Orchard Gate

Proposed Residential Development

AIR QUALITY IMPACT ANALYSIS REPORT

Kennelsfort Road Upper
Palmerstown
Co. Dublin

AAI Palmerstown Ltd

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1 Introduction

1.1 Report purpose

This report describes the existing air quality in the vicinity of the development site and the potential impact of the proposed development during the construction phase and operational phase. The assessment includes recommended mitigation measures to control and minimise the impact that the development may have on local air quality.

1.2 Instruction

DKPartnership (DKP) have been commissioned by AAI Palmerstown Ltd to carry out the analysis and report for the proposed Orchard Gate residential development as described below.

1.3 Development detail

The development is located at the former warehouse facility at units 64 & 65, Cherry Orchard Industrial Estate. The site presents a gateway location at the Western junction of Kennelsfort Road Upper and the eastern industrial estate. This location represents the start of the lands zoned REGEN continuing to the east.
The proposal is for 127 build to sell apartments and associated facilities with a mix of 55 no. one bedroom apartments, 41 no. two bedroom apartments and 31 no. three bedroom apartments . the scheme incorporates incubator employment use with block A.
The development is set out in 3 no. five storey buildings and 1 no. 4 storey building enclosing a raised podium courtyard with the eastern junction building having an 8 storey gateway feature element. On site parking of 62 spaces is contained within a landscaped podium element with 1 on street go-car space provided. Extensive public realm upgrades are incorporated with an upgraded cycle way provided on Kennelsfort road upper.

Site Area : 8,888m²

1.4 Legislation and guidelines

Research for this report included a review of the Air Quality Standards Regulations (S.I. 180 of 2011) and the EPA annual reports on air quality in Ireland. Predicted air quality emissions for the main traffic-derived pollutants have been modelled using the screening air quality assessment from the U.K Highway Agency Design Manual for Roads and Bridges (DMRB) and data from the transport assessment undertaken for Orchard Gate. Analysis for this report included a review of the following guidelines and recommendations:

- Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports Draft (EPA, 2017)
- Advice Note on Preparing Environmental Impact Statements – Draft (EPA, 2015)
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment 2013.
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018
- Guidance on the Assessment of Dust from Demolition and Construction Version 1.1 (Institute of Air Quality Management (IAQM), 2014)

2 Executive summary

2.1 Analysis conducted

The assessment identifies Irelands national air quality network, detailing relevant air quality standards. A review of air quality around the development site using existing EPA monitoring, an assessment of the impact on air quality during the construction phase and operational phase and the predicted air quality for future residents is outlined. Emissions impacting air quality for the main traffic-derived pollutants (nitrogen dioxide and particulate matter) have been predicted using the screening air quality assessment from the U.K Highway Agency Design Manual for Roads and Bridges (DMRB) Volume 11. The assessment also includes detailed recommended mitigation methods for controlling dust and air quality pollution.

2.2 Standards and regulations overview

To reduce the risk of poor air quality impacts, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. EU directives set baseline standards for monitoring air quality and reducing emissions in Ireland. In 2008 the European Commission introduced a new Directive on ambient air quality and cleaner air for Europe (2008/50/EC) which has been transposed into Irish Legislation through the revised Air Quality Standards Regulations (S.I. 180 of 2011). The Environmental Protection Agency (EPA) publish annual reports on air quality in Ireland that provide monitoring data. The most current EPA report - 2021 Annual Report on Air Quality in Ireland has been examined in order to assess the existing air quality conditions and to provide information on background concentrations.

2.3 Mitigation measures overview

Mitigation measures for both operation and construction of the development were assessed and detailed in section 6 of this report. In summary measures include where appropriate and practicable: wind breaks and barriers, frequent cleaning and watering of the construction site and associated access roads, control of vehicle access, vehicle speed restrictions, covering of piles, hard surface roads should be wet swept to remove any deposited materials and un-surfaced roads should be restricted to essential site traffic only. As outlined in the DMRB assessment, the operational phase was determined as not-significant with regards to an impact on local ambient air quality and as such there are no mitigation measures specified for the operational phase. The ongoing increasement in public transport to reduce dependency on the use of the private car will furthermore reduce air quality impacts from transport.

2.4 Non-technical summary

The assessment identified the existing baseline levels in the area of the proposed development by an evaluation of EPA monitoring data. The EPA data of current and previous years establish air quality parameters are all well below national and EU ambient air quality standards. The existing baseline air quality at the site locality can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values. The air quality impact was considered for each distinct stage, construction phase and operational phase. The impact of the development during the construction phase on air quality at potential neighbouring receptors was determined by an assessment of dust soiling. Standard mitigation measures outlined in the dust management plan would be implemented onsite to control emissions during construction. With mitigation measures in place impacts of the proposed development on air quality for the construction phase is likely to result in negligible impacts. The impact of the development during the operational phase on air quality was determined by an assessment using the DMRB air quality model predicting pollutant concentrations at 2 no. of receptors as a result of increased road traffic. Modelled impact results showed an expected small increase in annual NO2, PM10, benzene and CO but each parameter would still remain well below the limit values for EU regulations. In the context of significance outlined in relevant guidelines, the impacts have been defined as negligible and would not result in a perceptible change in the existing local air quality environment. On last inspection (October 2022) the Cherry Orchard industrial estate presented no business activities which exceed EPA emission thresholds. The proposed site is not in any immediate location of facilities that generate industrial emissions on a scale requiring an industrial IED or IPC license. This means there are no existing industrial emissions of concern that would have an adverse impact on future resident's air quality.

3 Geographical overview

3.1 Project overview

Image 3.1 the (google maps) site is an overview of the site area with the proposed development approximately outlined in red.

Image 3.1: Proposed development site boundary

4 Approach and methodology

4.1 National air quality network

The EPA is the authority with responsibility for ambient air quality monitoring in Ireland and measures the levels of a number of atmospheric pollutants. Ambient air quality monitoring is carried out in accordance with the requirements of the CAFE Directive which has been transposed into Irish national legislation by the Air Quality Standards Regulations 2011. For the purposes of detailing ambient air quality in Ireland, it is divided into four zones: Zone A: Dublin, Zone B: Cork, Zone C: Other cities and large towns, Zone D: Rural Ireland. In Ireland, the network is managed by the EPA in partnership with Local Authorities and other public/semi-state bodies. A series of monitoring stations are located across the country, these stations collect air quality data for public information. The proposed development site is located within Zone A, Dublin. The EPA monitor at local sites and national sites. The nearest local EPA air quality monitoring station from the development site is Ballyfermot, Dublin 10. These local monitoring stations give people a rapid and up-to-date indication only, of air quality in their locality.

4.2 Air quality standards regulations

To reduce the risk of poor air quality impacts, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. EU directives set baseline standards for monitoring air quality and reducing emissions. 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 a number of pollutants. These limits are for the protection of human health and are presented in Table 4.1. Air quality significance criteria are assessed on the basis of compliance with the standards.

Pollutant	Limit value objective	Averaging period	Value limit ($\mu g/m^3$)
Nitrogen Dioxide (NO_2)	Protection of human health	calendar year	40
		1 hour	200
Benzene	Protection of human health	calendar year	5
Carbon Monoxide (CO)	Protection of human health	calendar year	10,000
Lead	Protection of human health	calendar year	0.5
Sulphur Dioxide (SO_2)	Protection of human health	1 hour	350
		24 hours	125
Particulate Matter (PM_{10})	Protection of human health	24 hours	50
		calendar year	40
Particulate Matter ($PM_{2.5}$)	Protection of human health	calendar year	25

Table 4.1: Air quality standards regulations (S.I.180 of 2011)

4.3 Dust deposition guidelines

The concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM10) and less than 2.5 microns (PM2.5) and the EU ambient air quality standards outlined in Table 4.1 have set ambient air quality limit values for PM10 and PM2.5. 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. With regard to dust deposition, there are currently no national or European Union air quality standards with which levels of dust deposition can be compared. To measure dust deposition a figure of 350 mg/m2/day (as measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, VDI

2129) can be applied to ensure that no nuisance effects will result. The IAQM guidelines outline an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts.

4.4 Current air quality trends in Ireland

Ireland's air quality is currently good relative to other EU States. The ambient air quality pollutants of most concern on an EU-wide level are nitrogen dioxide and particulate matter.

- Nitrogen Oxides (NO_2 and NO):

Nitrogen oxides are gaseous pollutants associated with traffic exhaust emissions. Nitrogen oxides include the gases nitrogen oxide (NO) and nitrogen dioxide (NO_2). Both pollutants are emitted to ambient air when petrol/diesel is burned. NO_2 is more important than NO from the EPA's point of view as its impact on health is higher. In terms of ambient air quality, the main source of nitrogen oxides in Ireland is road transport, with diesel vehicles producing more nitrogen oxides than petrol vehicles.

- Particulate Matter (PM_{10} and $PM_{2.5}$):

PM consists of very small particles that are suspended in the air. There are two main types, PM_{10} (diameter less than 10µm) and $PM_{2.5}$ (diameter less than 2.5µm). There are many sources of PM, in Ireland the dominant sources of PM from human activities are solid fuels used in home heating in winter and the transport sector.

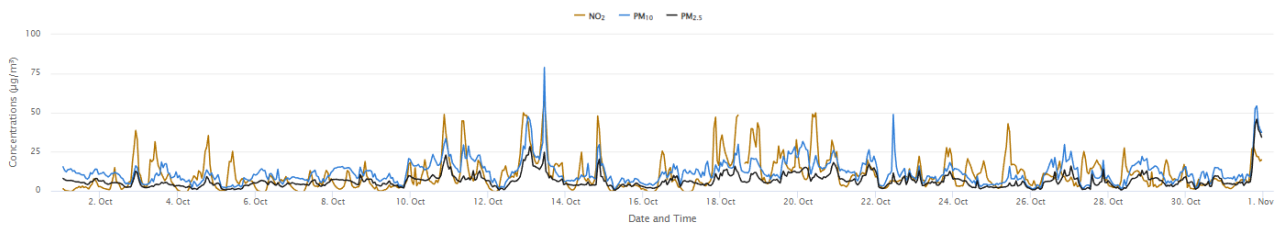
4.5 Receiving environment at Palmerstown (including neighbouring industrial estate)

Palmerstown is a western Dublin suburb, approximately 12km from Dublin city centre. The Palmerstown area is bordered to the north by the River Liffey, to the west by Lucan, to the south-west by Clondalkin, to the south by Ballyfermot and to the east by the village of Chapelizod. The proposed development site borders industrial units to the east and south. Located west is existing residential estate Palmers crescent with Kennelsfort Road Upper in-between. Catering units are located immediately north with a community school further north.

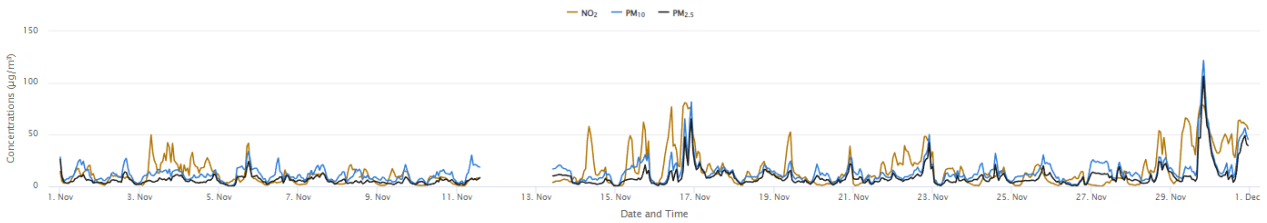
The development area is located within an area which includes sources of transportation related air emissions principally from the Kennelsfort Road Upper and local industrial units and sources of domestic heating from nearby residential housing. Within the Cherry Orchard industrial estate there are no business activities which exceed EPA emission thresholds requiring an industrial IED or IPC license. The site is not in any immediate location of facilities that generate industrial emissions on a large scale. This means there are no existing industrial emissions of concern that would have an adverse impact on future resident's air quality at the proposed development.

4.6 EPA local air quality monitoring results

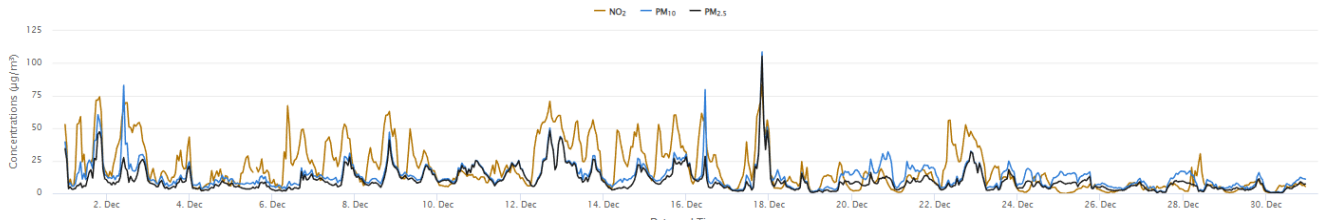
The EPA publish annual reports on air quality in Ireland. These reports can be accessed via the EPA website at www.epa.ie. The most current EPA report ' Air Quality in Ireland 2021' has been examined in order to describe the existing air quality conditions and to provide information on background concentrations. The ambient air quality data collected and reviewed for the purpose of this study focused on the principal substances (NO_2 and PM emissions) which may be released from the site during the construction and operation phases and which may exert an influence on local air quality. The proposed residential development site is located within Zone A, the Dublin conurbation. The EPA monitor locally and nationally. The nearest local and national EPA air quality monitoring station from the development site is Ballyfermot, Dublin 10 , approximately 2km away. Local monitoring data for PM and NO_2 can only be obtained up to a couple of months previous. The previous 5 months graphs for are illustrated below:



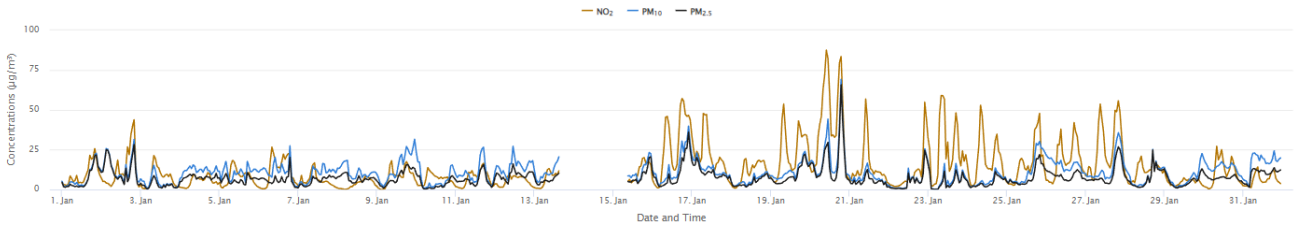
Oct 2022 monitoring data. Copyright EPA



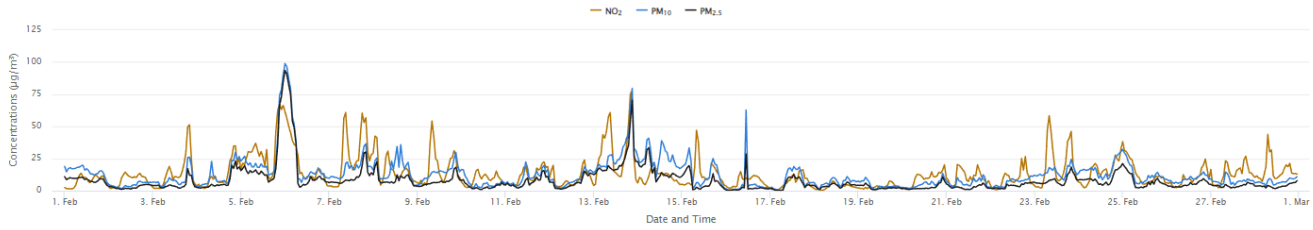
Nov 2022 monitoring data. Copyright EPA



Dec 2022 monitoring data. Copyright EPA



Jan 2023 monitoring data. Copyright EPA



Feb 2023 monitoring data. Copyright EPA

The EPA publish official data only from the national monitoring station on a yearly basis. Table 4.2 shows the annual mean value concentrations measured at this monitoring site for 2021, 2020, 2019, 2018 and 2017.

Pollutant (mean concentration)	2021	2020	2019	2018	2017	5-year Average	Annual Limit for Protection of Human Health
	($\mu g/m^3$)						
Sulphur Dioxide (SO_2)	2.6*	2.9	1.5*	2.1*	2.08*	2.2	20
Particulate Matter (PM_{10})	11.8	12.0	14	16	12	13.16	40
Particulate Matter ($PM_{2.5}$)	7.8	8.0	10	7	7.5*	8.0	20
Nitrogen Dioxide (NO_2)	13.2	12	20	17	16.5	15.7	40

Carbon Monoxide (CO) (mg/m^3)	0.35*	0.3*	0.3*	0.2*	0.3*	0.3	10 (mg/m^3)
Benzene	0.35*	0.52	0.3	0.3*	0.09*	0.3	5
Lead (Pb)	0.09*	0.04*	0.04	0.06*	0.05*	0.06	0.5

Table 4.2: Data from the EPA ambient air monitoring report 2019

* Ballyfermot monitoring station does not record all ambient air quality parameters outlined in the Directive. Therefore air quality in the receiving environment was assessed using the average annual mean value concentrations from all measured monitoring stations in Zone A for that year.

4.7 Air quality for health

The EPA's air quality index for health (AQIH) is a number from 1 to 10 that tells you what the air quality currently is and whether or not this might affect the health of an individual. A reading of 10 means the air quality is very poor and a reading of one to three inclusive means that the air quality is good. Table 4.3 below illustrates this.

Band	Index	NO_2 ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	PM10 ($\mu g/m^3$)
Good	1	0-67	0-11	0-16
	2	68-134	12-23	17-33
	3	135-200	24-35	34-50
Fair	4	201-267	36-41	51-58
	5	268-334	42-47	59-66
	6	335-400	48-53	67-75
Poor	7	401-467	54-58	76-83
	8	468-534	59-64	84-91
	9	535-600	65-70	92-100
Very poor	10	>601	>71	>101

Table 4.3: Information from the EPA air quality index for health

The health advice associated with the AQIH for people is as follows in table 4.4.

Band	Index	Health advice for general population	Health advice for At-risk groups
Good	1 2 3	Enjoy your usual outdoor activities	Enjoy your usual outdoor activities
Fair	4 5 6	Enjoy your usual outdoor activities.	Adults and children with lung problems, and adults with heart problems, who experience symptoms, should consider reducing strenuous physical activity, particularly outdoors
Poor	7 8 9	Anyone experiencing discomfort such as sore eyes, cough or sore throat should consider reducing activity, particularly outdoors.	Adults and children with lung problems, and adults with heart problems, should reduce strenuous physical activity, particularly outdoors, and particularly if they experience symptoms.
Very poor	10	Reduce physical exertion, particularly outdoors, especially if you experience symptoms such as cough or sore throat	Adults and children with lung problems, adults with heart problems, and older people, should avoid strenuous physical activity.

Table 4.4: Irelands EPA air quality index for health advice information

4.8 Significance of EPA results

The EPA data levels of pollutants show air quality parameters are all below the air quality limit values. The monthly monitoring data indicates the AQIH mostly falls into the category of index 1 and 2 . Data shows on occasion air quality fluctuates to index 3 for PM_{10} and $PM_{2.5}$ but both would still in the band of 'Good' air quality in terms of health for people in the vicinity. It can be seen that the existing baseline air quality at the site locality can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values of individual pollutants. The quality of existing air quality at the subject site must be maintained and/or improved where possible.

4.9 Sensitive receptors

The principal local receptors that may be impacted by the development are existing residential dwellings to the west, Palmers crescent residential estate, located within a distance range of 25-35m. The non-domestic catering units north, located within a distance range of 11-30m. the industrial units located east and south. The Palmerstown Community School located north.

Image 4.1: Sensitive receptors

5 Air Quality Impact

5.1 Stages of development

When considering a new development the potential impact on air quality must be considered for each distinct stage.
- construction phase
- operational phase

It is important that there are no unacceptable decreases in ambient air quality levels predicted during the construction phases and during the operational phase.

5.2 Potential impact of the proposed development

The construction phase of the development has the potential to generate short term dust emissions. The majority of any dust produced during the construction phase may be deposited close to source. The movements of construction vehicles on the site could also generate dust emissions. The operational phase of the proposed development has the potential to result in an impact on local air quality primarily as a result of the increased traffic movements associated with the development. At the local scale the principal pollutants potentially are NO2 and PM10.

5.3 Predicted impact of the proposed development

Construction phase:
The construction phase of the development has the potential to generate dust emissions and may have the potential to impact air quality in the short term. Dust emissions can lead to elevated PM10 and PM2.5 concentrations and may also cause dust soiling. It is not easy to accurately quantify dust emissions arising from construction activities. A semi-quantitative approach is recommended by the National Roads Authority (NRA) Guidelines to determine the likelihood of a significant impact. The construction assessment criteria reproduced from the NRA are set out in Table 5.1

Source		Potential Distance for Significant Effects (Distance from source)		
Scale	Description	Soiling	PM_{10}	Vegetation Effects
Major	Large Construction sites, with high use of haul routes.	100m	25m	25m
Moderate	Moderate Construction sites, with moderate use of haul routes.	50m	15m	15m
Minor	Minor Construction sites, with minor use of haul routes.	25m	10m	10m

Table 5.1: Assessment criteria for the impact of dust from construction activities with standard mitigation in place (NRA 2011)

While dust from construction activities tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. Some of the Palmers crescent residential estate, located within a distance range of 25-35m. the industrial units north and east is located within 50m of the site. Where dust impacts are likely, avoidance and mitigation measures will be put in place to reduce the impact levels such as wind breaks, barriers and frequent cleaning and watering of the construction site roads, further detailed mitigation measures discussed in section 6. Vehicles such as HGV's travelling to and from the site during the construction phase have the potential to cause an increase to pollutant concentrations at nearby receptors. Small increases in levels to PM and pollutants related to increased traffic can be predicted however relative to baseline levels, the impact of the proposed development during construction will not have an adverse impact in concentrations above the limit of regulation values. Provided the dust minimisation measures outlined in the plan are adhered to, the air quality impacts during the construction phase will not be significant.

Operational phase:
The design and construction of buildings in accordance with National Building Regulations (The Irish Building Regulations Technical Guidance Document L – Conservation of Fuel & Energy – Dwellings) will 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. In order to counteract the impact of the development on the existing and future air quality the design of the proposed residential apartments and houses has considered a number of sustainable heating and energy saving features.

The operational phase of the proposed development also has the potential to result in an impact on local air quality primarily as a result of the increased traffic movements associated with the development. It is envisioned that a proportion of the commuting residents will avail of Dublin Bus commuter services. The availability of public transport will significantly reduce the number of private vehicles exiting and entering the development, this continued encouragement will help significantly reduce the number of private vehicles exiting and entering the development. The DMRB screening air quality spreadsheet from the U.K Highway Agency Design Manual for Roads and Bridges, was used to assess the impact of increased traffic associated with the new development.

Projected transport figures were used to predict the concentrations of traffic-derived pollutants in future years. The model combined background concentrations of pollutants, sourced from the EPA reports (**5-year average values were used)** with predicted concentrations. Results were generated using an average speed of 20 km/h assuming congested traffic conditions. Using the DMRB screening air quality spreadsheet, future pollutant concentrations were predicted at sensitive receptors A and B, see receptor A and B on image 5.1 for their location. The receptor Palmers Crescent residential neighbourhood near the Kennelsfort Road Upper was chosen as the sensitive receptor A and Palmerstown Community School was chosen as the sensitive receptor B.

Image 5.1: receptor locations, A and B.

In order to quantify the magnitude of change in pollutant concentrations, the descriptors in table 5.3 were used. To describe the significance of the impact, table 5.4 was then used. These descriptor tables are from the Transport Infrastructure Ireland Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes which detail a methodology for determining air quality impact significance criteria for road schemes and has been adopted for this assessment. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do-Nothing' scenario, which assumes that the proposed development is not in place in future years, in order to determine the degree of impact.

Magnitude of Change	Annual Mean NO_2 ($\mu g/m^3$)	No. of Days with PM_{10} concentration greater than 50 $\mu g/m^3$	Annual Mean PM ($\mu g/m^3$)
Large	Increase/decrease	Increase/decrease	Increase/decrease

	≥4	>4 days	≥2.5
Medium	Increase/decrease 2 - <4	Increase/decrease 3 or 4 days	Increase/decrease 1.25 - <2.5
Small	Increase/decrease 0.4 - <2	Increase/decrease 1 or 2 days	Increase/decrease 0.25 - <1.25
Imperceptible	Increase/decrease <0.4	Increase/decrease <1 day	Increase/decrease <0.25

Table 5.3: Definition of impact magnitude for changes in ambient air pollutant concentrations.

Absolute Concentration in Relation to Objective /Limit Value	Changes in Concentration		
	Small	Medium	Large
Increase with Scheme			
Above Limit Value with Scheme (≥40µg/m^3 of NO_2 or PM_{10}) (≥25µg/m^3 of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Limit Value with Scheme (36-<40µg/m^3 of NO_2 or PM_{10}) (22.5-<25µg/m^3 of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Limit Value with Scheme (30-<36µg/m^3 of NO_2 or PM_{10}) (18.75-<22.5µg/m^3 of $PM_{2.5}$)	Negligible	Slight Adverse	Slight Adverse
Well Below Limit Value with Scheme (<30µg/m^3 of NO_2 or PM_{10}) (<18.75µg/m^3 of $PM_{2.5}$)	Negligible	Negligible	Slight Adverse

Table 5.4: Air quality impact descriptors for changes in annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations at a receptor.

The results of the impact assessment arising from increased transport are presented in Table 5.5 and 5.6. The results predict future air quality relative to the existing baseline.

Receptor A	Annual Average NO_2 (µg/m^3)	Annual Average PM_{10} (µg/m^3)	Annual Average (µg/m^3)Benzene	Annual Average CO (µg/m^3)
Background	15.7	13.2	0.3	0.3
Limits	40	40	5	10
Do Nothing (2030)	16.21	13.6	0.33	0.32
Increase	+0.51	+0.40	+0.03	+0.02
Magnitude	small	small	imperceptible	imperceptible
Description	negligible	negligible	negligible	negligible
Do Something (2030)	17.82	13.77	0.36	0.35
Increase	+2.12	+0.57	+0.06	+0.05
Magnitude	medium	small	imperceptible	imperceptible
Description	negligible	negligible	negligible	negligible

Table 5.5: Modelled results for receptor A.

Receptor B	Annual Average NO_2 ($\mu g/m^3$)	Annual Average PM_{10} ($\mu g/m^3$)	Annual Average ($\mu g/m^3$)Benzene	Annual Average CO ($\mu g/m^3$)
Background	15.7	13.2	0.3	0.3
Limits	40	40	5	10
Do Nothing (2030)	16.17	13.4	0.33	0.32
Increase	+0.47	+0.38	+0.03	+0.02
Magnitude	small	small	imperceptible	imperceptible
Description	negligible	negligible	negligible	negligible
Do Something (2030)	17.71	13.69	0.36	0.35
Increase	+2.01	+0.49	+0.06	+0.05
Magnitude	medium	small	imperceptible	imperceptible
Description	negligible	negligible	negligible	negligible

Table 5.5: Modelled results for receptor B.

Summary of modelling assessment: Levels of traffic-derived air pollutants for the development at receptor A and B show an expected increase in annual NO2, PM10, benzene and CO. The impact equates to a 'medium' increase in annual average NO2. Using the significance criteria, it results in a 'negligible' impact in terms of local impact as a result of increased traffic. The predicted PM10 impact equates to a 'small' increase in annual average PM10. A small increase in annual average PM10 is 'negligible' in terms of a local impact as a result of increased traffic. In summary, the modelled results do show an increase in annual NO2 and PM10 but each remain well below the limit values for EU regulations. This predicted increase above the existing situation results in a negligible impact and would not result in a perceptible change in the existing local air quality environment.

5.4 Predicted air quality index for future occupancy at Orchard Gate

Using the predicted operational traffic flow modelled data (which assumed constant congested traffic conditions at the site for worst case scenario) the air quality index for future occupancies health puts the site in an index 1 category. The previous 6 months of local monitoring data indicate that the area is mostly in an index 1 and 2 category with a few occasions of levels recorded at index 3 for PM_{10} readings. These predicted air emissions at the site still have the same health advice for people which is 'Enjoy your usual outdoor activities'. At-risk groups of the population have the same health advice in index 1, 2 & 3 of 'Enjoy your usual outdoor activities'. The predicted AQIH is good for future occupancy.

It is worth noting any measures to promote and improve the attractiveness of using public transport, cycling, walking, car sharing or a combination of these as alternatives to single occupancy private car travel could potentially improve the AQIH in the future.

On last inspection (October 2022) the Cherry Orchard industrial estate presented no business activities which exceed EPA emission thresholds. The proposed site is not in any immediate location of facilities that generate industrial emissions on a scale requiring an industrial IED or IPC license. This means there are no existing industrial emissions of concern that would have an adverse impact on future resident's air quality at the proposed development.

6 Mitigation measures

6.1 Remedial and reductive measures

Construction phase: In order to mitigate dust emissions and minimise air quality impacts during the construction phase, placing activities which are a potential source of dust away from boundaries would minimise the possibility of exposure. Standard mitigation measures would be implemented onsite to control emissions during construction, Full details of the dust management plan can be found in Appendix A. Summary of mitigation measures include:

- Any required demolition works to be undertaken in a phased and controlled manner. The dampening down of potential dust generating demolition activities.
- Avoid unnecessary vehicle movements and limit speeds on site so as to minimise the generation of airborne dust.
- Site roads shall be regularly cleaned and maintained as appropriate. Hard surface roads shall be swept to remove mud/aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- location of temporary storage of dusty materials and material transfer operations as far from the nearest sensitive receptors as practicable. Aggregates will be transported to and from the site in covered trucks.
- All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage.
- All plant machinery not in operation shall be turned off and idling engines shall not be permitted for excessive periods. Where drilling or pavement cutting, grinding or similar types of operations are taking place, measures to control dust emissions will be used by the erection of wind breaks or barriers.
- 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.

Operational phase: As outlined in the impact assessment, it is likely the operational phase will not generate air emissions that would have an adverse impact on local ambient air quality and as such there are no mitigation measures specified for the operational phase. The government aims to promote sustainability by enhancing public transport with regular and ongoing increases in the public transport capacity, both road and rail and to reduce dependency on the use of the private car. These alternatives as well as the increasing use of electric vehicles could potentially improve the air quality emission impact in the future.

6.2 Monitoring

Construction phase: If the construction contractor adheres to good working practices and the mitigation measures are in place, the levels of emissions generated are assessed to be minimal and are unlikely to cause an impact on air quality during the construction phase, there is no monitoring recommended.
Operational phase: There is no monitoring recommended for the operational phase of the development as impacts to air quality are predicted to be negligible.

6.3 Air quality impact summary

The assessment identified the existing baseline levels in the area of the proposed development by an evaluation of EPA monitoring data. The EPA data of current and previous years establish air quality parameters are all well below national and EU ambient air quality standards. The existing baseline air quality at the site locality can be characterised as being good with no exceedances of the National Air Quality Standards Regulations limit values. The air quality impact was considered for each distinct stage, construction phase and operational phase. The impact of the development during the construction phase on air quality at potential neighbouring receptors was determined by an assessment of dust soiling. Standard mitigation measures outlined in the dust management plan would be implemented onsite to control emissions during construction. With mitigation measures in place impacts of the proposed development on air quality for the construction phase is likely to result in negligible impacts. The impact of the development during the operational phase on air quality was determined by an assessment using the DMRB air quality model predicting pollutant concentrations at 2 no. of receptors as a result of increased road traffic. Modelled impact results showed an expected small increase in annual NO2, PM10, benzene and CO but each parameter would still remain well below the limit values for EU regulations. In the context of significance outlined in relevant guidelines, the impacts have been defined as negligible and would not result in a perceptible change in the existing local air quality environment. On last inspection (October 2022) the Cherry Orchard industrial estate presented no business activities which exceed EPA emission thresholds. The proposed site is not in any immediate location of facilities that generate industrial emissions on a scale requiring an industrial IED or IPC license. This means there are no existing industrial emissions of concern that would have an adverse impact on future resident's air quality.

Appendix A - Dust Management Plan

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 planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions. As the prevailing wind is predominantly south-westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors. The Principal Contractor or equivalent must ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised.

- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary. A complaints register will be kept on site detailing all sources of complaints received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out.
- Regular inspections of the site and boundary should be carried out to monitor dust, records and notes on these inspections should be logged.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
- In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed, and satisfactory procedures implemented to rectify the problem.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site if necessary.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover or fence stockpiles to prevent wind whipping.

Site roads and operating vehicles / machinery

- 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. Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist.
- 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.
- Ensure all vehicles switch off engines when stationary.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.

Site traffic on public roads

- Vehicles delivering material with potential for dust emissions to an off-site location shall be enclosed or covered with tarpaulin at all times.
- At the main construction traffic exit, a wheel wash facility shall be installed. All trucks leaving the site must pass through the wheel wash. The wheel wash will be located sufficiently far from the exit to allow trucks to ‘drip off’ prior to exit. In addition, public roads outside the site shall be regularly inspected for cleanliness and cleaned as necessary.
- Vehicles onsite shall turn off engines when not in use to prevent idling emissions.

Onsite operations

- Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays.

- Ensure an adequate water supply on the site for effective dust / particulate matter suppression.
- Use enclosed chutes and conveyors and covered skips.
- Avoid dry sweeping of large areas.
- Minimise drop heights from conveyors and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event.

Waste management
- Avoid bonfires and burning of waste materials.

Demolition activities
- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure effective water suppression is used during demolition operations.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Earthwork's activities
- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser or similar will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Construction activities
- Ensure aggregates are stored in bunded areas and are not allowed to dry out unless this is required for a particular process.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately.
- During periods of very high winds (gales), construction activities likely to generate significant dust emissions should be postponed until the gale has subsided.