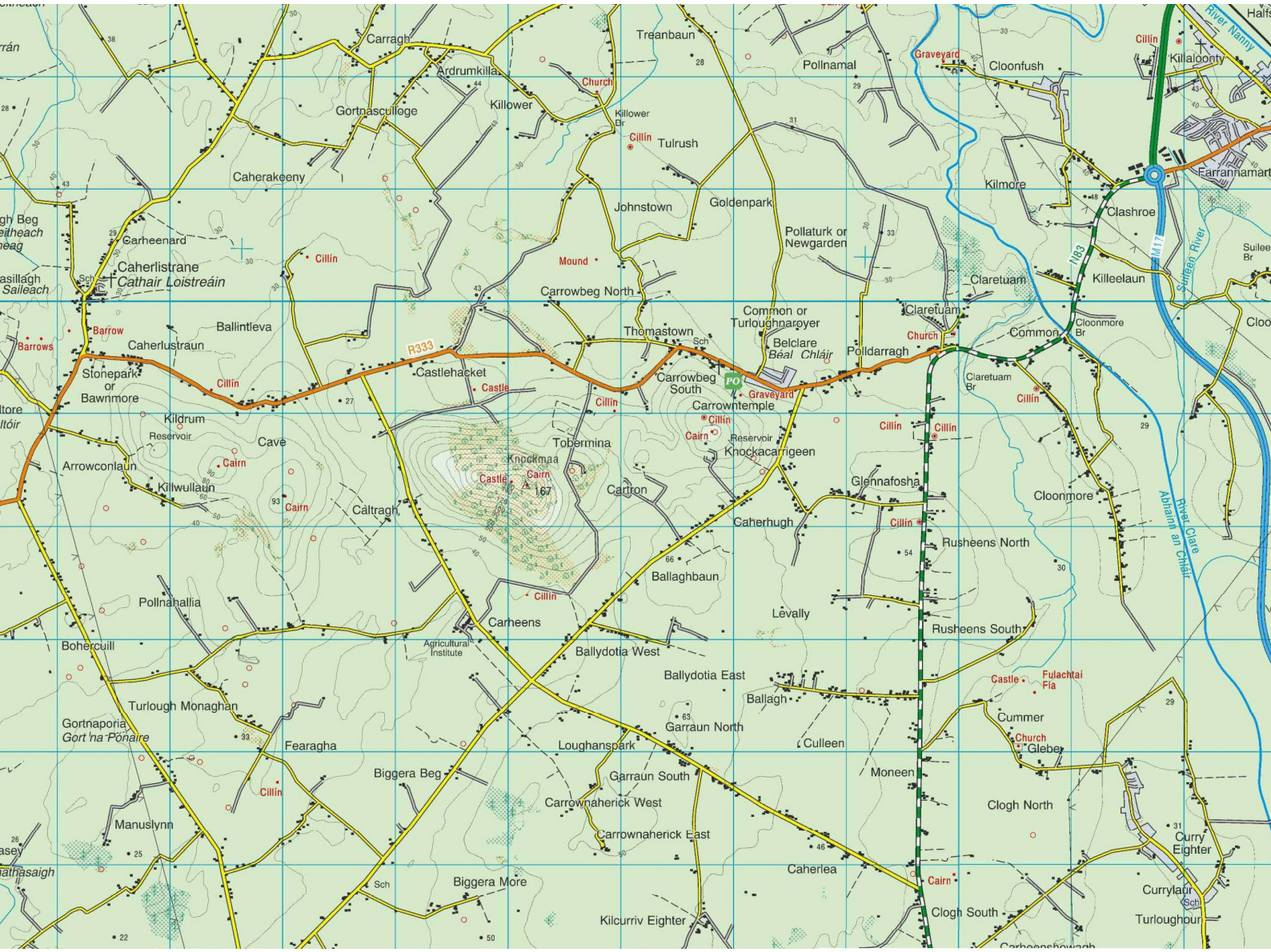
CHAPTER 10

AIR QUALITY



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QUARRY CONSULTING

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CHAPTER 10: AIR QUALITY

Introduction

10.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by Quarry Consulting addresses the potential air quality related impacts associated with the continued use of existing quarry & associated manufacturing activities and proposed storage yard at Cartron, Belclare, Co. Galway.

10.2 The application site comprises an existing operational quarry, which is L shaped, with an extraction area of 15.9 Ha and a total site area of approximately 16.3 Ha.

10.3 The quarry operations comprise extraction of limestone using blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for road construction, site development works and in the production of onsite value added products such as concrete, asphalt, and agricultural lime products. The concrete plant on-site is a potential source of dust emissions, which are managed through established mitigation measures to minimise impact on air quality. The asphalt plant operates under an air emissions licence (AP11/14) to control emissions, ensuring compliance with environmental standards.

10.4 Further information on the site infrastructure, operations, environmental management systems, and controls at the established quarry site is provided in the Chapter 3 of this EIAR.

Purpose of the Chapter

10.5 This chapter is aimed at assessing and documenting the potential impacts on air quality that could arise from the continued use of the existing limestone quarry and associated manufacturing activities. Within the context of a quarry operation, such impacts are related to processes like blasting, extraction, crushing, and transport of the quarried limestone.

10.6 The chapter is designed to present the current baseline conditions, identify potential air pollutant sources, estimate the likely magnitude and significance of these impacts, and propose suitable mitigation measures. A key objective is to ensure the proposed project adheres to all relevant air quality regulations and standards.

Scope of the Assessment

10.7 The primary focus of this air quality assessment is on the operational phase of the proposed continuation of use to the existing limestone quarry and associated manufacturing activities. The aim is to identify, analyse, and document potential effects to local air quality that could result from various quarry operations, including blasting, extraction, crushing, and transportation.

10.8 In addition to the application of Irish Guidelines as outlined in EPA (2006) and (2022), and in the absence of Irish Guidance specifically focussed on quarries and air quality, the work presented in this EIAR Section has also applied UK practical guidance as published by the **UK Institute of Air Quality Management - Guidance on the Assessment of Mineral Dust Impacts for Planning (May 2016).**

10.9 The later sections of this chapter will discuss:

- Screening
- Legislative Policy and Context.
- Methodology.

- Site Characteristics and The Proposed Application.
- Baseline Conditions.
- Impact Assessment.
- Mitigation Measures and Best Practices.
- Residual Impacts and Monitoring Program.

Contributors

10.10 Quarry Consulting undertook the impact assessment presented in this chapter on behalf of Mortimer Quarries. This chapter was prepared by Rory Brickenden (B.A./MEngSc). The lead consultant for the study was Peter Kinghan (Chartered Mineral Surveyor), Post Graduate Diploma in Environmental Engineering.

Peter Kinghan

10.11 The Air Quality chapter of the Environmental Impact Assessment Report (EIAR) for the proposed quarry development has been authored by Peter Kinghan, a Chartered Mineral Surveyor and Chartered Geomatics Surveyor with over 20 years of professional experience in environmental impact assessments across diverse sectors, including extractive industries, waste management, and energy. He holds a Diploma in Geo Surveying, a Degree in Mineral Surveying and Resource Management, and a Diploma in Environmental Engineering from Trinity College Dublin (2006), complemented by a Master's degree in Business Management. Additionally, Peter is certified in Geographic Information Systems (DIT 2008) and a certificate in Environmental Sustainability from University College Dublin (2024).

Rory Brickenden BA, MEngSc.

10.12 The Air Quality chapter of the Environmental Impact Assessment Report (EIAR) for the proposed quarry development has been completed by Rory, a geoscientist with Quarry Consulting. Rory holds a BA in Geoscience from Trinity College Dublin (2023) and a Master's degree in Water, Waste, and Environmental Engineering from University College Dublin (2024). His professional experience encompasses a variety of environmental assessments, particularly in the quarry and energy sectors. Rory's experience in environmental surveying air quality monitoring tasks such as noise, dust, and water monitoring.

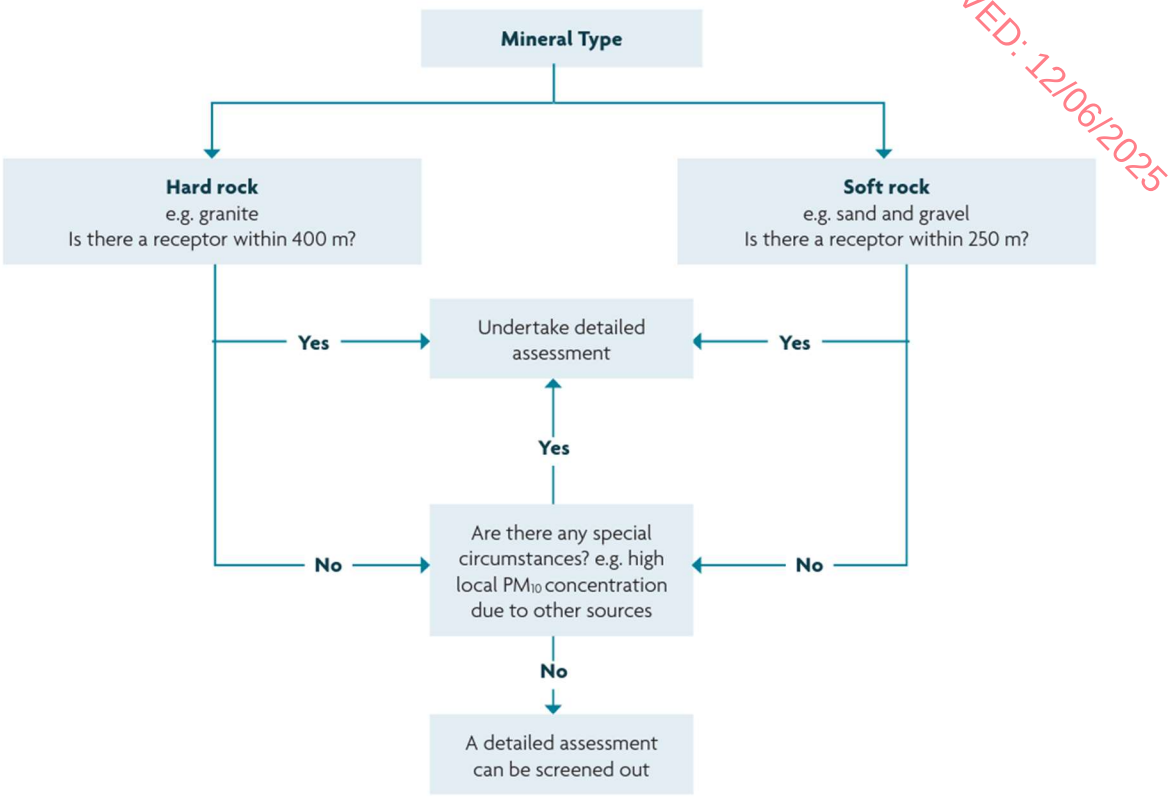
Screening of Detailed Assessment

10.13 As per the 'Guidance on the Assessment of Mineral Dust Impacts for Planning' there is the potential to screen the need for a detailed assessment. Section 3 of the report states:

> "Where there are no receptors near to a mineral site there will be no significant effect. Therefore it is possible to screen out the need for a detailed assessment based on the distance from a mineral site to potentially sensitive receptors."

10.14 The flow chart (figure 10.1) provides the steps undertaken in the screening of the assessment.

Figure 10.1: Screening of Detailed Assessment



10.15 The proposed continuation of use involves the extraction of limestone which can be classed as a hard rock, and the nearest receptor is located approx. 375m from the application boundary (not the quarry area). The nearest receptor is approx. 590m from the quarry extraction area.

10.16 A detailed assessment must be carried out to assess the impacts arising from dust due to the proposed continuation of use. This assessment will take into account existing and proposed operations. It also considers the potential impact on health and the potential effect on flora and fauna including any designated sites that may be affected.

Legislative Context and Policy

Air Quality Standards

10.17 The Clean Air for Europe (CAFE) Directive (2008/50/EC) was published in May 2008, replacing earlier directives. This Directive was transposed into Irish legislation by the Air Quality Standards (AQS) Regulations 2011 (S.I. No. 180 of 2011), which established the national policy on air quality. These regulations were the primary basis for assessing and managing air quality in Ireland until recently (source: epa.ie)[1].

10.18 The Directive (EU) 2024/2881 on Ambient Air Quality and Cleaner Air for Europe (recast) was adopted by the European Parliament and the Council on the 23rd of October 2024. This directive was published in the Official Journal of the European Union on 20th of November 2024, entering into force on the 10th of December 2024, 20 days after publication.

10.19 The Directive (EU) 2024/2881 builds on the CAFE Directive, setting new and more stringent air quality standards under the EU's Zero Pollution Action Plan as part of the European Green Deal. The directive introduces phased limit values to be attained by 2026 and 2030, reflecting the EU's commitment to reducing the health and environmental impacts of air pollution.

10.20 The Directive (EU) 2024/2881 aims to:

a) Reduce the health and environmental impacts of air pollution by establishing stricter limit values, target values, and average exposure reduction obligations for key pollutants;

b) Ensure a transition towards a toxic-free environment by 2050, with staged air quality standards for 2026, 2030, and beyond;

c) Improve air quality monitoring, modelling, and public reporting mechanisms;

d) Facilitate coordinated efforts across Member States to manage transboundary air pollution.

10.21 The directive introduces specific air quality standards for pollutants such as:

- nitrogen oxides;
- sulphur dioxide;
- carbon monoxide;
- ozone;
- particulate matter (PM10 and PM2.5);
- benzene;
- lead; and
- heavy metals.

10.22 The World Health Organization (WHO) Air Quality Guidelines (2021) set stringent limits for key air pollutants to protect public health. These guidelines recommend lower thresholds than current EU standards for pollutants such as $PM_{2.5}$, PM_{10}, NO_2, and SO_2, reflecting the latest scientific evidence on the health impacts of air pollution. While these guidelines are not legally

[1] https://airquality.ie/information/air-quality-standards

binding, they serve as a benchmark for policymakers aiming to reduce air pollution and its associated health risks.

10.23 Table 10.1 outlines the air quality limit values for the protection of human health, highlighting thresholds for key pollutants as established under the CAFE Directive (2008/50/EC), the Directive (EU) 2024/2881, and the latest WHO Air Quality Guidelines (2021). Table 10.2 presents air quality limit values for the protection of vegetation and ecosystems.

Table 10.1 Air quality limit values for human health

Human Health	**Air Quality Emission Limit Values (µg/m³)**				
Pollutant	Averaging Period	CAFE Directive (2008/50/EC)	Directive (EU) 2024/2881 (Limits to be attained by **2026**)	Directive (EU) 2024/2881 (Limits to be attained by **2030**)	WHO Air Quality Guidelines
Nitrogen Dioxide (NO_2)	Hour	200 μ g/m^3 (not to be exceeded more than 18 times in a calendar year)	200 µg/m³ (not to be exceeded more than 18 times in a calendar year)	200 μ g/m^3 (not to be exceeded more than 3 times in a calendar year)	200 μ g/m^3
	24 hours	N/a	N/a	50 μ g/m^3 (not to be exceeded more than 18 times in a calendar year)	25 μ g/m^3 (3-4 exceedance days per calendar year)
	Calendar Year	40 μ g/m^3	40 μ g/m^3	20 μ g/m^3	10 μ g/m^3
Sulphur Dioxide (SO_2)	10 minutes	N/a	N/a	N/a	500 μ g/m^3
	Hour	350 μ g/m^3 (not to be exceeded more than 24 times in a calendar year)	350 μ g/m^3 (not to be exceeded more than 24 times in a calendar year)	350 μ g/m^3 (not to be exceeded more than 3 times in a calendar year)	N/a
	24 hours	125 μ g/m^3 (not to be exceeded more than 3 times in a calendar year)	125 μ g/m^3 (not to be exceeded more than 3 times in a calendar year)	50 μ g/m^3 (not to be exceeded more than 18 times in a calendar year)	40 μ g/m^3 (3-4 exceedance days per calendar year)

	Calendar Year	N/a	N/a	20 μ g/m^3	N/a
Particulate matter with aerodynamic diameter of less than 10µm (PM_{10})	24 hours	50 μ g/m^3 (not to be exceeded more than 35 times in a calendar year)	50 μ g/m^3 (not to be exceeded more than 35 times in a calendar year)	45 μ g/m^3 (not to be exceeded more than 18 times in a calendar year)	45 μ g/m^3 (3-4 exceedance days per calendar year)
	Calendar Year	40 μ g/m^3	40 μ g/m^3	20 μ g/m^3	15 μ g/m^3
Particulate matter with aerodynamic diameter of less than 2.5µm ($PM_{2.5}$)	24 hours	N/a	N/a	25 μ g/m^3 (not to be exceeded more than 18 times in a calendar year)	15 μ g/m^3 (3-4 exceedances per calendar year)
	Calendar Year	25 μ g/m^3 (stage 1 $PM_{2.5}$) 20 μ g/m^3 (stage 2 $PM_{2.5}$)	25 μ g/m^3	10 μ g/m^3	5 μ g/m^3
Lead	Calendar Year	0.5 μ g/m^3	0.5 μ g/m^3	0.5 μ g/m^3	0.5 μ g/m^3
Carbon Monoxide	1 hour	N/a	N/a	N/a	30,000 μ g/m^3
	8 hours	10,000 μ g/m^3	10,000 μ g/m^3	10,000 μ g/m^3	10,000 μ g/m^3
	24 hours	N/a	N/a	4,000 μ g/m^3 (not to be exceeded more than 18 times in a calendar year)	4,000 μ g/m^3 (3-4 exceedance days per calendar year)

Benzene	Calendar Year	5 μ g/m^3	5 μ g/m^3	3.4 μ g/m^3	1.7 μ g/m^3
Ozone	Maximum daily 8 hour mean	120 μ g/m^3 (not to be exceeded more than 25 days per calendar year averaged over 3 years)	120 μ g/m^3 (not to be exceeded more than 18 days per calendar year averaged over 3 years)	120 μ g/m^3 (not to be exceeded more than 18 days per calendar year averaged over 3 years)	100 μ g/m^3 (3-4 exceedances per calendar year)

Table 10.2 Air quality limit values for vegetation and ecosystems

Vegetation		**Air Quality Emission Limit Values (µg/m³)**	
Pollutant	Averaging Period	CAFE Directive (2008/50/EC)	Directive (EU) 2024/2881
Nitrogen dioxide (NOx)	Calendar year	30 μ g/m^3	30 μ g/m^3
Sulphur Dioxide (SO_2)	Calendar year	20 μ g/m^3	
	1st October - 31st March) (Winter mean)	20 μ g/m^3	20 μ g/m^3

Air Quality Monitoring and Compliance in Ireland

10.24 Ireland's air quality monitoring network has expanded significantly in recent years. As of November 2024, the network consists of 112 operational stations, providing coverage across the country. This network plays a crucial role in generating public health advice, assessing compliance with EU air quality standards, and supporting policy decisions. The EPA, in collaboration with local authorities, public bodies, and universities, manages the monitoring network to ensure the data is robust and reliable. Real-time air quality data, accessible through the airquality.ie2 platform, supports public awareness, national and international reporting, and public health actions.

10.25 In 2022, Ireland successfully met all its legal requirements under the Cleaner Air for Europe (CAFE) Directive3. None of the monitored pollutants, including PM_{10}, $PM_{2.5}$, NO_2, and SO_2, exceeded the EU limit values. However, challenges remain, particularly regarding $PM_{2.5}$ from solid fuel combustion and NO_2 from vehicle emissions in urban areas. These local challenges highlight the importance of continued investment in cleaner technologies and public awareness initiatives.

10.26 The adoption of Directive (EU) 2024/2881 introduces stricter limits to be phased in by 2026 and 2030, reflecting the EU's commitment to reducing air pollution and protecting public health. These enhanced standards will present additional challenges, particularly in heavily urbanized or traffic-congested areas, requiring further innovation and coordinated policy efforts to maintain compliance.

Relevant Guidance

10.27 This assessment has been undertaken with guidance from the 'Guidelines on the information to be contained in environmental impact assessment reports', published by the EPA in May 2022 and 'Environmental Impact Assessment of projects, guidance on the preparation of the Environmental Impact Assessment Report' published by the European Commission in 2017.

10.28 Other guidance documents considered in this assessment include:

- IAQM (UK); Guidance on the Assessment of Mineral Dust Impacts for Planning, 2016;
- EPA; Guideline Document entitled Environmental Management in the Extractive Industries, 2006;
- Galway County Development Plan 2022-2028
- Climate Action Plan, 2025
- Quarries and Ancillary Activities – Guidelines for Planning Authorities – DOEHLG, April 2004;

Planning Policy

10.29 Currently, the National Planning Policy lacks dedicated regulations addressing air emissions within the realm of the extractive industry or its associated production activities. The responsibility of evaluating land use and planning matters linked to the extractive industry and related undertakings falls upon Local Authorities when formulating their County Development

[2] https://airquality.ie/

[3] https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2022.php#:~:text=Summary%3A%20Air%20quality%20in%20Ireland,based%20WHO%20guidelines%20in%202022.

Plans. The overarching goal of planning policy is to establish a sustainable management approach for activities and outcomes, achieving a well-balanced equilibrium among environmental, economic, and social factors.

Galway County Development Plan 2022-2028

10.30 The current Galway County Development Plan which was adopted in May 2022 includes a number policies and objectives for the planning and sustainable development of the County from 2022-2028. The following policies relate to air quality:

- AQ 1 Ambient Air Quality

To promote the preservation of best ambient air quality compatible with sustainable development in accordance with the EU Ambient Air Quality and Cleaner Air for Europe (CAFÉ) Directive (2008/50/EC) and ensure that all air emissions associated with new developments are within Environmental Quality Standards as set out in the Air Quality Standards Regulations 2011 (SI No. 180 of 2011) (or any updated/superseding documents).

- AQ 2 Assessment of Air Quality

To require developments which would have the potential to have adverse impacts on air quality to carry out assessments of the impact of the development on air quality.

- AQ 3 Air Quality Mitigation Measures

To require the use of appropriate mitigation measures such as dust dampeners to minimise the potential impacts of developments on air quality.

Existing Conditions – Galway County Council Plan File Ref. No. 06/2275 & ABP Ref: PL 07.222783

10.31 The existing planning conditions for the existing quarry relating to air quality are shown below:

Condition No.5:

'In addition to this annual audit, the developer shall submit quarterly reports with full monitoring records of dust monitoring, noise monitoring, surface water quality monitoring, and groundwater monitoring, details of such information to be agreed with ·the planning authority. notwithstanding this requirement, all incidents where levels of noise or dust exceed agreed levels shall be notified to the planning authority within two working days. Incidents of surface or groundwater pollution or incidents that may result in groundwater pollution shall be notified to the planning authority without delay.'

Condition No.7:

'Operating hours for quarrying activities shall be restricted to between 0800 hours and 1800 hours, Monday to Friday and between 0800 hours and 1400 hours on Saturdays. Loading may take place between 0700 hours and 0800 hours, Monday to Saturday. The facilities shall not operate outside these hours or on Sundays or Public Holidays.'

Condition No.13:

'Total dust emissions arising from the on-site operations shall not exceed 35 milligrams per metre squared per day ·averaged over a continuous period of 30 days when measured as deposition of insoluble and soluble particulate matter at any position along the boundary of the facility. An adequate hose capacity shall be maintained in the quarry area to dampen down stockpiles, waste piles, roads and circulation areas and equipment during periods of dry windy weather to prevent the emission of fugitive.'

Condition No.14:

'The wheels and undersides of all vehicles transporting aggregate from the site onto the public road shall, prior to the exit of such vehicles onto the public road, be washed in a wheel washing facility which shall be operated in accordance with the requirements of the planning authority.'

License Conditions – Air Emissions Licence (AP11/14)

10.32 The onsite asphalt plant is regulated by EPA Air Emissions Licence Reg. No. AP11/14. A full copy of the current licence, including all emission-limit values and monitoring conditions, is provided in Appendix B – Air Emissions Licence.

Guidelines Extractive Industry Emissions Limit Values

10.33 In 1996, the Irish Concrete Federation (ICF), the trade body representing the interests of quarry operators and producers of construction materials, published the ICF Environmental Code which provided guidance for its members on best practice in the environmental management of quarries. The document was subsequently updated in 2005.

10.34 Section 261 of the Planning and Development Act 2000 (as amended), which regulates a significant proportion of established pit development, came into effect in April 2004. The Department of Environment planning guidelines for the extractive industry 'Quarries and Ancillary Activities – Guidelines for Planning Authorities' (DoEHLG 2004) were published around the same time.

10.35 Separately, in 2006, the EPA published its Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals).

10.36 There are several methods to measure dust deposition but only the German TA Luft Air Quality Standards (TA Luft, 1986) specify a method of measuring dust deposition – the Bergerhoff Method (German Standard VDI 2119, 1972) – with dust nuisance.

10.37 On this basis, the EPA recommend a dust deposition limit value of 350 mg/m2/day (when averaged over a 30-day period) be adopted at Site boundaries associated with quarrying related activities. This limit value has been applied in this assessment.

Site Dust Monitoring

10.38 The quarry operates under the guidance of an Environmental Management Scheme (EMS) for the purpose of environmental management and control at the existing quarry. Dust monitoring using the Bergerhoff method has been undertaken over a number of years as part of the monitoring scheme under the current planning and the most recent version of the EMS.

Methodology

Selection of Athenry Weather Station

10.39 The closest weather stations with enough appropriate records to best represent long term conditions at the subject site is the Athenry weather station. Athenry has been adopted for being the closest weather station illustrating monthly rainfall. The weather station is located such that the meteorological data collected closely represented the conditions experienced at the proposed application.

Dust Dispersal

10.40 In practice, the number of days when dust may be transported beyond the existing quarry boundary and the proposed extension area is quite limited. The reasons are being that heavier rainfall has the potential to provide natural suppression over longer periods than one day.

Also, a combination of dry weather and wind is required to raise and transport airborne dust. Most windy days occur in the winter when weather conditions tend to be wetter.

Windspeed Direction and Frequency

10.41 The amount of dust capable of being dispersed to a particular location together with its frequency, is related to several factors including distance, weather and topography.

Distance

10.42 As dust travels downwind from the source it disperses outwards and upwards and progressively falls to the ground surface, with larger particles falling first. As a result, the concentration of dust reduces rapidly from the source of the emission. Most emitted dust is deposited generally, within a distance of a few tens of metres. Smaller particles have the potential to travel further but with minimal significance due to dispersion such that any cumulative concentration would fall well below Air Quality Objectives.

Topography

10.43 Topography is also a significant factor with respect to dust dispersal. There is a substantial change in level between the sources of dust within the current quarry excavation and processing areas and sensitive receptors. These processing areas will to a large extent, be the same as they are at the present time.

10.44 Receptors are mainly at a significantly higher elevation from the principal sources of dust. The local terrain between the main source and the receptor acts as a physical barrier. This effectively provides a natural shelter for nearby receptors and reduces significantly any airborne concentrations.

Weather

10.45 The main elements of weather play an important part in the dispersion of dust particles. These are wind and rainfall. The direction in which airborne dust will travel, and be deposited, is determined by the direction from which the wind travels. The wind speed and gusts will dictate how far dust may travel.

10.46 Rainfall is an important factor in dust dispersal as it acts as a natural dust suppressant. Ireland has a maritime climate which results in high levels of rainfall. The weather tends to be mild, moist and changeable with abundant rainfall and in general a lack of temperature extremes. This has a significant effect on dust emissions.

10.47 Relatively small amounts of daily rainfall, c. >0.2mm are sufficient to ensure that dust is not readily dispersed away from its source.

10.48 Research carried out in the Netherlands with a climate broadly similar to Ireland concluded that it took a period of 28 hours following rainfall events for particulate matter (PM) in the form of road dust to reach 50%, of its maximum mobility. It took 90 hours to reach 90% mobility of its maximum mobility (Source-Effect of rain events on the mobility of road dust load in two Dutch and Spanish roads).[4]

10.49 The data from the Athenry weather station shows monthly precipitation from 2021 to 2024 (see table 10.3)

[4] https://www.sciencedirect.com/science/article/pii/S135223101200814X

Table 10.3 Total monthly rainfall in millimetres for Athenry weather station

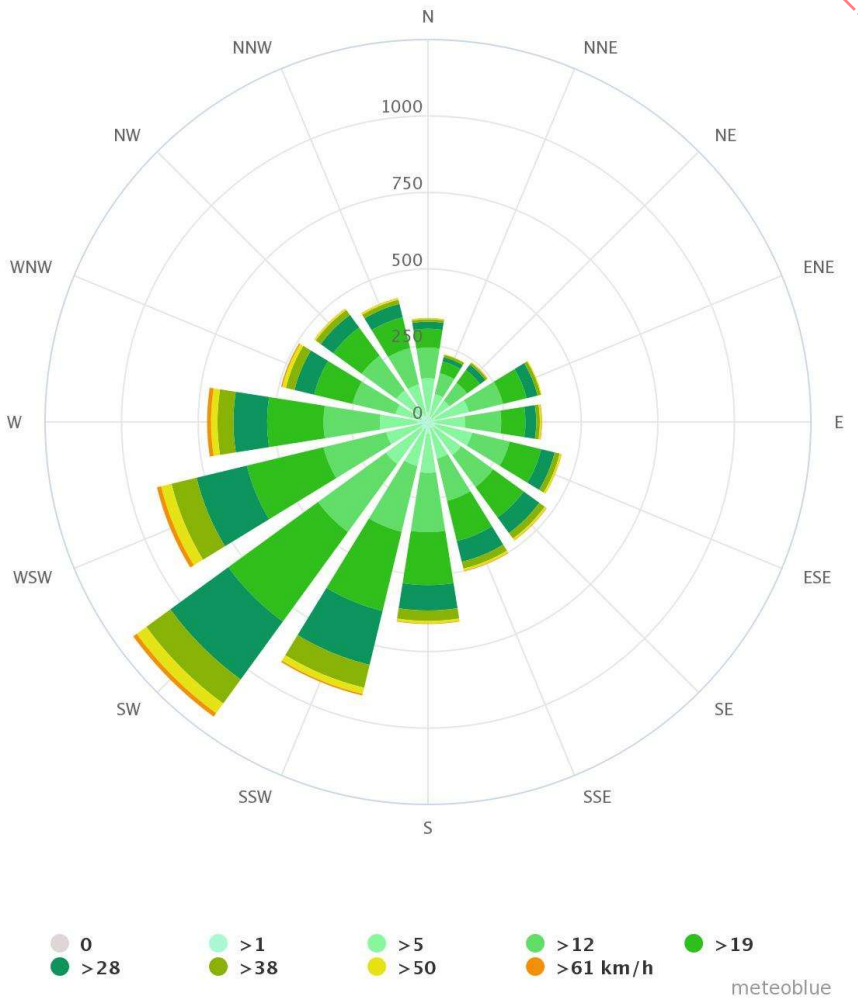
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2024	92.4	159.1	130.5	100.7	59.0	58.9	71.5	159.0	46.6	112.7	88.0	82.2	1160.6
2023	113.9	42.0	185.9	93.4	63.5	93.8	224.1	129.1	148.2	179.9	113.5	202.9	1590.2
2022	56.9	143.1	39.0	51.6	78.9	79.4	66.0	79.6	114.2	199.3	156.2	114.3	1178.5
2021	167.3	113.4	102.1	23.9	95.7	29.8	58.5	84.8	91.1	164.0	78.9	114.7	1124.2

10.50 With respect to wind, data from Athenry weather station was used to obtain a Windrose that shows the frequency of winds greater than 2.5m/s and rainfall less than 0.2mm. These are classed as potentially dusty wind under IAQM guidance. Met Eireann historical data (https://www.met.ie/climate/available-data/historical-data) was used to obtain hourly data on precipitation amount, mean wind speed and predominant wind direction from 26th of February 2010 to 1st March 2025.

10.51 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.

10.52 A wind-rose for the site is presented in Figure 10.2 from Meteoblue.com for Athenry 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 2.5 m/s capable of carrying airborne dust.

Figure 10.2: Windrose from Athenry weather station (Meteoblue.com)



10.53 A detailed methodology is provided in Appendix A - Methodology. Figure 10.A1 in Appendix A shows a Windrose showing the frequency of potentially dusty winds.

Dispersion Modelling

IAQM and PAN 50 Guidance

10.54 The Institute of Air Quality Management (IAQM), in its 2016 guidance on the Assessment of Mineral Dust Impacts for Planning, notes that detailed dispersion modelling is not generally recommended for mineral extraction sites due to the lack of reliable sector-specific emission factors. Instead, the IAQM promotes a qualitative, risk-based approach using the Source-Pathway-Receptor (S-P-R) framework, which is more suited to dust assessments in this sector.

Conclusion

10.55 The IAQM guidance discourages detailed modelling for mineral extraction sites, therefore dispersion modelling is not deemed necessary. A qualitative risk-based approach will adequately address the air quality impacts of the current quarry operations.

10.56 This approach ensures compliance with environmental standards while accounting for the practical limitations of dispersion modelling in the context of mineral extraction.

PM10 Contribution from Extraction Activities

10.57 The IAQM recommend that if the PM10 background concentration is less than 17 µg/m^3 there is little risk that the process contribution (PC) from the site would lead to an exceedance of the annual mean objective.

10.58 In terms of whether the PM_{10} concentration in the local area is likely to exceed the AQS, the following information has been reviewed:

- existing PM_{10} concentrations; and
- expected additional contribution of PM_{10} from site operations.

10.59 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, pit operations can potentially contribute up to 5µg/m^3 towards annual mean background concentrations of the coarse fraction (2.5 – 10µm diameters) of particulates in the immediate area.

10.60 To ensure a robust assessment of potential PM_{10} impacts, 5µg/m^3 has been applied to represent the development contribution to annual ambient PM_{10} 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

10.61 The Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document (Publication number: PE-ENV-01106) published by Transport Infrastructure Ireland (TII) in December 2022 outlines the methodology for assessing air quality impacts associated with infrastructure projects. This document includes detailed guidance on screening criteria to determine if traffic changes due to a proposed scheme may affect air quality. The criteria for defining the affected road network (ARN) are as follows:

- Road alignment will change by 5 meters (m) or more; or
- Annual average daily traffic (AADT) flows will change by 1,000 or more; or
- Heavy duty vehicle (HDV) (vehicles greater than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more; or
- Daily average speed change by 10 kph or more; or
- Peak hour speed will change by 20 kph or more

Existing Environment

Site Location

10.62 The site is located in the townland of Cartron, Belclare, Co. Galway, situated approximately 5.6km south-west of Tuam and 10km north-east of Headford, while Galway is 20km south of the site.

10.63 The site is located to the south of the R333 and north of the L2212 from which access is provided via an unnamed local road approximately 600m in length. In the vicinity of the site the L2212 comprises an unmarked single carriage road with an 60km/hr speed limit. The L2212 joins the R333 at a T-junction approximately 1.5km north-east of the site.

10.64 Beyond the site, the landscape is rural in character, consisting of predominately agricultural land enclosed with stone walls, with patches of bog, scrubland and woodland, most notable Knockmaa Wood immediately west of the site.

10.65 Residences within the general area typically consist of one-off rural houses and ribbon development along the local road network. There are no properties within 400m of the extraction area, the nearest properties comprise a detached farm house approximately 590m to the north of the site and a series of dwellings on the L2212 south-west of the site. There are approximately 56 dwellings within 1km of the quarry. The closest settlement to the site is the village of Belclare, which is situated approximately 1.2km north of the site.

Proposed Application

10.66 The proposed development being applied for under this current planning application will consist of:

- Continued use of the existing quarry (granted under Planning Ref. File No.: 06/2275 and ABP Ref.: PL07.222783), including drilling, blasting, crushing, processing, and stockpiling of materials within a total site area of 15.09 hectares to the permitted depth of 33m OD.
- Continued use of existing permitted structures and facilities, including:
  - Weighbridge and wheelwash with side and overhead spray bars.
  - Office and staff facilities building and carpark provision (Ref. 17512).
  - Asphalt plant (Ref. 15104), concrete batching plant (Ref. 20419), maintenance shed (Ref. 141295), aggregate shed, ESB substation (Ref. 191964), crushing and screening plant, and stock bays (Ref. 062275 & 21442).
  - Associated site infrastructure.
- Construction of a new quarry storage yard (c. 1.09 Ha.) to the east of the existing quarry.
- Relocation of the existing permitted sheds (Plan Ref File No. 21442) to an area beside the proposed storage yard area.
- Importation of soil and stone (both waste and non-waste) for site restoration purposes and selected construction and demolition waste for recycling to preserve natural aggregate resources, subject to the necessary authorisations.
- The proposed development will facilitate the continued operation and restoration of the site, with the operational life of the quarry ceasing upon resource exhaustion, followed by restoration to agricultural and natural uses using imported material.

10.67 The proposed development is within an overall application area of c. 16.3 hectares and is for a total period of 35 years (comprising an operational period of 33 years followed by 2 years for completion of restoration).

10.68 Additional information can be found in relation to the proposed development Chapter 3 – Project Description.

Predicted Impacts on Air Quality

10.69 Day-to-day activities associated with quarrying can potentially raise dust levels if site preparation, restoration, extraction, material handling, on-site and off-site transportation, and stockpiling are not carefully managed. As dust travels downwind from the source, it disperses and progressively falls to the ground, with larger particles settling first.

10.70 The primary sources of air emissions from the development will be related to plant and machinery operating across various activities, including site preparation/restoration, extraction, materials handling, and both on-site and off-site transportation of materials. Wind-blown dust can also arise under dry and windy conditions. Due to the high level of precipitation in the study area, dust generation is naturally suppressed. Potential impacts from these activities are primarily related to dust deposition and vehicle and plant emissions.

Drilling and Blasting of In-situ Material

10.71 In order to remove the underlying bedrock, blast holes must be first drilled using a blasting rig. This will be undertaken on average once per month and in response to the demand for aggregate. Drilling rigs used are fitted with a dust and noise suppression system. Emission from drilling and blasting are generally relatively low and do not travel far from the source.

Transportation of Material

10.72 Emissions from vehicles travelling from the application area to the existing quarry can act as a source of emissions and can occur along the entire route. Vehicle movements on the internal access/haul roads are a source of dust nuisance as emissions can increase rapidly in proportion to vehicle speed and traffic volume. Research has shown that the majority of dust particles, typically produced from un-surfaced roads, deposit rapidly settles within 8m of the source.

Vehicle & Plant Emissions

10.73 Exhaust emissions resulting from plant and vehicles operating directly at the application area or indirectly by transporting material from the application area to the main quarry have the potential to contribute to local pollution levels, both within and surrounding the area. Carbon Dioxide (CO_2), Nitrous Oxide (N_2O) constitutes the main emissions from the plant and vehicles operating at the application area.

Asphalt Plant

10.74 The quarry includes a fixed asphalt plant that vents through a single stack. Unlike the diffuse dust generated by drilling, haulage and stockpiles, the asphalt plant's emissions arise from fuel combustion and bitumen heating, producing gases (NO_x, SO_2, VOCs) and fine particulates that disperse above the processing area. Detailed licence limits and monitoring results are addressed later in the chapter.

Receptors

10.75 The local environment surrounding the current quarry comprises a range of ecological and human receptors that may be potentially impacted by changes to air quality. A description of the sensitive receptors located within 400m of the proposed application is shown below:

Human Receptors

10.76 Potential impacts on human receptors in proximity to the quarry site are assessed in this chapter.

10.77 It has been found that deposited dust does not generally travel beyond 400 m (IAQM, Appendix 2, 2016), therefore all receptors within 400 m of the site boundary are included in the assessment. The guidance states that it is commonly accepted that the greatest impacts from particulates will occur within 100 m of the source, with the potential for travel up to 400 m.

10.78 Within a 400-meter radius of the existing limestone quarry, there are approximately 3 residences. It is important to note that the distance from the nearest receptor to extraction area is approx. 550m, therefore a conservative approach is taken by using the nearest point from the access road to the closest receptor.

10.79 Table 10.4 shows the classification based on the direction and frequency of potentially dusty winds in relation to each of the receptors.

Table 10.4 Receptor classification based on wind frequency

Receptor	Relevant Wind Direction (Based on Windrose)	Frequency of Potentially Dusty Winds	Frequency Classification
Group 1	300-340	7.38	Moderately frequent
Knockmaa Hill pNHA	90-130	6.92	Moderately Frequent

10.80 Table 10.5 and figure 10.3 show the receptors within 400m of the proposed application which will be assessed. Receptor group 1 consists of three receptors and the closest receptor to the application boundary within the group of receptors is assessed.

Table 10.5 Categorisation of receptor distance

Receptor	Sensitivity	Distance (m) / Direction From Application Boundary (approx.)	Distance Category
Group 1	High	375m Southeast	Distant
Knockmaa Hill pNHA	High	172m Southwest	Intermediate

10.81 The frequency of potentially dusty winds and the distance from the application boundary is used to determine the pathway effectiveness.

Figure 10.3: Receptor distance to application boundary

Environmental Receptors

10.82 The Lough Corrib SAC, located approximately 3.3 km east of the application area (table 10.6), is a valuable ecological resource. The effects of air quality changes on Lough Corrib are extremely unlikely due to the distance, therefore it is not included in this assessment.

10.83 The Knockmaa Hill proposed natural heritage area is located approx. 172m northwest of the application area. This area will be included in the assessment due to its proximity to the application area.

Table 10.6 Distance of nearest ecological receptor

Receptor	SENSITIVITY	DISTANCE (M) / DIRECTION FROM APPLICATION BOUNDARY (APPROX.)
Lough Corrib SAC	High	3.3km east
Knockmaa Hill pNHA	Medium	172m Northwest

Receptor Sensitivity

10.84 There are eight receptors being assessed, seven are residential and one is a Special Area of Conservation. All of which are classified as highly sensitive receptors as seen in The Institute of Air Quality Management: Guidance on the Assessment of Mineral Dust Impacts for Planning (2016):

> 'High Sensitivity Receptor:
>
> - users can reasonably expect enjoyment of a high level of amenity; or
> - the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.
> - indicative examples include dwellings, medium and long term car parks and car showrooms.'

Dust Dispersion and Ecological Sensitivity

10.85 Research and operational guidelines indicate that significant ecological impacts due to dust deposition typically occur only at very high deposition rates, which are generally over 1 gram per square meter per day (1 g/m²/day).

10.86 This deposition rate significantly exceeds the upper limit recommended by environmental guidelines. The Department of Environment, Heritage and Local Government (DEHLG), along

with the Environmental Protection Agency (EPA)[5], has set the threshold for acceptable dust deposition rates for industrial sectors including extractive industries. According to the guidelines provided by the DEHLG and the EPA, the threshold is set at 350 milligrams per square meter per day (350 mg/m²/day). This limit is established to prevent any significant adverse ecological or human health impacts under typical operating conditions.

Baseline Conditions

Existing PM_{10} Concentrations

10.87 The proposed development is located in Air Quality Zone D – Rural Ireland. In the absence of local background data, the most recent annual mean NO2, PM10 and PM2.5 monitoring data from other stations within the EPA National Ambient Air Quality Monitoring Network located in Zone D areas across Ireland are shown in table 10.7. All monitored concentrations in 2023 are below the relevant standards for NO2, PM10 and PM2.5 given in Table 10.7.

Table 10.7 Annual mean monitoring data for zone D stations (Air Quality Summary Tables 2023)

Monitoring Station (Air Quality Zone D)	Annual Mean Concentration (µg/m3)			PM_{10}: Number of Days	NO_2: Number of Days
	PM_{10}	$PM_{2.5}$	NO_2	>50µg/m3	>200µg/m3
Tipperary Town	10.8	6.7	–	0	–
Shannon Estuary/Askeaton, Co. Limerick	8.4	4.8	–	0	–
Carrick-on-Shannon	8.9	5.4	10	0	0
Enniscorthy	13.3	9	–	2	–
Birr	13.1	8.3	11.3	1	0
Macroom	11.3	7.3	–	0	–
Castlebar	9.9	–	6.6	0	0
Cobh Carrignafoy	11.8	6.8	–	0	–

[5]Environmental Protection Agency (EPA), "Guidance on the Assessment of Dust from Demolition and Construction," EPA, 2016.

Claremorris	8.1	5.2	–	0	–
Kilkitt	7.1	–	1.7	0	0
Cavan	10.0	6.4	–	0	–
Roscommon Town	9.7	6.4	–	0	–
Edenderry	16.3	12.4	8.6	6	0
Mallow	10.5	6.1	–	2	–
Longford	13.1	9.2	–	2	–
Cobh Cork Harbour	11.4	–	–	0	–
Killarney, Co. Kerry	8.9	5.4	–	0	–
Malin Head	12.8	6.8	–	0	–
Emo Court Co. Laois	–	–	2.3	–	0
Briarhill	–	–	16.1	–	0
Cork Glanmire Rd	–	7.6	–	–	–
Average	10.86	7.11	8.01	-	-

10.88 Table 10.7 illustrates that average PM10, PM2.5, and NO2 concentrations at quality zone D monitoring stations for 2023 are below the Air Quality Standards (AQS). The average annual mean across all monitoring stations located in air quality zone D for PM10, PM2.5, and NO2 are 10.86, 7.11, and 8.01, respectively. The Claremorris monitoring station is located approx. 26km north of the proposed development and is the closest monitoring station in air quality zone D to the proposed development. There were 0 exceedances of the 24-hour mean PM10 concentration of 50µg/m3 at the Claremorris monitoring station, which should not be exceeded more than 35 times in a calendar year.

Existing Dust Deposition

10.89 Monitoring to date includes all of the quarry operations. The monitoring at the site boundary demonstrates that deposited dust is within the guideline limits. Inspection of the quarry surrounds on various occasions show that there is no evidence of soiling or significant amounts of deposited dust on vegetation. There will be no significant effect or change as a result of the proposed application. Potential significant impact on residences from dust resulting from site operations is considered to be negligible.

10.90 Dust deposition monitoring is undertaken at 4 boundary locations of the quarry site (see figure 10.4).

10.91 The dust deposition data for 2024 and 2025 are shown in table 10.8 and 10.9.

10.92 All of the recorded dust deposition rates presented in Table 10.8 and 10.9 are below the more recommended emission limit value (ELV) of 350 mg/m2/day.

Figure 10.4: Dust deposition monitoring locations

Table 10.8 Dust deposition results from 2024 (mg/m2/day)

Location	2024 Sampling Periods											
	January	February	March	April	May	June	July	August	September	October	November	December
D1	329	134	201	26	20	89	121	215	175	105	16	137
D2	348	169	239	142	66	200	250	223	329	174	16	102
D3	162	17	244	17	50	66	265	255	146	178	29	166
D4	75	19	176	33	65	107	99	71	276	207	75	Note 1

Note 1: Not reported due to the presence of organic matter in the collection vessel.

Table 10.9 Dust deposition results from 2025 (mg/m2/day)

Location	2025 Sampling Periods											
	January	February	March	April	May	June	July	August	September	October	November	December
D1	324	3	Note 1	117								
D2	266	10	150	13								
D3	151	143	Note 1	217								
D4	Note 1	18	270	230								

Note 1: Not reported due to the presence of organic matter in the collection vessel.

Existing Stack Emissions Monitoring - Asphalt Plant

10.93 Stack emissions from the asphalt plant are monitored in line with Air-Emissions Licence AP11/14. An independent ISO 17025 laboratory carries out quarterly test of the main stack for total particulates, NO_x (as NO_2), SO_2 and CO. The results for 2024 and 2025 are provided in Appendix C – Stack Emissions Results.

10.94 Stack emissions monitoring shows that particulate, NO_x, SO_2, stack temperature and volume-flow values are within the emission-limit values specified in Air-Emissions Licence AP11/14. No exceedances were recorded.

Impact Assessment

10.95 The construction, operational and restoration phases are included as part of the impact assessment due the potential for each of the phases to be occurring at the same time.

Dust Assessment

10.96 A summary of the risk assessment of dust impacts from sources within the proposed application area is presented in Table 10.10 below.

Table 10.10 Summary of the impact assessment results

Receptor	Source Emissions Risk	Pathway Effectiveness	Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effect
R1	Medium	Ineffective	Negligible Risk	High	Negligible Effect
Knockmaa Hill Proposed Natural Heritage Area	Medium	Moderately Effective	Low Risk	Medium	Negligible Effect

10.97 From Table 10.10, it is observed that the risk of impact from dust emissions associated with the proposed application (without any mitigation measures in place) is a negligible effect at receptor group one and at Knockmaa Hill proposed natural heritage area.

10.98 Note that this does not take into account implementation of mitigation measures within the proposed application area that include provision of perimeter screening berms, dust suppression measures etc. (outlined in the Mitigation Measures section below).

10.99 Table 10.11 below provides a detailed overview of potential dust impacts associated with specific operational activities within the proposed development, in accordance with EPA Guidelines (2022). This table categorises dust-generating scenarios by activity type, describing the nature and significance of each effect, as well as its expected extent, frequency, and likelihood.

10.100 Key activities assessed include:

- **Blasting and Extraction**: Emission from drilling and blasting are generally relatively low and do not travel far from the source. These operations are expected to produce dust emissions that may affect areas within 100 meters of the source, with dust potentially traveling up to 400 meters. Given the controlled nature of blasting, the probability of

significant impact remains low, with dust effects generally localised and occurring, typically, once every five weeks, potentially increasing to twice in that period.

- **Stockpiling**: Dust from stockpiles has a slight negative effect and is primarily localised to within 100 meters of the source, with an unlikely probability of affecting areas up to 400 meters.
- **Haulage**: Vehicle movements on unpaved roads are identified as having a moderate impact on local air quality, as dust may be generated frequently.
- **Crushing and Screening**: Dust from material processing equipment is considered slight in magnitude, and is primarily localised to within 100 meters of the source, with an unlikely probability of affecting areas up to 400 meters.
- **Heavy-Duty Vehicle Traffic (Off-Site)**: Emissions from HDVs entering and exiting the site are expected to be imperceptible, with effects localised along transport routes and a low probability of significant air quality impact.
- **Concrete Batching Plant**: Boundary monitor D2 consistently records dust deposition below the 350 mg/m2/day limit, confirming that emissions from the concrete plant remain within guideline levels.
- **Asphalt Plant**: Combustion gases and fine particulates are released from a single elevated stack. The plume is buoyant and monitored under Licence AP11/14. The stack has a low probability of significant air quality impact.

10.101 Table 10.11 provides a clear summary of the potential air quality impacts under each activity, setting the basis for targeted dust control measures to mitigate effects on sensitive receptors.

Table 10.11 Air Quality Impact Summary Table (Based on EPA Guidelines 2022)

Scenarios	Activity	Nature and Description of the Effect	Quality of Effect	Significance of Effect	Extent & Context of Effect	Probability of Effects	Duration and Frequency
Site Preparation and Restoration	Site preparation/restoration	Dust emissions from soil movement and heavy plant operations	Negative	Slight	Local impact within 100 m, potential for travel up to 400 m	Unlikely	Long-term, occasional
Quarry Operations (Blasting and Extraction)	Blasting and extraction	Dust emissions from blasting and material handling	Negative	Slight	Local impact within 100 m, potential for travel up to 400 m	Unlikely	Long-term, monthly
Materials Handling	Material handling	Dust generated by plant on uneven surfaces	Negative	Slight	Localised to quarry void area	Unlikely	Long-term, frequent
On-site Transportation	Haulage	Dust from vehicle movements on unpaved haul roads	Negative	Slight	Local, along internal haul routes	Unlikely	Long-term, frequent
Mineral Processing	Crushing and screening	Dust emissions from crushing and screening equipment	Negative	Slight	Local impact within 100 m, potential for travel up to 400 m	Unlikely	Long-term, occasional
Stockpiling Materials On-Site	Stockpiling	Dust from stockpiled materials	Negative	Slight	Local impact within 100 m, potential for travel up to 400 m	Unlikely	Long-term, occasional

Scenarios	Activity	Nature and Description of the Effect	Quality of Effect	Significance of Effect	Extent & Context of Effect	Probability of Effects	Duration and Frequency
Off-site Transportation	HDV traffic	Emissions from heavy-duty vehicles on paved roads	Negative	Not significant	Local, along transport routes	Unlikely	Long-term, frequent
Point-source Emissions	Asphalt plant stack	Combustion gases & fine particulates released via elevated stack	Negative	Not significant	Localised plume; negligible ground-level concentrations beyond site boundary	Unlikely	Long-term, intermittent (only when plant operating)

PM_{10} Assessment

10.102 The background annual mean PM10 concentrations (µg/m3) for air quality monitoring stations located in air quality zone D for 2023 is less than 17 µg/m3. The IAQM recommend that if the PM10 background concentration is less than 17 µg/m3 there is little risk that the process contribution (PC) from the site would lead to an exceedance of the annual mean objective. It is therefore unlikely that the PM10 contribution from the site would lead to an exceedance of the AQS.

10.103 In terms of PM10, the annual mean concentration was 10.86µg/m³ in 2023 at monitoring stations located in air quality zone D. The potential contribution of 5µg/m3 towards annual mean background concentrations of the coarse fraction (2.5 – 10µm diameters) of particulates (in the immediate area of the site) is considered to be insignificant and well below the annual objective of 40µg/m³. It also remains below the annual limit of 20 µg/m³ established by Directive (EU) 2024/2881, which must be achieved by 2030.

10.104 In terms of PM2.5 the annual mean concentration was 7.11µg/m³ in 2023 at monitoring stations located in air quality zone D. This is below the annual objective of 25 µg/m3. It also remains below the annual limit of 10 µg/m³ established by Directive (EU) 2024/2881, which must be achieved by 2030.

10.105 Therefore, the potential impacts in relation to increase in ambient PM10 and PM2.5 concentrations can be classified as 'not significant'.

Traffic Emissions Assessment

10.106 For the purposes of assessment, the projected traffic movements associated with the application based on a 50-week year, 5.5 days per week, and 20 tonne loads, will result in up to 79 HDV movements per day (refer to Chapter 13 – Traffic), with no significant changes to either road alignment or speed.

10.107 Therefore, as none of the roads in the surrounding road network meet any of the traffic / alignment criteria set out in the TII 2022 Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document, then the impact of the scheme can be considered to be 'negligible' in terms of local air quality and no further air quality assessment is deemed necessary.

10.108 On this basis, the impact of the proposed continuation of use of the existing limestone quarry from the change of HDVs traffic 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.

Radon Gas

10.109 The potential effects of radon gas are assessed in Chapter 5 – Population and Human Health. The assessment concludes that:

"The potential effects on the health of employees working at the site as a result of radon emissions is therefore not likely to be significant."

10.110 Additional information in relation to radon gas can be found in Chapter 5 – Population and Human Health.

Silica Dust

10.111 When rocks containing crystalline silica are cut, crushed, ground, drilled or used in similar industrial processes, dust particles are produced. Some of these particles are very fine – known as respirable crystalline silica or RCS. If high quantities of this very fine RCS dust are

inhaled on a regular basis over many years, there is a potential risk that the cumulative effects can cause a lung disease known as silicosis. It is now also accepted that prolonged and intense RCS exposure can cause lung cancer.

10.112 Material that is extracted at the application site comprises Limestone rock, which is then used as aggregates for concrete, blocks, hardcore, farm drainage, earthworks and fill, with the majority of materials produced being used in roadbuilding and in the construction sector. The typical crystalline silica content of Limestone is less than 5%, as calcium carbonate is the primary chemical compound in the rock and not silica.

10.113 The quarry operator has a legal responsibility to adhere to the HSA Safe Quarry Guidelines to Section 26(b)(ii) of the Safety Health and Welfare at Work (Quarries) Regulations 2008 and the EU Directive on Carcinogens and Mutagens in the Workplace - 2017/2398/EC. This latter legalisation sets an occupational exposure limit of 100 µg/m^3 RCS in industrial workplaces.

10.114 Effective dust prevention, protection and control techniques are already in place at the site, including spraying and requirements for PPE. The potential effects on the health of employees working at the site as a result of silica dust is therefore not likely to be significant.

10.115 RCS disperses very rapidly (within 1-10m of origin) and therefore concentrations return to background or near background levels very quickly. As a consequence, RCS is only a risk to people working directly at the source and without proper PPE and dust management techniques. RCS does not therefore present a risk to the health of the sensitive receptors in the vicinity of the application site.

Mitigation Measures

Existing Mitigating Features

Hedgerows and Trees

10.116 The presence of established hedgerows and trees in the vicinity of the quarry site provides a degree of natural shielding against the dispersion of dust emissions downwind of the prevailing winds. These vegetation features act as physical barriers that can help intercept and trap airborne particulate matter, thereby reducing the extent to which dust travels beyond the immediate operational area. However, it is acknowledged that while hedgerows and trees contribute to dust mitigation, their effectiveness may vary based on factors such as wind direction, foliage density, and the particle size of the emitted dust.

Topography

10.117 Topography is a significant factor with respect to dust dispersal. There is a substantial change in level between the principal sources of dust within the quarry excavation and sensitive receptors. These receptors are at a much higher elevation compared to the principal sources of dust i.e. processing and stockpiling. The difference in elevation between the main sources and the receptor acts as a physical barrier to wind. It provides an effective barrier to winds for nearby receptors and reduces significantly any airborne concentrations.

Mitigation Adequacy

10.118 The presence of hedgerows, trees, and changes in elevation offers initial mitigating effects on dust emissions from the proposed quarry extension. While these features contribute to reducing dust dispersion, it is prudent to acknowledge that they might not provide complete containment. Thus, the effect of hedgerows, trees and topography of the dispersion of dust will not be included in this assessment to ensure a conservative approach.

Site Specific Mitigation Measures

10.119 Table 10.12 shows the site specific mitigation measures for the proposed application.

Table 10.12 Existing and Proposed mitigation measures

Source	Emission Potential	Mitigation Measures	Effectiveness
Excavators/HDV	High – dry or fine material during strong windy weather	Minimise drop heights when handling materials. Soils placed directly into screening berms or in progressive works. Avoid working in adverse/ windy conditions.	High
	Low – material of high moisture content during conditions of low wind speed		High
Onsite Vehicles	High when travelling over un-surfaced and dry site roads	Minimise distances of onsite haul routes.	High
		Use of water sprays / tractor & bowser to moisten surfaces during dry weather.	High
		Restrict vehicle speeds through signage / staff training.	High
		Location of haul routes away from sensitive receptors.	High
Road Vehicles (transfer offsite)	Low / Moderate on paved road surfaces	Use of road sweeper to reduce the amount of available material for re-suspension.	High
		Existing paved access road	High
Stockpiles	High when dry or fine material being stored or handled during strong windy weather	Located within quarry void	High
		Limit mechanical disturbance.	High
Processing Plant	High – during dry and strong windy weather	Retention of hedgerows	High
		Existing perimeter berms	High
		Avoid working in adverse weather conditions	High
		Locate plant within quarry void	High

		Screening berms seeded and planted	High
Asphalt Plant	High - emissions of sulphur dioxide (SO_2), nitrogen dioxide (NO_2), nitrous oxide (NO_x), Particulates (Pm10 and Pm2.5)	Emission of combustion gases through a 30 m high emission stack ensures effective dispersion of the emissions.	High
		All bitumen tanks will be kept at temperatures below 165^{0}C. This temperature maintains the bitumen in molten state, minimising emissions of bitumen fumes.	High
		Particulate emissions are minimised by passing emissions through a bag filter assembly comprised of number of individual bags resulting in particulate removal	High
Concrete Batching Plant	High	Cement is delivered to site in bulk tankers and stored in sealed silos.	High
		The batching plant is enclosed to ensure that no dust emissions arise from the manufacturing process.	High
		The concrete material is discharged by an enclosed chute into the back of the ready mix truck therefore no dust arises on the discharge of the concrete into the truck.	High
		The wash out of the mixer uses water thus ensuring no dust emissions.	High

Residual Impacts

10.120 With the range of mitigation measures to be implemented, design measures to be incorporated into the working scheme and history of dust monitoring results, it is considered that the risk of dust impact at receptors from the proposed application reduces further. The proposed screening berms, the location of the stockpiles in the quarry floor, and the existing mitigation measures in place at the concrete batching plant and asphalt plant act as significant mitigation measures against the dispersal of dust and other gaseous pollutants.

10.121 After an assessment of potential adverse effects produced by the proposed application it was concluded that there would be no significant adverse air quality effects for both human and ecological receptors (see table 10.13)

Table 10.13 Residual Air Quality Impact Summary Table (Post-Mitigation)

Scenarios where impacts may arise	Activity	Nature and Description of the Effect	Residual Significance of Effect	Probability of Residual Effects
Site Preparation and Restoration	Site preparation/restoration	Dust emissions from soil movement and heavy plant operations	Not significant	Unlikely
Quarry Operations (Blasting and Extraction)	Blasting and extraction	Dust emissions from blasting and material handling	Not significant	Unlikely
Materials Handling	Material handling	Dust generated by plant on uneven surfaces	Not significant	Unlikely
On-site Transportation	Haulage	Dust from vehicle movements on unpaved haul roads	Not significant	Unlikely
Mineral Processing	Crushing and screening	Dust emissions from crushing and screening equipment	Not significant	Unlikely
Stockpiling Materials On-Site	Stockpiling	Dust from stockpiled materials	Not significant	Unlikely
Off-site Transportation	HDV traffic	Emissions from heavy-duty vehicles on paved roads	Not significant	Unlikely
Point Source Emissions	Asphalt plant	Combustion gases and fine particulates released via elevated stack	Not significant	Unlikely

	Concrete batching plant	Dust from cement and aggregate handling	Not significant	Unlikely

Cumulative Impacts

10.122 The cumulative impacts are those which result from incremental changes caused by other past, present or reasonably foreseeable actions together with the proposed application. Therefore, the potential impacts of the proposed application cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.

10.123 A review of potential cumulative effects has identified Mc Tigue's Quarry, located adjacent to the proposed development, as a potential source of cumulative dust and particulate emissions. However, the results from the dust monitoring for the site indicate that predicted dust deposition and ambient particulate matter concentrations are well below their respective limit values.

10.124 Given that both facilities are subject to standard dust management measures, which are expected to further minimise emissions and reduce the likelihood of cumulative impacts, the potential for significant cumulative effects is considered low.

10.125 Baseline dust deposition monitoring carried out at the existing development, complies with the recommended dust deposition emission limit value of 350 mg/m^2/day (averaged over 30 days).

10.126 There are no other significant sources of emission to air within close proximity to the site and therefore no potential for significant cumulative impacts has been identified.

10.127 The cumulative impact of the proposed application with respect to emissions to air will be not significant.

'Do Nothing Scenario'

10.128 In the Do-nothing scenario, the existing quarry operations are to be maintained at existing levels. From an air quality perspective, no significant changes in air quality are expected. Therefore, it should be noted that this proposal and current operations are similar in nature.

Conclusion

10.129 On the basis of the assessment presented above, it is concluded that the proposed application, with the range of mitigation measures to be implemented and design measures incorporated into the working scheme, will not have a dust deposition impact on any assessed receptors.

Monitoring Program

10.130 Dust monitoring locations shall be reviewed and revised where and as/when necessary. The results of the dust monitoring will be available for public inspection at the office of the quarry and shall be submitted to Galway County Council on request.

APPENDICES

Appendix A - Methodology

Methodology

10.1 The section elaborates on the IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning (2016) employed to evaluate the effects of deposited dust and fine particulates stemming from extraction activities. This approach adheres to a conventional methodology involving source-pathway-receptor considerations. This report followed the guidelines as part of the assessment.

10.2 The residual source emissions are characterised based on the scale of the operations and the site activities and are classified as either small, medium or large.

10.3 Directions regarding the suitable categorization of the residual source are outlined in the IAQM guidance, specifically outlined in Appendix 4 from 2016. This characterization of the source encompasses an evaluation of the standard management and mitigation measures that will be executed at the site.

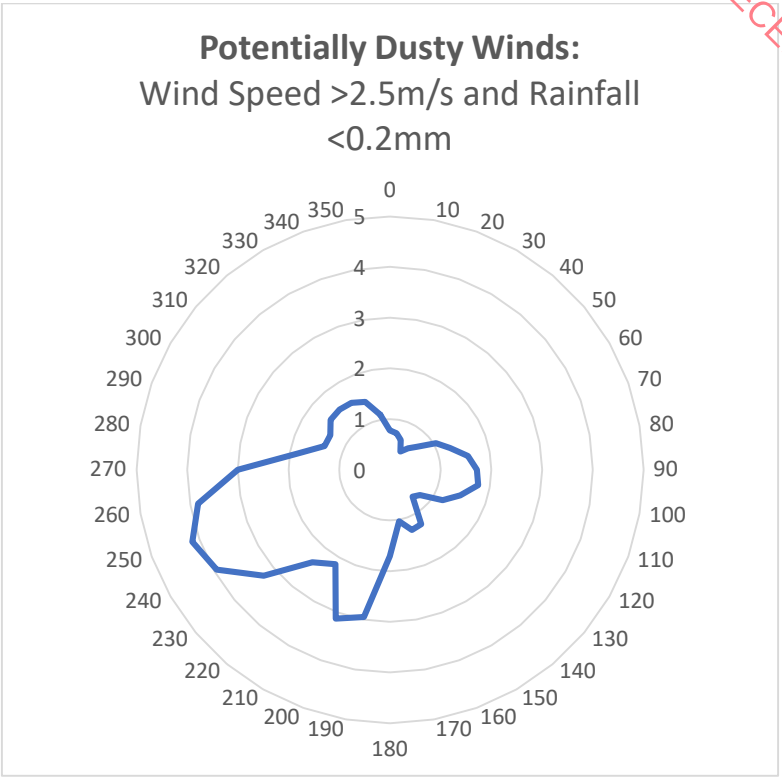
10.4 The evaluation of the pathway from the source to the receptor involves an assessment that considers the distance and orientation of receptors in relation to the prevailing wind and local meteorological conditions. Local meteorological data is also employed to appraise the frequency of winds in each direction. Research findings indicate that deposited dust typically doesn't disperse beyond 400 meters (IAQM, Appendix 2, 2016), thus all receptors located within 400 meters of the site boundary are taken into consideration. The guidance asserts that it's widely accepted that the most significant impacts will manifest within 100 meters of the source, with the potential for dispersion up to 400 meters.

10.5 The criteria utilised for categorizing the frequency of potentially dusty winds (Table 10.A2) and the distance between receptors and the source (Table 10.A3) are employed to define the effectiveness of the pathway (Table 10.A4). The residual source emissions and pathway effectiveness are combined to anticipate the potential Dust Impact Risk, as illustrated in Table 10.A5.

Windrose data

10.6 Hourly data from Met Eireann taken from 26th of February 2010 to 1st March 2025 was used to generate a Windrose (Figure 10.A1) that shows the frequency of potentially dusty winds at Athenry weather station. Potentially dusty winds are classed as having wind speeds greater than 2.5m/s and less than 0.2mm of rainfall as per IAQM guidelines.

Figure 10.A2: Potentially dusty winds from Athenry weather station



Source Emissions Classification

10.7 The source emissions classification is extracted from the IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning. The guidance provides the factors that may be considered when determining if the source emissions will have a small, medium or large risk. The Dust Impact Risk was determined for each of the main operational activities:

10.8 The classification was determined based on the following reasons as per the IAQM 2016 guidance document:

Site Preparation/Restoration:

- The area for site preparation/restoration will include an area <10ha, bunds <8m in height, <10 heavy plant machinery simultaneously active. The site working area will be >2.5ha and there will be >20,000m^3 material movement. Therefore, site preparation/restoration is classified as medium risk.

Mineral Extraction:

- The mineral extraction area will be <10ha and will approx. 300,000 tonnes per annum of material extracted. Therefore, mineral extraction is classified as medium risk.

Materials Handling:

- The material handling will take place within the quarry void which would suggest a small risk but there will be >5 plant machinery and the ground will be poorly surfaced. Therefore materials handling is classified as small-medium risk.

On-site Transportation:

- The haul roads within the proposed development will be unpaved and have high a road surface of high dust potential. There will be <250 movements of heavy duty vehicles in one day and there will be a maximum speed limit of 15km/h in place on all haul roads. Therefore, on-site transportation is classified as medium risk.

Mineral Processing:

- As there will be max 300,000 tonnes of rock processed per annum using a mobile crusher and screener with effective design in dust control. Therefore, mineral processing is classified as medium risk.

Stockpiles/Exposed Surfaces:

- The stockpiles will be kept within the quarry void and below the existing ground level. The stockpiles will be located >100m from the site boundary. Therefore, stockpiles/exposed surfaces are classified as medium risk.

Off-Site Transportation

- The existing paved access road will continue to be used, along with the existing vehicle clean facilities and the access road is >50m in length. Therefore, offsite transportation is classified as medium risk.

10.9 For the assessment, it is assumed that each of the activities will be classified as medium risk and the distances will be taken from the site boundary and not the location of the individual site activity (see table 10.A1). This is a conservative approach in conducting the assessment.

Table 10.A1 Source emissions risk

Activity	Source Emissions Risk
Site Preparation and Restoration	Medium
Mineral Extraction	Medium
Materials Handling	Small-medium
On-site Transportation	Medium
Mineral Processing	Medium
Stockpiles and Exposed Surfaces	Medium
Off-site Transportation	Medium

Frequency of Potentially Dusty Winds

10.10 Table 10.A2 is extracted from the IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning. It shows the categorisation of the frequency of potentially dusty winds. Potentially dusty winds are winds that occur at greater than 2.5m/s and the rainfall is less than 0.2mm.

Table 10.A2 Categorisation of frequency of potentially dusty winds

Frequency Category	Criteria
Infrequent	Frequency of winds (>2.5 m/s) from the direction of the dust source on dry days are less than 5%
Moderately frequent	The frequency of winds (>2.5 m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	The frequency of winds (>2.5 m/s) from the direction of the dust source on dry days are between 12% and 20%
Very frequent	The frequency of winds (>2.5 m/s) from the direction of the dust source on dry days are greater than 20%

Receptor Distance from Application boundary

10.11 Table 10.A3 shows the categories for distance from the application boundary to the receptor.

Table 10.A3 Distance categories from the application boundary

Category	Criteria
Distant	Receptor is between 200m and 400m from the application boundary
Intermediate	Receptor is between 100m and 200 m from the application boundary
Close	Receptor is less than 100m from the application boundary

Pathway Effectiveness

10.12 The pathway effectiveness (table 10.A4) is determined using the frequency of potentially dusty winds and the receptor distance from the application boundary.

Table 10.A4 Pathway effectiveness

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

Estimation of Dust Impact Risk

10.13 The dust impact risk (table 10.A5) is determined using the source emissions risk and the pathway effectiveness.

Table 10.A5 Dust impact risk

		Source Emissions Risk		
		Small	**Medium**	**Large**
Pathway Effectiveness	**Highly effective pathway**	Low Risk	Medium Risk	High Risk
	Moderately effective pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

Descriptors for Magnitude of Dust Effects

10.14 The magnitude of dust effects is determined using the sensitivity of the receptor. Table 10.A6 shows the magnitude of the dust effects.

Table 10.A6 Magnitude of dust effects

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

Appendix B – Air Emissions License (AP11/14)

Appendix C – Stack Emissions Monitoring Results