9 CLIMATE (AIR QUALITY & CLIMATE CHANGE)

9.1 Introduction

AWN Consulting Ltd. has been commissioned to carry out an assessment of the likely air quality and climate impacts associated with a proposed Strategic Housing Development (SHD) (172no. units) at Portmarnock, Co. Dublin. A full description of the Proposed Development is available in Chapter 3: Description of Proposed Development.

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9.2 Assessment Methodology

9.2.1 Criteria for Rating of Impacts

Ambient Air Quality Standards

In order 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 (see Table 9.1 and Appendix 9.1).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC, which has set limit values for NO_2, PM_{10} and $PM_{2.5}$, which are applicable in relation to this project (see Table 9.1). Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions (see Appendix 9.1).

Pollutant	Regulation Note 1	Limit Type	Value
Nitrogen Dioxide (NO_2)	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times / year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
		Critical level for protection of vegetation	30 µg/m^3 NO + NO_2
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health – not to be exceeded more than 35 times / year	50 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3

Note 1: EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

Table 9.1: Ambient Air Quality Standards.

Dust Deposition Guidelines

The concern from a health perspective is focussed on particles of dust which 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.

With regard to 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 Bergerhoff 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.

Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013 (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) was enacted (the Act). The purpose of the Act was to enable Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050*' (3.(1) of No. 46 of 2015). This is referred to in the Act as the '*national transition objective*'. The Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The *Climate Action Plan* (CAP), published in June 2019, outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The CAP has set a built environment sector reduction target of 40 – 45% relative to 2030 pre-NDP (National Development Plan) projections.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme for the Climate Action (Amendment) Bill 2019 in December 2019. The General Scheme was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act is to provide for the approval of plans "*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*". The 2021 Climate Act will also "*provide for carbon budgets and a decarbonisation target range for certain sectors of the economy".* The 2021 Climate Act defines the carbon budget as "*the total amount of greenhouse gas emissions that are permitted during the budget period".*

The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request that each Local Authority produce a climate action plan lasting five years, specifying the mitigation measures and the adaptation measures to be adopted by the Local Authority.

The Fingal County Council Climate Change Action Plan 2019 – 2024 sets out specific objectives in relation the climate: -

- A 40% reduction in the Council's greenhouse gas emissions by 2030.
- To make Dublin a climate resilient region, by reducing the impacts of future climate change-related events.
- To actively engage and inform citizens on climate change.

The actions in the plan are a starting point and will be regularly monitored and updated by a dedicated Climate Action Team, working with an Interdepartmental Steering Group representative of all five Dublin Council Departments.

9.2.2 Construction Phase

The current assessment focuses on identifying the existing baseline levels of PM_{10} and $PM_{2.5}$ in the region of the Proposed Development by an assessment of EPA monitoring data. Thereafter, the impact of the Construction Phase of the Proposed Development on air quality was determined by a qualitative assessment of the nature and scale of dust generating construction activities associated with the Proposed Development.

Construction Phase traffic also has the potential to impact air quality and climate. The UK Design Manual for Roads and Bridges (DMRB) guidance (UK Highways Agency, 2019a), 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. Transport Infrastructure Ireland (TII) guidance (2011) recommend the use of the UK DMRB guidance (UK Highways Agency, 2007) in its document and notes that the TII guidance should be adapted for any updates to the DMRB (see Section 1.1 of Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes, 2011). This approach is considered best practice in the absence of specific Irish guidance.

- Annual average daily traffic (AADT) changes by 1,000 or more.
- Heavy duty vehicle (HDV) AADT changes by 200 or more.
- A change in speed band.
- A change in carriageway alignment by 5m or greater.

The Construction Phase traffic does not meet the above scoping criteria and therefore, has been scoped out from any further assessment as there is no potential for significant impacts to air quality.

9.2.3 Operational Phase

Air Quality Assessment

Operational phase traffic has the potential to impact air quality. The air quality assessment has been carried out following procedures described in the publications by the EPA (2015; 2017) and using the methodology outlined in the guidance documents published by the UK Highways Agency (2019a) and UK Department of Environment Food and Rural Affairs (DEFRA) (2016; 2018). Transport Infrastructure Ireland (TII) reference the use of the UK Highways Agency and DEFRA guidance and methodology in their document Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (2011). This approach is considered best practice in the absence of Irish guidance and can be applied to any development that causes a change in traffic.

The UK Highways Agency guidance *LA 150* (2019a) scoping criteria outlined in Section 9.2.2 was used to determine the road links required for inclusion in the modelling assessment. As none of the road links impacted by the Proposed Development met the scoping criteria a detailed assessment was scoped out as there is no potential for significant impacts to air quality.

Air Quality Impact on Ecological Sites

For routes that pass within 2km of a designated area of conservation (either Irish or European designation) the TII requires consultation with an ecologist (TII, 2011). However, in practice the potential for impact to an ecological site is highest within 200m of the proposed scheme and when significant changes in AADT (>5%) occur. Only sites that are sensitive to nitrogen deposition should be included in the assessment. In addition, the UK Highways Agency (2019) states that a detailed assessment does not need to be conducted for areas that have been designated for geological features or watercourses.

Transport Infrastructure Ireland's *Guidelines for Assessment of Ecological Impacts of National Road Scheme*s (2009) and *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities* (DEHLG, 2010) provide details regarding the legal protection of designated conservation areas.

If both of the following assessment criteria are met, an assessment of the potential for impact due to nitrogen deposition should be conducted: -

- A designated area of conservation is located within 200m of the Proposed Development; and
- A significant change in AADT flows (>5%) will occur.

The Baldoyle Bay Special Area of Conservation (SAC) and Proposed Natural Heritage Area (pNHA) (site code 000199), along with the Baldoyle Bay Special Protection Area (SPA) (site code 004016) are to the direct east of the Proposed Development within approx. 200m. However, there is no significant change in AADT flow and as a result a detailed assessment has been scoped out as there is no potential for significant impacts to the designated site.

Climate Assessment

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013. Which has set a target of a 30% reduction in non-ETS sector emissions by 2030 relative to 2005 levels.

As per the EU guidance document Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013) the climate baseline is first established by reference to EPA data on annual GHG emissions (see Section 9.3.3). Thereafter the impact of the Proposed Development on climate is determined. Emissions from road traffic associated with the Proposed Development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments LA 114 Climate (UK Highways Agency 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the Operational Phase.

- A change of more than 10% in AADT.
- A change of more than 10% to the number of heavy duty vehicles.
- A change in daily average speed of more than 20 km/hr.

If any of the road links impacted by the Proposed Development meet or exceed the above criteria, then further assessment is required. None of the road links impacted by the Proposed Development meet the scoping criteria above and therefore a detailed assessment has been scoped out as there is no potential for significant impacts to climate.

9.3 Receiving Environment

9.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is 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). 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 actually 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, which is located approximately 5km west of the site. Dublin Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 9.1). For data collated during five representative years (2016 – 2020), the predominant wind direction is westerly to south-westerly, with generally moderate wind speeds (Met Éireann, 2021).

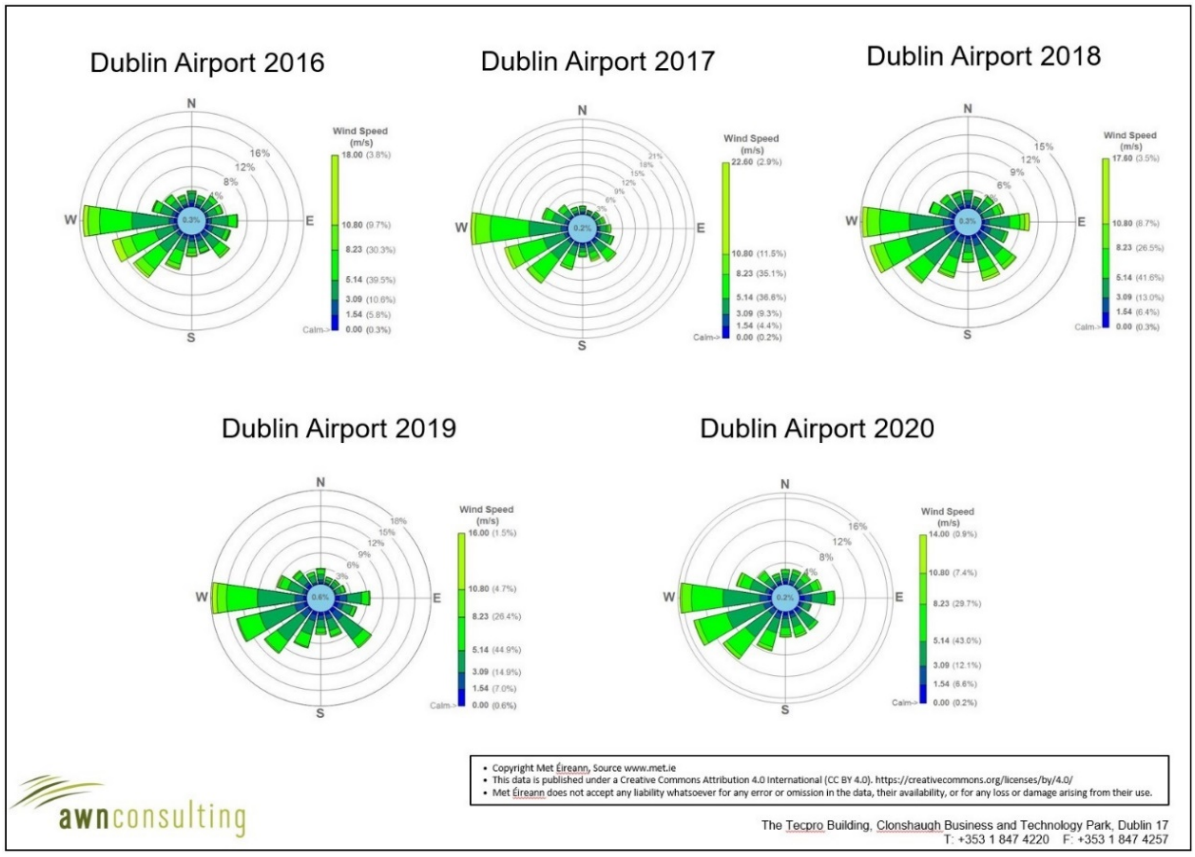

Figure 9.1 Dublin Airport Windroses 2016 – 2020**.**

Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2019*" (EPA, 2020b). 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 (EPA, 2020b).

As part of the implementation of the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2020b). 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 is within Zone A (EPA, 2020b). The long-term EPA 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.).

With regard to NO_2, continuous monitoring data from the EPA (EPA, 2020b) at suburban Zone A locations in Ballyfermot, Dun Laoghaire, Swords and Rathmines show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 15 – 22 µg/m^3 in 2019 (see Table 9.3). Sufficient data is available for all stations to observe the long-term trend since 2015 (EPA, 2020b) (see Table 9.3), with results ranging from 13 – 22 µg/m^3 and few exceedances of the one-hour limit value. The station in Swords is approximately 7 km north-west of the Proposed Development site and monitored background concentrations would be representative of the site location. Concentrations of NO_2 at the Swords site over the period 2015 – 2019 ranged from 13 – 16 µg/m^3. Based on the above information, an estimate of the background NO_2 concentration in the region of the Proposed Development is 16 µg/m^3.

Station	Averaging Period Notes 1, 2	Year				
		2015	2016	2017	2018	2019
Rathmines	Annual Mean NO_2 ($\mu g/m^3$)	18	20	17	20	22
	Max 1-hr NO_2 ($\mu g/m^3$)	106	102	116	138	183
Dún Laoghaire	Annual Mean NO_2 ($\mu g/m^3$)	16	19	17	19	15
	Max 1-hr NO_2 ($\mu g/m^3$)	103	142	153	135	104
Swords	Annual Mean NO_2 ($\mu g/m^3$)	13	16	14	16	15
	Max 1-hr NO_2 ($\mu g/m^3$)	170	206	107	112	108
Ballyfermot	Annual Mean NO_2 ($\mu g/m^3$)	16	17	17	17	20
	Max 1-hr NO_2 ($\mu g/m^3$)	142	127	148	217	124

Note 1 Annual average limit value – 40 $\mu g/m^3$ (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Note 2 1-hour limit value – 200 µg/m3 as a 99.8th%ile, i.e. not to be exceeded >18 times per year (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Table 9.3: Trends in Zone A Air Quality – Nitrogen Dioxide (NO_2).

Continuous PM_{10} monitoring carried out at the Zone A locations of Rathmines, Phoenix Park and Dún Laoghaire showed 2015 – 2019 annual mean concentrations ranging from 9 – 15 $\mu g/m^3$ (Table 9.4), with at most 9 exceedances (in Rathmines) of the 24-hour limit value of 50 $\mu g/m^3$ (35 exceedances are permitted per year). The most representative location is Phoenix Park which had an average annual mean concentration of 10.8 $\mu g/m^3$ over the five year period. Based on the EPA data (Table 9.4) a conservative estimate of the current background PM_{10} concentration in the region of the Proposed Development is 13 $\mu g/m^3$.

Station	Averaging Period Notes 1, 2	Year				
		2015	2016	2017	2018	2019
Rathmines	Annual Mean PM_{10} ($\mu g/m^3$)	15	15	13	15	15
	24-hr Mean > 50 $\mu g/m^3$ (days)	5	3	5	2	9
Phoenix Park	Annual Mean PM_{10} ($\mu g/m^3$)	12	11	9	11	11
	24-hr Mean > 50 $\mu g/m^3$ (days)	2	0	1	0	2
Dún Laoghaire	Annual Mean PM_{10} ($\mu g/m^3$)	13	13	12	13	12
	24-hr Mean > 50 $\mu g/m^3$ (days)	3	0	2	0	2

Note 1 Annual average limit value – 40 $\mu g/m^3$ (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Note 2 24-hour limit value – 50 $\mu g/m^3$ as a 90.4th%ile, i.e. not to be exceeded >35 times per year (EU Council Directive 1999/30/EC & S.I. No. 180 of 2011).

Table 9.4: Trends in Zone A Air Quality – PM_{10}

Continuous $PM_{2.5}$ monitoring carried out at the Zone A location of Rathmines showed $PM_{2.5}/PM_{10}$ ratios ranging from 0.60 – 0.68 over the period 2015 – 2019. Based on this information, a conservative ratio of 0.7 was used to generate a background $PM_{2.5}$ concentration in the region of the Proposed Development of 9.1 $\mu g/m^3$.

Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details final emissions up to 2019 (EPA, 2021b). The data published in 2021 states that Ireland has exceeded its 2019 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.85 Mt. For 2019, total national greenhouse gas emissions are 59.78 million tonnes carbon dioxide equivalent (Mt CO_2eq) with 45.58 MtCO_2eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2019 at 35.3% of the total, with the transport sector accounting for 20.3% of emissions of CO_2.

GHG emissions for 2019 are 4.4% lower than those recorded in 2018. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for four years in a row. Emissions from 2016 – 2019 exceeded the annual EU targets by 0.29 MtCO_2eq, 2.94 MtCO_2eq, 5.57 MtCO_2eq and 6.85 MtCO_2eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2020 GHG Emissions Projections Report for 2020 – 2040 (EPA, 2021c) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 2019. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 to 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 12.2MtCO_2eq under the "With Existing Measures" scenario and under the "With Additional Measures" scenario (EPA, 2021c). The projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the 2019 Climate Action Plan and the use of the flexibilities available.

Sensitivity of the Receiving Environment

In line with the UK Institute of Air Quality Management (IAQM) guidance document 'Guidance on the Assessment of Dust from Demolition and Construction' (2014) 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 the majority 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.

In terms of receptor sensitivity to dust soiling, there are approximately 21no. high sensitivity residential properties within 50m of the main works area of the Proposed Development site. Based on the IAQM criteria outlined in Table 9.5, the worst case sensitivity of the area to dust soiling is considered to be medium.

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
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

Table 9.5: Sensitivity of the Area to Dust Soiling Effects on People and Property.

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 13 µg/m^3 and there are approximately 35 high sensitivity receptors located within 100m of the Proposed Development site. Based on the IAQM criteria outlined in Table 9.6, the worst case sensitivity of the area to human health is considered to be low.

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<200
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	**Low**	Low
		1-10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

Table 9.6: Sensitivity of the Area to Human Health Impacts.

9.4 Characteristics of the Proposed Development

9.4.1 Proposed Development

The Proposed Development is located in the townlands of Drumnigh, Maynetown and Portmarnock, Portmarnock, Co. Dublin. A full description of the development is available in Chapter 3: Description of Proposed Development.

When considering a development of this nature, the potential air quality and climate impact on the surroundings must be considered for each of two distinct stages: -

- Construction Phase.
- Operational Phase.

9.4.1.1 Construction Phase

The key elements of construction of the Proposed Development with potential for air quality and climate impacts are: -

- Potential fugitive dust emissions from general site preparation and construction activities.
- Potential fugitive dust emissions from trucks associated with construction.
- Engine emissions from construction vehicles and machinery.

9.4.1.2 Operational Phase

The key elements of operation of the Proposed Development with potential for air quality and climate impacts are: -

- A change in traffic flows on road links nearby the Proposed Development.

9.5 Potential Impact of the Proposed Development

9.5.1 Proposed Development

9.5.1.1 Construction Phase

Air Quality

In order 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 taken into account, in conjunction with the previously established sensitivity of the area (see Section 9.3.4). The major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are: -

- Demolition.
- Earthworks.
- Construction.
- Trackout (movement of heavy vehicles).

Demolition

There is no scheduled demolition associated with the Proposed Development and as such has been scoped out of the analysis.

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below: -

- **Large:** Total site area > 10,000m^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 >8m in height, total material moved >100,000 tonnes.
- **Medium:** Total site area 2,500m^2 – 10,000m^2, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8m in height, total material moved 20,000 – 100,000 tonnes.
- **Small:** Total site area < 2,500m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

The total developable site area is approximately 53,000m^2 which is greater than 10,000m^2. However, it is estimated that approximately 24,000m^3 of material will be moved during excavation and infill operations, this is less than 100,000 tonnes. Therefore, the dust emission magnitude for the proposed earthwork activities can be classified as medium.

The sensitivity of the area, as determined in Section 9.3.4, is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 9.7, combining the medium dust emission magnitude with a medium sensitivity to dust soiling results in an overall medium risk of dust impacts as a result of the proposed earthworks activities in the absence of mitigation. There is an overall low risk of human health impacts as a result of the earthworks activities as the overall sensitivity of the area to human health impacts is low (Section 9.3.4).

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 9.7: Risk of Dust Impacts – Earthworks.

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below: -

- **Large:** Total building volume > 100,000m^3, on-site concrete batching, sandblasting.
- **Medium:** Total building volume 25,000m^3 – 100,000m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching.
- **Small:** Total building volume < 25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude for the proposed construction activities can be classified as large as a worst-case as the total building volume will be greater than 100,000m^3. As outlined in Table 9.8, combining this with a medium sensitivity to dust results in an overall medium risk of dust soiling impacts as a result of the proposed construction activities in the absence of mitigation. There is an overall low risk of human health impacts as a result of the construction activities as the overall sensitivity of the area to human health impacts is low (Section 9.3.4).

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 9.8: Risk of Dust Impacts – Construction.

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below: -

- **Large:** > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m.
- **Medium:** 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100m.
- **Small:** < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50m.

The dust emission magnitude for the proposed trackout can be classified as medium as there will be approximately 20 outward HGV movements per day at peak times. As outlined in Table 9.9, combining this with a medium sensitivity to dust soiling results in an overall medium risk of impacts as a result of the proposed trackout activities in the absence of mitigation. There is an overall low risk of human health impacts as a result of trackout activities as the overall sensitivity of the area to human health impacts is low (Section 9.3.4).

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 9.9: Risk of Dust Impacts – Trackout.

Summary of Dust Emission Risk

The risk of dust impacts as a result of the Proposed Development are summarised in Table 9.10 for each activity. The magnitude of risk determined is used to prescribe the level of site specific mitigation required for each activity in order to prevent significant impacts occurring.

Overall, in order to ensure that no dust nuisance occurs during the earthworks, construction and trackout activities, a range of dust mitigation measures associated with a medium risk of dust impacts must be implemented. In the absence of mitigation there is the potential for short-term, negative and slight impacts to nearby receptors as a result of construction dust emissions.

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	-	Medium Risk	Medium Risk	Medium Risk
Human Health	-	Low Risk	Low Risk	Low Risk

Table 9.10: Summary of Dust Impact Risk used to Define Site-Specific Mitigation.

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 DMRB assessment criteria in Section 9.2.2.

It can therefore be determined that the Construction Phase traffic will have an imperceptible, neutral and short-term impact on air quality.

Climate

There is the potential for a number of greenhouse gas emissions to enter the atmosphere during the construction of the Proposed Development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document "Guidance on the Assessment of Dust from Demolition and Construction" (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, the impact on climate is considered to be imperceptible, neutral and short term.

Human Health

Dust emissions from the Construction Phase of the Proposed Development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per section 9.3.4 the surrounding area is of low sensitivity to dust related human health impacts. It was determined that there is an overall low risk of dust related human health impacts as a result of the Construction Phase of the Proposed Development. Therefore, in the absence of mitigation there is the potential for imperceptible, negative, short-term impacts to human health as a result of the Proposed Development.

9.5.1.2 Operational Phase

Air Quality

There is the potential for a number of emissions to the atmosphere during the Operational Phase of the Proposed Development. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO_2, PM_{10} and $PM_{2.5}$.

Traffic flow information obtained from JB Barry, the consulting engineers on this project, was reviewed prior to assessing the impact of the Proposed Development. It was concluded that further assessment of impacts from the aforementioned pollutant emissions can be screened out using the UK DMRB guidance (UK Highways Agency, 2019a), on which the TII guidance was based.

The Proposed Development will not increase traffic levels by more than the scoping criteria (see Section 9.2.2), therefore, an assessment of the impact of traffic emissions during the operational phase on ambient air quality is not necessary as no significant impacts are likely. It can be concluded that the impact of the Proposed Development in terms of air quality is long-term, localised, neutral and imperceptible.

Climate

The impact of the Proposed Development on emissions of CO_2 impacting climate were assessed using the DMRB screening criteria as outlined in Section 9.2.3 (UK Highways Agency, 2019b). As with the air quality assessment impacts on climate can be screened out due to no road links being classed as impacted.

Therefore, the likely overall magnitude of the changes on climate in the Operational Phase is imperceptible, neutral and long-term.

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. A detailed flood risk assessment has been undertaken as part of this planning application and adequate attenuation and drainage have been provided for to account for increased rainfall in future years. Therefore, the impact will be imperceptible.

In addition, the Proposed Development has been designed to reduce the impact to climate where possible, the following measures have been incorporated into the design of the development: LED fittings and compact fluorescent lamps, are considerations being undertaken to improve the impact lighting may have on climate.

Further details of the measures to be incorporated into the design of the development are outlined within the Sustainability & Energy Statement, prepared by JAK Consulting Engineers in support of this planning application.

Human Health

Traffic related air emissions have the potential to impact air quality which can affect human health. However, the change in traffic associated with the Proposed Development was not of the magnitude to require detailed air dispersion modelling as there is no potential for significant impacts. Therefore, traffic emissions are predicted to be below the ambient air quality standards set for the protection of human health. It can be determined that the impact to human health during the Operational Phase is long-term, neutral and imperceptible.

9.5.1.3 Do-Noting Impact

In the Do Nothing scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc). The Do Nothing scenario is considered neutral in terms of air quality and climate.

9.5.2 Cumulative

9.5.3 Construction Phase

According to the IAQM guidance (2014) should the Construction Phase of the Proposed Development coincide with the Construction Phase of any other developments within 350m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. There is the potential for the Construction Phase of the Proposed Development to overlap with other phases of the Portmarnock SHD. However, provided the mitigation measures outlined in Section 9.7 and Appendix 9.2 are implemented throughout the Construction Phase of the Proposed Development significant cumulative dust impacts are not predicted.

Due to the short-term duration of the Construction Phase and the low potential for significant CO_2 and N_2O emissions cumulative impacts to climate are considered imperceptible.

There are no significant cumulative impacts to air quality or climate predicted for the Construction Phase.

9.5.4 Operational Phase

The traffic data used to assess the Operational Phase impacts to air quality and climate included the cumulative traffic associated with the Proposed Development as well as other existing and permitted developments in the local area where such information was available. Therefore, the cumulative impact is included within the Operational Phase impact for the Proposed Development. The impact is predicted to be long-term, neutral and imperceptible with regards to air quality and climate.

9.5.4.1 Do-Nothing Impact

As per Section 9.5.1.3.

9.6 Mitigation Measures (Ameliorative, Remedial or Reductive Measures)

9.6.1 Proposed Development

9.6.1.1 Construction Phase

Air Quality

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the Dust Management Plan. The key aspects of controlling dust are listed below. Full details of the Dust Management Plan can be found in Appendix 9.2. These measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site.

In summary the measures which will be implemented will include: -

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

Climate

Construction Phase traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the Construction Phase of the Proposed Development. Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to short-term nature of these works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures can be implemented during the Construction Phase of the Proposed Development to ensure emissions are reduced further. In particular the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

9.6.1.2 Operational Phase

The impact of the Proposed Development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site specific mitigation measures are required.

The Proposed Development has been designed to minimise the impact to climate where possible during operation. Details of the measures to be incorporated into the design of the development are outlined in Section 9.5.1.2 and within the Sustainability & Energy Statement, by JAK Consulting Engineers prepared in support of this planning application.

9.7 Residual Impact of the Proposed Development

9.7.1 Proposed Development

9.7.1.1 Construction Phase

Air Quality

Once the dust minimisation measures outlined in Section 9.7 and Appendix 9.2 are implemented, the impact of the Proposed Development in terms of dust soiling will be short-term, localised, negative and imperceptible at nearby receptors.

Climate

Based on the scale and short-term nature of the construction works and the intermittent use of equipment, the potential impact on climate change and transboundary pollution from the Proposed Development is deemed to be neutral, short-term and imperceptible in relation to Ireland's obligations under the EU 2030 target.

Human Health

Best practice mitigation measures are proposed for the Construction Phase of the Proposed Development which will focus on the pro-active 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 of the Proposed Development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the Proposed Development is likely to be negative, short-term, localised and imperceptible with respect to human health.

9.7.1.2 Operational Phase

Air dispersion modelling of operational traffic and Operational Phase CO_2 emissions as a result of the traffic associated with the Proposed Development were scoped out of this assessment. As a result the impact of the Proposed Development on air quality, climate and human health is considered long-term, neutral and imperceptible.

9.7.1.3 Worst Case Impact

Conservative background concentrations were used in order to ensure a robust assessment. Thus, the predicted results of the Construction and Operational Phase assessment are worst-case and will not cause a significant impact on either air quality or climate.

9.7.2 Cumulative

9.7.2.1 Construction Phase

According to the IAQM guidance (2014) should the Construction Phase of the Proposed Development coincide with the Construction Phase of any other development within 350m then there is the potential for cumulative construction dust impacts. However, best practice dust mitigation measures will be implemented across the site which will avoid significant dust emissions. Provided these mitigation measures are in place for the duration of the Construction Phase cumulative dust related impacts to nearby sensitive receptors are not predicted to be significant. Cumulative impacts to air quality will be short-term, localised, negative and imperceptible.

Due to the short-term duration of the Construction Phase and the low potential for significant CO_2 and N_2O emissions cumulative impacts to climate are considered neutral.

9.7.2.2 Operational Phase

The traffic data reviewed for the Operational Phase impacts to air quality and climate included the cumulative traffic associated with other existing and permitted developments in the local area. Therefore, the cumulative impact is included within the Operational Phase impact for the Proposed Development. The impact is predicted to be long-term, neutral and imperceptible with regards to air quality and climate.

9.8 Monitoring

9.8.1 Proposed Development

9.8.1.1 Construction Phase

Monitoring of construction dust deposition at 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/(m2*day) during the monitoring period between 28 – 32 days.

9.8.1.2 Operational Phase

There is no monitoring recommended for the Operational Phase of the Proposed Development as impacts to air quality and climate are predicted to be imperceptible.

9.9 Reinstatement

Not applicable to air quality and climate.

9.10 Difficulties Encountered

There were no difficulties encountered when conducting this assessment.