

7 AIR QUALITY

7.1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared to accompany the section 37L application for the extension to the existing quarry at Hempstown Commons, County Kildare to extend the life of the quarry for a further 12 years of operation. The Proposed Development is located within the administrative boundary of Kildare County Council (KCC).

This chapter of the EIAR has been prepared by WSP Ireland Consulting Ltd (WSP) and assesses the potential air quality impacts associated with the Proposed Development during the assessment period. It should be read together with Chapter 2 (Project Description), Chapter 4 (Ecology), Chapter 8 (Climate), and Chapter 12 (Traffic and Transport).

The assessment has been prepared by Justin Lingard (BSc, MRes, PhD) and Shivank Mishra (BE, MTech) and reviewed by Katie Armstrong (BSc, MSc). Justin is a Chartered Scientist (CSci), a Member of the Institution of Environmental Sciences (IES), and a Member of the Institute of Air Quality Management (IAQM) and has more than 16 years' experience of air quality assessments. Shivank is a Member of Institution of Environmental Sciences (IES) and a Member of the Institute of Air Quality Management (IAQM); he has over a years' experience. Katie is a member of the Air and Waste Management Association (A&WMA) and has over 18 years' experience preparing air quality assessments.

7.1.1 TECHNICAL SCOPE

The EIA Directive (Directive 2011/92/EU, as amended by Directive 2014/52/EU) requires that a description of the likely significant effects of the Proposed Development on the environment resulting from air pollutant emissions is provided.

This EIAR has been informed by a review of operational monitoring records covering the period from 29 December 2019 to the present.

ITEMS SCREENED INTO THE ASSESSMENT

7.1.1.1 Mineral Dust

For quarry related activities, the most likely emissions to air are dust and particulate matter (e.g., PM₁₀ and PM_{2.5}) which arise predominantly from the handling and transport of materials. These tend to be fugitively dispersed source emissions rather than specific point source emissions and this dictates the mitigation measures required. Consequently, a qualitative assessment of dust impacts associated with mineral dust from the quarrying activities (which includes the removal of topsoil and overburden) has been undertaken in line with Institute of Air Quality Management's (IAQM) 'Guidance on the Assessment of Mineral Dust Impacts for Planning'.

7.1.1.2 Plant and Non-Road Mobile Machinery Emissions

The IAQM's guidance on the 'Assessment of Dust from Demolition and Construction' guidance states that:

“Experience of assessing the exhaust emissions from on-site plant (NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed”.

Consequently, impacts associated with site plant and non-road mobile machinery (NRMM) emissions associated with the operational phase of the Proposed Development have been assessed qualitatively.

ITEMS SCREENED OUT OF THE ASSESSMENT

7.1.1.3 Road Vehicle Emissions

Chapter 12 Traffic and Transport summarises the operational phase traffic data for the Proposed Development during the assessment period. There are six staff employed on-site (four plant operators and two administrative staff at the weighbridge) which will account for six inbound and six outbound light-duty vehicle (LDV) trips per day as well as miscellaneous trips which account for four further LDV trips per day (two inbound and two outbound), i.e., an increase in LDV movements of 16 AADT (annual average daily traffic, vehicles per day). Heavy-duty vehicle (HDV, >3.5t) movements are expected to account for an increase in 40 AADT, (20 inbound and 20 outbound trips per day).

Consequently, the change in operational traffic flows due to the Proposed Development do not exceed the indicative scoping criteria given for determining the need for a detailed air quality assessment provided in the Environmental Protection UK (EPUK) / IAQM ‘Land-Use Planning and Development Control: Planning for Air Quality’ guidance. Therefore, the potential impacts from operational traffic emissions can be considered as having an insignificant effect on local air quality.

7.1.1.4 Vehicle Trackout

The IAQM’s guidance on the ‘Assessment of Dust from Demolition and Construction’ requires consideration of sensitive human receptors within 50m of the route(s) used by vehicles on the public highway, up to 250m from the Proposed Development entrance(s). For sensitive ecological receptors, which are defined in the guidance as including Ramsar sites, Special Protection Areas (SPA), Special Areas of Conservation (SAC) the same criteria are used.

While there are four residential properties to the north-west of the site entrance in the direction of the Kildare Sand and Gravel site, the closest situated approximately 70m away from the junction with the L6030, there are no sensitive receptors within 50m of the trackout route (which is taken to be the section of the L6030 south-east of the site entrance up to the junction with the N81) up to 250m from the Proposed Development’s entrance. The nearest ecological site is Red Bog SAC which is located 1.4km from the Proposed Development; thus, assessment of vehicle trackout on sensitive receptors has been scoped out and is not considered further.

7.1.1.5 Odour Emissions

Inert materials will be excavated from the Proposed Development during the assessment period, which do not give rise to odours, and no infilling of waste will take place. Therefore, consideration of operational odour emissions have been screened out and are not considered further.

7.1.1.6 Point Source Emissions

No substantial stationary combustion processes or point source emissions to air form part of the operations of the Proposed Development during the assessment period, therefore consideration of emissions to air have also been screened out of this assessment and are not considered further.

7.1.1.7 Carparking Area

The proposals include the construction of a new car park near the site entrance to replace the existing parking facilities. The design will involve the construction of a low berm around part of the site to create a safety barrier around the carparking area, the base will be the existing land condition, i.e., thin aggregate over bedrock. The construction will involve the movement of some of the existing stockpiles to other parts of the site to accommodate the new carpark.

The duration of the construction works is not expected to exceed one month and best practice mitigation measures to limit the generation of construction dust and PM₁₀, as outlined in the IAQM guidance, will be employed throughout to minimise the risk of any impacts at sensitive receptors, e.g., the use of a water bowser to suppress dust.

Taking this into consideration, together with the remote location of the Site and limited number of sensitive human receptors in close proximity (the closest residential property is located approximately 70m away from the site entrance), no significant residual effect is anticipated and further consideration of the impacts arising from this element of the proposals have been screened out and are not considered further.

7.1.1.8 Site Restoration

Two years of additional restoration work are planned at the end of the 12-year operational phase however the impacts associated with these works are beyond the scope of this assessment.

7.1.2 GEOGRAPHICAL AND TEMPORAL SCOPE

The land which is the subject of this EIAR is located within the EIA project boundary (as a minimum) and shown in Figure 7 1. This figure also includes the study areas for the items screened into the assessment (given above), these are described below.

Different study areas have been used for the baseline and operational phase assessments covering consideration of the impacts associated with mineral dust, plant and NRMM emissions on sensitive human receptors. They include consideration of transboundary impacts on receptors in County Wicklow which lies north-eastern of the EIA boundary (as shown in Figure 7 1). The study areas have been defined through reference to the appropriate guidance (given above), beyond these distances no significant effects are anticipated.

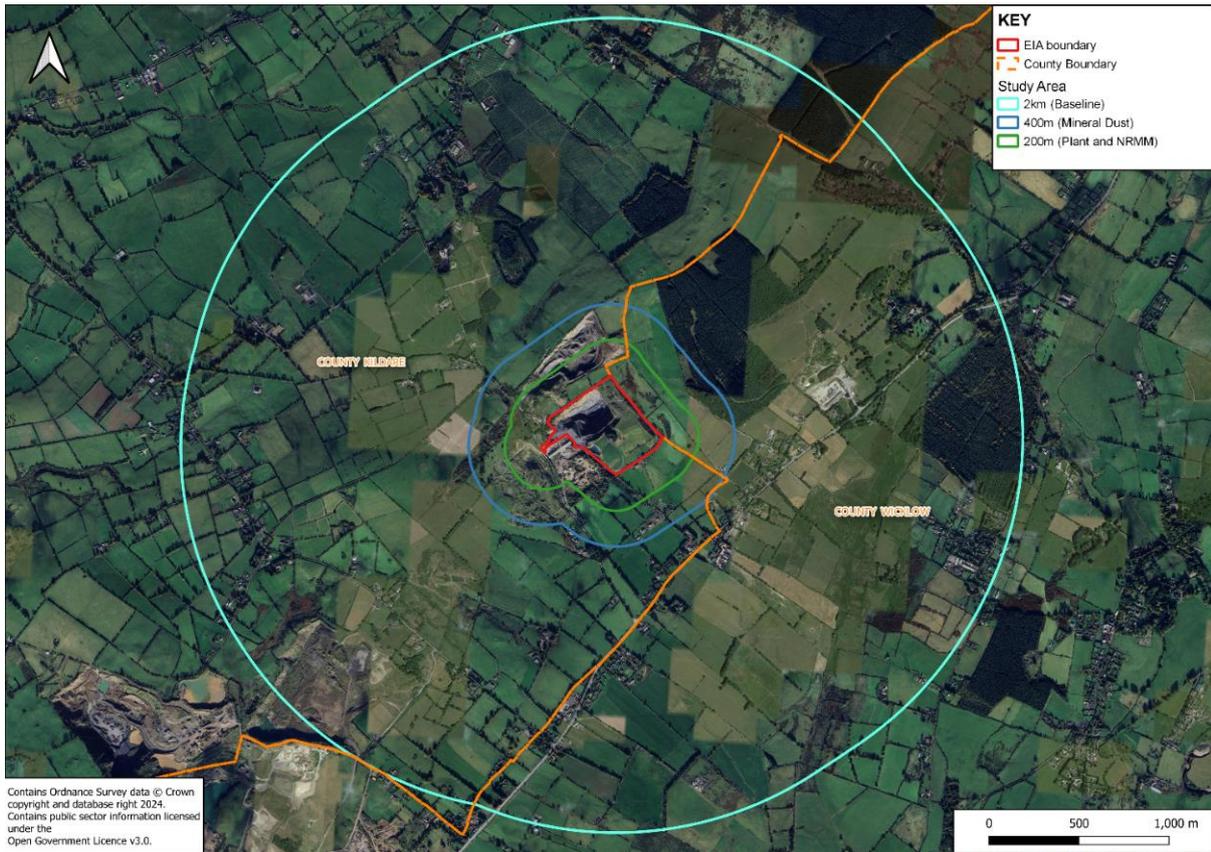


Figure 7-1 - Assessment Study Areas

GEOGRAPHICAL SCOPE

7.1.2.1 Baseline

The baseline study area for the assessment period extends to the neighbouring operations to the north and the southwest, and as such includes potentially cumulative/in-combination effects for the same period.

Where air quality data is unavailable, the study area has been extended as required to allow for the inclusion of additional data, e.g., monitoring data, indicative of conditions at the Proposed Development. Likewise, where data is not available for the assessment period, the best available data, i.e., most recent, has been used and this noted in the assessment.

7.1.2.2 Mineral Dust

The study area for the assessment of mineral dust from quarry emissions extends 400m from the EIA site boundary; this area includes both non-sensitive, i.e., commercial premises and businesses, and sensitive human receptors, i.e. residential properties.

7.1.2.3 Plant and Non-Road Mobile Machinery Emissions

The study area for the assessment of plant and NRMM emissions extends 200m from the EIA site boundary; this area includes sensitive human receptors (residential properties).

TEMPORAL SCOPE

The temporal scope of the assessment covers a further 12 years of operation and its duration is defined as 'medium-term' (lasting seven to 15 years).

The lands, which are the subject of this EIAR (i.e., lands within the Application Boundary) extend to approximately 10.03ha and are located within the EIA boundary for the EIAR (approximately 18.45 ha). The site includes the established extraction area of the quarry and a proposed northeastern extension. The existing quarry void extends to approximately 5.1ha and is located entirely within the EIA boundary and the Application Boundary. The proposed extraction is to be in the existing void area with an additional lateral extension of approximately 1.89ha to the northeast.

Full details of the works and development carried out within the Application Boundary over the assessment period are provided in Chapter 2 (Project Description) and, in summary, comprise:

- Continued extraction and processing of blast rock;
- Continued use of stockpiling in the stockpile areas;
- Continued export of aggregate offsite;
- Continued pumping of water collected from the quarry floor to the soakaway(s); and
- Phased stripping of topsoil and overburden over 25m sections from the proposed lateral extension area. This material will be stockpiled against the northwest quarry wall in engineered benches within the void.

7.1.3 PROJECT DESCRIPTION SUMMARY

A full description of the proposed development is provided in Chapter 2 (Project Description) of this EIAR. A high-level summary of the proposed development is provided below.

The proposed development for further extraction of rock is to be within the existing void area with lateral extension of the void proposed in a north-easterly direction. The estimated total quantity of aggregate resource to be extracted in the life-of-quarry is c. 1,757,500 tonnes. A proposed 12 year life-of-quarry requirement is based on an average production rate of ca. 2,929 tonnes per week for rock. Dry processing of mechanically broken and blast rock onsite will comprise crushing and screening to produce aggregate materials for market.

SQL proposed to relocate the existing office container, wheel wash and water recycling tank, weighbridge to fully within the Application Site to provide space for realignment of the private access lane on SQL lands and to develop dedicated carparking facilities for the quarry operation on SQL owned lands.

The proposed car parking facilities will provide parking for HGVs and private vehicles, including guest parking.

SQL propose to decommission the existing abstraction borehole located off the access road to facilitate the road realignment on their own lands. SQL propose to undertake periodic extraction of groundwater from an abstraction borehole located on Stresslite Precast Ltd to provide water for SQL's closed-loop system wheelwash recycling tank and the mobile bowser.

There will be no direct discharge to surface or groundwater from the quarry operations. Collected waters from the base of the quarry void will continue to be pumped to the primary soakaway (which is connected to an overflow soakaway). It is proposed that the collect waters will pass through a bypass separator prior to discharge to the primary soakaway. It is proposed to extend the existing sump on the quarry floor to provide additional temporary holding capacity for collected waters, if required.

Following end-of-quarry life, a 2 year restoration period is proposed. This is detailed in a Restoration and Habitats Management Plan provided in appendix 2B of Chapter 2 (Project Description) of this EIAR.

7.2 LEGISLATIVE AND POLICY CONTEXT

7.2.1 LEGISLATION

7.2.1.1 Nuisance Dust

The impact of dust is usually monitored by measuring rates of dust deposition. According to the Environment Protection Agency (EPA) guidance 'Environmental Management in the Extractive Industries', there are currently no Irish statutory standards or EPA guidelines relating specifically to dust deposition thresholds for inert mineral dust.

A number of methods are available to measure dust deposition but only the German TA Luft Air Quality Standards specify a method of measuring dust (nuisance) deposition – the Bergerhoff Method (German Standard VDI 2119).

On this basis, the EPA recommend a boundary dust deposition limit value of 350 mg/m²/day (when averaged over a 30-day period (one month), +/- two days).

7.2.1.2 Air Pollutants

European Air Quality Directives

The European Union (EU) Directive on Ambient Air Quality Assessment and Management came into force in September 1996 (96/62/EC) and defines the policy framework for 12 air pollutants known to have harmful effects on human health and the environment. Air quality limit values (ambient pollutant concentrations not to be exceeded after a given date) for the pollutants are set through a series of Daughter Directives. The first Daughter Directive (1999/30/EC) sets limit values for NO₂ and PM₁₀ (amongst other pollutants) in ambient air.

Following the Daughter Directives, EU Council Directive 2008/50/EC on ambient air quality and cleaner air for Europe (known as the 'CAFE' Directive) came into force in June 2008, consolidating the existing air quality legislation, making provision for Member States to postpone attainment deadlines and allowing exemption from the obligation to limit values for certain pollutants, subject to strict conditions and assessment by the European Commission. Directive 2008/50/EC was transposed into Irish legislation in 2011 through The Air Quality Standards Regulations 2011. The Directive merged the four daughter directives and EU Council decision into a single directive on air quality. The new Directive also introduced a new limit value for PM_{2.5} but does not change the existing air quality standards.

National Air Quality Legislation

The Air Pollution Act 1987 is the primary legislation relating to air quality in Ireland and provides the means for local authorities to take the measures that they deem necessary to control air pollution.

SI 180/2011 - Air Quality Standards Regulations (2011) transpose the Directive on ambient air quality (2008/50/EC) into Irish law. These regulations establish limit values and thresholds for various pollutants in ambient air, the relevant air quality standards used in this assessment are given in Table 7-1.

Table 7-1 - Relevant Air Quality Standards

Air Pollutant	Averaging Period	Standard ($\mu\text{g}/\text{m}^3$)
Nitrogen dioxide (NO_2)	Annual	40
	1-hour	200 (Not to be exceeded more than 18 times in a year)
Particulate Matter (PM_{10})	Annual	40
	24-hour	50 (not to be exceeded more than 35 times a year)
Particulate Matter ($\text{PM}_{2.5}$)	Annual	20

The EPA monitor the levels of pollutants against the standards set out in EU and Irish legislation and act as the 'competent authority' for annual reporting to the Minister for the Environment, Climate and Communications.

There are four air quality Zones in Ireland, defined for air quality management and assessment purposes. Highly populated areas are classified as Zone A, with sparsely populated areas as Zone D. The Proposed Development is located within a designated Zone D for air quality reflecting its rural setting.

7.2.1.3 Other Relevant Legislation

The relevant legislation considered in the assessment include:

- European Communities (Environmental Impact Assessment Regulations) 1989 (SI No. 349/1989);
- Section 177F of the Planning & Development Act 2000 (as amended);
- Directive 2014/52/EU of the European Parliament and of the Council (amending Directive 2011/92/EU);
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, SI 296/2018;
- Planning and Development Regulations 2001 (as amended); and
- Mines and Quarry Act 1965.

7.2.2 RELEVANT POLICIES AND PLANS

KCC have published a development plan covering the initial temporal period of the assessment (up to 2029). The plan policies of relevance to this assessment are given below.

7.2.2.1 Kildare County Development Plan 2023-2029

The Kildare County Development Plan 2023-2029 contains the council's current policies relating to planning and sustainable development across their administrative area. KCC has adopted policies and objectives within the development plan in relation to the protection of environs from adverse environmental impact from extractive industry.

The plan acknowledges the potential environmental effects of the aggregate industry and importance of protecting surrounding residential and natural amenities. It identifies that gravel resources are important to the general economy providing a valuable source of employment in some areas of the county. It acknowledges that there is an increasing demand for aggregates and that areas for extraction of aggregates and minerals are needed in the county. To address this the plan identifies that planning policies should be carefully considered to avoid adverse effects on aggregate resources and related extractive industries. It notes that it is necessary to ensure that aggregates can be sourced without significantly damaging the landscape, environment, groundwater and aquifer sources, road network, heritage and / or residential amenities of the area.

KCC policies relevant to the assessment of air quality in respect to the extraction industry include:

- **RD P8** – (It is the policy of KCC to) *Support and manage the appropriate future development of Kildare's natural aggregate resources in appropriate locations to ensure adequate supplies are available to meet the future needs of the county and the region in line with the principles of sustainable development and environmental management and to require operators to appropriately manage extraction sites when extraction has ceased.*
- **RD O42** – (It is the policy of KCC to) *Ensure that development for aggregate extraction, processing and associated concrete production does not significantly impact the following:*
 - *Special Areas of Conservation (SACs);*
 - *Special Protection Areas (SPAs);*
 - *Natural Heritage Areas (NHAs);*
 - *Other areas of importance for the conservation of flora and fauna;*
 - *Zones of Archaeological Potential;*
 - *The vicinity of a recorded monument;*
 - *Sensitive landscape areas as identified in Chapter 13 of this Plan;*
 - *Scenic views and prospects;*
 - *Protected Structures;*
 - *Established rights of way and walking routes; and*
 - *Potential World Heritage Sites in Kildare on the UNESCO Tentative List, Ireland.*

- **RD O44** – (It is the policy of KCC to) *Require applications for mineral or other extraction to include (but not limited to):*
 - *An Appropriate Assessment Screening where there is any potential for effects on a Natura 2000 site.*
 - *An Environmental Impact Assessment Report (EIAR).*
 - *An Ecological Impact Assessment may also be required for subthreshold developments to evaluate the existence of any protected species / habitats on site.*
- **RD O49** – (It is the policy of KCC to) *Have regard to the following guidance documents (as may be amended, replaced, or supplemented) in the assessment of planning applications for quarries, ancillary services, restoration and after-use:*
 - *Quarries and Ancillary Activities: Guidelines for Planning Authorities, DeHLG (2004). - Environmental Management Guidelines.*
 - *Environmental Management in the Extractive Industry (Non-Scheduled Minerals), EPA (2006). - Archaeological Code of Practice between the DeHLG an ICF (2009).*
 - *Geological Heritage Guidelines for the Extractive Industry (2008).*
 - *Wildlife, Habitats, and the Extractive Industry – Guidelines for the protection of biodiversity within the extractive industry, NPWS (2009).*

7.2.3 RELEVANT GUIDANCE

This assessment has been undertaken with reference to the following guidance:

- Environmental Protection Agency ‘Annual Air Quality in Ireland Report’ (2023);
- Health and Safety Authority Safe Quarry ‘Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations’ (2008);
- Department of the Environment, Heritage and Local Government ‘Quarries and Ancillary Activities - Guidelines for Planning Authorities’ (2004);
- IAQM ‘Guidance on the Assessment of Dust from Demolition and Construction’ (2024);
- EPA ‘Guidelines on the Information to be Contained in Environmental Impact Assessment Reports’ (2022);
- EPUK / IAQM ‘Land-Use Planning and Development Control: Planning for Air Quality’ (2017);
- IAQM ‘Guidance on the Assessment of Mineral Dust Impacts for Planning’ (2016);
- European Commission ‘Climate Change and Major Projects’ (2016);
- Department for Environment, Food and Rural Affairs (Defra, UK) ‘Process Guidance Note 3/16 (12) - Secretary of State’s Guidance for Mobile Crushing and Screening’ (2012); and
- EPA ‘Environmental Management in the Extractive Industries’ (2006).

7.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

7.3.1 ASSESSMENT METHODOLOGY

7.3.1.1 Mineral Dust

The following section details the IAQM methodology used for assessing the impacts of deposited dust and fine particulates from the extraction activities. It follows a standard source-pathway-receptor methodology.

The residual source emissions have been characterised based on the scale of the operations and the Proposed Development activities and are classified as either small, medium or large. Guidance on the appropriate scale of the residual source is provided in the 2016 IAQM guidance (in Appendix 4). This source characterisation includes consideration of the routine management and mitigation measures which have been undertaken at the Proposed Development and which will continue.

The pathway from the source to the receptor has been assessed considering the distance and direction of receptors to the source relative to the prevailing wind and local meteorology. Local meteorological data has also been used to assess the frequency of the winds in each direction. The guidance states that it is commonly accepted that the greatest impacts will occur within 100m of the source and that deposited dust does not generally travel beyond 400m therefore all (sensitive and non-sensitive) receptors within this distance of the boundary are considered.

The criteria for the categorisation of the frequency of potentially dusty winds (given in Table 7-2) and the receptor distance from source (given in Table 7-3) is used to define the pathway effectiveness (given in Table 7-4). The residual source emissions and the pathway effectiveness are then combined to predict the Dust Impact Risk as shown in Table 7-5.

Table 7-2 - Categorisation of Potentially Dusty Winds

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

Table 7-3 - Categorisation of Receptor Distance from Source

Category	Criteria
Distant	Receptor is between 200m and 400m from the dust source

Category	Criteria
Intermediate	Receptor is between 100m and 200m from the dust source
Close	Receptor is less than 100m from the dust source

Table 7-4 - 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

Table 7-5 - Estimation of Dust Impact Risk

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

The last step is to assess the likely magnitude of the dust effects associated with the Proposals (as given in Table 7-6). This is determined using both the dust impact risk and the receptor sensitivity. Receptor sensitivity is classified as either low, medium or high based on the receptor type.

Table 7-6 - Descriptors for Magnitude of Dust Effects

		Receptor Sensitivity		
		Low	Medium	High
	High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect

		Receptor Sensitivity		
		Low	Medium	High
Dust Impact Risk	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

7.3.1.2 Plant and Non-Road Mobile Machinery Emissions

The qualitative assessment of operational phase plant and NRMM on sensitive human receptors within 200m of the EIA site boundary has considered the number of plant/vehicles operating on-site, their typical operating hours and their locations when determining whether a significant effect is likely to occur.

7.3.2 SIGNIFICANCE CRITERIA

The determination of significance refers to the EPA Guidelines. It therefore considers the quality of effect (positive, negative or neutral), the duration of effect, the extent and context of the effect, the significance of effect, the probability of effect, its duration and frequency.

7.3.2.1 Mineral Dust

Following the application of suitable mitigation measures, a conclusion must be reached on the likely significance of the air quality effects collectively, with it either being classed as ‘significant’ or ‘not significant’. The assessment of impacts and their effects has been carried out based on the residual emissions from the Proposed Development taking account of the control measures that are currently incorporated. If the outcome of the assessment is that the air quality effect is ‘not significant’ then it is likely that these controls will be sufficient. If, on the other hand, the assessment predicts the impacts and their effects are likely to be ‘significant’ then it is likely that additional mitigation will be required, to a proportionate degree to sufficiently reduce the impacts.

7.3.2.2 Plant and Non-Road Mobile Machinery Emissions

The approach provided in the EPUK / IAQM guidance has been used within this assessment to describe the air quality effects of additional emissions from associated with operational emissions associated with plant and machinery.

This guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change in pollution concentration as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion is summarised in Table 7-7.

Table 7-7 - Impact Descriptors for Individual Receptors

Long term average concentration at receptors in assessment year	Percentage Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1%	2-5%	6-10%	>10%
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Notes
 AQAL = Air Quality Assessment Level, which for this assessment are detailed in Table 7-1.
 Where the % change in concentrations is <0.5%, the change is described as 'negligible' regardless of the concentration.
 When defining the concentration as a percentage of the AQAL, 'without Development' concentration should be used where there is a decrease in pollutant concentration and the 'with Development;' concentration where there is an increase.
 Where concentrations increase, the impact is described as adverse, and where it decreases as beneficial.

The EPUK / IAQM guidance notes that the criteria in Table 7.7 should be used to describe impacts at individual receptors and should be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The assessment of overall significance should be based on professional judgement, considering several factors, including:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

7.4 BASELINE AND SUBSEQUENT CONDITIONS (2019 TO PRESENT)

7.4.1 THE PROPOSED DEVELOPMENT AND SURROUNDS

The Proposed Development will be used for the extraction of greywacke rock from an extension to Shillelagh Quarry from the existing quarry void located in the townland of Hempstown Commons, County Kildare, approximately 4km northeast of Blessington, County Wicklow.

The Proposed Development is located in a rural area surrounded by farmland and the existing quarry. There are sporadic settlements made-up of small low-density housing developments, more concentrated residential housing can be found in the town of Blessington. There are other quarry operations located immediately to the southwest of the Proposed Development which are likely to be operational during the assessment period.

The proposed quarry works include the relocation of existing extraction and processing of rock using mobile crushing and associated plant from the neighbouring Shillelagh Quarry to the Proposed Development. There is no proposed change to material extraction and / or processing rates. During

the initial phase of the extension, 1 no. screen and 1 no. crusher will be located outside of the void along the northeast face together with a temporary stockpile. As the extension is quarried, this plant will be progressively moved onto the quarry floor. The extracted and screened greywacke rock will be transferred via the internal haul route which will run along the southeastern edge of the existing quarry void to HDVs before exiting the Proposed Development onto the L6030 / N81 for onward sale and distribution to the market.

There have been no odour or dust nuisance complaints associated with the site operations over the past five years, this has been confirmed by the site operator.

7.4.2 WIND ROSE

The climate at the Proposed Development is summarised in Chapter 8 Climate and the local wind field, i.e., the prevailing wind speed and wind direction, which influences the dispersion of dust and air pollutants is summarised below.

The Irish climate is subject to strong maritime influences, the effects decrease with increasing distance from the Atlantic coast. The climate at the Proposed Development is typical of the Irish climate, which is temperate maritime.

The closest Met Éireann station is located at Casement Aerodrome, Baldonnell, County Dublin, approximately 10km north-northeast of the Proposed Development. A wind rose based on daily averages of wind speed and wind direction observations for the five-year period covering 1 January 2020 to 31 December 2024 measured at Casement Aerodrome is presented in Figure 7.2. This shows that the prevailing winds are from the south-west with a small easterly component.

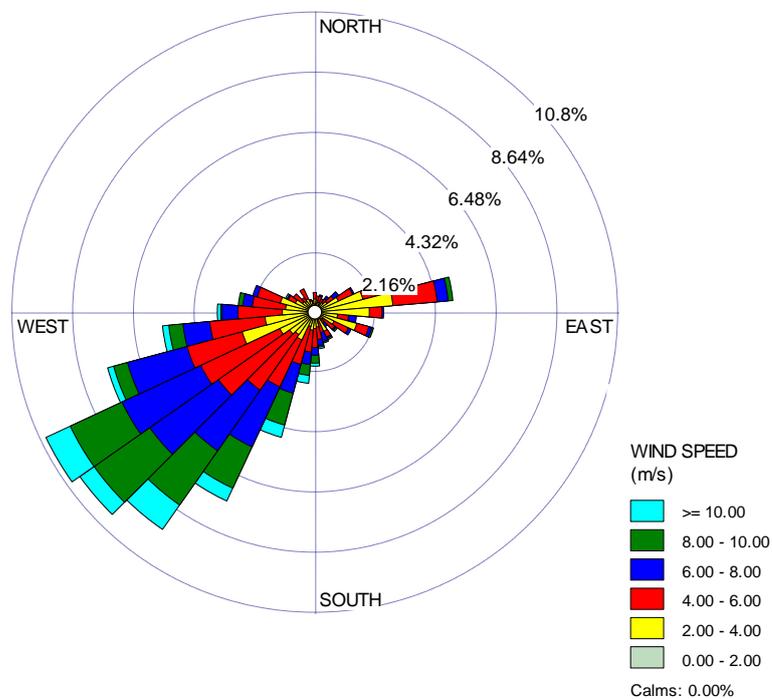


Figure 7-2 - Wind Rose for Casement Aerodrome (2020-2024)

7.4.3 BACKGROUND AIR QUALITY MONITORING DATA

7.4.3.1 Primary Data - Proposed Development Monitoring Data

Boundary dust monitoring has generally been undertaken at the Proposed Development on a monthly basis by independent laboratories (details of each laboratory are given in the notes in Table 7-9 and Table 7-10) from 2020 to December 2024 using the Bergerhoff method at a total of five locations which are described in Table 7-8 and shown in Figure 7-3 and Figure 7-4.

Table 7-8 - Dust Monitoring Locations

Monitoring Location	Description	Site coordinates (based on OS grid reference, m)	
		X	Y
D1	Located in the northeast corner of the Proposed Development, approximately 75m from the entrance.	98643.7	377320.8
D2	Located near the northeast boundary of the Proposed Development, primarily downwind	99044.5	377474.8
D3	Located near the southeast boundary of the Proposed Development.	99072.2	377137.2
D4	Located at a residential receptor on section of L6030 used as the site access and egress route.	98776.4	376850.5
D5	Located at a residential receptor on a section of L6030 not used as the site access and egress route but used by neighbouring quarry for access and egress.	98601.2	377215.3

Note:
Monitoring at location D4 ceased on 27 August 2022 after which time monitoring location D5 was identified as location D4 in all subsequent monitoring reports issued.



Figure 7-3 - Dust Monitoring Locations (29 December 2019 to 27 August 2022)



Figure 7-4 - Dust Monitoring Locations (27 August 2022 to present)



As noted in Section 7.2.1.1, the EPA recommend a boundary dust deposition limit value of 350 mg/m²/day measured using the Bergerhoff method, the monitoring results are summarised in Table 7-9.

Table 7-9 - Recorded Boundary Deposited Dust (mg/m²/day) (29 December 2019 to 27 August 2022)

Monitoring Period		Recorded Boundary Deposited Dust (mg/m ² /day)				
Start Date	End Date	D1	D2	D3	D4	D5
Nov 2019	Mar 2020	Change of contracted monitoring supplier				
04-03-2020	03-04-2020	5514	1108	531	ND	ND
Mar 2020	May 2020	ND				
02-06-2020	03-07-2020	255.6	81.7	145.4	ND	ND
Jul 2020	Sept 2020	ND				
14-09-2020	12-10-2020	170.4	122.5	361.4	ND	ND
16-10-2020	13-11-2020	159	166.3	198.6	33.7	23.7
13-11-2020	16-12-2020	62.9	223.3	233.1	66.7	56.9
16-12-2020	18-01-2021	36.7	65.8	67.6	113.9	79.1
18-01-2021	18-02-2021	64.2	101.5	76.5	56.5	75.6
18-02-2021	18-03-2021	56.4	118.4	9.1	181	300.9
18-03-2021	15-04-2021	119	386.6	161.8	333.2	381.5
14-04-2021	14-06-2021	68.3	75.2	144.6	57.8	ND
14-06-2021	21-07-2021	ND	227.7	74.4	90	878.9
July 2021		ND	218.8	101.6	486.5	98.3
21-08-2021	17-09-2021	ND	261.9	57.5	397.8	150.6
17-09-2021	21-10-2021	155.6	87.2	365.3	336.7	90.1
20-10-2021	26-11-2021	97.2	178.4	37.2	180.7	94.6
21-12-2021	20-01-2022	36.2	129.9	35.8	156.2	829.5
21-01-2022	25-02-2022	208.5	517.8	111.7	270.6	250

Monitoring Period		Recorded Boundary Deposited Dust (mg/m ² /day)				
Start Date	End Date	D1	D2	D3	D4	D5
25-02-2022	24-03-2022	53.3	231.1	28.8	84.2	70.6
24-03-2022	27-08-2022	ND	168.8	153.1	236.8	245.9
Average		470.5	235.3	152.3	192.6	241.7

Notes:

ND No data available.

Due to movement restrictions in response to Covid-19, no samples were collected between March and May 2020 and July and September 2020.

Monitoring data provided by the Water Lab from June 2020 to April 2023 and BHP laboratories for March 2020 and from May 2023 to present.

The number precision report is based on the data reported by analyst in the accompanying reports.

Bold text denotes boundary dust deposition levels above 350mg/m²/day.

The exact deployment period of the jars for monitoring in July 2021 is not known.

Monitoring at location D4 stopped on 27 August 2022 after which time monitoring location D5 was identified as location D4 in all monitoring reports issued.

Table 7-10 - Recorded Boundary Deposited Dust (mg/m²/day) (27 August 2022 to present)

Monitoring Period		Recorded Boundary Deposited Dust (mg/m ² /day)			
Start Date	End Date	D1	D2	D3	D4
27-08-2022	30-09-2022	ND	<1.2	141.6	1259.6
30-09-2022	01-11-2022	329.9	131	45	1006.1
01-11-2022	01-12-2022	105.4	144	15.5	1306.6
04-01-2023	08-02-2023	244	156.1	130	458.9
08-02-2023	10-03-2023	1002.2	298.8	135.5	361.8
10-03-2023	07-04-2023	189.3	99.6	1184.7	1270.7
07-04-2023	08-05-2023	259.5	295.1	84.7	1143.8
08-05-2023	07-06-2023	228	217	38	1527
07-06-2023	28-08-2023	ND*	214	241	197
28-08-2023	28-09-2023	ND**	85	34	91

Monitoring Period		Recorded Boundary Deposited Dust (mg/m ² /day)			
Start Date	End Date	D1	D2	D3	D4
28-09-2023	27-10-2023	93	27	50	94
27-10-2023	20-11-2023	77	133	215	87
20-11-2023	19-12-2023	63	101	91	90
19-12-2023	23-02-2024	ND*	48	46	68
23-02-2024	28-03-2024	ND***	270	10	47
28-03-2024	30-04-2024	794	47	21	94
30-04-2024	22-05-2024	106	81	20	136
22-05-2024	27-06-2024	ND*	226	654	15
27-06-2024	25-07-2024	142	87	100	270
25-07-2024	27-08-2024	150	123	307	110
27-08-2024	24-09-2024	231	78	61	134
24-09-2024	22-10-2024	157	181	86	262
22-10-2024	28-11-2024	1584	76	110	112
28-11-2024	18-12-2024	177	111	117	80
Average		329.6	134.6	164.1	425.9

Notes:

ND No data available.

ND* Sample jar missing.

ND** Sample site inaccessible.

ND*** Sample jar smashed.

Monitoring data provided by the Water Lab from June 2020 to April 2023 and BHP laboratories for March 2020 and from May 2023 to present.

The number precision report is based on the data reported by analyst in the accompanying reports.

Bold text denotes boundary dust deposition levels above 350mg/m²/day.

Monitoring at location D4 stopped on 27 August 2022 after which time monitoring location D5 was identified as location D4 in all monitoring reports issued

Based on the data presented in Table 7-9 and Table 7-10, there were 25 instances (at different monitoring locations) when the monitored dust concentration was more than 350mg/m²/day,

therefore approximately 85% of the total samples were below the limit. Of the 25 instances when concentrations exceeded the threshold, 11 occurred at monitoring location D5/D4 (eight of which occurred between August 2022 and May 2023 after D5 was reported as D4) located close to the site entrance, five at location D3, four at location D1, three at location D2 and two at D4 (up to August 2022).

There is variability in the deposition rates recorded across the monitoring months and locations. As such, the quarry's contribution of recorded deposited dust cannot be clearly distinguished within the monitoring data. Location D2 is primarily downwind of the Proposed Development and only three exceedances of the threshold value were recorded at this location (all prior to August 2022) with an average dust deposition rate of 235mg/m²/day (prior to August 2022, as shown in Table 7-9) reducing to 134mg/m²/day (after August 2022, as shown in Table 7-10). This suggests that deposited dust from the operation of the quarry has been deposited within the Proposed Development or very close to it, rather than being dispersed far off-site.

Location D4/D5 had the highest frequency of exceedances of the threshold and is located close to the neighbouring precast concrete manufacturing plant and the site access point / egress road. The eight exceedances that occurred after August 2022 are believed to be due to release of restrictions imposed by the Government of Ireland on construction sector activity in 2020/2021 in response to the Covid-19 pandemic, this included the temporary closure of construction sites. Following the removal of these constraints in the latter half of 2022, the sector rebounded strongly and there was a high demand for products. The consistent monthly exceedances measured after August 2022 are believed to be due to a sustained period of high output and exceedances are also seen at monitoring location D1 (between March and February 2023) and D3 (between March and April 2023). The number of loads leaving the Proposed Development between July 2022 and July 2023 ranges from 450 to 525 a month (excluding December 2022 when the number dips to 291, consistent with Christmas closure across the wider construction sector). After July 2023 the exceedances dissipate, levels return to normal and the number of loads leaving the site falls throughout the latter part of 2023 by about 50 loads per month. It is likely that the exceedances seen at other times are linked to material handling and vehicle movements along unpaved access roads close to the site entrance (although the section closest to the site entrance is paved).

7.4.3.2 Secondary Data - EPA Monitoring

A review of publicly available information published by the Irish EPA indicates that background monitoring was undertaken at three locations in Kildare, Celbridge, Naas and Newbridge. None of these are currently active and none are located within the 2km baseline study area.

The most recent monitoring was undertaken at Celbridge in County Kildare approximately 17km north from the Proposed Development, although monitoring ceased in 2011. The last reported data from the EPA ambient air monitoring station at Celbridge was undertaken between the 12 July 2010 and 10 April 2011 and is summarised in Table 7-11, no PM_{2.5} monitoring was undertaken at this location.

Table 7-11 - Air Quality Monitoring Data for Celbridge (2010-2011)

Pollutant	Averaging Period	Mass Concentration ($\mu\text{g}/\text{m}^3$)
NO ₂	Average	13.5
	99.7%ile of hourly values	79.3
PM ₁₀	Average	19.5
	90.4%ile daily average*	37.3

Note:

*The 90.4%ile of PM₁₀ daily mean concentrations is the 36th highest value in a series of PM₁₀ daily mean concentrations; it is related to the PM₁₀ daily limit value, which allows for 35 exceedances of the 50 $\mu\text{g}/\text{m}^3$ threshold in a year.

In the absence of local background data, the most recent annual mean NO₂, PM₁₀ and PM_{2.5} monitoring data from other stations within the EPA National Ambient Air Quality Monitoring Network located in Zone D areas across Ireland are detailed in Table 7-12. There are also monitoring stations located in Naas and Newbridge, but these have been omitted as they are in Zone B locations.

Table 7-12 - Annual Mean Monitoring Data for Zone D Stations (2023)

Monitoring Location	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)		
	NO ₂	PM ₁₀	PM _{2.5}
Tipperary Town	ND	10.8	6.7
Carrick-on-Shannon / Askeaton	10.0	8.4	5.4
Enniscorthy	ND	13.3	9
Birr	11.3	13.1	8.3
Macroom	ND	11.3	7.3
Castlebar	6.6	9.9	ND
Cobh Carrignafoy	ND	11.8	6.8
Claremorris	ND	8.1	5.2
Kilkitt	1.7	7.1	ND
Cavan	ND	10	6.4
Roscommon Town	ND	9.7	6.4
Edenderry	8.6	16.3	12.4

Monitoring Location	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)		
	NO ₂	PM ₁₀	PM _{2.5}
Mallow	ND	10.5	6.1
Longford	ND	13.1	9.2
Cobh Cork Harbour	ND	11.4	ND
Killarney, County. Kerry	ND	8.9	5.4
Malin Head	ND	12.8	6.8
Cork Glanmire Road	ND	ND	7.6
Shannon Estuary / Askeaton, County Limerick	ND	ND	4.8
Emo Court Co. Laois	2.3	ND	ND
Briarhill	16.1	ND	ND

Note:
ND denotes no data.

All monitored concentrations in 2023 are below the relevant standards for NO₂, PM₁₀ and PM_{2.5} given in Table 7-1. Taking a conservative approach, and assuming no reduction in emissions of these pollutants in the future, levels of all pollutants would remain below the relevant standards.

7.5 SELECTION OF SENSITIVE RECEPTORS

7.5.1.1 Sensitive Human Receptors

Sensitive locations are places where the public or sensitive ecological habitats may be exposed to pollutants resulting from activities associated with the Proposed Development. These will include locations sensitive to increases in dust deposition and PM₁₀ exposure resulting from mineral dust, and gaseous pollutants from operational emissions due to plant and NRMM. An assessment is undertaken where there are sensitive receptors within the study areas defined in Section 7.1.2.

In terms of locations that are sensitive to dust and air pollutants, these will include places, such as residential properties, where members of the public are likely to be regularly present over the period of time prescribed in Table 7-1. For instance, on a footpath where exposure will be transient (for the duration of passage along that path) comparison with a short-term standard, i.e., 1-hour mean, may be relevant. At a school or adjacent to a private dwelling, where exposure may be for longer periods, comparison with a long-term standard (such as the 24-hour or annual mean) may be more appropriate.

7.5.1.2 Sensitive Ecological Receptors

The IAQM guidance defines the types of sensitive ecological receptors to be considered in the assessment.

Table 7-13 - Ecological Receptor Sensitivity and Types

Receptor Sensitivity	Types of Ecological Receptors
High	Locations with an international designation, e.g., a Ramsar site, where the designated features may be affected by dust soiling. Locations where there is a community of a dust sensitive species such as vascular plants. Indicative examples include SAC designated for acid heathlands adjacent to a source of alkaline dusts.
Medium	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Nationally designated site and the designated features may be affected by dust deposition, indicative examples include SSSIs or local wildlife sites with very specific sensitivities.
Low	Locations with a local designation where the features may be affected by dust deposition. An indicative example is a local Nature Reserve with dust sensitive features.

As mentioned previously, the nearest ecological site is Red Bog SAC which is located 1.4km from the Proposed Development, therefore consideration of impacts on sensitive ecological receptors due to mineral dust has been screened out based on distance, i.e., the risk of an impact is likely to be negligible and any resulting effects are likely to be not significant, and not considered further in this assessment.

7.6 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

Chapter 2 Project Description provides detailed information on the operational activities associated with the Proposed Development including the:

- Extraction rates;
- Plant used (type and number);
- Inherent mitigation measures;
- Operational hours; and
- Stockpile locations and haul routes.

7.7 POTENTIAL EFFECTS

7.7.1 SOURCES

7.7.1.1 Mineral Dust

The main potential impact on ambient air quality associated with extraction activities and aggregate processing is that associated with deposition of dust generated by the rock extraction and material transfer operations. Potential dust emissions associated with quarry workings include:

- Mechanical handling operations, including crushing and grading processes where in general the more powerful the machinery and the greater the volumes of material handled the greater the potential for dust emission;

- Haulage, where the weight of vehicles, their speed of passage and number of wheels in contact with the ground, and the nature and condition of road surfaces or haul routes affect the amount of dust emitted;
- Loading and movement of overburden to dump areas;
- Blasting and rock breaking;
- Wind erosion from paved areas, material stockpiles, unsurfaced internal haul roads and quarry floors; and
- Import of soils for quarry restoration including transport and void filling (although this assessment does not consider the impacts associated with the restoration of the Proposed Development).

The activities / sources within the Proposed Development have been assessed using the methodology outlined in Section 7.3 to identify the potential dust emission magnitude (prior to the implementation of mitigation), these are summarised below:

- Site preparation has been classified as a large magnitude source as more than ten items of heavy plant are expected to be operational at any one time due although the site area is small (as rock will be extracted within an area of approximately 1.89ha);
- Mineral extraction has been classified as a medium magnitude source due to the average annual extraction rate of up to approximately 146,500 tonnes of greywacke (averaged over 12-years) within the working area with periodic drilling and blasting undertaken to extract rock;
- Materials handling has been classified as a large magnitude source due to there between 5 and 10 loading plant (1 no. 26 tonne articulated haulers, 2 no. loading shovels and 2 no. articulated 40 tonne dumpers) which will operate during the operational phase within 50m of the EIA site boundary. The majority of material handling activities will take place within the quarry void although during the initial period, topsoil and overburden removal, plant and stockpiling will be undertaken outside of the void;
- On-site transportation has been classified as a medium magnitude source as there are expected to be less than 100 (up to 44 are anticipated per day) HDV movements per day and haul roads will be used for on-site transportation of materials;
- Mineral processing has been classified as a large magnitude source as mobile crushing and screening of rock will take place on-site;
- Stockpiles (of greywacke) and exposed surfaces have been classified as a large magnitude source as the stockpiles will be located within 50m of EIA site boundary; and
- Off-site transportation has been classified as a medium magnitude source as water from a water tank will be used to suppress dust; and vehicles leaving the site will pass through a wheel wash.

7.7.1.2 Plant and Machinery Emissions

Emissions of oxides of nitrogen (NO_x) and particulate matter from site plant and NRMM have the potential to increase NO₂, PM₁₀ and PM_{2.5} concentrations at locations within 200m of the EIA site boundary. As shown in Figure 7-5 there are four residential properties (where the air quality objectives apply) within 200m of the EIA site boundary and one receptor (a property owned by SQL

and occupied by site employees) within the boundary that could be affected by plant and NRMM emissions.

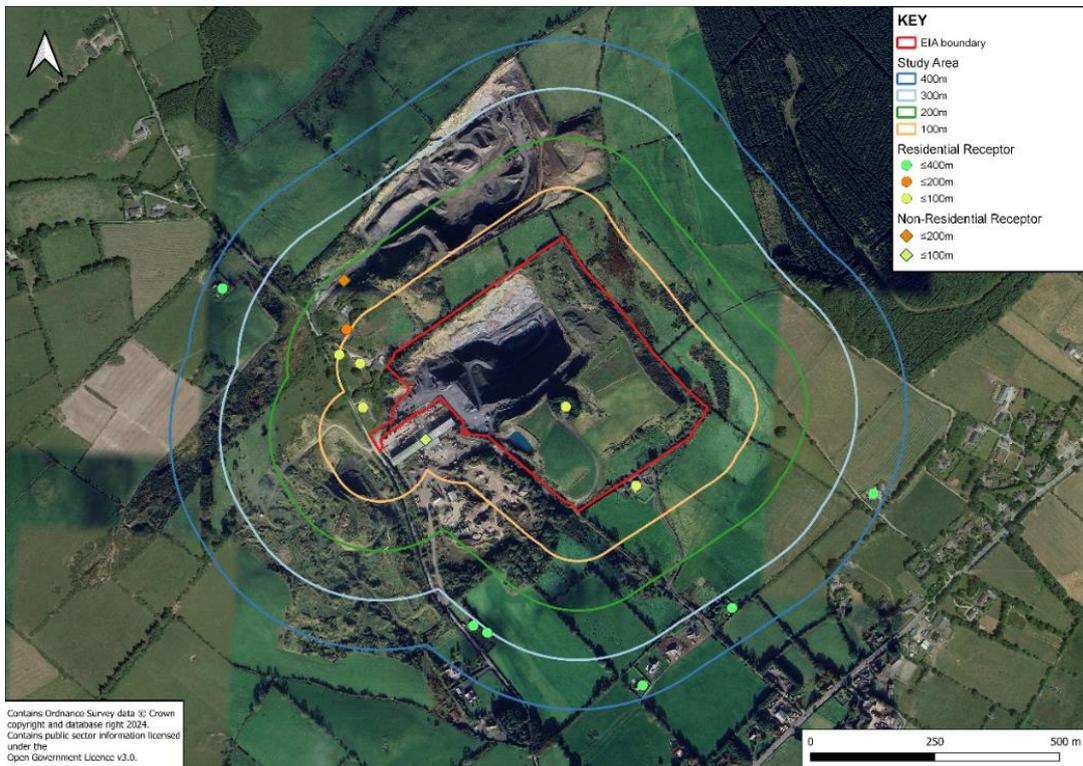


Figure 7-5 - Location of Receptors within the Assessment Study Areas

As noted in Chapter 2 Project Description, there will be up to 12 items of plant and NRMM operating on site. Plant is used within the quarry’s operating hours so any emissions tend to be short-term and temporary (i.e., no longer than the working day: 0800 hours and 1800 hours, Monday to Friday and between 0800 hours and 1400 hours on Saturdays, although loading and transporting of processed material may start at 0700 hours on all days) in nature.

During the initial removal of topsoil and overburden from the extension extracted material will be temporarily stockpiled in the northeast corner, and the mobile screen and crusher will also be situated in this area. As the volume of extracted material increases, stockpiled material and plant will be moved into the void, i.e., below ground level. Figure 7-6 shows the stockpile areas and rock haul routes have been minimised to limit the distance travelled between the site entrance and quarry void.

All plant and NRMM will be routinely maintained to allow operation at optimal conditions.



Figure 7-6 - Proposed site layout

7.7.2 SITE PARAMETERS

The risks of potential dust emissions associated with the Proposed Development being transported off-site are largely determined by the local atmospheric conditions and the distance from the source to the receptor. The conditions considered in the assessment include:

- Wind speed, to determine the likely occurrence of particles travelling beyond the Proposed Development boundary; and
- Wind direction, to identify the areas over which particles are likely to travel.

As detailed in Section 7.4.2, the closest Met Éireann station to the Proposed Development is located at Casement Aerodrome approximately 10km north-northeast of the Proposed Development. Wind speed and wind direction are measured at the station and a wind-rose is presented in Figure 7-2 based on daily data from 1 January 2020 to 31 December 2024. Analysis of the data shows that the prevailing wind direction is from the southwest, with 63% of the winds being $\leq 6.0\text{m/s}$ and a further 31% of winds between 6.0-10.0m/s.

7.7.2.1 Mineral Dust Assessment

The receptors within 400m of the Proposed Development (as shown in Figure 7-5) are given in Table 7-14. Residential receptors have been categorised as high sensitivity receptors and the non-residential (industrial) receptors have been categorised as medium sensitivity receptors.

Table 7-14 - Receptors within the Mineral Dust Study Area

Receptor Type and Distance Band	Number of Receptors in Group	Category of Receptor distance	Number of Receptors in Prevailing Wind Direction (NE of boundary or haul route)	Frequency of dusty winds	Pathway Effectiveness
Residential Properties					
≤100m	5	Close	0	Infrequent	Ineffective
≤200m	1	Intermediate	0	Infrequent	Ineffective
≤300m	0	Distant	0	Infrequent	Ineffective
≤400m	6	Distant	0	Infrequent	Ineffective
Non-Residential Properties/Locations					
≤100m	1	Close	0	Infrequent	Ineffective
≤200m	1	Intermediate	0	Infrequent	Ineffective
≤300m	0	Distant	0	Infrequent	Ineffective
≤400m	0	Distant	0	Infrequent	Ineffective

The category of receptor distance is defined based on the criteria in Table 7-5 of the methodology and the frequency of dusty winds is determined based on the criteria in Table 7-4 of the methodology. The receptor distance category and the frequency of dusty winds are then combined using Table 7-6 of the methodology to define the pathway effectiveness.

Assessment of the disamenity dust associated with the operation of the Proposed Development during the assessment period is summarised for each receptor in Table 7-15.

Table 7-15 - Assessment of Dust Disamenity Effects at Receptors

Receptor Type and Distance Band from Boundary	Maximum Residual Source Emissions	Pathway Effectiveness	Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effects
Residential Properties					
≤100m	Large	Ineffective	Low Risk	High	Slight adverse

Receptor Type and Distance Band from Boundary	Maximum Residual Source Emissions	Pathway Effectiveness	Dust Impact Risk	Receptor Sensitivity	Magnitude of Dust Effects
≤200m	Large	Ineffective	Low Risk	High	Slight adverse
≤300m	Large	Ineffective	Low Risk	High	Slight adverse
≤400m	Large	Ineffective	Low Risk	High	Slight adverse
Non-Residential Properties/Locations					
≤100m	Large	Ineffective	Low Risk	Medium	Negligible
<200m	Large	Ineffective	Low Risk	Medium	Negligible
<300m	Large	Ineffective	Low Risk	Medium	Negligible
<400m	Large	Ineffective	Low Risk	Medium	Negligible

Following the IAQM guidance, the nature of the Proposed Development and the existing mitigation measures (outlined in section 7.8 below) the magnitude of any deposited dust effects will range from slight adverse to negligible.

7.7.2.2 Plant and Machinery Emissions

Based on the current local air quality in the baseline study area (given in section 7.4.3.2), the limited number and proximity of sensitive human receptors to the EIA site boundary, the predominant location of plant and NRMM emissions, i.e., within the quarry void, the number and hours of operation, the impact plant and NRMM emissions on local air quality is considered to be negligible and not significant.

7.8 REMEDIAL MEASURES

Details of the mitigation measures used to reduce the impact of potential dust emissions from the Proposed Development on the surrounding area and the sensitive receptors identified for the duration of the assessment period are summarised below (further mitigation measures are also listed in Chapter 2 Project Description) and are consistent with the good practice mitigation measures given in the IAQM guidance:

- Rock extraction will be conducted deep within the quarry, with blasting activities primarily contained within the quarry walls to minimise external impact;
- Dust monitoring will be undertaken at consistent monitoring locations on a routine basis;
- The timing of operations will be optimised in relation to meteorological conditions;
- A mobile water tank will be used for dust suppression on haul roads, stockpile areas and on the quarry floor, when required;
- All plant will be regularly maintained and operated within the void once topsoil and overburden has been removed;

- On site speed restrictions (<10km/h) will be maintained to limit the generation of fugitive dust emissions; and
- All HGVs exiting the Proposed Development will exit through the existing wheel-wash to minimise trackout.

The determination of significance refers to the EPA Guidelines; Table 7-16 assesses the potential impacts associated with the operation of the Proposed Development on dust and local air quality that have been considered for the assessment period with and without the appropriate mitigation measures detailed above in place. The duration of these effects will occur in the medium term during the quarry’s phased operations (i.e., during stripping and extraction).

Table 7-16 - Assessment of Impacts to Local Air Quality and Mitigation Measures Employed

Impact	With / Without Mitigation	Type of Effect	Quality of Effects	Significance of Effects	Duration of Effects
Mineral dust and PM ₁₀ associated with the extraction and handling of quarried material	Without	Direct	Negative	Slight	M-T
	With	Direct	Negative	Imperceptible	M-T
Emissions of NO _x , PM ₁₀ and PM _{2.5} from plant and NRMM on sensitive human receptors	Without	Direct	Negative	Slight	M-T
	With	Direct	Negative	Imperceptible	M-T

Notes:

- Type of effect - direct and indirect.
- Quality of effects - positive; neutral and negative.
- Significance of effects - imperceptible; not significant; slight effects; moderate effects; significant effects; very significant; and profound effects.
- Duration of effects - momentary effects (seconds to minutes); brief effects (less than a day); temporary effects (less than a year); short-term effects (1 to 7 years); medium-term effects (7 to 15 years); long-term effects (15 to 60 years); and permanent effects (lasting over 60 years).

Without mitigation measures it is considered that dust impacts from extraction activities may not affect the character of an environment but would result in noticeable changes. Through the implementation of the existing site’s environmental management programme, it has been demonstrated that the dust from various activities has an effect which causes noticeable changes in the character of the environment without affecting its sensitivity.

Taking into consideration the mitigation measures which will be employed at the Proposed Development throughout the assessment period, as detailed above, it is not considered necessary to implement any additional remedial measures during the assessment period.

7.9 RESIDUAL EFFECTS

Following the implementation of the mitigation measures outlined above, the residual effect of mineral dust and PM₁₀ is expected to be imperceptible (i.e., negligible) and unlikely to lead to a significant effect.

Likewise, the impact of emissions of NO_x, PM₁₀ and PM_{2.5} from plant and NRMM on sensitive human receptors is expected to be imperceptible (negligible) and unlikely to lead to a significant effect.

7.10 CUMULATIVE EFFECTS

The cumulative effects associated with other permitted / under construction third-party developments have been considered in Chapter 15 of this EIAR. Cumulative effects are considered to be **not significant**.

7.11 MONITORING

Based on the findings of the assessment, i.e., that the Proposed Development is unlikely to result in a significant effect, no additional monitoring or enhancement measures are required beyond those already employed. It is anticipated that the current boundary dust deposition monitoring will continue in its current form.

7.12 DIFFICULTIES ENCOUNTERED

Where suitable information on operational phase processes was not available, professional judgement has been used in the completion of the assessment.

Problems were also encountered with the monitoring data, although they are not considered to have affected the outcome of the assessment, these include:

- Where sampling jars at dust monitoring locations were found to be missing or broken upon collection, data for these months was omitted from the results presented in section 7.4.3.1. Because of this finding, the Applicant now employs plastic jars to overcome this issue.
- Due to movement restrictions introduced in response to the Covid-19 pandemic, the sample jars deployed in March 2020 could not be collected after 28 days, and instead were collected in May 2020. As a result, the dust deposition results for this time may not be representative due to the extended averaging period.

7.13 SUMMARY AND CONCLUSIONS

This EIAR chapter has assessed the potential impacts of the Proposed Development which have been assessed in the context of relevant national and local air quality legislation, policy and guidance.

The possible sources of emissions to air have been identified as mineral dust (including PM₁₀) associated with the extraction and handling of quarried material, and emissions of NO_x, PM₁₀ and PM_{2.5} from plant and NRMM.

The assessment has shown that operational phase mineral dust emissions from the Proposed Development, under normal operational conditions, are likely to result in a slight adverse impact on sensitive human receptors within 400m prior to the implementation of appropriate mitigation measures. Following the implementation of the mitigation measures (outlined above) the impact is likely to be imperceptible (negligible) and are considered to have no significant effect.

Emissions from plant and NRMM used on site have also assessed. Prior to the implementation of appropriate mitigation measures the impact on sensitive human receptors within 200m is likely to be slight adverse although this reduces to an imperceptible (negligible) impact following the application of appropriate mitigation and are considered to have no significant effect.

7.14 REFERENCES

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