9.0 CLIMATE & AIR QUALITY

9.1 INTRODUCTION

This section of the Environmental Impact Assessment Report has been prepared to identify and assess the potential air quality and climatic impacts associated with the proposed development of lands for mixed use development at Ballycullen, Dublin 24 during both the construction and operational phases of the development.

The proposed development will consist of 502 no. residential units (108no. 1-bed, 170no. 2-bed, 162 no. 3-bed; 62 no. 4-bed) comprising 197no. 2 storey houses (terraced/semi-detached/detached) (19no. 2-bed, 116no. 3-bed; 62no. 4-bed) and 28no. 3 and 4 storey simplex/duplex apartment blocks providing 305no. apartments (108no. 1-bed apartments, 151no. 2-bed apartments, 46no. 3-bed apartments). The proposed development also includes a crèche (475sq.m), public open space, car parking (surface/under croft), bicycle parking, bicycle storage structures and lockers, bin stores, and 8no. ESB substations. All associated site development works and services provision. This document includes a comprehensive description of the existing air quality and climate at and in the vicinity of the subject site, a description of how the construction and operational phases of the development may impact existing air quality and finally; the mitigation measures that shall be implemented to control and minimise the impact that the development may have on local ambient air quality and reduce the impact on the local micro climate.

9.1.1 Expertise and Qualifications

This section of the EIAR has been prepared by Nevin Traynor, of Traynor Environmental Ltd. Nevin Traynor is a Senior Environmental Scientist with Traynor Environmental ; with over 20 years' experience in the environmental sector. His project experience includes the management and productions of Environmental Impact Statements (EISs)/EIARs, particularly within the Commercial/Industrial and Housing Sector.

8.2 Assessment Methodology

The assessment includes:

- A comprehensive description of the existing air quality in the vicinity of the subject site.
- A description and assessment of how construction and the operation of the development may impact existing air quality.
- The mitigation measures that will be implemented to control and minimise the impact that the development may have on local ambient air quality and reduce the impact on the local microclimate.
- And, finally, a description as to how the development will be constructed and operated in an environmentally sustainable manner.

8.2.1 Desktop Research – Principal Data Sources

The general assessment methodology of the potential impact of the project on air quality and climate has been conducted in accordance with:

- Climate Action and Low Carbon Development Act 2015
- The Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (2011)
- Directive 2011/92/EU of the European Parliament and Council of the 13th of December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 2014/52/EU of the European Parliament and Council of the 16th of April 2014
- EPA Guidelines on information to be contained in Environmental Impact Statements (2022) (EPA, 2022) (the EPA Guidelines)
- Guidance on the preparation of Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) (European Commission, 2017) (the EU EIAR Guidance).

9.2.1.0 Legislation and Guidelines

Air quality standards and guidelines are available from a number of sources. The guidelines and standards referenced in this report include those from Ireland and the European Union.

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 (Ref Table 8-1).

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 National Air Quality Standards Regulations 2011 (S.I No. 180 of 2011), which implement European Commission Directive 2008/50/EC which has set limit values for the pollutants SO_2, NO_2, PM_{10}, benzene and CO. Council Directive 2008/50/EC replaces the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC). Provisions are also made for the inclusion of new ambient limit values relating to $PM_{2.5.}$ The European 2008/50/EC Clean Air for Europe (CAFÉ) Directive is the current air quality directive for Europe which supersedes the European Directives 1999/30/EC and 2000/69/EC. The Directive is implemented by the Air Quality Standards Regulations 2011 which replace the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999.

In order to assess a wider range of air pollutants in the development area it is necessary to review current air quality monitoring data from published sources such as the most recent EPA's 2022 Annual report entitled Air Quality in Ireland. This EPA report provides detailed monitoring data collected from a number of monitoring locations throughout Ireland on an annual basis to assess national compliance with National Air Quality Regulations. Given the location of the site within Ballycullen it is characterised as a Zone A area as defined by the EPA.

EU legislation on air quality requires that Member States divide their territory into zones for the assessment and management of air quality. The zones currently in place in Ireland in are as follows:

- Zone A is the Dublin conurbation,
- Zone B is the Cork conurbation
- Zone C comprising 23 large towns in Ireland with a population >15,000.
- Zone D is the remaining area of Ireland.

The air quality in each zone is assessed and classified with respect to upper and lower assessment thresholds based on measurements over the previous five years. Upper and lower assessment thresholds are prescribed in the legislation for each pollutant. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold.

Pollutant	2008/50/EC Limit Type	2008/50/EC Limit Value (Applicable until 2030)	Directive (EU) 2024/2881 Limit Type	Directive (EU) 2024/2881 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/m^3	Hourly limit for protection of human health - not to be exceeded more than 3 times/year	200 µg/m^3
	n/a	n/a	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	50 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
Particulate Matter (as PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
Particulate Matter (as $PM_{2.5}$)	n/a	n/a	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m^3
	Annual limit for protection of human health	25 µg/m^3	Annual limit for protection of human health	10 µg/m^3

Table 8.1: Air Quality Standards Regulations 2011 (based on EU Council Directive 2008/50/EC)

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

9.2.1.1 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 ($PM_{2.5}$). The EU ambient air quality standards 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/m2/day averaged over a

one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the TALuft limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the proposed development.

9.2.1.2 Construction Impact Assessment Criteria

Transport Infrastructure Ireland's 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes' states that "*it is very difficult to accurately quantify dust emissions arising from construction activities*" and that "*it is thus not possible to easily predict changes to dust soiling rates or PM_{10} concentrations.*" The guidance advises the use of a semi-quantitative approach to determine the likelihood of a significant impact which should be combined with an assessment of the proposed mitigation measures.

The construction assessment criteria, reproduced from the NRA guidance, are set out in Table 9.3 below.

Source		**Potential distance for significant effects (distance from source)**		
Scale	**Description**	**Soiling**	**PM_{10} [a]**	**Vegetation effects**
Major	Large construction sites, with high use of haul routes	100m	25m	25m
Moderate	Moderate sized construction sites, with moderate use of haul routes	50m	15m	15m
Minor	Minor construction sites, with limited use of haul routes	25m	10m	10m

Table 9.3: Assessment criteria for the impact of duct emissions from construction activities with standard mitigation in place (NRA, 2011)

The impact of construction related dust emissions is assessed by estimating the area over which there is a risk of significant impacts as per the NRA guidance.

9.2.1.3 Operational Impact Assessment Criteria

Once operational, the proposed the development at the site has the potential to impact on local air quality as a result of the requirements of new buildings to be heated and with the increased traffic movements associated with the development.

Air quality significance criteria are assessed on the basis of compliance with the national air quality limit values. The Air Quality Standards Regulations 2011 replace the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999.

9.2.1.4 Climate Assessment Methodology

Climate has implications for many aspects of the environment from soils to biodiversity and land use practices. The proposed development may impact on both the macro-climate and micro-climate. The macro-climate is the climate of a large geographic area such as Ireland. The micro-climate refers to the climate in the immediate area.

The impact of the proposed scheme upon the macro-climate is assessed through the consideration of the change in CO_2 emissions that will occur due to the changes in traffic flow that occur in response to the proposed scheme.

9.2.1.5 Conference of the Parties

The Conference of the Parties to the Convention (COP28) occurred in Glasgow in November 2021 with the following outcomes. The 2023 United Nations Climate Change Conference or Conference of the Parties of the UNFCCC, more commonly known as COP28 was the 28th United Nations Climate Change conference, held from 30 November until 12 December at Expo City, Dubai, United Arab Emirates. The COP conference has been held annually (except 2020 due to the COVID-19 pandemic)since the first UN climate agreement in 1992. They are intended for governments to agree on policies to limit global temperature rises and adapt to impacts associated with climate change

Emissions

In order to prevent the worst outcome of climate change, while also "accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science" also called for a tripling of global renewable energy capacity by 2030, the development of numerous "zero- and low-emission technologies", further efforts "towards the phase-down of unabated coal power" and a cut in methane emissions.

Reaffirming the Paris Agreement

Prior to the summit, some nations opposed to stronger action had criticised the focus at COP28 on 1.5C as ‘reopening the Paris agreement’. The main goal of which is to hold temperature rises ‘well below’ 2C above pre-industrial levels while ‘pursuing efforts’ to limit rises to 1.5C.

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD) (2014), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005 (DEHLG, 2007a; 2004).

Data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NO_X (EEA,2012). Directive (EU) 2016/2284 "on Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC" was published in December 2016. The directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3, $PM_{2.5}$ and CH4. In relation to Ireland, 2020-29 emission targets are for SO_2 (65% below 2005 levels), for NO_X (49% reduction), for VOCs (25% reduction), for NH_3 (1% reduction) and for $PM_{2.5}$ (18% reduction). In relation to 2030, Ireland's emission targets are for SO_2 (85% below 2005 levels), for NO_X (69% reduction), for VOCs (32% reduction), for NH_3 (5% reduction) and for $PM_{2.5}$ (41% reduction).

The following guidelines and EU Directives relating to Climate Change aspects of EIA reports have been applied to this assessment in order to determine the potential impacts/effects that the proposed development may have on climate change.

- EPA Guidelines on information to be contained in Environmental Impact Assessment Reports 2022
- European Union (Planning & Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018)
- Directive 2011/92/EU of the European Parliament and Council of the 13th December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 2014/52/EU of the European Parliament and Council of the 16th April 2014 The Irish Building Regulations Technical Guidance Document L - Conservation of Fuel & Energy – Dwellings amended in 2017 includes requirements for all residential dwelling to be "Nearly Zero Energy Buildings" (NZED's) by 31st December 2020.
- Irelands National Energy and Climate Plan 2021 – 2030.

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.

9.2.1.6 Climate Action and Low Carbon Development Act 2015

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the 2015 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' (section 3(1) of the 2015 Act. This is referred to in the Act as the 'national transition objective.' The Act made provision for, inter alia, 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 2015 Act was amended by the Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2015 Act as amended).

The key duty imposed on planning authorities by section 15 of the Climate Action and Low Carbon Development Act 2015 (as amended) is:

A relevant body [e.g., a planning authority] shall, as far as practicable, perform its functions in a manner consistent with

a) the most recent approved climate action plan,
b) the most recent approved national long term climate action strategy,
c) the most recent approved national adaptation framework and approved sectoral adaptation plans,
d) the furtherance of the national climate objective, and
e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the state."

9.2.1.7 2024 Climate Action Plan

The 2024 Climate Action Plan (CAP) was published by the Irish Government in December 2023 (Government of Ireland, 2023). The Climate Action Plan 2024 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets.

9.2.1.8 Climate Action Plan

The Climate Action Plan for South Dublin was developed by South Dublin County Council (SDCC) under the guidance of the Climate Action Regional Office (CARO). The CAS aims to:

- Make South Dublin a stronger county by reducing impacts of future climate change related events.
- Fully consider the mainstream climate adaptation in the day-to-day delivery of services by SDCC
- Actively engage with and inform citizens and communities about the impacts of climate change.
- Public awareness is key to developing effective climate adaptation measures.

The actions of this CAP are set in a framework of six key themes with an overarching goal for each theme.

9.2.1.9 Climate Change Advisory Council

The Climate Change Advisory Council submitted their Annual Review 2023 to the Minister of the Environment, Climate and Communications on 21st of July 2023. Detailed key messages, including observations and recommendations for each sector (electricity; transport; built environment; enterprise and waste; agriculture, forestry and other land use; and biodiversity), can be found at the beginning of each chapter in the annual review. The overall recommendations are as follows:

- Government needs to identify and remove barriers to policy implementation by ensuring adequate funding and planning reform at scale and speed.
- Key actions need to be implemented now to prevent longer term drainage and increased costs to society and the economy.
- Government must adopt new approaches to address emission reductions, creating investment and enhancing skills across the economy, particularly in areas such as retrofitting and renewable energy.
- The establishment of a Just Transition Commission is recommended to ensure that Ireland achieves its climate objectives in a way that is fair and equitable and protects vulnerable people and communities; and
- The Government should support opportunities that reduce emissions and make Ireland better prepared for the impacts of climate change.

9.2.1.10 Ireland's Greenhouse Gas Emissions

Ireland's greenhouse gas (GHG) emissions increased in the period from 1990 to 2001 where it peaked at 71.81 Mt CO2 equivalent, before displaying a downward trend to 2014. Emissions increased by 4.2% and 3.7%, respectively in the years, 2015 and 2016 and remained relatively stable in 2017 and 2018, followed by a 4.1% decrease in 2019. In 2020 final estimates of total national GHG emissions amounted to 58.94 Mt CO2 equivalent, which is 3.5% lower than 2019 emissions largely driven by the covid restrictions. The gradual lifting of covid restrictions in 2021 along with an increase in the use of coal and less renewables within electricity generation resulted in a 5.1% increase in emissions in 2021 compared to 2020. A 1.9% increase in emissions was seen in 2022 compared to 2021, mainly due to a substantial decrease in residential sector emissions combined with decreases from industry, agriculture and electricity generation. Ireland's GHG emissions have increased by 9.2% from 1990-2022.

In relation to the greenhouse gases, carbon dioxide (CO2) accounted for 60.4% of the total, with methane (CH4) and nitrous oxide (N2O) contributing 29.0% and 9.4% as CO2 equivalent, respectively and F-gases contributing 1.2% of the total as CO2 equivalent.

In 2022, the energy industries, transport and agriculture sectors accounted for 74.1% of total GHG emissions. Agriculture is the single largest contributor to the overall emissions, at 38.4%. Transport, energy industries and the residential sector are the next largest contributors, at 19.1%, 16.6% and 10.0%, respectively.

9.3 RECEIVING ENVIRONMENT

9.3.1 Description of the Baseline Environment/Context

The proposed development is located approx. 520 metres from the M50 near junction 12. The M50 is located west and south of the site. Abbots Grove Park is located to the west boundary of the site, Stocking Wood Avenue and White Pines Park are located to the North and West boundaries of the site. Agricultural land is bordering the south site boundaries.

The development area is located within a zone which includes a significant sources of transportation related air emissions principally from the M50 Motorway, R113 and local road infrastructure. It is noted that there are no major sources of industrial air emissions within 3km of the site.

9.3.1.1 Description of Existing Climate

The nearest representative synoptic meteorological station to the subject site is at Casement Aerodrome which is located approximately 18km north of the site and as such, long-term measurements of wind speed/direction and air temperature for this location are representative of prevailing conditions experienced at the subject site. Recent meteorological data sets for Casement Aerodrome were obtained from Met Éireann for the purposes of this assessment study. The existing air quality environment is therefore principally defined by traffic from the M50, R113 and the Ballycullen Road. Fuel combustion for space heating for commercial activities and residential developments also contributed to the ambient air quality.

9.3.1.2 Rainfall

Precipitation data from the Casement Aerodrome meteorological station for the period 2015-2024 indicates a mean annual total of about 756.90 mm. This is within the expected range for most of the eastern half of the Ireland which has between 750 mm and 1000 mm of rainfall in the year.

9.3.1.3 Temperature

The annual mean temperature at Casement Aerodrome (2015-2024) is 10.0ºC. Given the relatively close proximity of this meteorological station to the proposed development site, similar conditions would be observed. Table 9.4 sets out meteorological data for Casement Aerodrome from 2015-2024.

Year	Period	Rainfall (mm)	Mean Temperature (ºC)
2015	Annual Mean	766	9.0
2016	Annual Mean	732	9.7
2017	Annual Mean	703	10.1
2018	Annual Mean	658	10.0
2019	Annual Mean	865	9.8
2020	Annual Mean	789	10.1
2021	Annual Mean	697	9.8
2022	Annual Mean	688	10.2
2023	Annual Mean	1001	10.6
2024	Annual Mean	670	10.3
Mean		**756.90**	**10.0**

*Table 9.4: Meteorological Data for Casement Aerodrome 2015-2024 (*Data supplied by Met Eireann)

9.3.1.4 Wind

Wind is of key importance for both the generation and dispersal of air pollutants. Casement Aerodrome met data has been examined to identify the prevailing wind direction and average wind speeds over a three-year period (see Figure 9.1). For data collated during three representative years 2022, 2023 & 2024. The predominant wind direction is westerly to south-westerly with predominately moderate wind speeds.

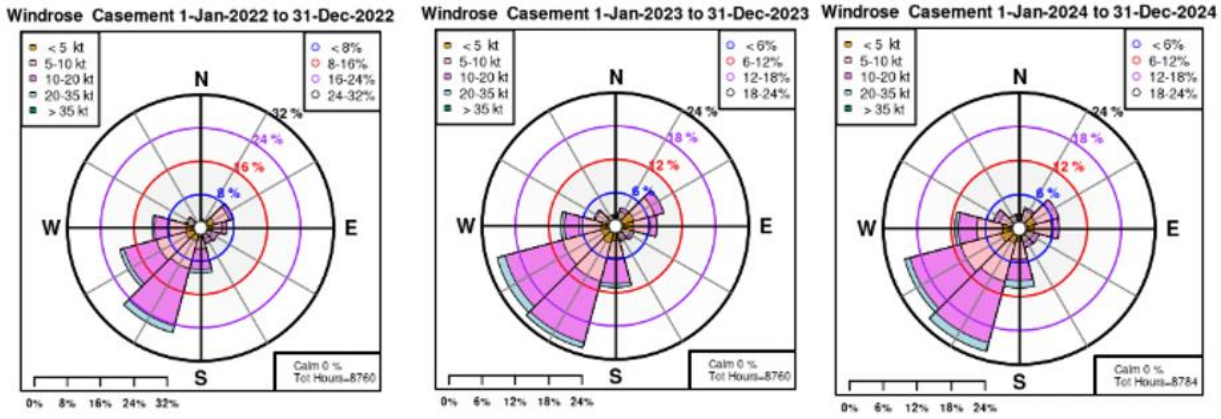

Figure 9.1: Windrose for Casement Aerodrome 2022-2024

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), as amended, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2024). 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, 2024). 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.).

NO_2

Long-term NO_2 monitoring was carried out at the representative Zone A suburban background locations of Tallaght, Dún Laoghaire, Swords and Ballyfermot for the period 2019 – 2023. (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 for the suburban background locations. Additionally, there were no exceedances of the hourly limit value of 200 µg/m^3.

The monitoring sites in Ballyfermot and Tallaght are considered representative of the proposed development location due to their proximity to the site and similar location characteristics.

Concentrations of NO_2 at the Ballyfermot and Tallaght sites ranged from 13 – 20 µg/m^3 over the period 2019 – 2023. The NO_2 annual average for suburban background locations over the 2019 - 2023 period suggests an overall average of no more than 14 µg/m^3 as a background concentration. Based on the above information an 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
Tallaght	Annual Mean NO_2 (µg/m3)	-	14	13	14	14
	1-hr Mean > 200 µg/m^3 (days)	-	0	0	0	0
Dun Laoghaire	Annual Mean NO^2 (µg/m3)	15	13	16	16	13
	1-hr Mean > 200 µg/m^3 (days)	0	0	0	0	0
Swords	Annual Mean NO_2 (µg/m3)	15	11	11	12	10
	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

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

PM_{10}

Continuous PM_{10} monitoring was carried out at four 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/m^3 over the 2019 – 2023 period. There was at most 1 exceedance of the daily limit of 50 µg/m^3 in 2023 (35 exceedances are permitted per year) (EPA, 2024). The overall average PM_{10} concentration at the suburban background Zone A sites over the 2019 – 2023 period is 12 µg/m^3. 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/m^3.

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

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

$PM_{2.5}$

Average $PM_{2.5}$ levels at the Zone A suburban monitoring locations of Ballyfermot, Dún Laoghaire, Finglas, Marino, St. Anne's Park and Phoenix Park over the period 2019 - 2023 ranged from 6 - 10 $\mu g/m^3$ (EPA, 2024). The overall annual average concentration for this 5-year period is 8 $\mu g/m^3$. Based on this information, an estimate of the background $PM_{2.5}$ concentration in the region of the proposed development is 8 $\mu g/m^3$.

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 set out in Directive 2008/50/EC. However, the current pollutant concentrations at some monitoring sites are not in compliance with the 2030 limit values set out in Directive (EU) 2024/2881 and the clean air strategy.

further measures will be needed at a national scale to reduce air pollution in future years. The EPA have indicated that road transport emissions are contributing to increased levels of NO_2 with 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).

Site Specific Air Quality Monitoring

A site-specific short-term monitoring study was conducted for Nitrogen oxides, Sulphur dioxide and BTEX and Particulates (Benzene, Toluene, Ethylbenzene and Xylene). All pollutants were measured at the boundary locations (AQM1, AQM3, AQM7, AQM10 and AQM13) using passive diffusion tubes over a two-week period. Figure 9.2 identifies the monitoring locations. The baseline survey was conducted during December 2024 when the potential for higher ambient levels of fossil fuel generated pollutants would be at a maximum.

These locations were chosen in order to obtain short-term sample concentrations for the identified parameters from the principal sources of pollution i.e. vehicle exhaust emissions and home heating emissions.

The survey was indicative only and results obtained cannot be used to demonstrate compliance with short-term or annual limit values detailed in Table 9.6 above. The survey does, however, aid in identifying the influence of sources in the vicinity of the proposed development site. The results from the monitoring surveys are presented in Table 9.7.

The concentrations of NO_2, SO_2 and Benzene measured during the short-term measurement survey were significantly below their respective annual limit values and comparable with levels reported by the EPA.

Pollutant	Sample Period	Concentration µg/m³					Criteria (Annual limit)
		Air Quality Monitoring Locations					
		AQM 1	AQM 3	AQM 7	AQM 10	AQM 13	
Nitrogen dioxide	02.12.24 – 16.12.24	<5	<4	<4	<4	<4	40 µg/m³(as annual average)
Sulphur dioxide	02.12.24 – 16.12.24	<3	<3	<3	<3	<3	125 µg/m³(as annual average)
Benzene	02.12.24 – 16.12.24	<2	<2	<2	<2	<2	10 µg/m³(as annual average)
Ethylbenzene	02.12.24 – 16.12.24	<2.5	<3	<3	<3	<3	N/A
Toluene	02.12.24 – 16.12.24	<9	<9	<9	<9	<9	N/A
m/p-Xylene	02.12.24 – 16.12.24	<3	<3	<3	<3	<3	N/A
o-Xylene	02.12.24 – 16.12.24	<2	<2	<2	<2	<2	N/A

Table 9.7 Results of passive diffusion tube monitoring at the proposed development site.

Note 1: < value indicates below Laboratory limit of detection.

Figure 9.2 Baseline Air Quality Monitoring Locations AQM1 TO AQM15 Dust Levels Tested with DustTrak II Aerosol Monitor 8530.

AQM Location	Total Particulates mg/m^3/day
AQM1	*0.015*
AQM2	*0.016*
AQM3	*0.019*
AQM4	*0.015*
AQM5	*0.018*
AQM6	*0.020*
AQM7	*0.020*
AQM8	*0.018*
AQM9	*0.019*
AQM10	*0.019*
AQM11	*0.021*
AQM12	*0.027*
AQM13	*0.018*
AQM14	*0.019*

Table 9.8 Total Particulates measured onsite

Significance

Based on published air quality data for the Zone A Dublin city area in the vicinity of the subject site together with site specific monitoring data, it may be concluded that the existing baseline air quality at the subject site may be characterised as being good with no exceedances of the Air Quality Regulations 2011 limit values of individual pollutants. The quality of existing air quality at the subject site must be maintained and improved where possible as a result of the proposed development to ensure that local human health and the ecological environment is not adversely affected.

Sensitivity

The subject site shall be developed by ground clearance and site preparation works and the subsequent construction of residential units, a creche, roads, open spaces, and landscaped areas.

9.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development will consist of 502 no. residential units (108no. 1-bed, 170no. 2-bed, 162 no. 3-bed; 62 no. 4-bed) comprising 197no. 2 storey houses (terraced/semi-detached/detached) (19no. 2-bed, 116no. 3-bed; 62no. 4-bed) and 28no. 3 and 4 storey simplex/duplex apartment blocks providing 305no. apartments (108no. 1-bed apartments, 151no. 2-bed apartments, 46no. 3-bed apartments). The proposed development also includes a crèche (109sq.m), public open space, car parking (surface/under croft), bicycle parking, bicycle storage structures and lockers, bin stores, and 8no. ESB substations. All associated site development works and services provision. Provision of the first phase of Ballycullen residential development (on lands within the applicant's ownership) and other public and communal open spaces.

All associated site development works, landscaping, boundary treatments and services provision. When considering a development of this nature, the potential impact on air quality and climate must be considered for each distinct stage: the short (1-3 years) and medium term (3-5) impact of the construction phase and the longer-term impact of the operational phase. The construction phase will be undertaken over a maximum 5-year period. It is important that there are no unacceptable decreases in ambient air quality levels predicted during the construction phases and during the operational phase.

9.5 POTENTIAL IMPACTS

Predicted Impact

Various elements of both the construction and operational phases of the proposed development have the potential to impact on the local receiving environment, on adjacent residential properties and on human health. The likely potential impacts for both construction and operation of the proposed scheme prior to mitigation are described in this section of the EIAR.

9.5.1 Construction Phase

Air Quality

The development of the site will be conducted in the following phased stages:

- Enabling works - Site set up and Site clearance.
- Construction works including site infrastructure, house building and landscaping.

Construction impacts associated with both of these phased stages are considered below.

Enabling Works – Site Set Up and Clearance

Works activities associated with the 'Site set up' will be undertaken prior to construction works commencing in each sub-phase. The setting up of the site shall involve the construction of site security hoarding and site compounds, site offices, materials and waste storage areas and staff welfare facilities. These temporary activities will have a minimal potential to generate fugitive dust emissions or combustion gas emissions.

Site clearance and ground excavation works will be undertaken in separate phases and these activities have the potential to generate fugitive windblown dust emissions rising from the operation of mechanical plant such as dozers, excavators and tipper trucks and the movement of these vehicles on exposed surfaces at the site. Infrastructural works will be required to facilitate site services.

With regard to the volume of waste material (top and sub soils) generated during site clearance, there will be a requirement for HGV trucks. Stripped soils shall be stockpiled and covered on site for re-use during final landscaping works. Trucks shall be loaded with material on-site by mechanical excavators and loading shovels which will generate fugitive dust emissions as a result of the transfer of the excavated materials comprised principally of soils and stones from stockpile to truck. The movements of construction vehicles on the site shall

also generate windblown dust emissions. Where dusty waste material is loaded onto exposed open trucks, fine dusts may be released as the truck travels along public roads.

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the 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 states that site traffic and plant is unlikely to make a significant impact on climate.

Therefore, the potential impact on climate is considered to be imperceptible, neutral, and short-term. During the enabling site works there needs to be a statement on the assessment of effects on Dust deposition.

- Elevated particulate matter concentrations (PM_{10} and $PM_{2.5}$) as a result of dust generating activities on site; and
- An increase in concentrations of airborne particles, volatile organic compounds, nitrogen oxides, and sulphur oxides due to exhaust emissions from diesel powered vehicles and equipment on site (non-road mobile machinery) and vehicles accessing the site.

Building and Site Infrastructure Construction Works

The development relates to the construction of residential units in a mix of apartments, car parking and landscaping. The proposal includes for internal roads and streets along with appropriate hard and soft landscaping treatments.

During the construction phase there will be extensive site works, involving construction machinery, construction activities on site which have the potential to generate fugitive windblown dust emissions.

Construction equipment including generators and compressors will also give rise to some exhaust emissions. However, due to the size and nature of construction activities, exhaust emissions during construction will have a negligible impact on local air quality.

Construction traffic to and from the site shall result in a short term increase in the volume of diesel fuelled HGV's along the local road network which will generate additional hydrocarbon and particulate emissions from the vehicle exhausts. However, the activities detailed above will result in an imperceptible impact on local air quality and sensitive receptors.

Climate

During the construction phase, existing vegetated areas throughout the development site will be removed due to site clearance works and associated movement of construction traffic thus impacting the micro-climate. Whilst this will impact the evapotranspiration rates of vegetation, there will be no impact upon the moisture evaporation from the exposed soil. Therefore, there will be no significant impacts on microclimate.

CO_2 will be released into the atmosphere as a result of the movement of construction vehicles and use of plant. However emissions associated with such activities will occur over a short-term period (c. 3 years) which will not result in an adverse impact on the local micro or the broader macro climate.

9.5.2 Operational Phase

Air Quality

The operational phase of the proposed development will result in a slight, long term impact on local air quality primarily as a result of the requirements of new buildings to be heated and with the increased traffic movements associated with the development.

Traffic movements associated with the development have been evaluated and assessed as part of the Traffic Impact Assessment for the development which will include parking for vehicles which will enter and exit the site. The am and pm peak traffic movements will not result in an adverse impact on local air quality at any of the junctions and it is predicted that the impact of car engine exhaust emissions will have a negligible impact on local ambient air quality.

The design and construction of all buildings in accordance with National Building Regulations shall ensure that modern building materials are used and that they are designed to be thermally efficient resulting in a reduction in the volume of fossil fuels required to heat the buildings. It is predicted that fossil fuel combustion gas emissions including Carbon Dioxide, Sulphur Dioxide, Nitrogen Oxides, Carbon Monoxide and hydrocarbon particulate emissions will be slight and will not have an adverse significant impact on the existing ambient air quality in the vicinity of the proposed development site.

Energy Efficiency - All proposals for development shall seek to meet the highest standards of sustainable design and construction with regard to the optimum use of sustainable building design criteria such as passive solar principles and also green building materials. In order to reduce energy consumption, the following key design considerations have been considered in the design process and will be incorporated into the construction of the residential units, where feasible:

- Passive solar design including the orientation, location and sizing of windows
- The use of green building materials: low embodied energy & recycled materials
- Energy efficient window units and frames
- Building envelope air tightness
- Installation of Heat Recovery & Ventilation systems in all apartment units which operate by extracting warm air from kitchens and bathrooms, cleaning it and distributing it to other rooms in the unit.

Climate

The site area will include open space and landscaped areas. The overall development includes the construction of buildings and roadways will have the effect of marginally raising local air temperatures, especially in summer.

Therefore, it is predicted that the proposed development will not have an adverse impact on micro-climate at the nearest residential properties or on the local receiving environment in the vicinity of the site boundaries.

The proposed development includes structures which may impact on the local micro-climate by means of wind shear effects. Greenhouse gases occur naturally in the atmosphere (e.g. carbon dioxide, water vapour, methane, nitrous oxide and ozone) and in the correct balance, are responsible for keeping the lower part of the atmosphere warmer than it would otherwise be. These gases permit incoming solar radiation to pass through the Earth's atmosphere, but prevent most of the outgoing infrared radiation from escaping from the surface and lower atmosphere into the upper levels. However, human activities are now contributing to an upward trend in the levels of these gases, along with other pollutants with the net result of an increase in temperature near the surface.

Motor vehicles are a major source of atmospheric emissions thought to contribute to climate change, however, vehicle exhaust emissions generated from site related vehicles will have a negligible impact on the macro-climate given modern technological developments in cleaner and more efficient vehicle engines.
The scheme has been designed to provide thermally efficient buildings which will reduce the consumption of fossil fuels within each individual dwelling. This will reduce the impact the operational phase of the development will have on the micro and macro climate. In particular, there will be no "traditional" passive air vents in the proposed new buildings which are both thermally and acoustically inefficient and if possible, Mechanical Ventilation and Heat Recovery (MVHR) systems shall be incorporated into the design of the builsings. The MVHR systems together with thermally and acoustically rated window sets will reduce the potential future impacts that the external climate will have in terms of wind and changing temperatures on the internal environment within the residential units. These design features will ensure the units are thermally efficient thus reducing the use of fossil fuels leading to a reduction of the impact on climate.
The thermal efficiency of the buildings will ensure that the development will be sustainable and will be protected against the impacts of future climate change which can include high winds, storm events and prolonged colder periods during the winter season.

The EPA's Integrated Pollution Prevention and Control (IPPC) Licensing Application Guidance Notes, 2012 define the threshold of boiler emissions for the categorisation of major ot minor emissions. As a genreal rule, gas boilers over 5 MW are regarded to be significant and categorised as a major emission. There will be no gas boilers in excess of 5MW on this site. Therefore, the impact will be long-term, localised, neutral, and imperceptible.

9.6 POTENTIAL CUMULATIVE IMPACTS

In accordance with *Schedule 6, Part 2(c) of the Planning and Development Regulations 2001*, this section has considered the cumulative impact of the proposed development in conjunction with future development in the vicinity of the subject site. This section relates to the cumulative impact on the subject site itself and on surrounding sites.

The European Commissions report of May 1999 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions' defines cumulative impact as follows:

"Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project".

The cumulative air quality impact of the existing residential development and existing local transport infrastructure together with the proposed development is assessed with regard to having established the baseline air quality and then predicting the impact that the proposed development will have on the baseline air quality. Together the combined impact can be assessed to determine if there is sufficient "atmospheric budget" to facilitate the proposed development.

It is predicted that the cumulative impact of the construction and operational phases of theproposed development and proposed or permitted neighbouring developments will not have an adverse long term impact on the receiving environment.

It is considered that there will be the potential for a short term slight negative cumulative impact associated with the construction phase of the proposed development on ambient air quality and climate primarily as a result of the use of diesel to fuel construction plant and equipment. However, through the implementation of Construction Phase air quality mitigation measures and the integration into the design of the operational development of sustainable aspects and energy reduction features will ensure the receiving environment including off site residential receptors and existing habitats will not be adversely impacted.

9.7 MITIGATION MEASURES

9.7.1 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 minimisation plan can be found in Appendix 10. A.

- The specification and circulation of a dust management plan for the site and the identification of persons responsible for managing dust control and any potential issues.

- The development of a documented system for managing site practices with regard to dust control
- The development of a means by which the performance of the dust management plan can be monitored and assessed.
- The specification of effective measures to deal with any complaints received.

At all times, the procedures within the plan 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. The proceduses to rectify the problems are set out in the Dust Managament Plan.

Dust nuisance is defined when air quality standards relating to dust deposition and PM_{10} are exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented.

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a Dust Management Plan (see appendix 10 - A). Provided the dust management measures outlined in the plan are adhered to, the air quality impacts during the construction phase will not be significant. Regard has also been taken for the import of infill materials from off-site locations and potential dust impacts as a result of this will also be mitigated.

9.7.2 Climate

Construction 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 development. Construction vehicles, generators etc., may give rise to some CO^2 and N_2O emissions. However, due to 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.

9.7.3 Mitigation Measures (Construction Phase)

- Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities.
- During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only.
- Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper.

- The overloading of tipper trucks exiting the site shall not be permitted.
- Aggregates will be transported to and from the site in covered trucks.
- Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.
- Wetting agents shall be utilised to provide a more effective surface wetting procedure.
- Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels.
- All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods.
- 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.
- Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins.
- Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system.
- A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM_{10} are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented.
- A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

9.7.4 Mitigation Measures (Operational Phase)

The Operational Phase of the Ballycullen development site will not generate air emissions that would have an adverse impact on local ambient air quality or local human health and as such there are no mitigation measures specified for the Operational Phase.

The operational phase mitigation by design measures to minimise the impact of the development on air quality and climate are as follows:

- Thermally efficient glazing systems on all units
- Mechanical Ventilation and Heat Recovery (MVHR) systems or equivalent installed in new buildings.
- Thermal insulation of walls and roof voids of all units

- A combination of technologies to ensure energy consumption in line with Part L 2022 requirements will include air source heat pumps and/or an alternative heating system such as gas boilers with PV panels for renewable energy.
- Inclusion of electric car charging points to encourage electric vehicle ownership
- Proximity of the public transport network to the development which will provide public transport to residents .

9.8 PREDICTED IMPACTS WITH MITIGATION

The proposed development will result in some impacts to climate through the release of GHGs. The proposed development has proposed best practice mitigation measures and is committing to reducing climate impacts where feasible. The residual impact of the proposed development in relation to GHG emissions is considered direct, long-term, negative, and slight, which is overall not significant in EIA terms. In relation to climate change vulnerability, it has been assessed that there are no significant risks to the proposed development as a result of climate change. The residual effect of climate change on the proposed development is considered direct, long-term, negative, and imperceptible, which is overall not significant in EIA terms.

9.9 'DO NOTHING' SCENARIO

The subject site is currently comprised of agricultural land. Based on the projected increase in traffic up to the reference year of 2037, the increase in traffic related emissions, based on projected Traffic Impact Assessment figures without the subject development would be insignificant. This increase above the existing situation would be minor and would not result in a perceptible change in the existing local air quality environment.

9.10 WORST CASE SCENARIO

The main potential for adverse impact on local air quality will occur during the construction phase. The worst-case scenario therefore corresponds to the situation where the mitigation measures for construction activities fail or are not implemented. Should dust mitigation measures not be implemented during the construction phase, significant dust nuisance is likely in areas close to the construction site. Given the distance to sensitive receptors dust nuisance is not considered to be a significant issue providing mitigation measures are carried out.

9.11 MONITORING & REINSTATEMENT

Monitoring

This section describes the dust monitoring methodologies that shall be implemented at the site during the construction phases to ensure that dust generated by site activities does not cause nuisance or cause detrimental health effects to residential areas and sensitive receptors located in the vicinity of the site boundaries.

Dust Deposition Monitoring Methodology

Dust deposition levels will be monitored to assess the impact that site construction site activities may have on the local ambient air quality and to demonstrate that the environmental control measures in place at the site are effective in minimising the impact of construction site activities on the local receiving. The following procedure shall be implemented at the site on commencement of site activities:

The dust deposition rate will be measured by positioning Bergerhoff Dust Deposit Gauges at strategic locations near the boundaries of the site for a period of 30 +-2 days. Monitoring shall be conducted on a monthly basis during periods when the highest levels of dust are expected to be generated i.e., during site preparation works and soil stripping activities and on a quarterly basis thereafter. The proposed monitoring locations (D1 – D5) are presented below in Figure 9.3.

The selection of sampling point locations will be completed after consideration of the requirements of *Method VDI 2119* with respect to the location of the samplers relative to obstructions, height above ground and sample collection and analysis procedures. The optimum locations will be determined by a suitably qualified air quality expert to ensure that the dust gauge locations are positioned in order to best determine potential dust deposition in the vicinity of the site boundaries and existing buildings.

After each (30 +-2 days) exposure period, the gauges will be removed from the sampling location, sealed and the dust deposits in each gauge will be determined gravimetrically by an accredited laboratory and expressed as a dust deposition rate in mg/m2-day in accordance with the relevant standards. Technical monitoring reports detailing all measurement results, methodologies and assessment of results shall be subsequently prepared and maintained by the Site Manager. Monitoring reports shall be made available to the Local Authority as requested. A dust deposition limit value of 350 mg/m^2-day (measured as per German Standard Method VDI 2119 – Measurement of Particulate Precipitations – Determination of Dust Precipitation with Collecting Pots Made of Glass (Bergerhoff Method) or Plastic. is commonly specified by Local Authorities and by the EPA to ensure that no nuisance effects will result from specified activities, and it is to this Best Practice standard method that this programme of dust monitoring and control has been prepared. The *German Federal Government Technical Instructions on Air Quality Control - TA Luft* specifies an emission value for the protection against significant nuisances or significant disadvantages due to dust fall. This limit value is 350 mg/m2-day and it is to this limit value that all measured dust deposition levels shall be assessed. This limit value is commonly specified by Local Authorities at construction sites.

Figure 9.3: Construction Phase dust monitoring locations D1 – D5

Reinstatement

Reinstatement issues are not relevant to this Section of the EIAR.

9.12 DIFFICULTIES IN COMPILING INFORMATION

There were no difficulties encountered in compiling this section of the EIAR.

9.13 REFERENCES

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- The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling the Environmental Effects of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
- UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance
- USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures
- USEPA (1986) Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition (periodically updated)

APPENDIX 10 - A:

DUST MINIMISATION PLAN

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland and the United Kingdom.

Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction/demolition planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance. As the prevailing wind is predominantly south-westerly, locating construction/demolition compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed. The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials. Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions is highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur.

The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised.
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions.
- 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.
- It is recommended that community engagement be undertaken before work commences on site explaining the nature and duration of the work to local residents and businesses.

- 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.
- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised.
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions.
- 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.
- It is recommended that community engagement be undertaken before work commences on site explaining the nature and duration of the work to local residents and businesses.
- 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.
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein.
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed, and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80%.

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads.
- Access gates to the site shall be located at least 10m from sensitive receptors where possible.
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction/demolition period. Research has found that watering can reduce dust emissions by 50%. Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist.

The required application frequency will vary according to soil type, weather conditions and vehicular use.

- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust.
- During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided.

Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions.

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors.
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency.
- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads should be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned, as necessary.

Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues.
- The development of a documented system for managing site practices with regard to dust control.
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.