9 AIR QUALITY

9.1 INTRODUCTION

This chapter assessed the likely impact on air quality associated with the proposed "Phase 1F" residential development at Portmarnock, Co. Dublin. A full description of the development is available in Chapter 3 - Description of Development.

This chapter was completed by Aisling Cashell. Aisling is an Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BA and MAI in Civil, Structural and Environmental Engineering from Trinity College Dublin. She is a Member of the Institute of Engineers Ireland (MIEI). She has two years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential, commercial and industrial developments, as well as renewable energy developments. She has undertaken air quality and climate impact assessments for transportation schemes, primarily regional and national road schemes, from constraints, through to route selection and EIAR stage.

9.2 ASSESSMENT METHODOLOGY

The principal guidance and best practice documents used to inform the assessment of potential impacts on air quality is summarised below.

The assessment has referred to national guidelines where available, in addition to international standards and guidelines relating to the assessment of air quality impacts. These are summarised below:

- Guidance on the Assessment of Dust from Demolition and Construction Version 2.2 (Institute of Air Quality Management (IAQM, 2024) (hereafter referred to as the IAQM Guidelines);
- A Guide to The Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.1) (IAQM, 2020); and
- PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (Transport Infrastructure Ireland (TII), 2022a).

In addition to specific air quality guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022b);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government, August, 2018); and
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017).

9.2.1 Criteria for Rating of Impacts

9.2.1.1 Ambient Air Quality Standards

To reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed based on compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 *of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast)*. This Directive sets out new air quality standards for pollutants to be reached by 2030 which are more closely aligned with the World Health Organisation (WHO) air quality guidelines.

Prior to 2030 the air quality standards set out in EU Directive 2008/50/EC *of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe* are still applicable.

The Air Quality Standards Regulations 2022 (S.I. 739 of 2022) transposed EU Directive 2008/50/EC. With the adoption of Directive (EU) 2024/2881, Ireland must transpose this Directive into national law (i.e. update the Air Quality Standards Regulations) before December 2026.

The ambient air quality standards applicable for nitrogen dioxide (NO_2) and particulate matter (as PM_{10} and $PM_{2.5}$) are outlined in Table 9.1. These pollutants are of relevance to the proposed development. The limit values set out in Directive (EU) 2024/2881 will need to be achieved by 2030, with the limit values set out in the Air Quality Standards Regulations 2022 (and future updated regulations) applicable until 2030.

Pollutant	Directive 2008/50/EC		Directive (EU) 2024/2881	
	Limit Type	Limit Value (applicable until 2030)	Limit Type	Limit Value (to be attained by 2030)
Nitrogen Dioxide (NO_2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m³	Hourly limit for protection of human health - not to be exceeded more than 3 times/year	200 µg/m³
	N/A	N/A	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	50 µg/m³
	Annual limit for protection of human health	40 µg/m³	Annual limit for protection of human health	20 µg/m³
Particulate Matter (as PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m³	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m³
	Annual limit for protection of human health	40 µg/m³	Annual limit for protection of human health	20 µg/m³
Particulate Matter (as $PM_{2.5}$)	N/A	N/A	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m³
	Annual limit for protection of human health	25 µg/m³	Annual limit for protection of human health	10 µg/m³

Table 9.1: Air Quality Standards Regulations 2022

9.2.1.2 WHO Air Quality Guidelines and Clean Air Strategy for Ireland

In April 2023, the Government of Ireland published the Clean Air Strategy for Ireland (Government of Ireland 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026 (Table 9.2), the IT4 targets by 2030 and the final targets by 2040 (Table 9.2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also acknowledges that *"meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2"*.

Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that *"Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II".*

These assessment thresholds relate to monitoring of ambient air quality by Member States, where *"exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years".*

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	24-hour limit for protection of human health	-	-	25µg/m^3
	Annual limit for protection of human health	30µg/ m^3	-	10µg/m^3
PM (as PM_{10})	24-hour limit for protection of human health	75µg/ m^3	50µg/m^3	45µg/m^3
	Annual limit for protection of human health	30µg/ m^3	20µg/m^3	15µg/m^3
PM (as $PM_{2.5}$)	24-hour limit for protection of human health	37.5µg/m^3	25µg/m^3	15µg/m^3
	Annual limit for protection of human health	15µg/m^3	10µg/m^3	5µg/m^3

Table 9.2: WHO Air Quality Guidelines 2021

The applicable air quality limit values for the purposes of this assessment are those set out in Table 9.1. The limit values stipulated under Directive 2008/50/EC and the Air Quality Standards Regulations 2022 are applicable for the construction phase and Opening Year 2029 for the proposed development. The limit values stipulated by Directive (EU) 2024/2881 are applicable for the Design Year 2044 for the proposed development.

9.2.1.3 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust that are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$) and the EU ambient air quality standards outlined in Table 9.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for nuisance dust in respect of this development.

Regarding dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Heritage & Local Government (DEHLG, 2004) apply the TA Luft limit of 350 mg/m^2/day to the site boundary of quarries. This limit value can also be implemented with regard to dust impacts from construction of the proposed development.

9.2.2 Construction Phase

9.2.2.1 Construction Traffic Assessment

Construction phase traffic has the potential to impact air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022), states that road links meeting one or more of the following criteria can be defined as being '*affected*' by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

EGIS Group have prepared a Traffic and Transport Impact Assessment for the proposed development enclosed separately and have prepared Chapter 14 - Material Assets (Transportation) of this EIAR. As per Chapter 14, it has been determined that the construction phase traffic will not increase by 1,000 AADT, or 200 HDV AADT, or that the development will not result in speed changes or changes in road alignment. Therefore, the traffic does not meet the above scoping criteria. A detailed air quality assessment of construction phase traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality with respect with human or ecological receptors.

9.2.2.2 Construction Dust Assessment

The Institute of Air Quality Management in the UK guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2024) outlines an assessment method for predicting the impact of dust emissions from demolition, earthworks, construction and haulage activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site-specific mitigation required. Transport Infrastructure Ireland (TII) recommends the use of the IAQM guidance (IAQM, 2024) in the TII guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022a).

The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into large, medium or small scale depending on the nature of the activities involved. The criteria for determining the category for the works involved are outlined in Table 9.3, these are based on the IAQM guidance (IAQM, 2024). The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Dust Emission Magnitude		
Small	Medium	Large
Demolition		
• Total building volume <12,000 m^3. • Construction material with low potential for dust release (e.g. metal cladding or timber). • Demolition activities <6 m above ground. • Demolition during wetter months.	• Total building volume 12,000 - 75,000 m^3. • Potentially dusty construction material. • Demolition activities 6 – 12 m above ground level.	• Total building volume >75,000 m^3. • Potentially dusty construction material (e.g. concrete). • On-site crushing and screening. • Demolition activities >12 m above ground level.
Earthworks		
• Total site area <18,000 m^2. • Soil type with large grain size (e.g. sand). • <5 heavy earth moving vehicles active at any one time. • Formation of bunds <3 m in height • Earthworks during wetter months.	• Total site area 18,000 m^2 - 110,000 m^2. • Moderately dusty soil type (e.g. silt). • 5 – 10 heavy earth moving vehicles active at any one time. • Formation of bunds 3 – 6 m in height	• Total site area >110,000 m^2. • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size). • >10 heavy earth moving vehicles active at any one time. • Formation of bunds >6 m in height.
Construction		
• Total building volume <12,000 m^3. • Construction material with low potential for dust release (e.g. metal cladding or timber).	• Total building volume 12,000 - 75,000 m^3. • Potentially dusty construction material (e.g. concrete). • On-site concrete batching.	• Total building volume >75,000 m^3. • On-site concrete batching. • Sandblasting.
Trackout (Truck Movements)		
• <20 HDV (>3.5 t) outward movements in any one day. • Surface material with low potential for dust release. • Unpaved road length <50 m.	• 20 – 50 HDV (>3.5 t) outward movements in any one day. • Moderately dusty surface material (e.g. high clay content). • Unpaved road length 50 – 100 m.	• >50 HDV (>3.5 t) outward movements in any one day. • Potentially dusty surface material (e.g. high clay content). • Unpaved road length >100 m.

Table 9.3 IAQM Criteria to Determine Dust Emissions Magnitude

Once the dust emission magnitude has been determined the next step, according to the IAQM guidance (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, human health and ecological effects. The level of risk associated with each activity is determined using the criteria in Table 9.4.

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

Table 9.4 IAQM Criteria to Determine Risk of Dust Impacts

9.2.3 Operational Phase

9.2.3.1 Operational Phase Traffic Assessment

Operational phase traffic has the potential to impact local air quality due to increased vehicle movements associated with the proposed development. The TII scoping criteria detailed in Section 9.2.2.1 were used to determine if any road links are affected by the proposed development and require inclusion in a detailed air dispersion modelling assessment. The proposed development will not result in the operational phase traffic increasing by more than 1,000 AADT. In addition, there are no proposed changes to the traffic speeds or road alignment. Therefore, no road links impacted by the proposed development satisfy the screening criteria. A quantitative assessment of the effect of traffic emissions on ambient air quality is not necessary as there is no potential for significant effects to local air quality.

9.3 RECEIVING ENVIRONMENT

9.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality are the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus,

concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Dublin Airport meteorological station, which is located approximately 5 km west of the site. Dublin Airport data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (Figure 9.1). For data collated during five representative years (2020 – 2024), the predominant wind direction is westerly to south-westerly with a mean wind speed of 5.4 m/s over the 30-year period of 1991 - 2020 (Met Éireann, 2025).

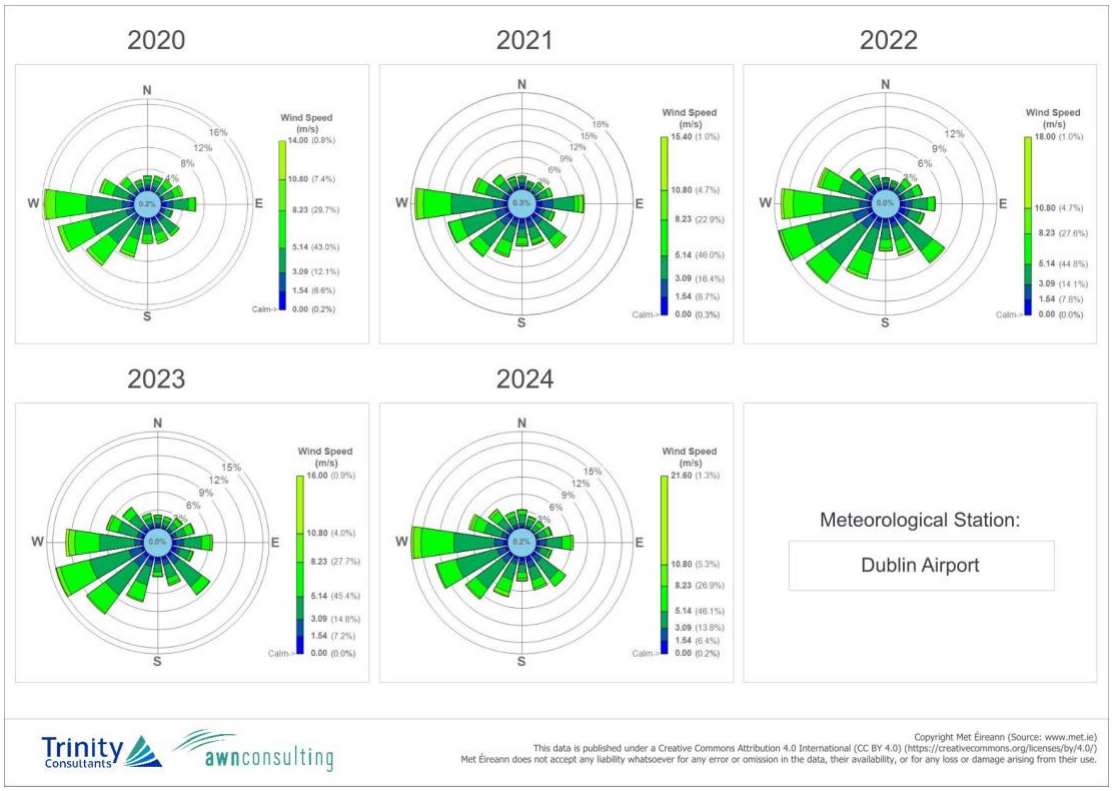

Figure 9.1: Windroses for Dublin Airport Meteorological Station

9.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is "*Air Quality in Ireland 2023*" (EPA, 2024). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments.

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2025). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone A (EPA, 2025). The long-term monitoring data has been used to determine background concentrations for the

key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions e.g. natural sources, industry, home heating etc.

Continuous monitoring by the EPA is carried out at several monitoring stations within Zone A. These stations include urban background sites, roadside (traffic) sites and suburban background sites. It is necessary to select monitoring stations that are representative of the site location. Not all monitoring stations are considered suitable for determining background pollutant concentrations and must be reviewed on a case-by-case basis to determine the most appropriate EPA monitoring sites for the current assessment.

The EPA state on their website (EPA, 2025) that background sites generally represent overall area-wide exposure more closely than roadside sites. Roadside monitoring sites are heavily influenced by traffic emissions and are not considered representative of area-wide pollutant levels.

The full suite of EPA Zone A monitoring locations was reviewed. These included urban traffic (Pearse Street, Ringsend, St. John's Road), suburban traffic (Blanchardstown, Davitt Road, Dublin Port), urban background (Rathmines, Winetavern St.) and suburban background (Ballyfermot, Swords, Dun Laoghaire, Finglas, Marino, Phoenix Park, St. Anne's Park, Tallaght, Clonskeagh and Dublin Airport) locations. Suburban background was determined to be the most representative background level for the area of the proposed development.

9.3.2.1 NO_2

Long-term NO_2 monitoring was carried out at the representative Zone A suburban background locations of Dun Laoghaire, Ballyfermot, Swords and Tallaght for the period 2019 – 2023 (Table 9.5) (EPA, 2024). Long-term average concentrations are significantly below the annual average limit of 40 µg/m^3. Average results range from 10 – 20 µg/m^3 over the period 2019 – 2023. Additionally, there were no exceedances of the hourly limit value of 200 µg/m^3. The overall 5-year average annual mean concentration across these Zone A sites is 14 µg/m^3. Based on the above information a conservative estimate of the current background NO_2 concentration for the region of the proposed development is 14 µg/m^3.

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
Dun Laoghaire	Annual Mean NO_2 (µg/m^3)	15	13	16	16	13
	1-hr Mean > 200 µg/m^3 (days)	0	0	0	0	0
Ballyfermot	Annual Mean NO_2 (µg/m^3)	20	12	13	13	13
	1-hr Mean > 200 µg/m^3 (days)	0	0	0	0	0
Swords	Annual Mean NO_2 (µg/m^3)	15	11	11	12	10
	1-hr Mean > 200 µg/m^3 (days)	0	0	0	0	0
Tallaght	Annual Mean NO_2 (µg/m^3)	-	14	13	14	14
	1-hr Mean > 200 µg/m^3 (days)	-	0	0	0	0

Table 9.5: Trends in Zone A Air Quality - Nitrogen Dioxide (NO_2)

9.3.2.2 PM_{10}

Continuous PM_{10} monitoring was carried out at seven representative Zone A locations from 2019 – 2023: Ballyfermot, Dún Laoghaire, Finglas, Marino, Phoenix Park, St. Anne's Park and Tallaght.

Annual average PM_{10} concentrations across the sites ranged from 9 – 14 µg/m³ over the 2019 – 2023 period (Table 9.6). There were at most 7 exceedances of the daily limit of 50 µg/m³ in 2022 (at Ballyfermot). However, 35 exceedances are permitted per year (EPA, 2024). The overall 5-year average annual mean concentration across these Zone A sites is 12 µg/m³. Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 12 µg/m³.

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
Ballyfermot	Annual Mean PM_{10} (µg/m³)	14	12	12	13	11
	24-hr Mean > 50 µg/m³ (days)	7	2	0	1	0
Dún Laoghaire	Annual Mean PM_{10} (µg/m³)	12	12	11	12	12
	24-hr Mean > 50 µg/m³ (days)	2	0	0	1	1
Finglas	Annual Mean PM_{10} (µg/m³)	13	12	12	12	12
	24-hr Mean > 50 µg/m³ (days)	2	0	0	1	0
Marino	Annual Mean PM_{10} (µg/m³)	14	13	12	14	12
	24-hr Mean > 50 µg/m³ (days)	4	0	0	3	0
Phoenix Park	Annual Mean PM_{10} (µg/m³)	11	10	10	11	9
	24-hr Mean > 50 µg/m³ (days)	2	0	0	0	0
St. Anne's Park	Annual Mean PM_{10} (µg/m³)	12	11	11	13	11
	24-hr Mean > 50 µg/m³ (days)	1	0	0	1	0
Tallaght	Annual Mean PM_{10} (µg/m³)	12	10	10	11	11
	24-hr Mean > 50 µg/m³ (days)	3	1	0	1	1

Table 9.6: Trends in Zone A Air Quality - PM_{10}

9.3.2.3 $PM_{2.5}$

Average $PM_{2.5}$ levels in Ballyfermot, Dún Laoghaire, Finglas, Marino, Pheonix Park and St. Anne's Park, over the period 2019 - 2023 ranged from 6 - 10 µg/m³ (EPA, 2024). The overall annual average concentration for this 5-year period is 8 µg/m³ (Table 9.7). Based on this information, an estimate of the background $PM_{2.5}$ concentration in the region of the proposed development is 8 µg/m³.

Station	Averaging Period	Year				
		2019	2020	2021	2022	2023
Ballyfermot	Annual Mean $PM_{2.5}$ (µg/m³)	8.0	7.8	7.5	7.5	6.9
Dun Laoghaire	Annual Mean $PM_{2.5}$ (µg/m³)	8.0	7.5	7.8	7.8	7.4
Finglas	Annual Mean $PM_{2.5}$ (µg/m³)	7.0	7.5	7.3	7.3	6.6
Marino	Annual Mean $PM_{2.5}$ (µg/m³)	8.0	7.9	8.9	8.9	7.2
Phoenix Park	Annual Mean $PM_{2.5}$ (µg/m³)	7.0	6.4	6.3	6.3	5.6
St. Anne's Park	Annual Mean $PM_{2.5}$ (µg/m³)	7.0	6.9	7.8	7.8	6.5

Table 9.7: Trends in Zone A Air Quality – $PM_{2.5}$

9.3.2.4 Summary

Based on the above information the air quality in the suburban, Dublin area is generally good, with concentrations of the key pollutants generally well below the relevant limit values. However, the EPA have indicated that road transport emissions are contributing to increased levels of NO_2. There is the potential for breaches in the annual NO_2 limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM_{10} and $PM_{2.5}$). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2024).

Table 9.8 shows the estimated background concentrations used to inform the air quality assessment.

NO_2	PM_{10}	$PM_{2.5}$
14 µg/m³	12 µg/m³	8 µg/m³

Table 9.8 Estimated Background Concentrations

9.3.3 Sensitivity of the Receiving Environment

In line with the UK Institute of Air Quality Management guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2024) prior to assessing the impact of dust from a proposed development, the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend much of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. Table 9.9 outlines the criteria for determining the sensitivity of the area to dust soiling and dust-related human health effects as per the IAQM guidance (IAQM, 2024).

Sensitivity of the Area to Dust Soiling Effects on People and Property						
Receptor Sensitivity	Number of Receptors		Distance from Source (m)			
			<20	<50	<100	<250
High	>100		High	High	Medium	Low
	10 - 100		High	Medium	Low	Low
	1 - 10		**Medium**	Low	Low	Low
Medium	>1		Medium	Low	Low	Low
Low	>1		Low	Low	Low	Low
Sensitivity of the Area to Human Health Impacts						
Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	< 24 µg/m³	>100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	**Low**	Low	Low	Low
Medium	< 24 µg/m³	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	< 24 µg/m³	>1	Low	Low	Low	Low
Sensitivity of the Area to Dust Related Ecological Impacts						
Receptor Sensitivity			Distance from Source (m)			

	<20	<50
High	High	**Medium**
Medium	Medium	Low
Low	Low	Low

Table 9.9 IAQM Criteria for Determining the Sensitivity of the Area

In terms of receptor sensitivity to dust soiling, there are several highly sensitive residential properties within 100 m of the proposed development boundary (Figure 9.2). There are >100 properties within 100m, 10-100 within 50m and 1-10 within 20m of the site boundary. Based on these receptor numbers and using the IAQM criteria in Table 9.9, the sensitivity of the area to dust soiling impacts from the proposed development is medium.

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 12 µg/m^3. There are 1-10 high sensitivity receptors within 20 m of the proposed development boundary (Figure 9.2). Based on the IAQM criteria outlined in Table 9.9 the worst-case sensitivity of the area to dust-related human health effects is low.

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant, as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50 m from the site and 50 m from site access roads up to 250 m for the site entrance. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present.

There is a portion of the Baldoyle Bay SAC, SPA and pNHA within 50 m of the proposed development boundary (Figure 9.2). High sensitivity ecological receptors are sites with European or National designation with particularly dust sensitive species present. The Baldoyle Bay SAC/SPA is considered a high sensitivity receptor due to it's European designation. The same sensitivity has been assumed for the Baldoyle Bay pNHA also as the site's have similar qualifying interests. Based on the IAQM criteria outlined in Table 9.9, the worst-case sensitivity of the area to dust-related ecological effects is medium.

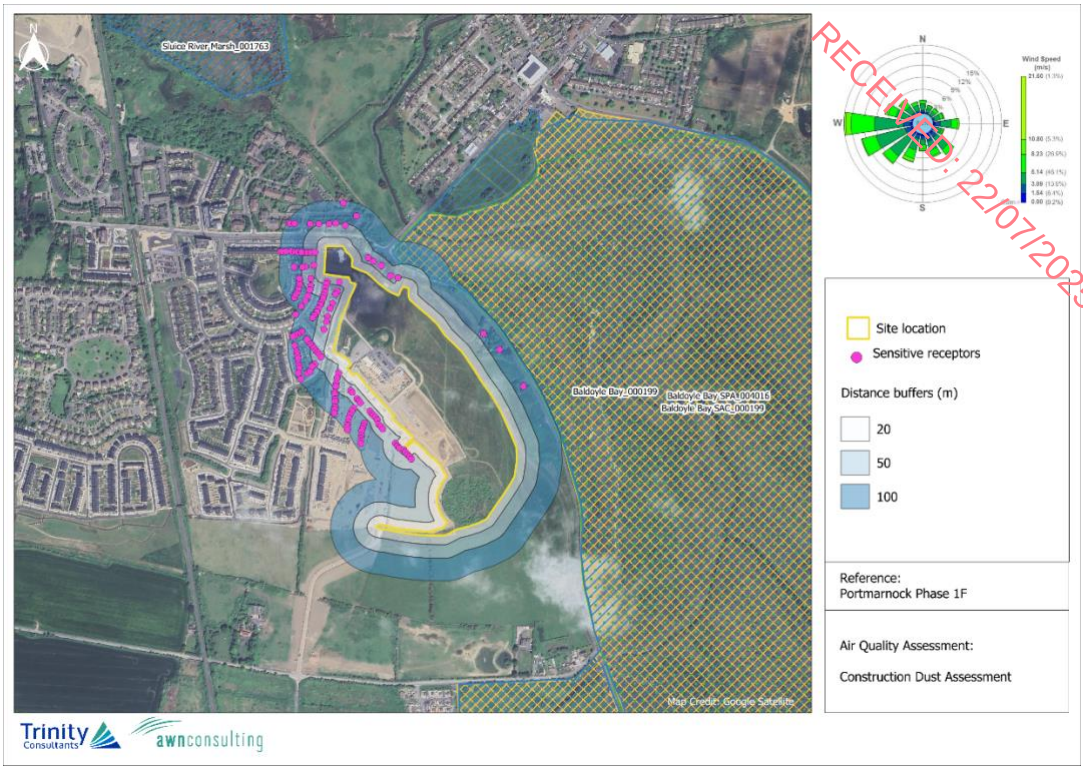

Figure 9.2 Construction Dust Assessment – Sensitive Receptors within 100m of Site

9.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development will comprise a mix of residential units; public open space including southern Monument Park which formed part of the Racecourse Park development; vehicular access to serve the development is proposed off Monument View; and all associated and ancillary site development, infrastructural, landscaping and boundary treatment works. A full description of the development is available in Chapter 3: Description of Proposed Development.

9.4.1 Construction Phase

During the construction phase construction dust emission have the potential to impact air quality. Dust emissions will primarily occur due to site preparation works, earthworks and the movement of trucks on site and exiting the site. There is also the potential for engine emissions from site vehicles and machinery to impact air quality. Construction phase impacts will be short-term in duration.

9.4.2 Operational Phase

Engine emissions from vehicles accessing the site have the potential to impact air quality during the operational phase of the development through the release of nitrogen dioxide (NO_2) and particulate matter (as PM_{10} and $PM_{2.5}$). Operational phase impacts will be long-term in duration.

9.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

9.5.1 Construction Phase

9.5.1.1 Construction Dust Assessment

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While

construction dust tends to be deposited within 250 m of a construction site, much of the deposition occurs within the first 50 m (IAQM, 2024). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Dublin Airport meteorological data indicates that the prevailing wind direction is westerly to south-westerly and wind speeds are generally moderate in nature (Section 9.3.1). In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30-year average data for Dublin Airport meteorological station indicates that on average 194 days per year have rainfall over 0.2 mm (Met Éireann, 2025). Therefore, it can be determined that 53% of the time dust generation will be reduced due to natural meteorological conditions.

To determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be considered, in conjunction with the previously established sensitivity of the area (Section 9.3.3). The major dust generating activities are divided into four types within the IAQM (IAQM, 2024) guidance to reflect their different potential impacts. These are: demolition, earthworks, construction and trackout (movement of heavy vehicles).

9.5.1.1.1 Determining the Potential Dust Emission Magnitude

The magnitude of the works under each category can be classified as either small, medium or large depending on the scale of the works involved. The magnitude of each activity has been determined below for the proposed development using the criteria in Table 9.3.

- Demolition: There is no demolition associated with the proposed development.
- Earthworks: The dust emission magnitude for the proposed earthwork activities can be classified as large as the total site area is greater than 110,000 m^2.
- Construction: The dust emission magnitude for the proposed construction activities can be classified as large as a worst-case as the total volume of buildings to be constructed will be greater than 75,000 m^3.
- Trackout: The dust emission magnitude for the proposed trackout can be classified as large, as there will be more than 50 (>3.5 t) outward movements in any one day.

9.5.1.1.2 Determining the Risk of Dust Impacts

Once the dust emission magnitude has been determined the next step, according to the IAQM guidance (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, dust-related human health effects and dust-related ecological effects (Section 9.3.3). The level of risk associated with each activity is determined using the criteria in Table 9.10. The overall risk of dust impacts from the construction works is shown in Table 9.10 for each category.

- Demolition: There is no demolition associated with the proposed development.
- Earthworks: As the overall sensitivity of the area to dust soiling is medium, when combined with a large dust emission magnitude, this produces an overall medium risk of dust soiling impacts (as per the criteria in Table 9.4). As the overall sensitivity of the area to dust-related human health effects is low, when combined with a large dust emission magnitude, this results in a low risk of dust-related human health effects (as per the criteria in Table 9.4). As the overall sensitivity of the area to dust-related ecological effects is medium, when combined with a large dust emission magnitude, this results in a medium risk of dust-related ecological effects (as per the criteria in Table 9.4).
- Construction: Combining the large dust emissions magnitude for the construction activities with the medium sensitivity to dust soiling results in a medium risk of dust soiling impacts using the criteria in Table 9.4. As the overall sensitivity of the area to dust-related human

health effects is low, when combined with a large dust emission magnitude, this results in a low risk of dust-related human health effects (as per the criteria in Table 9.4). As the overall sensitivity of the area to dust-related ecological effects is medium, when combined with a large dust emission magnitude, this results in a medium risk of dust-related ecological effects due to the proposed construction activities.

- Trackout: Combining the large dust emission magnitude for the trackout activities with the medium sensitivity to dust soiling results in a medium risk of dust soiling impacts using the criteria in Table 9.4. As the overall sensitivity of the area to dust-related human health effects is low, when combined with a large dust emission magnitude, this results in a low risk of dust-related human health effects (as per the criteria in Table 9.4). As the overall sensitivity of the area to dust-related ecological effects is medium, when combined with a large dust emission magnitude, this results in a medium risk of dust-related ecological effects due to the proposed trackout activities.

There is at most a medium risk of dust soiling impacts, a low risk of dust-related human health impacts and a medium risk of dust-related ecological impacts associated with the proposed works. As a result, best practice dust mitigation measures associated with medium risk works will be implemented to ensure there are no significant impacts at nearby sensitive receptors. In the absence of mitigation, dust impacts are predicted to be ***direct, short-term, negative***, ***slight*** and ***not significant*** impact on air quality.

Receptor	Receptor Sensitivity	Dust Emission Magnitude	Risk of Dust-Related Impacts
Earthworks			
Dust Soiling	Medium	Large	Medium Risk
Human Health	Low		Low Risk
Ecology	Medium		Medium Risk
Construction			
Dust Soiling	Medium	Large	Medium Risk
Human Health	Low		Low Risk
Ecology	Medium		Medium Risk
Trackout			
Dust Soiling	Medium	Large	Medium Risk
Human Health	Low		Low Risk
Ecology	Medium		Medium Risk

Table 9.10 Risk of Dust Impacts used to Define Site-Specific Mitigation

9.5.1.2 Construction Phase Traffic Assessment

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase. Particularly due to the increase in HGVs accessing the site. The construction phase traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the TII assessment criteria in Section 9.2.2.1.

Therefore, it can be determined that the construction phase traffic will have a ***direct, short-term, neutral, imperceptible*** and ***not significant*** impact on air quality.

9.5.2 Operational Phase

There is the potential for vehicles accessing the site to result in emissions of NO_2, PM_{10} and $PM_{2.5}$. However, the proposed development will not increase traffic by 1,000 AADT or 200 HDV AADT. In

addition, there are no proposed changes to the traffic speeds or road alignment. Therefore, no road links impacted by the proposed development satisfy the screening criteria (Section 9.2.2.1). A detailed air quality assessment was scoped out for the operational phase of the development as per the TII screening criteria. Operational phase effects on air quality are predicted to be ***direct, long-term, neutral, imperceptible*** and ***not significant*** impact on air quality.

9.5.3 Do-Nothing Impact

Under the Do-Nothing scenario the proposed development will not be constructed. In this scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area. As the site is zoned for development, in the absence of the proposed development it is likely that a development of a similar nature will be constructed in the future in line with national policy and the development plan objectives. Therefore, the construction and operational phase impacts outlined in this assessment are likely to occur in the future even in the absence of the proposed development.

9.5.4 Cumulative Impacts

9.5.4.1 Construction Phase

According to the IAQM guidance (IAQM, 2024) should the construction phase of the proposed development coincide with the construction phase of any other developments within 500 m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. A review of recent planning applications for the area was conducted to identify sites with the potential for cumulative impacts. The following permitted sites were identified as potentially having a cumulative impact:

- Portmarnock South Phase 1D;
- Portmarnock South Phase 1E (Ref. LRD0002/S3);
- New Portmarnock Pumping Station (FCC Reg. Ref. F21A/0389 – ABP Ref. ABP-314663-22); and
- Racecourse Park (ABP Ref. JP06F.311315).

If these sites were to commence construction at the same time, the cumulative effects will be temporary. Otherwise, no significant cumulative impacts have been identified.

The dust mitigation measures outlined in Section 9.6.1 will be applied throughout the construction phase of the proposed development. This will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development are deemed ***direct, short-term, negative, imperceptible*** and ***not significant*** impact on air quality.

9.5.4.2 Operational Phase

There is the potential for cumulative effects to air quality during the operational phase because of traffic associated with other existing and permitted developments within the area. The traffic data provided for the operational stage air quality assessment included specific cumulative developments within the area (see Traffic and Transport Assessment and for further details).

The change in operational phase traffic was below the TII screening criteria in Section 9.2.2.1 and a detailed air quality assessment of traffic emissions was screened out. It was concluded that the cumulative operational stage effect is ***direct, long-term, neutral***, ***imperceptible*** and ***not significant*** impact on air quality.

9.6 MITIGATION MEASURES (AMELIORATIVE, REMEDIAL OR REDUCTIVE MEASURES)

9.6.1 Construction Phase

The proposed development has been assessed as having a medium risk of dust soiling impacts, a low risk of dust related human health impacts and a medium-risk of dust related ecological impacts during the construction phase as a result of earthworks, construction and trackout activities (Section 9.5.1). Therefore, the following dust mitigation measures shall be implemented during the construction phase of the proposed development.

These measures are appropriate for sites with a medium risk of dust impacts and aim to ensure that no significant nuisance occurs at nearby sensitive receptors. The mitigation measures draw on best practice guidance from Ireland (DCC, 2018), the UK (IAQM (2024), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared for the site. The measures are divided into different categories for different activities.

9.6.1.1 Communications

- Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details.

9.6.1.2 Site Management

- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. Dry and windy conditions are favourable to dust suspension therefore mitigations must be implemented if undertaking dust generating activities during these weather conditions.
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out.

9.6.1.3 Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

9.6.1.4 Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.

- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

9.6.1.5 Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

9.6.1.6 Waste Management

- Avoid bonfires and burning of waste materials.

9.6.1.7 Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

9.6.1.8 Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

9.6.1.9 Measures Specific to Trackout

- A speed restriction of 15 kph will be applied as an effective control measure for dust for on-site vehicles.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

9.6.1.10 Monitoring

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

9.6.1.11 Operational Phase

There is no mitigation required for the operational phase of the development as impacts to air quality are predicted to be neutral and imperceptible.

9.7 RESIDUAL IMPACT OF THE PROPOSED DEVELOPMENT

9.7.1 Construction Phase

To minimise dust emissions during construction, a series of mitigation measures have been prepared as outlined in Section 9.6.1. Provided the dust minimisation measures are adhered to, the predicted residual air quality impacts during the construction phase are ***direct, short-term, negative, imperceptible*** and ***not significant***.

9.7.1.1 Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development, which will focus on the proactive control of dust and other air pollutants, to minimise

generation of emissions at source. The mitigation measures that will be put in place during construction will ensure that the impact complies with all EU ambient air quality legislative limit values (set out in Directive 2008/50/EC), which are based on the protection of human health (Table 9.1). Therefore, the predicted residual, dust-related, human health impact of the construction phase of the proposed development is ***direct, short-term, negative, imperceptible*** and ***not significant***.

9.7.2 Operational Phase

9.7.2.1 Air Quality

The operational traffic associated with the proposed development was reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the Proposed Development satisfy the TII scoping assessment criteria in Section 9.2.2.1. Therefore, the operational phase impact to air quality is ***direct, long-term, negative, imperceptible*** and ***not significant*.**

9.7.2.2 Human Health

A detailed air quality assessment of operational phase traffic has been scoped out as there is no potential for significant impacts to air quality with respect with human receptors. Section 9.2.2.1 determined that the impact to air quality during the operational phase of the proposed development is ***direct, long-term, negative, imperceptible*** and ***not significant***.

9.8 MONITORING

9.8.1 Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/m^2/day during the monitoring period of 30 days (+/- 2 days).

9.8.2 Operational Phase

There is no monitoring recommended for the operational phase of the proposed development as impacts to air quality are predicted to be imperceptible.

9.9 REINSTATEMENT

Reinstatement is not required.

9.10 DIFFICULTIES ENCOUNTERED

There were no difficulties encountered when compiling this assessment.