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INTRODUCTION

Background

8.1 This Chapter of the Environmental Impact Assessment Report (EIAR) presents an assessment of the potential effects on air quality (principally of dust emissions) arising from the proposed increase in the permitted soil and stone intake capacity and extended operational life of the existing soil recovery facility operated by Kilsaran Concrete Unlimited Company ('Kilsaran') at Halverstown, Kilcullen, Co. Kildare.

8.2 The proposed development provides for:

(i) an increase in the permitted total intake of soil and stone and broken rock to the existing licensed recovery facility, from 1.2 million tonnes to 2.06 million tonnes. The additional intake to the facility will comprise a mix of soil and stone managed as waste (as heretofore) and as (non-waste) by-product;

(ii) an extension to the permitted life of the existing facility of 3 years (to December 2029) in order to accommodate the additional soil and stone intake;

(iii) continued shared use of existing, co-located site facilities, structures and infrastructure (including the site office, staff welfare facilities, weighbridge (with dedicated office), wheelwash, hardstand areas, fuel storage tanks and site access road);

(iv) continued soil and stone intake at a rate of up to 300,000 tonnes per annum, of which no more than 95,000 tonnes (per annum) will be managed as waste;

(v) continued separation of any construction and demolition waste (principally concrete, metal, timber, PVC pipework and plastic) inadvertently imported to the facility, prior to removal off-site to authorised waste disposal or recovery facilities;

(vi) continued use of a section of the existing concrete block curing shed as a waste inspection and quarantine facility;

(vii) continued environmental monitoring of noise, dust and groundwater for the duration of the site recovery and restoration activities and for a short period thereafter (and in accordance with EPA waste licence requirements);

(viii) continued temporary stockpiling of topsoil pending its re-use as cover material for final restoration of the site; and

(ix) ultimate restoration of the modified final landform (entailing harrowing, topsoiling and seeding) to establish a native woodland habitat on the northern side of the access road and grassland habitat on the southern side.

8.3 Further detail in respect of the proposed development and the application site are provided in Chapter 1 and Chapter 2 of this EIAR.

8.4 Ongoing (and continued) backfilling of the lands at Halverstown will progress using only excess soil and stone sourced from pre-approved external construction and development sites. The facility does not, and will not, accept peat, contaminated soils or any non-hazardous waste. The current site layout can be seen in EIAR Figure 2-1.

Scope of Work / EIA Scoping

8.5 The focus of this assessment is the potential impact on local amenity from fugitive dust emissions associated with from the following site-based activities:

- importation of uncontaminated (inert) soil and stone from external sources (principally construction and development sites);
- unloading, placement (deposition) on land and in-situ compaction of imported soil and stones at active backfill areas within the existing site / facility;

- stockpiling of selected soil and stone materials (topsoil); and
- separation of any construction and demolition waste (inadvertently imported to site) prior to removal off-site to authorised waste disposal or recovery facilities.

8.6 The principal air quality impact associated with ongoing site backfilling and recovery activities (and planned extension thereto) is fugitive dust emission. Dust emissions are likely to arise during:

- trafficking by heavy goods vehicles (HGVs) over unpaved surfaces at the application site;
- unloading, handling and placement of imported soil and stone material; and
- stockpiling of imported soil and stone materials.

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

8.8 This Chapter describes and assesses the existing air quality baseline characteristics of the local area. Air emissions arising from the recovery facility are then applied to these baseline conditions and the resulting air quality impacts assessed. Mitigation measures are identified where required, to eliminate and reduce these impacts insofar as practical.

8.9 The following sections of this report describe the potential air quality impacts associated with the planned further activity at the existing backfilling / recovery facility and application site. The following issues are addressed separately:

- relevant legislation, standards, and guidance;
- baseline conditions pertaining to the measured (or estimated) existing air quality levels around the existing facility;
- methodology used to assess the impacts of the activities at the backfill / recovery facility on air quality at local properties;
- assessment of the impacts;
- description of mitigation measures that are included in existing environmental controls to eliminate or reduce the potential for air quality impacts and which will remain in place for extended site operations;;
- summary of cumulative impacts;
- summary of any residual impacts;
- monitoring proposals.

Consultations / Consultees

8.10 No consultations were undertaken specifically for the purposes of preparing this Chapter of the EIA. An initial virtual (online) meeting took place between Kilsaran, SLR and officials from Kildare County Council on 23 June 2023. A further follow-up online consultation meeting was held on 15 January 2024 (Ref. No. PP5660).

8.11 No additional specialist external consultation was undertaken in the preparation of this Chapter of the EIAR. Consultation was however undertaken with other specialist contributors to the EIAR.

Contributors / Author(s)

8.12 SLR Consulting Ireland undertook the impact assessment presented in this Chapter on behalf of Kilsaran Concrete. The lead consultant for the study was Conor Hughes MSc. Energy Science.

Limitations / Difficulties Encountered

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

REGULATORY BACKGROUND

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

Legislation

Air Quality Standards

8.15 The Government's policy on air quality within Ireland is set out in the Air Quality Standards (AQS) Regulations 2011. The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the EPA Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 (S.I. No. 33 of 1999). The 4th Daughter Directive was transposed by the Arsenic, Cadmium, Mercury, Nickel, and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. no. 58 of 2009).

8.16 The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in Ireland.

8.17 The AQS sets standards and objectives for ten priority pollutants. Standards establish concentrations of pollutants in the atmosphere which can broadly be taken to provide a certain level of environmental quality. Objectives are policy targets, often expressed as maximum concentrations, not to be exceeded (either without exception, or with a limited number of exceedances within a specified timescale).

8.18 Under the AQS, the following pollutants are monitored and controlled:

- nitrogen oxides;
- sulphur dioxide;
- carbon monoxide;
- ozone;
- particulate matter (PM_{10}, $PM_{2.5}$ and black smoke);
- benzene and volatile organic compounds;
- heavy metals; and
- polycyclic aromatic hydrocarbons.

8.19 These pollutants are monitored at 32 stations across the country and together they form the national ambient air quality network. A summary of relevant air quality limit values in relation to human health are presented in Table 8.1. Air quality limit values in relation to vegetation protection are presented separately in Table 8.2.

8.20 The air quality monitoring network is coordinated and managed by the EPA, as the National Reference Laboratory for air quality. The results of the monitoring are compared to limit values set out in EU and national legislation on ambient air quality. As was recommended in the 2011 Review of the Environmental Protection Agency, map-based assessments are prepared and published by the EPA.

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

Human Health	Limit or Target Value			Information and Alert Thresholds (where applicable)		Long Term Objective
Pollutant	Averaging Period	Value	Maximum Number of Allowed Occurrences	Period	Threshold value	
Nitrogen Dioxide (NO_2)	Hour Year	200 µg/m³ 40 µg/m³	18 0	1 hour alert	400 µg/m³ Exceeded for 3 consecutive hours	
Sulphur Dioxide (SO_2)	Hour Day	350 µg/m³ 125 µg/m³	24 3	1 hour alert	500 µg/m³ Exceeded for 3 consecutive hours	
Particulate matter with aerodynamic diameter of less than 10 µm (PM_{10})	Day Year	50 µg/m³ 40 µg/m³	35 0			
Particulate matter with aerodynamic diameter of less than 2.5 µm ($PM_{2.5}$)	Year	25 µg/m³ 20 µg/m³ (ECO)				0 8.5 to 18 µg/m³

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

Vegetation	Critical Level or Target Value		Long-Term Objective	
Pollutant	Averaging Period	Value	Value	Date
Nitrogen dioxide (NOx)	Calendar year	30 µg/m³		
Sulphur Dioxide (SO_2)	Calendar year and winter (October to March)	20 µg/m³		

Planning Policy and Development Control

National Planning Framework

8.21 The National Planning Framework (NPF) 2040 (published in February 2018) is a national planning framework for Ireland. The framework provides the policies for all regional and local plans. In the framework, the extractive industries are recognised as important for the supply of aggregates and construction materials to variety of sectors.

8.22 There are no specific policies in relation to air emissions in NPF for extraction or associated backfilling and restoration activities or for materials recovery activity. The stated general development objective is to facilitate development while at the same time protecting the environment.

Local Planning Policy – Kildare County Development Plan 2023 - 2029

8.23 The Kildare County Development Plan which was adopted on 28th January 2023 includes several policies and objectives for the planning and sustainable development of the County from 2023 to 2029.

8.24 Section 6.8.2 addresses air quality and states.

'Clean Air is essential in ensuring a high-quality environment for the wellbeing of the population. Air pollution can negatively affect human health and eco-systems. EU Directives set out air quality standards in Ireland and other member states for a wide variety of pollutants. The EPA is responsible for monitoring air quality in Ireland. An air quality station was commissioned in Naas in April 2021 and is currently noted as having 'good' air status.'

8.25 The development plan sets out policy in relation to management of air pollution. The policy **IN P8** commits the Council to

"*Implement the provisions of EU and National legislation on air, noise, and light pollution and other relevant legislative requirements, as appropriate."*

8.26 The Kildare CDP 2023 – 2029 includes the following objectives in Chapter 6 *Infrastructure Environmental Services*:

- **Objective IN O59** *"Ensure that all future development is in accordance with the EU Ambient Air Quality and Cleaner Air for Europe (CAFÉ) Directive (2008/50/EC).".*
- **Objective IN O60** *"Continue to monitor air quality at selected locations throughout the county in co-operation with the Health Service Executive and the Environmental Protection Agency.".*
- **Objective IN O61** *"Support the use of air quality monitors at schools throughout Kildare*."

Guidelines

Relevant Guidelines: Extractive Industry

8.27 The ongoing and planned further development at Halverstown provides for the backfilling and restoration of the existing pit by backfilling / recovery of imported uncontaminated (inert) soil and stone and broken rock. Related relevant extractive industry guidance in relation to dust emissions / deposition is presented below for information and reference.

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

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

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

Guidance Relating to Dust

8.31 Fractions of dust greater than 10 µm (micrometres) in diameter are not covered within the Air Quality Standards and typically relate to nuisance effects.

8.32 A range of monitoring techniques exist for dust deposition rates (i.e., Bergerhoff and Frisbee gauges). There are currently no Irish, European Union (EU) or World Health

Organisation (WHO) statutory standards or limits appropriate for the assessment of deposited dust and its propensity to generate annoyance.

8.33 Extractive industry standard criteria levels for the gravimetric assessment of dust deposition which are generally used across extractive industry in Ireland include the DoEHLG (2004) planning guidelines for the extractive industry[1], the ICF Guidelines (2005) and EPA (2006) Environmental Management Guidelines.[2]

8.34 Each of these Guidelines recommend the use of the Bergerhoff method for measuring dust deposition. In line with this approach, the guidelines recommend the TA Luft dust deposition limit value of 350mg/m^2/day (total dust deposition averaged over a 30-day period), measured at site boundaries.

8.35 When the rate of accumulation of this coarser fraction of dust (referred to as deposited dust) is sufficiently rapid to cause fouling or discolouration, then it is generally considered to introduce a nuisance. The point at which an individual perceives dust deposition as a nuisance and causes a complaint is highly subjective.

8.36 The colour and type of dust can influence the perception of nuisance and what is considered tolerable, for example, black coal dust may have a high contrast with its background.

8.37 The action of wind over dry ground will carry dust particles into the air. Although large emissions of dust occur naturally, man-made dust events are caused by a range of activities including agriculture, road traffic, construction works (including the handling and storage of soils) and by vehicles using paved and unpaved haul roads.

8.38 For operations involving the mechanical break up of solids, the most common concern regarding dust emissions is the potential nuisance effect from the larger fractions of dust.

Guidance on Assessment of Mineral Dust Impacts for Planning

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

Air Quality and Ecological Receptors

8.40 Much of the research on the effects of particulate matter on vegetation has focussed on the chemical effects of alkaline dusts. A summary of a review of available research on behalf of the UK's Department for the Environment Transport and Regions (DETR) concluded that:

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

8.41 An Interim Advice Note (IAN) prepared as a supplement for Volume 11, Section 3, part 1 of the UK DMRB (Design Manual for Roads and Bridges) and now incorporated into HA207/07[3] suggests that only dust deposition levels above 1,000 mg/m^2/day are likely to affect sensitive ecological receptors. This level of dust deposition is approximately five

[1] http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/DevelopmentandHousing/Planning/FileDownLoad%2C1606%2Cen.pdf

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

[3] Highways England, 2007 Design Manual for Roads and Bridges (DMRB) *HA207/07 Air Quality* (informed by IAN 061/05 - *Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs).*

times greater than the level at which most dust deposition may start to cause a perceptible nuisance to humans. It states that most species appear to be unaffected until dust deposition rates are at levels considerably higher than this.

Assessment of Air Quality Impact on Designated Nature Conservation Areas

8.42 Guidance on the assessment of the air quality impacts of development on designated nature conservation sites has been published by the Institute of Air Quality Management (IAQM, 2019). This guidance is useful in evaluating the effects of air pollution on habitats and species using air quality assessment.

8.43 The predicted scale of dust effects may be classified as either 'significant', or not 'significant'. Where effects are predicted to be 'significant', further mitigation is likely required before proposals are deemed to be acceptable under planning policy.

Air Quality and Health Effects

8.44 The main health effects of air pollution can include stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma. These conditions can lead to sickness and ill health as well as premature mortality.

8.45 Two recent EPA reports, Air Quality in Ireland 2021 and Ireland's Environment, An Assessment 2020 detail the main air quality trends based on monitoring from the national ambient air quality network. There are monitored exceedances of the WHO guideline values for ozone, PM10 and PM2.5 at several sites, though there are no current exceedances of the lower (less protective) EU standards at the existing monitoring locations in Ireland.

8.46 The EPA report also highlights the main challenges of reducing air pollution from key sources such as particulate matter emissions from solid fuel burning (e.g. peat, coal and wood) in the residential sector and NOx emissions from vehicles in the transport sector. A summary of relevant Air Quality limit values in relation to human health was previously presented in Table 8-1.

Site Specific Emission Limits

8.47 Condition No. 10 of the current planning permission in respect of ongoing backfilling and recovery activities at the application site (Planning Ref. 18/453) states that:

10(a) The total dust deposition arising from the onsite operations associated with the development shall not exceed 350 milligrams per square metre per day averaged over a continuous period of 30 days when measured as deposition of insoluble particulate matter at any position along the boundary of the site". No stripping of topsoil or overburden shall be carried out in periods of dry and windy weather.

10(b) Applicant shall use "Best Practicable Measures" to prevent / minimise noise and dust emissions during the operational phase of the development, through the provision and proper maintenance, use and operation of all machinery to the satisfaction of the Planning Authority.

8.48 Separately, Condition 4.1 of the EPA Waste Licence stipulates that

Dust and particulate matter from the activities shall not give rise to deposition levels which exceed the limit values (of 350mg/m / day, set in Schedule B.5).

8.49 On site monitoring of dust uses the Bergerhoff Method to align to the nationally recommended approach. Dust deposition monitoring carried out at the site boundaries indicates that ongoing, established site operations are complaint with the recommended dust deposition emission limit value of 350 mg/m^2/day (averaged over 30 days).

RECEIVING ENVIRONMENT

Study Area

8.50 The application site is located entirely within the townland of Halverstown, approximately 4.5 km south of Kilcullen, just over 2km northeast of Calverstown village and approximately 700m to the west of the M9 motorway.

8.51 The application site is bounded to the north by L6083 local road, by the R448 Regional Road (the former N9 National Primary Road) to the east and by farmland with residential housing and agricultural buildings to the south and west. The application site is accessed via an existing junction and entrance leading off the R448 Regional Road.

8.52 The existing backfilling / recovery facility and application site comprises lands originally developed as a sand and gravel pit (to the south of the access road through the site) and lands previously only ever used for agricultural use, principally grassland (in the north-eastern part of the application site). There is an existing concrete block plant (operated by the Applicant) located to the north-west of the application site and accessed by the road running through it.

8.53 The site is located in a rural area with development generally comprising isolated rural housing and other intermittent development located along the local road network. Land-use in the area is tied to a range of agricultural activities and enterprises, primarily dairy, tillage and horse breeding. There are some active (and former) sand and gravel pits interspersed across the local area, albeit at some distance from the site.

Baseline Study Methodology

8.54 The application site and surrounding area fall into Air Quality Zone D, categorised as rural east Ireland. The air quality in each zone is assessed and classified with respect to upper and lower assessment thresholds based on measurements over eight years from 2014 to 2021. The closest air quality monitoring location to the application site in a comparable Zone D rural area is located at Kilkitt, Co. Monaghan. As such, it is considered the most appropriate dataset available for assessment of air quality baseline concentrations in the study area around the application site.

8.55 Dust monitoring was conducted at and around the application site using the 'Bergerhoff method' referred to in the TA Luft Air Quality Standard. The deposition gauge used in the survey is the 'Bergerhoff' dust gauge, which comprises a plastic collection bottle and a post with protective basket, set at 1500 mm above ground level. The input of the atmospheric material into the bottle is determined over a planned period measurement (usually one month) by exposing the plastic collection bottle to the environment. The total dust collected in the bottle is expressed as deposition of insoluble particulate matter ($mg/m^2/day$) arising from fugitive actions in the area surrounding the application site.

Sources of Information

8.56 A desk study was carried out to examine all relevant information relating to air quality conditions around the application site. Met Eireann, the National Meteorological Service, was consulted in relation to the climate / weather data in respect of the study area (http://www.met.ie). The EPA website was examined to note information on baseline air monitoring data around the application site (http://www.epa.ie/air/quality/data/).

8.57 Information published on its website by the National Parks and Wildlife Service (NPWS) (http://webgis.npws.ie/npwsviewer/), part of the Department of the Environment, Community and Local Government (DoECLG), in respect of designated ecological sites, protected habitats and species was also reviewed, together with Ordnance Survey maps and aerial photography (http://map.geohive.ie/mapviewer.html).

Field Survey

8.58 Site-specific dust monitoring was carried out at the existing backfilling / recovery facility at Halverstown in accordance with Condition 10 of Planning Ref. 18/453 (and Condition 4.1 of EPA Waste Licence Ref W0300-01) for the period between December 2020 and February 2023.

8.59 The locations of the baseline dust deposition monitors are shown on Figure 8-1

- Location D1 - to the southeast of the application site;
- Location D2 - to the north of the application site;
- Location D3 - to the northwest of the application site; and
- Location D4 – to the west of the application site.

Dust Deposition Monitoring

8.60 The results of the dust deposition monitoring are presented in Table 8-3 below.

Table 8-3
Dust Deposition Monitoring Results

Monitoring Period	D1 (mg/m^2/day)	D2 (mg/m^2/day)	D3 (mg/m^2/day)	D4 (mg/m^2/day)
18/11/20 to 16/12/20	45.0	44.0	149.0	43.0
16/03/21 to 21/04/21	49.0	23.0	12.0	46.0
29/11/21 to 22/12/21	292.0	53.0	287.0	72.0
28/04/22 to 31/05/22	74.0	170.0	74.0	76.0
26/07/22 to 23/08/22	58.0	56.0	153.0	12.0
26/01/23 to 27/02/23	20.0	6.0	124.0	47.0
24/10/23 to 24/11/23	55	29	248	81

Background Air Quality

8.61 As previously noted, the closest EPA air quality monitoring location to the application site (in a comparable Zone D area) is located at Kilkitt, Co. Monaghan. The monitoring station continuously monitor concentrations of particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}). Recent annual mean concentrations monitored at Kilkitt (published on the EPA website[4]) are presented in Table 8-4 below.

Table 8-4
Background PM_{10} Background Concentrations – Kilkitt

Year	Annual Mean (µg/m^3)	Number of Days >50 µg/m^3
2014	9	2
2015	9	1
2016	8.1	0
2017	7.8	0
2018	9	0

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

Year	Annual Mean (µg/m^3)	Number of Days >50 µg/m^3
2019	7	1
2020	8.0	0
2021	7.8	0

8.62 Table 8.4 indicates that PM_{10} concentrations monitored at the Kilkitt monitoring site are below the annual mean Air Quality Standards (AQS) of 40 µg/m^3 and comply with the requirement that a 24-hour mean of 50 µg/m^3 should not be exceeded more than 35 times in a calendar year.

8.63 For rural areas, such as those surrounding the application site, the primary source of PM_{10} would be residential solid fuel emissions and local agricultural or rural based activities for deposited dust.

Meteorology: Dispersion of Emissions

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

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

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

Local Wind Speed and Direction Data

8.66 The closest weather station with sufficient records of wind direction and wind speed considered representative of conditions experienced at the application site is Baldonnel (Casement) Aerodrome Meteorological Station, which is located approximately 30 km to the north-east of the application site.

8.67 A windrose for the average conditions recorded at Baldonnel (Casement) Aerodrome, over a twenty-year period from 2002 to 2022 is presented in Figure 8-2. The predominant wind direction is from the southwestern quadrant. Moderate to high-speed winds (>2 m/s) occur for approximately 85.3 % of the time.

Rainfall data

8.68 Relevant rainfall data applicable to the site has been obtained from the Irish Meteorological Service website for the Baldonnel (Casement) Aerodrome. The annual average days with rainfall greater than 0.2 mm is 193.9 days per year. Natural dust suppression (from rainfall) is therefore considered to be effective for 53.1 % of the year.

Sensitive Receptors

Ecological Receptors

8.69 Based on the nature, size, and scale of the planned development, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 sites is up to a maximum radius of 2 km from the application site unless there are any potential

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

source-pathway-receptor links between the proposed development at Halverstown and Natura 2000 site(s) beyond this distance.

8.70 The application site is not subject to any statutory nature conservation designation, nor are there any designated sites within 2km of it, refer to EIAR Chapter 5 (Biodiversity).

Human Receptors

8.71 Sensitive locations are those where people may be exposed to dust from the planned site activities. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas, and food retailers.

8.72 Receptors have been identified within a 500 m distance of the overall planning application boundary. This is a cautious approach, as the dust generating activities are located at greater distances within the site. These receptors are listed in Table 8-5 and their locations are indicated in Figure 8-1. As housing is clustered in some areas, receptors have been identified at the nearest location to the application site boundary.

8.73 There are 23 sensitive receptors identified within the 500 m study area of the application site. A summary of the closest dust sensitive receptors in each direction surrounding the application site and their respective proximity to the nearest dust generating activity within the site is presented in Table 8-5 below.

Table 8-5
Dust Sensitive Receptors within 500 m

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Application Boundary
R1	Residential	Medium	50(E)
R2	Residential	Medium	80(SE)
R3	Residential	Medium	50(S)
R4	School	Medium	243(SE)
R5	Residential	Medium	120(N)
R6	Residential	Medium	101(N)
R7	Residential	Medium	162(N)
R8	Residential	Medium	155(SE)
R9	Residential	Medium	151(S)
R10	Residential	Medium	435(E)
R11	Residential	Medium	412(E)
R12	Residential	Medium	422(E)
R13	Residential	Medium	457(E)
R14	Residential	Medium	453(SE)
R15	Residential	Medium	351(W)
R16	Residential	Medium	170 (N)
R17	Residential	Medium	50(SE)
R18	Residential	Medium	480 (SE)
R19	Residential	Medium	495 (SE)

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Application Boundary
R20	Residential	Medium	438(N)
R21	Residential	Medium	410(N)
R22	Residential	Medium	454(N)
R23	Residential	Medium	490(N)

IMPACT ASSESSMENT - METHODOLOGY

Evaluation Methodology

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

8.75 Combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the site activities also have the potential to contribute to local air pollution.

8.76 The significance of impacts due to emissions from the application site are dependent upon the magnitude of the emissions, the prevailing meteorological conditions for the location, and the proximity of sensitive locations to the emission sources.

8.77 Notwithstanding the compliant dust emission levels reported in the baseline study for the existing facility, the impact assessment presented herein assesses the potential for further impact as if the continuation of established activities and increased intake limits were new development, giving rise to potentially new emissions and impacts.

8.78 The potential for 'in-combination' effects from other planned or proposed sources or air pollutants in the area has also been considered.

8.79 Each of the activities associated with the continuation of backfilling / recovery operations have been considered in assessment of potential air quality impacts including:

- emissions from material stockpiling, placement, backfilling, recovery and restoration (earthworks and trackout);
- PM_{10} contribution from operational activities; and
- traffic exhaust emissions.

8.80 The methodology used in each assessment is presented in the sub-sections below which also provide an explanation of the significance criteria to describe the impacts of the proposed development on air quality.

8.81 For the purposes of environmental assessment of releases of dust from backfilling and recovery activities, the classifications of PM_{10} and 'deposited dust' are typically applied. The impacts associated with PM_{10} are related to potential health impacts while deposited dust is related to potential nuisance effects. The assessment of the potential impacts of each fraction has, therefore, been undertaken separately.

Significance Criteria

8.82 The following air quality specific significance criteria have been used to assess the significance of air quality impacts in preference to overall descriptors of significance. No similar Irish Guidance is available.

8.83 To determine the significance of particulate matter effects associated with the development, an evaluation of the sensitivity of the surrounding area is required. Receptors can demonstrate different sensitivities to changes in environment which are classified as per Table 8-6 below (and IAQM Construction Dust Guidance[6]).

Table 8-6
Methodology for Defining Sensitivity to Dust and PM_{10} Effects

Sensitivity of Area	Examples	
	Human Receptors	Ecological Receptors(a)
Very High	Very densely populated area More than 100 dwellings within 20 m Local annual mean PM_{10} concentrations exceed the AQS. Works continuing in one area of the site for more than 1-year	European Designated sites
High	Densely populated area. 10-100 dwellings within 20m of site. Local annual mean PM_{10} concentrations close to the AQS (36 – 40 µg/m^3)	Nationally Designated sites
Medium	Suburban or edge of town Less than 10 receptors within 20 m Local annual mean PM_{10} concentrations below the AQS (30 – 36µg/m^3)	Locally designated sites
Low	Rural area; industrial area No receptors within 20 m Local annual mean PM_{10} concentrations well below the AQS (<30 µg/m^3) Wooded area between site and receptors	No designations
Notes: (a)-Only applicable if ecological habitats are present which may be sensitive to dust effects.		

8.84 Table 8-7 illustrates how the interaction of magnitude and sensitivity results in the significance of an environmental effect, with the application of mitigation measures as per the IAQM Construction Dust Guidance.

Table 8-7
Impact Significance Matrix – Dust Effects (With Mitigation)

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

[6] http://www.iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf

Trackout - Methodology

8.85 The Institute of Air Quality Management (IAQM) assessment of risk is determined by considering the predicted change in conditions because of the planned development. There is risk for potential dust effects arising from trackout (i.e. haulage).

8.86 Based on the scale and nature of the works including areas, and operations at the site, a dust emission class is defined for the trackout. The dust emission class is then used to determine the risk categories presented below. These risk categories determine the potential risk of dust soiling effects, assuming no mitigation measures are applied.

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

Table 8-8
Determination of Risk Category from Trackout Movements

Distance to Nearest Receptor		Dust Emission Class		
Human	**Ecological**	**Large**	**Medium**	**Small**
<20	-	High Risk Site	Medium Risk Site	Medium Risk Site
20 – 50	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
50 – 100	20 – 100	Low Risk Site	Low Risk Site	Negligible

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

Traffic Emissions - Methodology

8.89 Atmospheric emissions related to site proposals are primarily associated with the exhaust emissions from heavy goods vehicles (HGVs). The decision as to whether an assessment of potential impact is required is based upon the criteria set out in latest Design Manual for Roads and Bridges (DMRB) guidance (LA 105, 2019)[7].

8.90 The criterion for assessment of air quality contained within LA 105 is focussed on roads with relatively high changes in flows or high proportion of HGV traffic.

8.91 The following traffic scoping criteria shall be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the 'do something' traffic (with the project) compared to the 'do minimum' traffic (without the project) in the opening year:

- annual average daily traffic (AADT) ≥ 1,000; or
- heavy goods vehicle (HGV) AADT ≥ 200; or
- a change in speed band; or
- a change in carriageway alignment by ≥ 5m.

Operational Stage Dust Impacts - Methodology

8.92 A staged approach has been adopted; this ensures that the approach taken for the assessment of risk is proportional to the risk of an unacceptable impact being caused. As such, where a simple review of the situation shows that risk of a health or nuisance impact is negligible, this will be sufficient. In cases where the risk cannot be regarded as insignificant, a more detailed assessment may be required, such as a quantitative screening assessment or an advanced dispersion modelling exercise as appropriate.

[7] Highways England (2019), LA 105, Air Quality (Sustainability and Environment Appraisal), November

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

8.94 The predicted scale of dust effects may be classified as either 'significant', or not 'significant'. Where effects are predicted to be 'significant', further mitigation is likely required before the proposals are to be acceptable under planning policy.

8.95 A semi-quantitative assessment of fugitive dust emissions from the proposed facility has been undertaken. The assessment has been undertaken by constructing a conceptual model that takes into consideration the potential sources, surrounding receptors, and the pathway between source and receptor to assess the magnitude of risk of impact on local amenities.

8.96 The distance from the source to the sensitive receptor is crucial. The initial risk screening stage (Tier 1) focuses upon the potential for dust generation at the site and the distance between source and receptors. In Tier 1 of the assessment, a representative selection of dust sensitive receptors in each direction of the application site is identified within the 500m study area. Receptors within 500 m of dust generating activities progress onto a further (Tier 2) assessment.

8.97 Tier 2 involves identifying source-pathway-receptor linkages and a semi-quantitative assessment of the likelihood and magnitude of any effects that could be associated with each pollutant linkage. This assessment takes account of:

- wind direction and speed data (to estimate frequency of exposure);
- proximity to source (to estimate magnitude of exposure);
- sensitivity of receptor; and
- occurrence of natural dust suppression (rainfall patterns).

8.98 This information is used to inform a semi-quantitative assessment of the likely magnitude of impact and is based upon professional experience of the assessor as the issue of dust nuisance on local receptors is a subjective issue, where public perception on what constitutes 'acceptable' levels varies from one person to the next.

8.99 Assigning significance to nuisance impacts is qualitative and involves a judgement based on the likely magnitude, frequency, duration, and reversibility (or recovery) of the impact. In this context, significant impact is taken to mean what is generally not publicly acceptable and desirable.

8.100 Note that the following assessment does not consider any established or planned mitigation measures being applied at the backfilling / recovery facility, either at the present time or in the future (were the proposed development to be approved). These currently include the maintenance / provision of boundary landscaping and a range of dust suppression measures (refer to section on Mitigation Measures later in this Chapter).

8.101 Following presentation of the results of the risk assessment, mitigation measures are outlined and the residual impact assessed. The detailed methodology used in this assessment is outlined in detail in Appendix 8.A.

PM_{10} Contribution – Methodology

8.102 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;

- expected additional contribution of PM_{10} from increased site activities at the recovery facility.

8.103 In terms of estimating the potential magnitude of impact from increased site activities, a UK edition of the LAQM Technical Guidance (LAQM.TG(03)) states that fugitive dust from stockpiles, and quarry operations (similar development to the existing backfilling / recovery facility) can potentially contribute up to 5 µg/m^3 towards annual mean background concentrations of the coarse fraction (2.5 – 10 µm diameters) of particulates in the immediate area.

8.104 Given that the nature and scale of future site activities is likely to be similar to that which arises at the current development, the potential PM_{10} impact of continued soil intake is likely to be markedly lower. However, to ensure a robust assessment of potential PM_{10} impacts, the upper limit of 5 µg/m^3 has been applied to represent the future 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 - Methodology

8.105 Atmospheric emissions related to site proposals are primarily associated with the exhaust emissions from heavy duty vehicles (HDVs). The decision as to whether an assessment of potential impact is required is based upon the criteria set out in the Design Manual for Roads and Bridges (DMRB).

8.106 The criterion for assessment of air quality contained within the latest DMRB guidance (207/07) focuses on roads with relatively high changes in flows or high proportion of HDV / HGV traffic. Affected roads are defined as those that meet any of the following criteria:

- road alignment will change by 5m or more; or
- daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) movements or more; or
- HDV / HGV flows will change by 200 AADT or more; or
- daily average speed will change by 10 km/hr or more; or
- peak hour speed will change by 20 km/hr or more.

8.107 It is estimated that the continued backfilling and recovery activities at the application site will generate an average of 45 HGV trips per day when operating at maximum permitted intake limits. There are no changes required to road alignment nor will there be any change to existing average or peak hour speeds.

8.108 On this basis, there is no requirement for a Traffic Emissions assessment.

ASSESSMENT OF IMPACTS

Construction Stage Dust Impact

8.109 All of the site infrastructure required to service the proposed extension (to the life and capacity) of the existing development at Halverstown is already in place. As such there is no construction or development phase associated with the proposed development and no requirement to consider construction phase impacts.

Operational Phase - Trackout Assessment

8.110 During activities at the recovery facility, incoming / outgoing HGV traffic will follow established haul routes within Halverstown site, much of which are paved around the site entrance / egress and the shared infrastructure area (where the site office, welfare facilities, staff canteen, weighbridge, wheelwash etc. are located).

8.111 Given that HGVs travel over a relatively limited length of unpaved haul road in the centre of the application site and over paved roads around its access / egress point, the trackout dust risk category is considered to be 'low'. A summary of the determined risk category for proposed operation identified is presented in Table 8-9

Table 8-9
Soils Intake Activities: Risk of Particulate Emissions

Source	Risk of Dust Soiling Effects	Ecological Effects
Trackout	Negligible	Negligible

8.112 While the overall risk category has been assessed as 'low', if the activities were not mitigated, the effects of dust during dry and windy conditions could possibly lead to occasional increases in dust nuisance immediately around the application site. However, these are not considered to be significant given the limited duration of such meteorological conditions and the time-limited change in the extent and scale of site-based activities.

Operational Stage - Dust Impact Assessment

8.113 An overview of the sources and processes associated with the facility activities, and their respective potential for particulate dust emissions is presented in Table 8-10 below.

Table 8-10
Facility Activities: Sources of Particulate Emissions

Activity	Source	Emission Potential	Comments
Separation of Soils	Excavator / Dozer/ HDV	High - dry or fine materials during strong windy weather	Temporary, variable from day to day depending on prevailing meteorological conditions, level, and location of activity.
		Low – coarse or wet materials during conditions of low wind speed	
Material placement and onsite handling	Onsite plant and equipment handling dry loose material.	High when dry material being handled during strong windy weather. High on unpaved road surfaces	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.
Soils Stockpiling	Excavator / Stockpiles	High - dry or fine materials during strong windy weather	Temporary, variable from day to day depending on prevailing meteorological conditions, level, and location of activity.
		Low – coarse or wet materials during conditions of low wind speed	
Handling and Compaction of Soils	Excavator / Dozer	High - dry or fine materials during strong windy weather	Temporary, variable from day to day depending on prevailing meteorological conditions, level, and location of activity.
		Low – coarse or wet materials during conditions of low wind speed	

Human Receptors

8.114 Table 8-11 identifies receptors within the 500 m study area around the application site. There are 23 receptors rated as being of medium sensitivity within 500 m of the site boundary.

8.115 Using the tiered assessment methodology outlined previously, receptors located within 500 m have progressed to a Tier 2 assessment as they are considered to have a greater risk of dust impact.

8.116 Each receptor identified in Table 8-11 below is assessed against the frequency of exposure and the distance from the source to the receptor (i.e., the pathway). The methodology applied is described in detail in Appendix 8-A.

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

8.118 A wind-rose for the site is presented in Figure 8-2 for Casement Aerodrome Meteorological Station and illustrates the predominant wind directions from the south-west. The potential for the generation of airborne dust will increase with wind speed, with winds greater than 3 m/s capable of carrying airborne dust[8].

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

Table 8-11
Receptors Progressing to Tier 2 Assessment

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Application Boundary
R1	Residential	Medium	50(E)
R2	Residential	Medium	80(SE)
R3	Residential	Medium	50(S)
R4	School	Medium	243(SE)
R5	Residential	Medium	120(N)
R6	Residential	Medium	101(N)
R7	Residential	Medium	162(N)
R8	Residential	Medium	155(SE)
R9	Residential	Medium	151(S)
R10	Residential	Medium	435(E)
R11	Residential	Medium	412(E)
R12	Residential	Medium	422(E)
R13	Residential	Medium	457(E)

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

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Application Boundary
R14	Residential	Medium	453(SE)
R15	Residential	Medium	351(W)
R16	Residential	Medium	170 (N)
R17	Residential	Medium	50(SE)
R18	Residential	Medium	480 (SE)
R19	Residential	Medium	495 (SE)
R20	Residential	Medium	438(N)
R21	Residential	Medium	410(N)
R22	Residential	Medium	454(N)
R23	Residential	Medium	490(N)

8.120 A summary of the risk assessment of dust impacts from sources within the proposed development is presented in Table 8-12 below.

Table 8-12
Dust Risk Assessment (Without Mitigation Measures)

Receptor	Distance from Site Activities (approx.)(m)	Relevant Wind Direction(°)	Potential Exposure Duration (adjusted for dry days only) [a]	Relative Wind / Distance Rank	Multiplied Rank	Risk Evaluation (Without Mitigation)
R1	50 (E)	200-350	28.85	6/8	48	Moderate Adverse
R2	80 (SE)	290-0	2.1	1/8	8	Acceptable
R3	50 (S)	340-40	1.65	1/8	8	Acceptable
R4	243 (SE)	290-340	0.1	1/4	4	Insignificant
R5	120 (N)	190-230	16.65	6/5	30	Slight Adverse
R6	101 (N)	190-230	16.65	6/5	30	Slight Adverse
R7	162 (N)	190-230	16.65	6/5	30	Slight Adverse
R8	155 (SE)	290-340	2.1	1/5	5	Insignificant
R9	151 (S)	340-10	0.7	1/5	5	Insignificant
R10	435 (E)	270-310	3.25	2/2	4	Insignificant
R11	412 (E)	270-310	3.25	2/2	4	Insignificant
R12	422 (E)	270-310	3.25	2/2	4	Insignificant
R13	457 (E)	280-310	2.3	1/2	2	Insignificant
R14	453 (SE)	280-310	2.3	1/2	2	Insignificant
R15	351 (W)	110-140	1.65	1/3	3	Insignificant
R16	170 (N)	190-230	7.9	3/5	15	Slight Adverse
R17	50 (SE)	290-0	2.1	1/8	8	Acceptable
R18	480 (SE)	280-310	1.1	1/2	2	Insignificant

Receptor	Distance from Site Activities (approx.)(m)	Relevant Wind Direction(°)	Potential Exposure Duration (adjusted for dry days only) [a]	Relative Wind / Distance Rank	Multiplied Rank	Risk Evaluation (Without Mitigation)
R19	495 (SE)	280-310	1.1	1/2	2	Insignificant
R20	438 (N)	200-220	12.7	5/2	10	Acceptable
R21	410 (N)	190-210	9.05	4/2	8	Acceptable
R22	454 (N)	190-210	9.05	4/2	8	Acceptable
R23	490 (N)	190-210	9.05	4/2	8	Acceptable

Table Note:

(A) – relevant wind direction based on upwind sector which would potentially convey from site towards the receptor.

(B) – Potential duration of exposure based on frequency of moderate to high wind speed (adjusted for dry days only) as described in the methodology in Appendix 8-A.

(C) – Ranking as per methodology in Appendix 8-A

Refer to Figure 8-1 for Receptor Locations

Ecological Receptors

8.121 The application site is not subject to any statutory nature conservation designation and there are no protected sites within a 2km radius of the application site.

8.122 Based on the nature, size, and scale of the planned activity at Halverstown, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 sites is up to a maximum radius of 2 km from the application site, unless there are any source-pathway-receptor links between it and a Natura 2000 site(s) beyond this distance.

8.123 It is considered that no Natura 2000 sites would be affected by any direct loss of habitat or impacted upon by the effects of dust deposition or traffic emissions.

8.124 Studies have indicated that fugitive dust is typically deposited within 100m to 200 m of the source, the greatest proportion of which, comprising larger particles (greater than 30 microns) is deposited within 100 m. Where large amounts of dust are deposited on vegetation over a long timescale (a full growing season for example) there may be some adverse effects upon plants restricting photosynthesis, respiration, and transpiration.

8.125 Based on the above, it is concluded that the continuation of backfilling and recovery activities at Halverstown will have an insignificant dust deposition impact on ecological receptors.

Human Receptors

8.126 Using a screening assessment tool, the Air Quality Assessment (outlined in Appendix 8-A) considers that there is generally an insignificant to acceptable risk that dust may cause an impact at sensitive receptors within 500 m of the source of the dust generated activities. Risk of impact from dust emissions at receptor R1 was assessed to be moderate adverse, while R5, R6, R7, and R16 were assessed to be slight adverse without the (continued) implementation of mitigation measures. Impacts at all the remaining receptor locations were deemed acceptable or insignificant.

8.127 Note that the above assessment does not consider the fact that the development is already extant, nor does it take account of implementation of mitigation measures within the development (outlined in the section on Mitigation Measures below). This assessment is also deemed to be conservative based on the relatively moderate wind speeds which formed the basis of the risk evaluation.

Traffic Emissions - Assessment

8.128 For the purposes of assessment, the projected traffic movements associated with the (continued) development is predicted to be 45 AADT HGVs at maximum permitted intake levels, with no significant changes to either road alignment or speed.

8.129 Therefore, as none of the changes to the surrounding local road network meet any of the traffic / alignment criteria set out in HA 207/07, then the impact of the proposed intensification in recovery activity and HGV traffic movements can be 'negligible' in terms of local air quality and no further air quality assessment is deemed necessary.

8.130 On this basis, the impact of the facility from the HGV emissions can be screened out and combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the HGV movements are not considered to have potential to contribute to local air pollution.

PM_{10} Contribution from Facility Operations - Assessment

8.131 In terms of PM_{10}, the maximum annual mean measured baseline background concentration was 9µg/m³ in 2014, 2015, and 2018 at Kilkitt monitoring station. Therefore, the potential contribution up of 5 µg/m^3 towards annual mean background concentrations of the coarse fraction (2.5 – 10 µm diameters) of particulates (in the immediate area of the site) is insignificant and well below the annual objective of 40 µg/m³ for human health air quality limit.

8.132 The potential impacts in relation to increase in ambient PM_{10} concentrations beyond the development site boundary can be classified as 'negligible', given the limited duration of meteorological conditions and the limited extent of the extent and scale of any extended future backfilling / recovery activity.

Unplanned Events (i.e., Accidents)

8.133 Accidents, malfunctions and unplanned events refer to events or upset conditions that are not part of any activity or normal operation of the planned development. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions or unplanned events to occur during ongoing and any future backfilling and recovery operations.

8.134 Many accidents, malfunctions and unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation. In terms of air quality impact, the following unplanned events could have an effect on the local area:

- equipment malfunction;
- vehicle collision;
- dry and windy weather conditions with dust suppression equipment malfunction;
- accidental material spillages during transport.

8.135 In relation to air quality, the impacts of any unplanned events are considered to be negligible. If unplanned events were not mitigated, the effects of dust during dry and windy conditions could possibly lead to occasional increases in nuisance dust and 24-hour mean PM_{10} concentration immediately surrounding the existing facility and local road access. However, these are not considered to be significant given the limited duration of such meteorological conditions and the likely limited scale of any incident.

MITIGATION MEASURES

8.136 A range of mitigation measures implemented at the existing backfilling / recovery facility at Halverstown will continue to be implemented over the extended life of the facility as the additional intake tonnage is imported and placed in-situ.

8.137 Specific mitigation measures are outlined in Table 8-13 below.

Table 8-13
Soil / Particulate Emission Mitigation Measures

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
HGV	High – dry or fine particulate material during strong windy weather	Minimise drop heights when handling materials. Minimise working in adverse / windy conditions.	High
	Low – wet particulate material during conditions of low wind speed	Minimise drop heights when handling material. Provide protection from wind where possible.	High
Site Plant and Equipment Onsite Vehicles	High when travelling over un-surfaced and dry site roads.	Place and compact imported soils immediately. Minimise double handling	High
		Use of water sprays / tractor and bowser to dampen down active backfill areas, stockpiles and hardstanding areas during dry windy weather.	High
		Restrict vehicle speeds through signage / staff training.	High
		Minimise length / distance of onsite haul routes	High
		Construct haul roads using imported aggregate where necessary	High
		Locate haul routes away from sensitive receptors.	High
Road Vehicles (Transfers off-site)	Low / Moderate on paved road surfaces	Use of road sweeper to reduce the amount of available material for re-suspension.	Moderate / High
		Maintain the paved access road.	High
Stockpiles	High when dry or fine material being stored or handled during strong windy weather	Seed surfaces of completed mounds / bunds of topsoil if to be left in place for extended period.	High
		Limit mechanical disturbance.	High
Moderate to Acceptable Risk Receptors	High – during dry and strong windy weather	Retention of hedgerows along perimeter	High
		Minimise work in adverse weather conditions	High
		Increase dust suppression activity (sprinklers / water sprays from tractor and bowser).	High

Trackout

8.138 When adverse conditions apply (dry, windy weather), water from a bowser will be sprayed on dry unpaved road surfaces in order to minimize dust rise. Paved road surfaces around the site infrastructure area and the access road leading out of the site will also be sprayed as required.

8.139 All heavy goods vehicles leaving the application site will continue to be routed through the existing wheelwash facility in order to remove and / or dampen any dust / clay material attaching to the undercarriage and to prevent transport of fine particulates off-site, onto the local public road network.

Additional Mitigation Measures

8.140 Should it be necessary, an automated sprinkler system could also be installed around the facility to systematically dampen down stockpiled materials.

8.141 The following additional measures can also be implemented when required to achieve compliance with dust emission limits :

- Covering every load on vehicles delivering soil and stone to site (although the experience in operating the facility to date is that is unnecessary as the moisture content of excavated soils is typically too high to generate dust);
- Protecting / reinforcing perimeter vegetation screening around the application site;
- Undertaking regular plant and vehicle maintenance (cleaning);
- Undertaking regular monitoring and inspection of access and haul roads to identify and attend to accidental spillages (of soil / particulate materials) and any structural defects (i.e. potholes) to minimise shearing and break-up of road materials;
- considering meteorological conditions (wind speed and wind direction) when deciding where to site / locate material stockpiles.

Environmental Management System

8.142 Effective site management practices are critical to demonstrate the willingness of the facility operator to control dust emissions. Monitoring of dust deposition and procedures to record of complaints (if any) are in place, as required under established environmental monitoring systems and the existing waste licence. These help ensure appropriate corrective measures to reduce emissions are implemented in a timely manner .

8.143 Training on dust mitigation measures is provided to staff. It covers emergency response and contingency plans to react quickly in case of any failure of dust mitigation strategies or measures.

RESIDUAL IMPACT ASSESSMENT

8.144 With the range of mitigation measures to be implemented, it is considered that the potential risk of adverse dust impact at receptors from the continued operation of the existing facility will be further reduced.

8.145 After an assessment of potential adverse effects produced by the development it was concluded that there would be no significant adverse air quality effects for both human and ecological receptors (screened out) which cumulatively would not impact the surrounding area. Overall, the effects of the proposed development on air quality are deemed to be insignificant to acceptable.

8.146 A summary of the residual dust risk impact assessment is provided in Table 8-14 below.

Table 8-14
Residual Dust Risk Assessment (With Mitigation Measures)

Receptor Reference	Risk Evaluation
R1	Acceptable
R2	Insignificant
R3	Insignificant
R4	Insignificant
R5	Acceptable
R6	Acceptable
R7	Acceptable
R8	Insignificant
R9	Insignificant
R10	Insignificant
R11	Insignificant
R12	Insignificant
R13	Insignificant
R14	Insignificant
R15	Insignificant
R16	Acceptable
R17	Insignificant
R18	Insignificant
R19	Insignificant
R20	Insignificant
R21	Insignificant
R22	Insignificant
R23	Insignificant

8.147 Based on the assessment presented above, it is concluded that the proposed development, 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.

Cumulative Impacts

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

8.149 A review of Kildare County Council online planning search facilities indicates that no other major developments are planned or have been granted planning permission in the last five years in surrounding townlands or within 2km of the application site. In light of the above, it is considered that there is no potential for other planned development to create significant adverse cumulative impacts for air quality in the local area.

8.150 Notwithstanding this, this air quality assessment indicates that the long-term air quality impacts arising from the continued backfilling and recovery activities at the application site are insignificant / acceptable at all potentially sensitive receptors. As such dust and PM_{10} levels arising from the planned waste activities do not have the potential to increase or adversely impact dust levels or PM_{10} concentrations in the local area, either on their own or in combination with other development.

Interaction with Other Impacts

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

MONITORING

8.152 Dust deposition monitoring will continue to be implemented at the application site for the extended duration of backfilling / recovery activities using standard dust monitoring method (involving the Bergerhoff Instrument).

8.153 Results of dust monitoring shall be submitted to Kildare County Council and the EPA as required on a regular basis for review and record (and compliance) purposes.

FIGURES

Figure 8-1
Local Receptors

Figure 8-2
Wind Rose Windrose for Baldonnel (Casement) Aerodrome Meteorology Station

Notes:

1. EXTRACT FROM GOOGLE EARTH AERIAL PHOTOGRAPHY - AUGUST 2022.

Legend:

- PLANNING APPLICATION AREA (c. 18.0 Ha.)
- D1 — DUST MONITORING LOCATIONS
- R1 — LOCAL RECEPTORS

Rev	Amendments	Date	By	Chk	Auth

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Figure Title
DUST MONITORING & RECEPTOR LOCATIONS

Scale	SLR Project No.
1:10,000 @ A3	065158.00001

Designed	Drawn	Checked	Authorised
EW	EW	DL	DL
Date: 08/23	Date: 08/23	Date: 02/24	Date: 02/24

Figure Number **FIGURE 8.1** Rev. **1**

21/03/2024

S:\SLR Projects\00036 Kilsaran Concrete\065158 Halverstown Increase Waste Intake PA EIAR NIS WLA\EIAR\Volume-2 EIAR Report Figs Appends\08 Air\Dwgs\CAD\Working\065158.00001 Figure 8.1 Dust Monitoring & Receptor Locations.dwg

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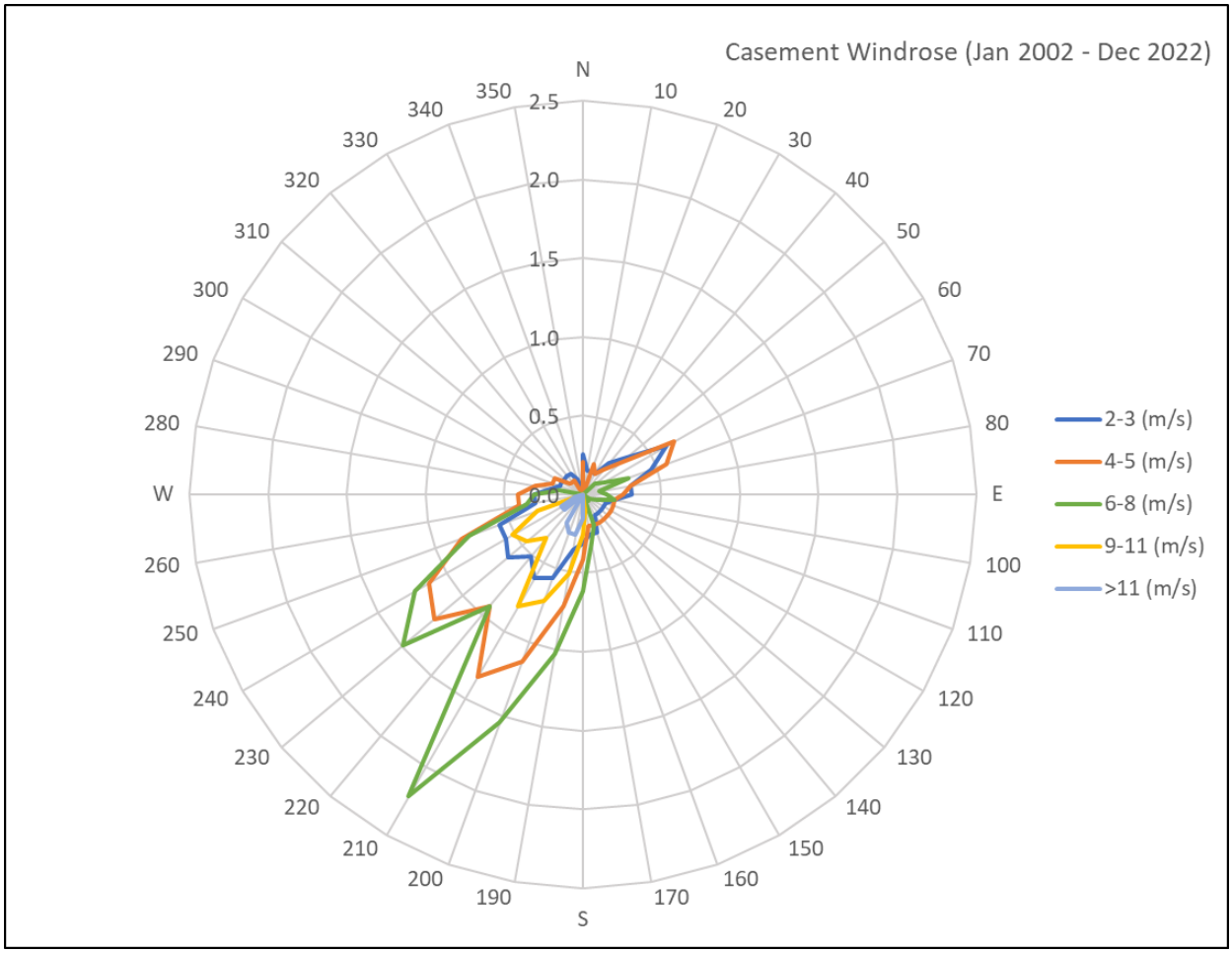
Figure 8-2
Windrose for Baldonnel (Casement) Aerodrome Meteorology Station



APPENDIX 8-A
Dust Risk Screening Assessment Methodology

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APPENDIX 8-A

DUST RISK SCREENING ASSESSMENT METHODOLOGY

The methodology applied in the assessment is a semi-quantitative risk assessment methodology, in which the probability of an impact occurring and the magnitude of the impact, if it were to occur, are considered. This methodology is the Tier 2 assessment of the dust assessment methodology. If identified dust sensitive receptors are not screened out within Tier 1, this approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the development, (i.e., the assessment does not take account of existing mitigation in place at the quarry.).

The magnitude of the potential risk at each receptor is classified depending on the frequency of exposure and the distance from the site to the receptor. Frequency of exposure is represented by the percentage of moderate to high winds (over 3m /s) from the direction of the site.

The screening assessment tool assesses the significance of the distance from site and the frequency of exposure of each receptor by assigning a ranked number. Receptors with a higher potential for dust impacts would therefore result in a higher value whilst receptors with lower potential would expect to carry a lower value. The value corresponding to an evaluation of risk is a product of the significance of the distance and frequency of exposure, each is assigned a value representing its significance. The multiplication of the two values assigned gives a total, which is then corresponded to a qualitative term of risk magnitude.

Frequency of Exposure Criterion

The potential for any site to emit dust is greatly influenced by weather. Increased wind speed increases the potential for the generation of airborne dust due to the suspension and entrainment of particles in airflow. A worst-case situation would be strong, warm, drying winds which increase the rate at which dust is lifted from an untreated surface and emitted into the air. Wind can also have the effect of spreading dust over a large area. Conversely, rainfall decreases dust emissions, due to both surface wetting and increasing the rate at which airborne dust is removed from air. An article on dust generation from quarry operations[9] suggests that rainfall of greater than 0.2 mm per day is considered sufficient to effectively suppress windblown dust emissions.

The frequency of exposure to dust emissions represents the percentage of time that wind speeds capable of carrying airborne dust (greater than 3m/s) are blowing from the site to the direction of the receptor. Frequencies are calculated based on meteorological data. For screening assessment wind speeds greater than 2 m/s were considered as this is how data on percentage occurrence of wind frequency and wind speed is calculated and presented by Met Eireann. For this reason, the assessment is conservative.

For the screening assessment, a value of 1mm would be used for the criteria to classify days as ‘dry’ or ‘wet’; five times the recommended value, using annual average rainfall data. The average number of days when rainfall exceeds 1.0 mm would be provided for each month and calculated over the year to provide an average.

The resulting frequency of moderate to high wind speeds with the potential of carrying airborne dust towards receptors would then be classified into the criteria in Table 8.A-1 with the respective rank value assigned.

[9] Leeds University. Good Quarry. http://www.goodquarry.com/article.aspx?id=55&navid=2

Table 8A-1
Frequency of Exposure – Risk Classification

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

Distance to Source Criterion

In assessing dust impacts, the distance from the source to the sensitive location is crucial, as airborne, and deposited dust tend to settle out close to the emission source. Smaller dust particles remain airborne for longer, dispersing widely and depositing more slowly over a wider area.

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

To allow for this effect of distance, buffer zones are often defined by mineral planning authorities around potentially dusty activities to ensure that sufficient protection is provided. They have not been established in any rigorous scientific way, but usually range from 50 m to 200 m. The 1995 UK DoE Guidance on dust from surface mineral working's, however, recommends a stand-off distance of 100-200 m from significant dust sources (excluding short-term sources), although it is recognised that these distances can be reduced if effective mitigation measures are identified and implemented. In terms of identifying sensitive locations therefore, and to represent an extreme worst-case scenario, consideration only needs to be given to sensitive receptors within 500 m of the site boundary. Receptors at a distance greater than 500 m have therefore been screened out in Tier 1 of the assessment.

The criteria for classifying the distance from receptor to source and thus assigning a rank value has therefore been based on the various references to dust behaviour described above. The rank classifications are presented below in Table 8.A-2. A risk category is maintained for receptors more than 500 m for circumstances where although a receptor is beyond 500 m from the dust source, its sensitivity for example is sufficient for it to be taken onto a Tier 2 assessment.

Table 8A-2
Distance to Source – Risk Classification

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

Sensitivity of Receptors

Sensitive locations are those where the public may be exposed to dust from the site. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas, and food retailers. Table 8.A-3 below[10] shows examples of dust sensitive facilities.

Table 8A-3
Examples of Dust Sensitive Facilities

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

Evaluation of Risk

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

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

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

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

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