8.7.1.1.3 Construction

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

- **Large** Total building volume > 75,000 m^3, on-site concrete batching, sandblasting;
- **Medium** Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching;
- **Small** Total building volume < 12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude for the proposed construction activities can be classified as **large** as the total volume of buildings constructed will be greater than 75,000 m^3. Using the criteria in Table 0.133 and combining the large dust emission magnitude with a medium sensitivity to dust soiling and low sensitivity to human health impacts results in an overall medium risk of dust soiling impacts and a low risk of dust-related human health impacts (Table 0.14) from the proposed construction activities.

Table 0.134 Criteria for Rating of Risk of Dust Impacts – Construction (IAQM, 2024)

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

Table 0.145 Risk of Dust Impacts – Construction

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

8.7.1.1.4 Trackout

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

- **Large** > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;
- **Medium** 20 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;
- **Small** < 20 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

The dust emission magnitude for the proposed trackout can be classified as **medium**, as there may be between 20 – 50 outward HGV trips per day during peak periods. Using the criteria in Table 0.156 and combining the medium dust emission magnitude with a medium sensitivity to dust soiling and low sensitivity to human health impacts results in an overall medium risk of dust soiling impacts and a low risk of dust-related human health

impacts (Table 0.16) from the proposed trackout activities.

Table 0.156 Criteria for Rating of Risk of Dust Impacts – Trackout (IAQM, 2024)

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

Table 0.167 Risk of Dust Impacts – Trackout

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Trackout	Risk of Dust-Related Impacts
Dust Soiling	Medium	Medium	Low Risk
Human Health	Low		Negligible

8.7.1.1.5 Summary of Dust Emission Risks

The risk of dust impacts as a result of the proposed development are summarised in Table 0.17 for each activity. The magnitude of risk determined is used to prescribe the level of site-specific mitigation required for each activity in order to prevent significant impacts occurring.

There is at most a medium risk of dust soiling and a low risk of human health impacts associated with the proposed works. Best practice dust mitigation measures appropriate for medium risk sites will be implemented to ensure there are no significant impacts at nearby sensitive receptors. In the absence of mitigation, dust impacts are predicted to be ***direct, short-term, negative*** and ***slight***, which is overall ***not significant*** in EIA terms.

Table 0.17 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Emission Magnitude	N/A	Large	Large	Medium
Dust Soiling Risk	N/A	Medium Risk	Medium Risk	Medium Risk
Human Health Risk	N/A	Low Risk	Low Risk	Low Risk

8.1.1.1.

8.7.1.2 Construction Phase Traffic Assessment

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase, particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the TII scoping assessment criteria in Section 0.
It can therefore be determined that the construction stage traffic will have ***direct, short-term, negative*** and ***imperceptible*** impact on air quality, which is overall ***not significant*** in EIA terms.

8.7.2 Operational Phase

8.7.2.1 Operational Phase Traffic Assessment

The potential impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development using the TII Road Emissions Model (TII, 2024). The traffic data has included specific cumulative developments within the area to provide for a worst-case assessment and to assess potential cumulative impacts (see Section 0, Traffic and Transport Assessment and Chapter 12 (Material Assets: Transportation) for further details).

The traffic data includes the Do Nothing (DN) and Do Something (DS) scenarios. The impact of NO_2, PM_{10} and $PM_{2.5}$ emissions for the Opening and Design Years was predicted at the nearest sensitive receptors to the impacted road links. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined.

The TII guidance PE-ENV-01106 (TII, 2022) details a methodology for determining air quality impact significance criteria for TII road schemes and infrastructure projects. However, this significance criteria can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative effects 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, to determine the degree of impact.

8.7.2.1.1 NO_2

The results of the assessment of the effects of the proposed development on NO_2 in the Opening Year 2030 and Design Year 2045 are shown in Table 0.18. The annual average concentration is in compliance with the limit value at the worst-case receptors in the year 2030 and 2045. Concentrations of NO_2 are at most 45% of the annual limit value in 2030 and 44% of the annual limit value in 2045. There are some predicted increases in traffic volumes between the opening and design years, therefore any decrease in pollutant concentrations is due to improving engine technologies. In addition, the TII guidance (TII, 2022) states that the hourly limit value for NO_2 of 200 µg/m^3 is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m^3. As predicted NO_2 concentrations are significantly below 60 µg/m^3 (Table 0.189), it can be concluded that the short-term NO_2 limit value will be complied with at all receptor locations.

The effects of the proposed development on annual mean NO_2 concentrations can be assessed relative to 'Do Nothing' levels. NO_2 concentrations at the receptors assessed will increase as a result of the proposed development when compared with the Do Nothing scenario. There will be at most an increase of 0.15 µg/m^3 at receptor R1, which is a 0.4% change when compared with the ambient air quality limit value of 40 µg/m^3. There will be a maximum increase of 0.21 µg/m^3 at receptor R2, which is a 0.5% change when compared with the ambient air quality limit value of 40 µg/m^3. Where the predicted annual mean concentrations in the Opening Year without the proposed development are less than 75% of the air quality standard (see Table 0.4) and there is a less than 5% change in concentrations compared with the annual mean ambient air quality standard, then, the impact is considered neutral as per the TII significance criteria (see Table 0.6). Therefore, the effect of the proposed development on NO_2 concentrations according to the TII guidance (TII, 2022) is neutral.

Table 0.18 Predicted Annual Mean NO_2 Concentrations (µg/m³)

Receptor	Impact Opening Year						
	DN	DN as % of AQLV	DS	DS as % of AQLV	DS-DN	% Change of AQAL	Description
R1	17.6	44%	17.8	44%	0.15	0.4%	Neutral
R2	17.9	45%	18.1	45%	0.21	0.5%	Neutral
Receptor	**Impact Design Year**						
	DN	**DN as % of AQLV**	**DS**	**DS as % of AQLV**	**DS-DN**	**% Change of AQAL**	**Description**
R1	17.5	44%	17.6	44%	0.11	0.3%	Neutral
R2	17.6	44%	17.8	44%	0.15	0.4%	Neutral

8.7.2.1.2 PM_{10}

In relation to changes in PM_{10} concentrations as a result of the proposed development, the results of the assessment can be seen in Table 0.19 for the Opening Year 2030 and Design Year 2045. The annual average concentration is in compliance with the limit value at the worst-case receptors in the year 2030 and 2045. Concentrations of PM_{10} are at most 38% of the annual limit value in 2030 and 2045. In addition, the proposed development will not result in any exceedances of the daily PM_{10} limit value of 50 µg/m³. The effects of the proposed development on annual mean PM_{10} concentrations can be assessed relative to 'Do Nothing' levels. PM_{10} concentrations at the receptors assessed will increase as a result of the proposed development when compared with the Do Nothing scenario. There will be at most an increase of 0.16 µg/m³ at receptor R1, this is a 0.4% increase when compared with the ambient air quality limit value of 40 µg/m³. There will be at most an increase of 0.22 µg/m³ at receptor R2, this is a 0.5% increase when compared with the ambient air quality limit value of 40 µg/m³. As with NO_2, where the predicted annual mean concentrations in the Opening Year without the proposed development are less than 75% of the air quality standard (see Table 0.4) and there is a less than 5% change in concentrations compared with the annual mean ambient air quality standard, then, the impact is considered neutral as per the TII significance criteria (see Table 0.6). Therefore, the impact of the proposed development on PM_{10} concentrations according to the TII guidance (TII, 2022) is neutral.

Table 0.19 Predicted Annual Mean PM_{10} Concentrations (µg/m³)

Receptor	Impact Opening Year						
	DN	DN as % of AQLV	DS	DS as % of AQLV	DS-DN	% Change of AQAL	Description
R1	14.7	37%	14.8	37%	0.16	0.4%	Neutral
R2	14.9	37%	15.1	38%	0.22	0.5%	Neutral
Receptor	**Impact Design Year**						
	DN	**DN as % of AQLV**	**DS**	**DS as % of AQLV**	**DS-DN**	**% Change of AQAL**	**Description**
R1	14.7	37%	14.9	37%	0.16	0.4%	Neutral
R2	15.0	37%	15.2	38%	0.22	0.5%	Neutral

8.7.2.1.3 $PM_{2.5}$

In relation to changes in $PM_{2.5}$ concentrations as a result of the proposed development, the results of the assessment can be seen in Table 0.220 for the modelled Opening Year 2030 and Design Year 2045. The annual average concentration is in compliance with the limit value at the worst-case receptors in the year 2030 and 2045.

Concentrations of $PM_{2.5}$ are at most 43% of the annual limit value in 2030 and 2045. The effect of the proposed development on annual mean $PM_{2.5}$ concentrations can be assessed relative to 'Do Nothing' levels. $PM_{2.5}$ concentrations at the receptors assessed will increase as a result of the proposed development when compared with the Do Nothing scenario. There will be at most an increase of 0.09 µg/m^3 at receptor R1, this is a 0.4% change when compared with the ambient air quality limit value of 25 µg/m^3. There will be at most an increase of 0.12 µg/m^3 at receptor R2, this is a 0.5% change when compared with the ambient air quality limit value of 25 µg/m^3. As with NO_2, where the predicted annual mean concentrations in the Opening Year without the proposed scheme are less than 75% of the air quality standard (see Table 0.4) and there is a less than 5% change in concentrations compared with the annual mean ambient air quality standard, then, the impact is considered neutral as per the TII significance criteria (see Table 0.6). Therefore, the impact of the proposed development on $PM_{2.5}$ concentrations according to the TII guidance (TII, 2022) is neutral.

Table 0.220 Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m^3)

Receptor	Impact Opening Year						
	DN	DN as % of AQLV	DS	DS as % of AQLV	DS-DN	% Change of AQAL	Description
R1	10.4	42%	10.5	42%	0.09	0.4%	Neutral
R2	10.5	42%	10.7	43%	0.12	0.5%	Neutral
Receptor	**Impact Design Year**						
	DN	**DN as % of AQLV**	**DS**	**DS as % of AQLV**	**DS-DN**	**% Change of AQAL**	**Description**
R1	10.4	42%	10.5	42%	0.09	0.4%	Neutral
R2	10.6	42%	10.7	43%	0.12	0.5%	Neutral

Overall, the TII significance criteria have identified neutral impacts due to increases in NO_2, PM_{10} and $PM_{2.5}$ annual mean concentrations. Changes in concentrations between the Do Something and Do Nothing scenarios are less than 5% of the annual mean ambient air quality standards (and the annual mean concentrations are less than 75% of the air quality standard). This equates to a potential effect of the proposed development on ambient air quality, and human health, in the operational stage which is considered ***direct, long-term, negative*** and ***not significant*** which is ***not significant***, according to the terminology in the EPA guidelines (EPA, 2022).

8.7.3 Cumulative Effects

8.7.3.1 Construction Phase

According to the IAQM guidance (IAQM, 2024) should the construction phase of the proposed development coincide with the construction phase of any other development within 500m then there is the potential for cumulative construction dust impacts. A review of relevant planning applications within 500m of the site was conducted in order to identify sites with the potential for cumulative impacts. There were 2 no. sites identified which may have coinciding construction phases with that of the proposed development, these include South Dublin County Council planning application refs. SD23A/0038 and SD22A/0356. However, these developments are both currently under construction and it is likely that the majority of dust generating construction works would be substantially completed prior to construction of the proposed development. Therefore the potential for cumulative impacts is significantly lessened.

The proposed development has been assessed as having a medium risk of dust soiling impacts during the construction phase. A number of mitigation measures have been proposed in order to ensure significant dust

impacts do not occur. Provided these measures are in place for the duration of the construction phase, significant cumulative construction dust impacts from the construction of the proposed development and other cumulative developments within 500m are not predicted. Cumulative impacts to air quality will be ***direct***, ***short-term, localised, negative*** and ***imperceptible*** which is overall ***not significant*** in EIA terms.

The construction stage traffic associated with the proposed development as well as other developments within the wider area has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the TII assessment criteria in Section 0.

8.7.3.2 Operational Phase

There is the potential for cumulative impacts to air quality during the operational phase as a result of traffic associated with other existing and permitted developments within the area. The traffic data provided for the operational stage air quality assessment included specific cumulative developments within the wider area, specifically SD23A/0083, SD22A/0356, SD23A/0149 and SHD3-ABP-310578-21 (see Chapter 12 (Material Assets: Transportation) and Traffic and Transportation Assessment for further details). Therefore, the cumulative impact has been assessed within Section 0. The impact to air quality during the operational phase of the proposed development will be ***direct, long-term, negative*** and ***not significant*** which is overall ***not significant*** in EIA terms.

8.8. Mitigation Measures

8.8.1 Construction Phase Mitigation

The proposed development has been assessed as having a medium risk of dust soiling impacts and a low risk of dust related human health impacts during the construction phase as a result of earthworks, construction and trackout activities (see Section 0). Therefore, the following dust mitigation measures shall be implemented during the construction phase of the proposed development. These measures are appropriate for sites with a medium risk of dust impacts and aim to ensure that no significant nuisance occurs at nearby sensitive receptors. The mitigation measures draw on best practice guidance from Ireland (DCC, 2018), the UK (IAQM (2024), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared for the site. The measures are divided into different categories for different activities.

Communications

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

Site Management

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

- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary where feasible, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Preparing and Maintaining the Site

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

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)

Operations

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

Waste Management

- No bonfires or burning of waste materials.

Measures Specific to Earthworks

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

Measures Specific to Construction

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

Measures Specific to Trackout

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

Monitoring

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel

located approximately 2m above ground level. The TA Luft limit value is 350 mg/m^2/day during the monitoring period of 30 days (+/- 2 days).

8.8.2 Operational Phase Mitigation

There is no mitigation required for the operational phase of the development as effects on air quality are predicted to be ***direct, long-term, negative*** and ***not significant***.

8.9. Residual Impact Assessment

8.9.1 Construction Phase

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared. Once the dust minimisation measures outlined in Section 0 are implemented, the effect of the proposed development in terms of dust soiling will be ***direct, short-term, negative*** and ***not significant*** which is overall ***not significant*** in EIA terms.

A detailed air quality assessment of the construction stage traffic has been scoped out (as per Section 0). It can therefore be determined that the construction stage traffic will have a ***direct, short-term, negative*** and ***imperceptible*** impact on air quality which is overall ***not significant*** in EIA terms.

8.9.2 Operational Phase

Air dispersion modelling of operational traffic emissions associated with the proposed development was carried out using the TII REM tool. The modelling assessment determined that the change in emissions of NO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors as a result of the proposed development will be not significant. Therefore, the operational phase effect to air quality is ***long-term, direct, negative***, and ***not significant*** which is overall ***not significant*** in EIA terms.

8.9.3 Cumulative Residual Effects

8.9.3.1 Construction Phase

According to the IAQM guidance (IAQM, 2024) should the construction phase of the proposed development coincide with the construction phase of any other developments within 500m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. However, provided the mitigation measures outlined in Section 0, are implemented throughout the construction phase of the proposed development significant cumulative dust impacts are not predicted. Impacts are predicted to be ***direct, short-term, negative*** and ***not significant*** which is overall ***not significant*** in EIA terms.

8.9.3.2 Operational Phase

Air dispersion modelling of operational traffic emissions associated with the proposed development and cumulative developments in the wider area was carried out using the TII REM tool. The modelling assessment determined that the change in emissions of NO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors as a result of the proposed development in combination with cumulative developments will be imperceptible. Therefore, the operational phase impact to air quality is ***long-term, direct, negative,*** and ***not significant*** which is overall ***not significant*** in EIA terms***.***

8.10. Risk to Human Health

Dust emissions from the construction phase of the proposed development have the potential to affect human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Section 0, the surrounding area is of low sensitivity to dust related human health impacts. It was determined that there is an overall low risk of dust related human health effects as a result of the construction phase of the proposed development.

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the effect of construction of the proposed development is likely to be ***direct, short-term, negative*** and ***not significant*** with respect to human health which is overall ***not significant*** in EIA terms.

Traffic related air emissions have the potential to affect air quality which can affect human health. As the operational phase air dispersion modelling has shown that emissions of air pollutants are significantly below the ambient air quality standards which are based on the protection of human health, impacts to human health are ***direct, long-term, negative*** and ***not significant*** which is overall ***not significant*** in EIA terms.

8.11. Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to air quality associated with the proposed development due to the nature and scale of the development. The proposed development is residential in nature and will not require large scale quantities of hazardous materials or fuels.

8.12. Monitoring

8.12.1 Construction Phase

During working hours, dust control methods will be monitored in addition to the prevailing meteorological conditions.

Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks (by visual inspection) of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.

Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

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

8.12.2 Operational Phase

There is no proposed monitoring during the operational phase.

8.13. Difficulties Encountered

There were no difficulties encountered in compiling this assessment.

8.14. Interactions

Air Quality and Population & Human Health

Construction Phase

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between Population and Human Health and Air Quality. An adverse air quality impact during the construction phase can cause health and dust nuisance issues. There is a low risk of dust-related human health impacts during the construction phase of the proposed development. Best practice mitigation measures will implemented during the construction phase to ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is direct, short-term, negative, localised and not significant with respect to Population and Human Health during the construction phase.

Operational Phase

Vehicles accessing the site will emit pollutants which may impact Air Quality and Human Health. However, the increased number of vehicles associated with the proposed development will not cause a significant change in air pollutant emissions in the locality. It has been assessed that emissions will be in compliance with the ambient air quality standards which are set for the protection of human health. Impacts will be long-term, localised, direct, negative and not significant.

Air Quality and Climate

Air Quality and Climate have interactions as the emissions from the burning of fossil fuels during the construction and operational phases generate both air quality and climate impacts. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

Air Quality and Land, Soils and Hydrogeology

Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between Air Quality and Land and Soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality, and Land and Soils during the

operational phase.

Air Quality and Biodiversity

Construction Phase

Dust generation can occur during extended dry weather periods due to construction traffic along haul routes and construction activities such as excavations and infilling works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. There are no designated ecological sites within 250 m of the proposed development site area. Significant dust impacts are not predicted beyond this distance. Dust mitigation measures will be implemented on site as set out in Section 8.8.1 of Chapter 8 of the EIAR. With the implementation of these mitigation measures dust emissions will be minimised and impacts will be direct, short-term, negative, localised and not significant with respect to biodiversity.

Operational Phase

There are no potentially significant interactions identified between Air Quality, and Biodiversity during the operational phase.

Air Quality and Material Assets – Traffic & Transport

Construction Phase

Interactions between Air Quality and Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are considered to be direct, short-term, negative, localised and not significant during the construction phase.

Operational Phase

The impact of the interactions between Traffic and Air Quality are considered to be long-term, direct, negative and not significant during the operational phase.

8.15. References

- BRE (2003) Controlling Particles, Vapours & Noise Pollution from Construction Sites
- Department of the Environment, Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities
- Dublin City Council (2018) Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition
- Environmental Protection Agency (2006) Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)
- Environmental Protection Agency (2023) Air Quality in Ireland 2022 Report
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- German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft
- Government of Ireland (2023) Clean Air Strategy for Ireland

- Institute of Air Quality Management (IAQM) (2024) Guidance on the Assessment of Dust from Demolition and Construction Version 2.2
- Met Éireann (2024) Met Éireann website: https://www.met.ie/
- 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
- Transport Infrastructure Ireland (2022) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106
- Transport Infrastructure Ireland (2024) Road Emissions Model (REM) online calculator tool
- 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
- World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)
- World Health Organisation (2021) Air Quality Guidelines 2021

9.0. Climate

9.1. Introduction

This chapter of the EIAR was prepared to assess the potential significant effects on climate associated with the proposed development in the townlands of Bohernabreena, Oldcourt, and Killininny, Dublin 24.

9.2. Expertise & Qualifications

This chapter was completed by Ciara Nolan. Ciara is a Senior Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institute of Environmental Science (MIEnvSc). She has over 7 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential developments including Woodbrook, Shankill (Planning Application Ref. ABP30584419), Ballygossan Park, Skerries (Planning Application Ref. LRD0010/S3), SHD Ratoath (Planning Application Ref. SH305196), SHD Rathmullen, Drogheda (Planning Application Ref. SH305552), commercial and industrial developments by Dublin Airport Authority, Abbvie, Mountpark, Pfizer, Takeda, as well as renewable energy developments such as Crockahenny Windfarm, Upperchurch Windfarm, Knocknamona Windfarm and Keerglen Windfarm. She also specialises in conducting air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Echelon DC, AWS, Takea, MSD and Regeneron. She has undertaken air quality and climate impact assessments for transportation schemes, primarily regional and national road schemes, from constraints, through to route selection and EIAR stage.

9.3. Description of the Proposed Development

The proposed development is located in the townlands of Bohernabreena, Oldcourt, and Killininny, Dublin 24. The proposed development will consist of a mix of residential units and all associated site works. A full description of the proposed development is outlined in Chapter 3 (Description of Development & Alternatives) of this EIAR.

9.3.1 Aspects Relevant to this Assessment

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude; and

- Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

9.4. Methodology

9.4.1 Relevant Legislation, Policy & Guidance

The assessment of potential impacts on climate has been prepared taking the relevant legislation, policy and guidance described in the following sections into consideration.

9.4.1.1 Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the 2015 Climate Act). The purpose of the 2015 Climate Act was to enable Ireland *"to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050"* (3.(1) of No. 46 of 2015). This is referred to in the 2015 Climate Act as the *"National Transition Objective"*. The 2015 Climate Act made provision for a national low carbon transition and mitigation plan (now known as a Climate Action Plan), and a national adaptation framework. In addition, the 2015 Climate 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 first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 (CAP19) 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. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2020) and a third update in December 2022 (Government of Ireland, 2022) with an Annex of Action published in March 2023.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government published the Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act) in March 2021. The 2021 Climate Act was signed into Law on the 23rd July of 2021, giving statutory effect to the core objectives stated within the first Climate Action Plan.

The purpose of the 2021 Climate Act (Government of Ireland, 2021) is to provide for the approval of plans *"to reduce the extent of further global warming, pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy"*. This is known as the *"national climate objective"*, which supersedes the 2015 Climate Act *"national transition objective"*. The 2021 Climate Act will also *"provide for carbon budgets and a decarbonisation target range for certain sectors of the economy"*. The 2021 Climate Act defines the carbon budget as *"the total amount of greenhouse gas emissions that are permitted during the budget period"*.

In relation to carbon budgets, the 2021 Climate Act states "*A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')*". The carbon budget is to be produced for 3 sequential budget periods, as shown in Table 0.21. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published in the Climate Action Plan 2024 (CAP24) (DECC, 2024) and are shown in
Table **0.22**. Buildings (Residential) has a 40% reduction requirement and a 2030 emission ceiling of 4 Mt CO_2e[8].

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO_2e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 0.21: 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025 (DECC, 2024)

Sector	Baseline (Mt CO_2e)	Carbon Budgets (Mt CO_2e)		2030 Emissions (Mt CO_2e)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50

[8] Mt CO_2e denotes million tonnes carbon dioxide equivalent.

Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach.			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

Table 0.22: Sectoral Emission Ceilings 2030 (DECC, 2024)

9.4.1.2 Policy

In December 2023 the current Climate Action Plan, CAP24, was published (DECC, 2024). This CAP builds on the progress of CAP23, which first published carbon budgets and sectoral emissions ceilings, and it aims to implement the required changes to achieve a 51% reduction in carbon emissions by 2030 and 2050 net zero goal. The CAP has six vital high impact sectors where the biggest savings can be made: renewable energy, energy efficiency of buildings, transport, sustainable farming, sustainable business and change of land-use. CAP24 states that the decarbonisation of Ireland's manufacturing industry is key for Ireland's economy and future competitiveness. There is a target to reduce the embodied carbon in construction materials by 10% for materials produced and used in Ireland by 2025 and by at least 30% for materials produced and used in Ireland by 2030. CAP24 states that these reductions can be brought about by product substitution for construction materials and reduction of clinker content in cement. Cement and other high embodied carbon construction elements can be reduced by the adoption of the methods set out in the Construction Industry Federation 2021 report Modern Methods of Construction. In order to ensure economic growth can continue alongside a reduction in emissions, the IDA Ireland will also seek to attract businesses to invest in decarbonisation technologies.

In April 2023 the Government published its *Long-Term Strategy on Greenhouse Gas Emissions Reductions* (DECC, 2023). This strategy provides a long-term plan on how Ireland will transition towards net carbon zero by 2050, achieving the interim targets set out in the Climate Action Plan.

The South Dublin County Council (SDCC) *Climate Change Action Plan* published in 2024 (SDCC, 2024) develops on the previous 2019 action plan and outlines a number of goals and plans to prepare for and adapt to climate change. The Climate Action Plan sets out a range of actions across the six theme areas of Energy & Buildings, Transport, Flood Resilience, Nature Based Solutions, Circular Economy & Resource Management and Citizen Engagement. This is aligned to the Government's overall National Climate Objective, which seeks to pursue and achieve, by no later than the end of 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy.

Some of the measures promoted within the Action Plan under the 5 key areas involve building retrofits, energy master-planning, development of segregated cycle routes, the promotion of bike share schemes, development of flood resilient designs, promotion of the use of green infrastructure and water conservation initiatives. The implementation of these measures will enable the South Dublin County Council area to adapt to climate change and will assist in bringing Ireland closer to achieving its climate related targets in future years. New developments need to be cognisant of the Action Plan and incorporate climate friendly designs and measures where possible.

9.4.1.3 Guidance

The assessment of potential impacts on climate has been prepared in accordance with the most relevant principal guidance and best practice documents:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a);
- PE-ENV-01105: Climate Assessment Standard for Proposed National Roads (TII, 2022b);
- GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII, 2022c);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013);
- 2030 Climate and Energy Policy Framework (European Commission, 2014);
- Technical guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a).
- 2030 EU Climate Target Plan (European Commission, 2021b);
- Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2021 Climate Act) (No. 32 of 2021) (Government of Ireland, 2021).
- Climate Action Plan 2024 (DECC, 2024);
- Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (hereafter referred to as the IEMA 2020 EIA Guide) (IEMA, 2020a);
- GHG Management Hierarchy (hereafter referred to as the IEMA 2020 GHG Management Hierarchy) (IEMA, 2020b);
- Assessing Greenhouse Gas Emissions and Evaluating their Significance (Institute of Environmental Management & Assessment (IEMA), 2022);
- Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (hereafter referred to as the IEMA GHG Guidance) (IEMA, 2022); and
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (Highways England, 2021).

9.4.2 Site Surveys/Investigations

No surveys were required as part of the climate assessment.

9.4.3 Greenhouse Gas Assessment

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established with reference to EPA data on annual GHG emissions (see Section 9.6).

9.4.3.1 Construction Phase

PE-ENV-01104 (TII, 2022a) recommends the calculation of the construction stage GHG emissions, including embodied carbon, using the TII Online Carbon Tool (TII, 2022c). Embodied carbon refers to the sum of the carbon needed to produce a good or service. It incorporates the energy needed in the mining or processing of raw materials, the manufacturing of products and the delivery of these products to site. The purpose of the GHG assessment is to engage the design team in the consideration of GHG emissions, including embodied carbon at an early stage in the development and mitigate GHG emissions. This engagement aims to ensure carbon savings are made and assist in aligning the project to Irelands CAP24 goal of Net Carbon Zero for 2050.

The TII Online Carbon Tool (TII, 2022c) has been commissioned by TII to assess GHG emissions associated with road or rail projects in Ireland. The TII Carbon Tool (TII, 2022c) uses emission factors from recognised sources including the *Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book Database* (CESSM, 2013), which can be applied to a variety of developments, not just road or rail. The use of the TII carbon tool is considered appropriate for certain elements of the proposed development as the material types and construction activities employed by the proposed development are accounted for in the tool. The carbon emissions are calculated by multiplying the emission factor by the quantity of the material that will be used over the entire construction / maintenance phase. The outputs are expressed in terms of tCO_2e (tonnes of carbon dioxide equivalent).

The TII Carbon Tool was used to assess the impact of the embodied carbon associated with site clearance activities and excavation of materials. Information on these elements was supplied by the project engineers.

The use of the TII Carbon Tool was not considered suitable for the building elements of the proposed development. As the TII Carbon Tool was developed for road and infrastructure projects, the material types within the tool are specific to these types of developments. These material types are not fully appropriate for assessing the embodied carbon associated with the construction of buildings. Therefore, the carbon impact of the buildings was carried out using an alternative tool; the Carbon Designer for Ireland tool.

The Irish Green Building Council in partnership with One Click LCA Ltd. have developed the Carbon Designer for Ireland tool (One Click LCA Ltd., 2023) for use on Irish specific building projects. The Carbon Designer tool is promoted by the EPA and the Land Development Agency. OneClickLCA is certified to EN 15978, EN 15978, ISO 21931–1 & ISO 21929, and data requirements of ISO 14040 & EN 15804, and is LEED, BREEAM and PAS 2080 aligned. It allows users to assess the carbon impact of buildings at an early stage using typical default materials and values. Inputs to the tool include the gross floor area and number of stories above ground level along with the building frame type. Once the baseline is established using generic data, the tool allows for optioneering and optimization of the carbon impact. It highlights the key areas within the building with the highest carbon impact and provides options for lower carbon intensive materials. The Carbon Designer for Ireland tool was completed by the project architects with the outputs provided to AWN Consulting to assess the GHG impact of the building elements of the proposed development; this included the house, duplex and apartment units.

Reasonable conservative estimates have been used in this assessment where necessary to provide an estimate of the GHGs associated with the proposed development. The information provided in both the Carbon Designer for Ireland tool and TII Carbon Tool was used to determine an estimate of the GHG emissions associated with the development.

The GHG assessment accounts for various components relating to the project during different life stages to determine the total impact of the development on climate. The reference study period (i.e. the assumed building life

expectancy) for the purposes of the assessment is 50 years. GHG emissions are attributed to four main categories, taken from BS EN 15978. The categories are:

- Product Stages (category A1 to A3): The carbon emissions generated at this stage arise from extracting the raw materials from the ground, their transport to a point of manufacture and then the primary energy used (and the associated carbon impacts that arise) from transforming the raw materials into construction products. These stages have been included within the scope of this assessment.
- Construction (category A4 to A5): These carbon impacts arise from transporting the construction products to site, and their subsequent processing and assembly into the building. This has been included within the scope of the assessment. Information for these stages was incorporated into the TII tool.
- In-Use Stages (Category B1 to B5): This covers a wide range of sources from the embodied carbon emissions associated with the operation of the building, including the materials used during maintenance, replacement and refurbishment. Category B6 and B7 refer to operational emissions. In-Use Stages are not included in the assessment scope of this study. Material refurbishment and replacement throughout the lifetime of the development (category B4 – B5) has been included within this assessment.
- End of Life Stages (category C1 to C4): The eventual deconstruction and disposal of the existing building at the end of its life takes account of the on-site activities of the demolition contractors. No 'credit' is taken for any future carbon benefit associated with the reuse or recycling of a material into new products. This stage as not included within the scope of this study due to the variability and uncertainty in deconstruction methods which may be in place at the end of the development's lifespan.
- Benefits and loads beyond the system boundary Module (D): Any potential benefit from the reuse, recovery and recycling potential of a building or a building product. This module is not included in the assessment scope of this study.

The assessment conducted as part of this EIAR included categories A1 – A5 and B4 – B5. All other categories were outside the scope of this assessment as this level of detailed information was not available at this stage or these categories are not considered relevant to this development type.

Detailed information on all building materials was not available at this stage in the project. Therefore, the assessment has assumed generic default values within the Carbon Designer for Ireland tool, where required, to provide an initial high-level assessment of the potential embodied carbon impact of the project.

9.4.3.2 Operational Phase

9.4.3.2.1 Operational Traffic Emissions

Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

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

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;

- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

As per Chapter 8 Air Quality, there are 2 no. road links that will experience a change of over 1,000 AADT during the operational phase as a result of the proposed development. As a result a detailed assessment of traffic related carbon dioxide (CO_2) emissions was conducted.

PE-ENV-01104 (TII, 2022c) states that road traffic related emissions information should be obtained from an Air Quality Practitioner to show future user emissions during operation without the development in place. The Air Quality Practitioner calculated the traffic related emissions through the use of the TII REM tool (TII, 2022d) which includes detailed fleet predictions for age, fuel technology, engine size and weight based on available national forecasts. The output is provided in terms of CO_2e for the Base Year 2024, Opening Year 2030 and Design Year 2045. Both the Do Nothing and Do Something scenarios are quantified in order to determine the degree of change in emissions as a result of the proposed development.

Traffic data was obtained from Pinnacle Consulting Engineers for the purpose of this assessment. Inputs include light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type and project county location. In order to assess the full cumulative impact of the development, the traffic data has included specific cumulative developments within the wider area, specifically SD23A/0083, SD22A/0356, SD23A/0149 and SHD3-ABP-310578-21 (see Chapter 12 Material Assets: Transportation and Traffic and Transportation Assessment for further details).

The traffic data is detailed in Table 0.23. Only road links that met the DRMB scoping criteria were included in the modelling assessment. See Chapter 8 Air Quality and Chapter 12 Material Assets: Transportation for further details on the traffic data.

Road Name	Speed (kph)	Base Year 2024	Opening Year 2030		Design Year 2045	
			Do Nothing	Do Something	Do Nothing	Do Something
		LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
3A – R113	50	5,182 (61)	5,645 (67)	7,010 (83)	6,065 (72)	7,429 (88)
3B – R113	50	5,100 (59)	5,556 (64)	6,899 (80)	5,969 (69)	7,312 (85)

Table 0.23: Traffic Data used in Operational Phase Climate Assessment

9.4.3.2.2 Operational Phase Energy Use

The EU guidance (European Commission, 2013) also states indirect GHG emissions as a result of a development must be considered, which includes emissions associated with energy usage. An Energy & Sustainability Report was prepared by Renaissance Engineering in relation to the proposed development and is submitted separately with this planning application. The report outlines a number of measures which have been incorporated into the overall design of the development which will have the benefit of reducing the impact to climate where possible during operation. Information on some of the measures in relation to operational energy usage and sustainability measures has been supplied to inform the climate assessment.

9.4.3.3 Significance Criteria for GHGA

The Transport Infrastructure Ireland (TII) guidance document entitled PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a) outlines a recommended approach for determining the significance of both the construction and operational phases of a development.

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022a) is based on IEMA guidance (IEMA, 2022) which is consistent with the terminology contained within Figure 3.4 of the EPA's *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022).

The 2022 IEMA Guidance (IEMA, 2022) sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors (i.e. Ireland's National GHG targets). In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended IEMA significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

TII (TII, 2022a) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022), TII reference the IEMA guidance(2022) which states that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero*[9] *by 2050*".

Significance is determined using the criteria outlined in Table 0.24 (derived from Table 6.7 of PE-ENV-01104 (TII, 2022a)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

[9] Net Zero: "*When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.*" Net zero is achieved where emissions are first educed in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.

Effects	Significance Level	Description
Significant Adverse	Major Adverse	The project's GHG impacts are not mitigated; The project has not complied with Do Minimum standards set through regulation, nor provided reductions required by local or national policies; and No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate Adverse	The project's GHG impacts are partially mitigated; The project has partially complied with Do Minimum standards set through regulation, and have not fully complied with local or national policies; and Falls short of full contribution to Ireland's trajectory towards net zero.
Not Significant	Minor Adverse	The project's GHG impacts are mitigated through 'good practice' measures; The project has complied with existing and emerging policy requirements; and Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	The project's GHG impacts are mitigated beyond design standards; The project has gone well beyond existing and emerging policy requirements; and Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration; The project has gone well beyond existing and emerging policy requirements; and Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

Table 0.24: GHGA Significance Criteria

Ireland's carbon budgets can also be used to contextualise the magnitude of GHG emissions from the proposed development (TII, 2022a). The approach is based on comparing the net proposed development GHG emissions to the relevant carbon budgets (DECC, 2023). With the publication of the Climate Action Act in 2021 and the Climate Action Plan 2024, sectoral carbon budgets have been published for comparison with the net GHG emissions from the proposed development over its lifespan. The relevant sector budgets are the Industry sector, Buildings (Transport sector and Waste sector. The relevant sectoral ceilings are set out in
Table **0.22**.

9.4.4 Climate Change Risk Assessment

The assessment involves determining the vulnerability of the proposed development to climate change. This involves an analysis of the sensitivity and exposure of the development to climate hazards which together provide a measure of vulnerability.

PE-ENV-01104 (TII, 2022a) states that the CCRA is guided by the principles set out in the overarching best practice guidance documents:

- EU (2021) Technical guidance on the climate proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a); and
- The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (IEMA, 2020).

The baseline environment information provided in Section 9.6, future climate change modelling and input from other experts working on the proposed development (i.e. hydrologists) should be used in order to assess the likelihood of a climate risk.

First an initial screening CCRA based on the operational phase is carried out, according to the TII guidance PE-ENV-01104. This is carried out by determining the sensitivity of proposed development assets (i.e. receptors) and their exposure to climate change hazards.

The proposed development asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022a) provide the below list of asset categories and climate hazards to be considered. The asset categories will vary for project type and need to be determined on a development by development basis.

- **Asset Categories** Pavements; drainage; structures; utilities; landscaping; signs, light posts, buildings, and fences.
- **Climate Hazards** Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

- **High Sensitivity** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
- **Medium Sensitivity** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2**.**
- **Low Sensitivity** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis is undertaken. The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective of the project type for example: flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium or Low as per the below criteria.

- **High Exposure** It is almost certain or likely this climate hazard will occur at the project location i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium Exposure** It is possible this climate hazard will occur at the project location i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low Exposure** It is unlikely or rare this climate hazard will occur at the project location i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability.

9.4.4.1 Significance Criteria for CCRA

The CCRA involves an initial screening assessment to determine the vulnerability of the proposed development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the proposed development to various climate hazards. The vulnerability assessment takes any proposed mitigation into account.

Vulnerability = Sensitivity x Exposure

Table 0.25 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale. A risk that is low or medium is classed as non-significant, while a high or extreme risk is classed as a significant risk.

TII guidance (TII, 2022a) and the EU technical guidance (European Commission, 2021a) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. The impact from climate change on the proposed development can is considered to be not significant.

Where residual medium or high vulnerabilities exist then the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks. An assessment of construction phase CCRA impacts is only required according to the TII guidance (TII, 2022a) if a detailed CCRA is required.

		Exposure		
		High (3)	Medium (2)	Low (1)
Sensitivity	High (3)	9 - High	6 – High	3 - Medium
	Medium (2)	6 - High	4 – Medium	2 - Low
	Low (1)	3 - Medium	2 – Low	1 - Low

Table 0.25: Vulnerability Matrix

The screening CCRA, detailed in Section 0, did not identify any residual medium or high risks to the proposed development as a result of climate change. Therefore, a detailed CCRA for the construction and operational phase were scoped out.

While a CCRA for the construction phase was not required, best practice mitigation against climate hazards is still recommended in Section 0.

9.5. Difficulties Encountered

There were no difficulties encountered in compiling this assessment.

9.6. Baseline Environment

PE-ENV-01104 (TII, 2022c) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline.

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe. This, in addition to Ireland's current failure to meet its EU binding targets under Regulation 2018/842 (European Union, 2018) results in changes in GHG emissions either beneficial or adverse being of more significance than previously considered prior to these declarations.

9.6.1 Current GHGA Baseline

Data published in July 2024 (EPA, 2024) indicates that Ireland exceeded (without the use of flexibilities) its 2023 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 2.27 Mt CO_2e. However, the 2023

emissions were the first time that Ireland's emissions were below (-1.2%) 1990 levels. ETS[10] emissions decreased (-17.0%) and ESR emissions decreased (-3.4%). Ireland's target is an emission reduction of 626 kt of CO_2e by 2030 on an average baseline of 2016 to 2018[11]. The EPA estimate that 2023 total national greenhouse gas emissions (excluding LULUCF) have decreased by 6.8% on 2022 levels to 55.01 Mt CO_2e, with a 2.2 Mt CO_2e (-21.6%) reduction in electricity industries alone. This was driven by a 40.7% share of energy from renewables in 2023 and increasing our imported electricity. Manufacturing Combustion and Industrial Processes decreased by 5.1% to 6.3 Mt CO_2e in 2023 due to declines in fossil fuel usage. The sector with the highest emissions in 2023 was agriculture at 37.6% of the total, followed by transport at 21.4%. For 2023 total national emissions (including LULUCF) were 60.62 Mt CO_2e as shown in Table 0.26. (EPA, 2024).

The provisional 2023 figures indicate that Ireland has used 63.9% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025.

Table 0.26: Total National GHG Emissions in 2023

Sector Note 1	2021 Emissions (Mt CO_2e)	2022 Emissions (Mt CO_2e)	2023 Emissions (Mt CO_2e)	Total Budget (Mt CO_2e) (2021-2025)	% Budget 2021-2025 used	Annual change 2022 to 2023
Electricity	9.893	9.694	7.558	40.0	67.9%	-22.0%
Transport	11.089	11.760	11.791	54.0	64.1%	0.3%
Buildings (Residential)	6.868	5.753	5.346	29.0	62.0%	-7.1%
Buildings (Commercial and Public)	1.444	1.447	1.409	7.0	61.4%	-2.6%
Industry	7.093	6.622	6.288	30.0	66.7%	-5.0%
Agriculture	21.940	21.795	20.782	106.0	60.9%	-4.6%
Other Note 2	1.864	1.931	1.832	9.0	62.5%	-5.1%
LULUCF	4.628	3.983	5.614			40.9%
Total including LULUCF	64.819	62.986	60.620	295.0	63.9%	-3.8%

Note 1 Reproduced from latest emissions data on the EPA website July 2024 (EPA, 2024).

Note 2 Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

[10] ETS emissions in this report refers to CO_2 emissions from stationary installations and from domestic aviation. It does not include emissions from intra-EU aviation as those are not considered part of Ireland's total reportable greenhouse gas emissions.

[11] REGULATION (EU) 2023/839 (19 April 2023).

9.6.2 Future GHGA Baseline

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII, 2022c) and IEMA Guidance (IEMA, 2022) the future baseline is a trajectory towards net zero by 2050, *"whether it* [the project] *contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050"*.

The future baseline will be determined by Ireland meeting its targets set out in the CAP24, and future CAPs, alongside binding 2030 EU targets. In order to meet the commitments under the Paris Agreement, the European Union (EU) enacted *'Regulation (EU) 2018/842 on binding annual GHG 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'* (hereafter referred to as the Regulation) (European Union, 2018). 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. The Regulation was amended in April 2023 and Ireland must now limit its greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters Including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and thus includes GHG emissions from transport, residential and commercial buildings and agriculture.

9.6.3 Current CCRA Baseline

The region of the proposed development has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Casement Aerodrome is the nearest weather and climate monitoring station to the proposed development with meteorological data recorded for the 30-year period from 1991 to 2020 (Met Éireann, 2023a). The historical regional weather data for Casement Aerodrome metrological station is representative of the current climate in the region of the proposed development. The data for the 30-year period from 1991 to 2020 indicates that the wettest months at Casement Aerodrome Metrological Station were October and November, and the driest month on average was March. July was the warmest month with a mean temperature of 15.7 Celsius. January was the coldest month with a mean temperature of 5.2 Celsius.

Met Éireann's 2023 Climate Statement (Met Éireann, 2023a) states 2023's average shaded air temperature in Ireland is provisionally 11.20 °C, which is 1.65°C above the 1961-1990 long-term average. Previous to this 2022 was the warmest year on record; however, 2023 was 0.38 °C warmer (see Figure 0.23).

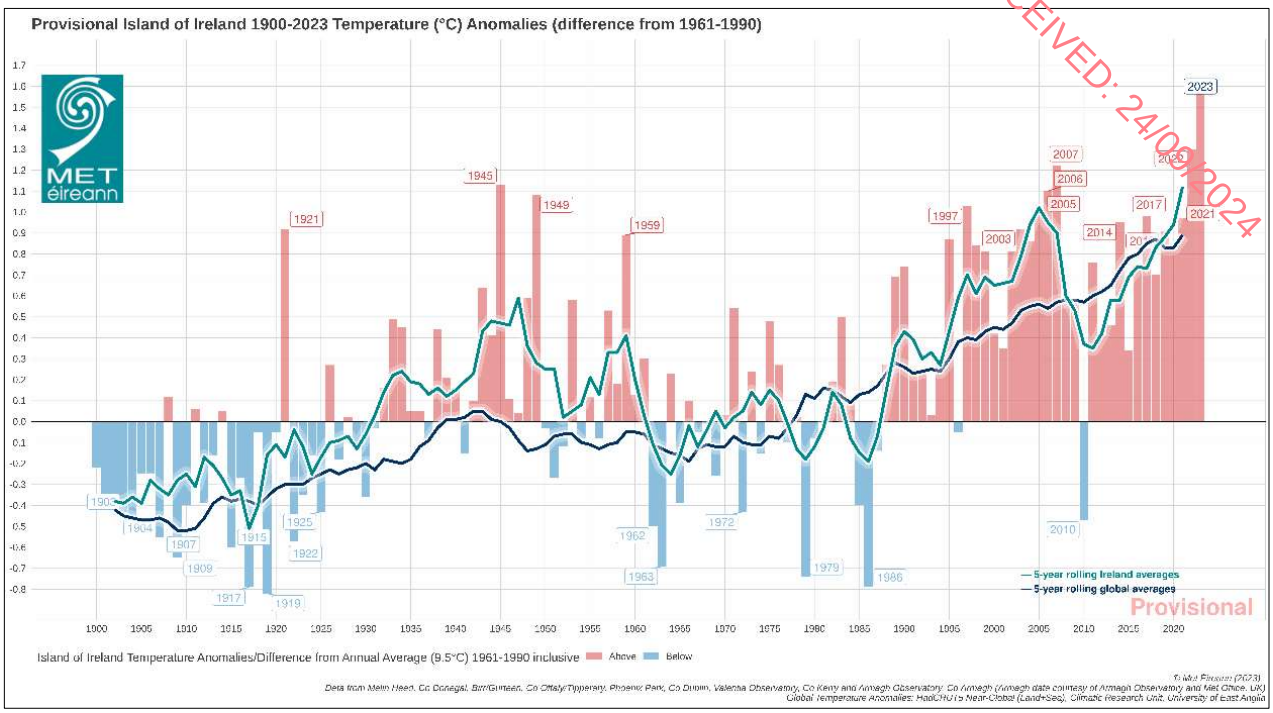


Figure 0.23: 1900-2023 Temperature (°C) Temperature Anomalies (differences from 1961-1990)

The year 2023 also had above average rainfall, this included the warmest June on record and the wettest March and July on record. Record high sea surface temperatures (SST) were recorded since April 2023 which included a severe marine heatwave[1] to the west of Ireland during the June 2023. This marine heatwave contributed to the record rainfall in July.

Recent weather patterns and records of extreme weather events recorded by Met Éireann have been reviewed. Considering the extraordinary 2023 data, Met Éireann states that the latest Irish climate change projections indicate further warming in the future, including warmer winters. The record temperatures means the likelihood of extreme weather events occurring has increased. This will result in longer dry periods and heavy rainfall events. Storm surges and coastal flooding due to sea level rise. Compound events, where coastal surges and extreme rainfall events occur simultaneously will also increase. Met Éireann has high confidence in maximum rainfall rates increasing but not in how the frequency or intensity of storms will change with climate change.

9.6.4 Future CCRA Baseline

Impacts as a result of climate change will evolve with a changing future baseline, changes have the potential to include increases in global temperatures and increases in the number of rainfall days per year. Therefore, it is expected that the baseline climate will evolve over time and consideration is needed with respect to this within the design of the proposed development.

Ireland has seen increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east including in the region where the proposed development will be located (EPA,

[1] https://www.met.ie/marine-heat-wave-2023-a-warning-for-the-future

2021b). The EPA have compiled a list of potential adverse impacts as a result of climate change including the following which may be of relevance to the proposed development (EPA, 2021a):

- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species.

The EPA's *State of the Irish Environment Report (Chapter 2: Climate Change)* (EPA, 2020a) notes that projections show that full implementation of additional policies and measures, outlined in the 2019 Climate Action Plan, will result in a reduction in Ireland's total GHG emissions by up to 25% by 2030 compared with 2020 levels. Climate change is not only a future issue in Ireland, as a warming of approximately 0.8°C since 1900 has already occurred. The EPA state that it is critically important for the public sector to show leadership and decarbonise all public transport across bus and rail networks to the lowest carbon alternatives. The report (EPA, 2020a) underlines that the next decade needs to be one of major developments and advances in relation to Ireland's response to climate change in order to achieve these targets and that Ireland must accelerate the rate at which it implements GHG emission reductions. The report states that mid-century mean annual temperatures in Ireland are projected to increase by between 1.0°C and 1.6°C (subject to the emissions trajectory). In addition, heat events are expected to increase by mid-century (EPA, 2020a). While individual storms are predicted to have more severe winds, the average wind speed has the potential to decrease (EPA, 2020a).

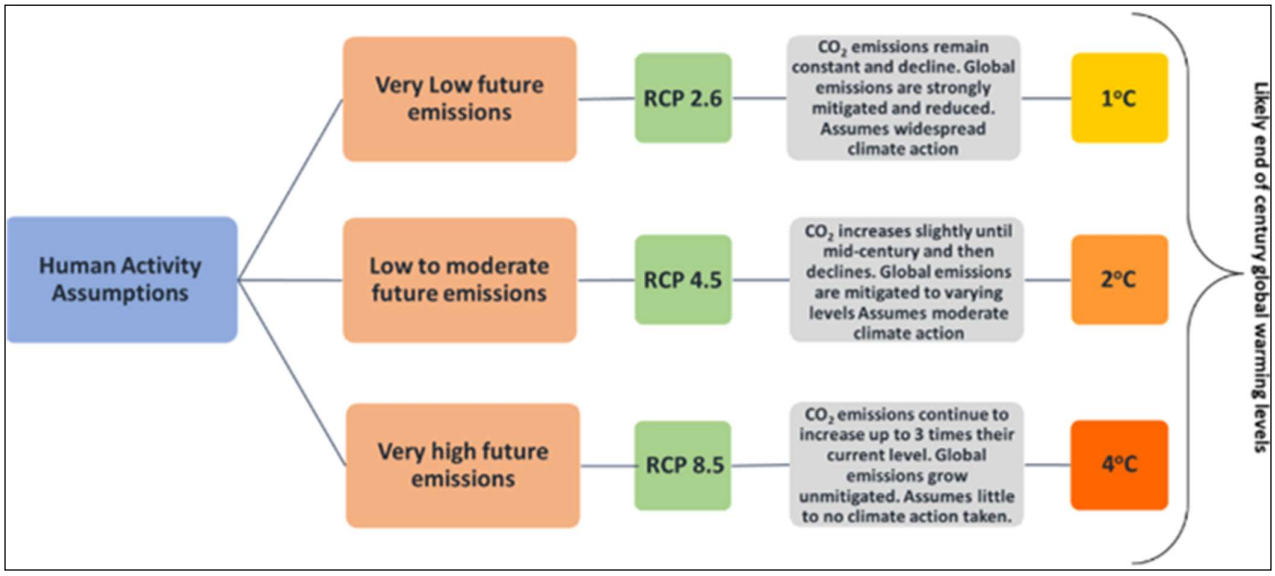
TII's Guidance document PE-ENV-01104 (TII, 2022c) states that for future climate change a moderate to high Representative Concentration Pathways (RCP) should be adopted. RPC4.5 is considered moderate while RPC8.5 is considered high. Representative Concentration Pathways (RCPs) describe different 21st century pathways of GHG emissions depending on the level of climate mitigation action undertaken.

Future climate predictions undertaken by the EPA have been published in *'Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach'* (EPA, 2020b). The future climate was simulated under both Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. This study indicates that by the middle of this century (2041–2060), mid-century mean annual temperatures are projected to increase by 1 to 1.2°C and 1.3 to 1.6°C for the RCP4.5 and RCP8.5 scenarios, respectively, with the largest increases in the east. Warming will be enhanced at the extremes (i.e. hot days and cold nights), with summer daytime and winter night-time temperatures projected to increase by 1 to 2.4°C. There is a projected substantial decrease of approximately 50%, for the number of frost and ice days. Summer heatwave events are expected to occur more frequently, with the largest increases in the south. In addition, precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events. Climate change also has the potential to impact future energy supply which will rely on renewables such as wind and hydroelectric power. Wind turbines need a specific range of wind speeds to operate within and droughts or low ground water levels may impact hydroelectric energy generating sites. More frequent storms have the potential to damage the communication networks requiring additional investment to create resilience within the network.

The EPA's *Critical Infrastructure Vulnerability to Climate Change* report (EPA, 2021b) assesses the future performance of Irelands critical infrastructure when climate is considered. With respect to road infrastructure, fluvial flooding and coastal inundation/coastal flooding are considered the key climate change risks with snowstorm and landslides being medium risks. Extreme winds and heatwaves/droughts are considered low risk to road infrastructure. One of the key outputs of the research was a framework that will provide quantitative risk-based decision support for climate change impacts and climate change adaptation analysis for infrastructure.

National Framework for Climate Services (NFCS) was founded in June 2022 to streamline the provision of climate services in Ireland and will be led by Met Éireann. The aim of the NFCS is to enable the co-production, delivery and use of accurate, actionable and accessible climate information and tools to support climate resilience planning and decision making. In addition to the NFCS, further work has been ongoing into climate projects in Ireland through research under the TRANSLATE project. TRANSLATE (Met Éireann, 2023b) has been led by climate researchers from University of Galway – Irish Centre for High End Computing (ICHEC), and University College Cork – SFI Research Centre for Energy, Climate and Marine (MaREI), supported by Met Éireann climatologists. TRANSLATE's outputs are produced using a selection of internationally reviewed and accepted models from both CORDEX and CMIP5. Representative Concentration Pathways (RCPs) provide a broad range of possible futures based on assumptions of human activity. The modelled scenarios include for "least" (RCP2.6), "more" (RCP4.5) or "most" (RCP8.5) climate change, see Figure 0.24.

Figure 0.24: Representative Concentration Pathways Associated Emission Levels

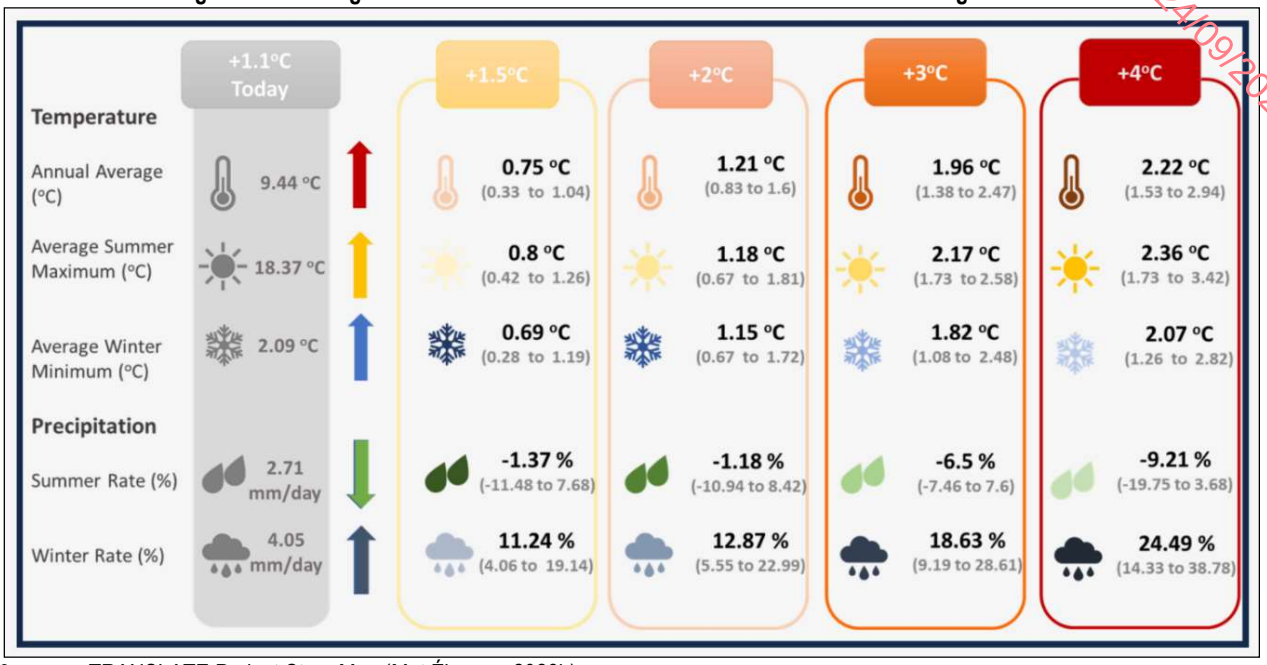


Source TRANSLATE Project Story Map (Met Éireann, 2023b)

TRANSLATE (Met Éireann, 2023b) provides the first standardised and bias-corrected national climate projections for Ireland to aid climate risk decision making across multiple sectors (for example, transport, energy, water), by providing information on how Ireland's climate could change as global temperatures increase to 1.5˚C ,2˚C, 2.5˚C, 3˚C or 4˚C (see Figure 0.24). Projections broadly agree with previous projections for Ireland. Ireland's climate is dominated by the Atlantic Meridional Overturning Circulation (AMOC), a large system of ocean currents – including the Gulf Stream – characterised by a northward flow of warm water and a southward flow of cold water. Due to the AMOC, Ireland does not suffer from the extremes of temperature experienced by other countries at a similar latitude. Recent studies have projected that the AMOC could decline by 30% – 40 % by 2100, resulting in cooler North Atlantic Sea surface temperatures (SST)s (Met Éireann, 2023b). Met Éireann projects that Ireland will nevertheless continue to warm, although the AMOC cooling influence may lead to reduced warming compared with continental Europe. AMOC weakening is also expected to lead to additional sea level rise around Ireland. With climate change Ireland's temperature and rainfall will undergo more and more significant changes e.g. on average summer temperature could increase by more than 2°C, summer rainfall could decrease by 9% while winter rainfall could increase by 24%. Future projects also include a 10-fold increase in the frequency of summer nights (values > 15°C) by the end of the century,

a decrease in the frequency of cold winter nights and an increase in the number of heatwaves. A heatwave in Ireland is defined as a period of 5 consecutive days where the daily maximum temperature is greater than 25°C.

Figure 0.25: Change of Climate Variables for Ireland for Different Global Warming Thresholds



Source TRANSLATE Project Story Map (Met Éireann, 2023b)

9.7. The 'Do Nothing' Scenario

In the Do Nothing scenario, construction works associated with the proposed development will not take place. Impacts from increased traffic volumes and associated emissions from the proposed development will also not occur. The climate baseline will continue to develop in line with the identified trends (see Section 9.6).

9.8. Potential Significant Effects

9.8.1 Greenhouse Gas Assessment

9.8.1.1 Construction Phase

The most significant proportion of GHG emissions tend to occur during the construction phase because of embodied carbon in construction materials and emissions from construction activities. Therefore, the assessment has been included in the construction phase assessment for the purposes of the EIAR. The assessment is broken down into the following stages as per Section 0:

- Product stage (A1 – A3);
- Transportation to site (A4);
- Site operations (construction activities) (A5); and
- Material replacement & refurbishment (B4 – B5).

The construction phase GHG emissions comprise stages A1 – A5 which includes the construction materials, the transport of the materials to site and the construction activities or site operations. Ongoing material refurbishment and replacement throughout the lifetime of the development is included within category B4 – B5, these are default values based on the typical maintenance requirements for the chosen material types over the assumed 50 year lifetime. Figure 0.26 shows the GHG emissions for the proposed development per life-cycle stage with both the output from the Carbon Designer for Ireland tool and TII Carbon Tool assessments included.

Construction materials make up the majority of GHG emissions for the proposed development making up approx. 64% of the total construction phase GHG emissions across the different building types (houses, duplex and apartment units). In relation to the house units, the foundations, external walls, beams, floors and roof elements are the areas with the highest GHG impact. For the duplex units, the foundations as well as the beams, floors and roofs are the elements with the largest GHG impact. This is similar as well for the apartment blocks. Material transportation to site, site operations and material replacement make up the remainder of the construction GHG emissions.

The carbon assessment has highlighted the areas where the highest embodied carbon emissions occur, specifically as a result of building materials. Where possible detailed material types were used within the Carbon Designer for Ireland tool, however, where material types were not known, as these will not be selected until detailed design stage, the standard default material type was used. Additionally, the average material types within the TII Carbon Tool were used for the purposes of this assessment in the absence of more detailed information.

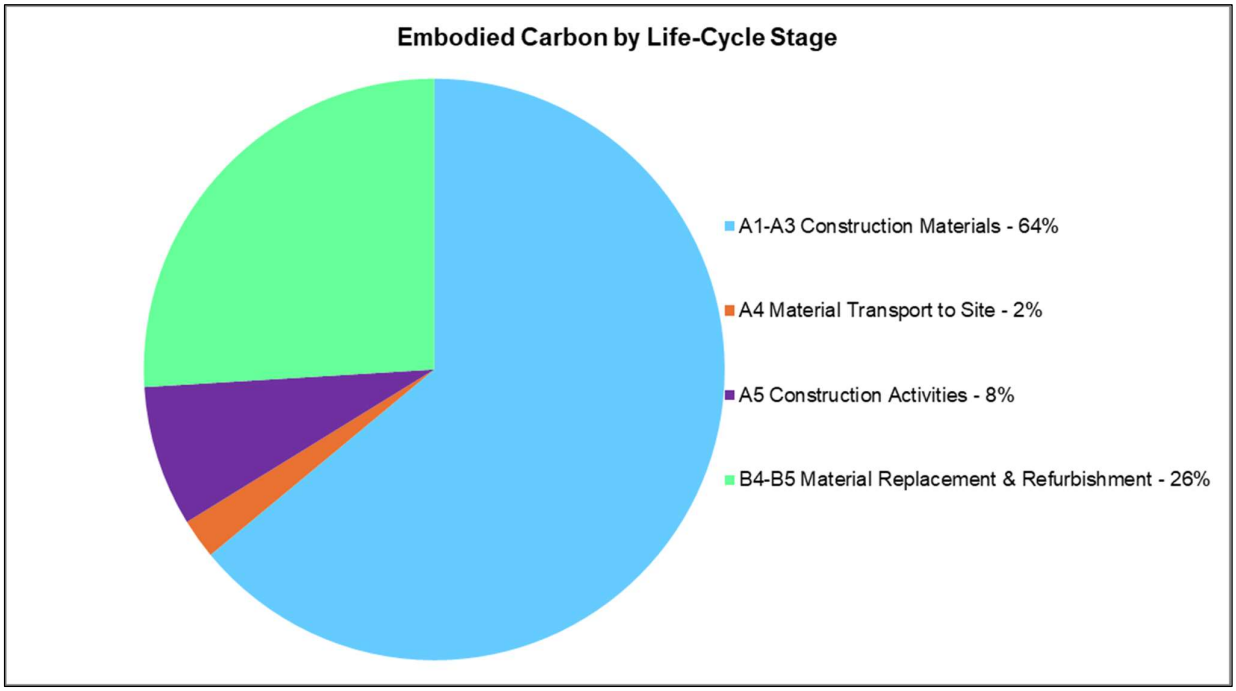


Figure 0.26: Embodied Carbon by Life-Cycle Stage

It has been calculated that the total construction phase embodied carbon (including maintenance and replacement of materials over the development lifetime) will be 28,597 tonnes CO_2e (see Table 0.27). The GHG emissions from the development as a total cannot be compared against one specific sector 2030 carbon budget, the emissions are broken down into different assessment categories and these must be compared separately to the relevant sectoral emissions budget which are detailed in Table 0.28. The relevant sectoral emissions for the proposed development comparison include the Industry sector, Transport sector and Waste sector. The predicted emissions for the proposed development are annualised over the assumed 50 year lifespan and then compared to the relevant sector 2030

carbon budgets. Annualising the full carbon emissions over the lifetime of the development allows for appropriate comparison with annual GHG targets.

Table 0.27: GHG Assessment Results

Stage		GHG Assessment Category	Predicted GHG Emissions (tCO_2e)	Relevant Sector for Carbon Budget Comparison	Annualised GHG Emissions as % of Relevant Carbon Budget
A1-A3		Materials	18,300	Industry	0.009%
A4		Material Transport	636	Transport	0.0002%
A5		Site Clearance and Demolition	9	Industry	0.000004%
A5		Excavations	55	Industry	0.00003%
A5		Construction/Installation Process	1,086	Industry	0.0005%
A5		Construction site material waste	1,017	Waste	0.0020%
A5		Construction site material waste transport	14	Transport	0.000005%
A5		Construction site waste	55	Waste	0.0001%
B4 - B5		Maintenance Material	7,425	Industry	0.004%
	Total		**28,597**		

Note 1 Project lifespan assumed 50 years for calculation purposes in line with best practice

The predicted GHG emissions (as shown in Table 0.28) can be averaged over the full lifespan of the proposed development to give the predicted annual emissions to allow for direct comparison with national annual emissions and targets.

In Table 0.28, GHG emissions have been compared against the carbon budget for the industry transport and waste sectors in 2030 (DECC, 2024), against Ireland's total GHG emissions in 2023 and against Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions based on 2005 levels (33 Mt CO_2e) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

The estimated total GHG emissions, when annualised over the 50-year proposed development lifespan, are equivalent to 0.0009% of Ireland's total GHG emissions in 2023 and 0.002% of Ireland's non-ETS 2030 emissions target. The estimated GHG emissions associated with transport-related activities are 0.0002% of the 2030 Transport budget, construction waste GHG emissions are 0.002% of the Waste budget and industry-related activities are 0.01% of the 2030 Industry budget.

Table 0.28: Estimated GHG Emissions Relative to Sectoral Budgets and GHG Baseline

Target/Sectoral Budget (tCO_2e)		Sector Annualised Proposed Development GHG Emissions	Annualised Proposed Development GHG Emissions as % of Relevant Target/Budget
Ireland's 2023 Total GHG Emissions (existing baseline)	60,620,000	Total GHG Emissions	0.0009%
Non-ETS 2030 Target	33,000,000	Total GHG Emissions	0.002%
2030 Sectoral Budget (Industry Sector)	4,000,000	Total Industry Emissions	0.01%
2030 Sectoral Budget (Transport Sector)	6,000,000	Total Transport Emissions	0.0002%
2030 Sectoral Budget (Waste Sector)	1,000,000	Total Waste Emissions	0.002%

9.8.1.2 Operational Phase

Ongoing maintenance of the proposed development materials has been accounted for within Section 0 above. The following section outlines the impact of operational energy use on GHG emissions and GHG emissions from operational phase transport.

9.8.1.2 Operational Energy Use

The proposed development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. These are outlined fully within the Energy & Sustainability Report prepared by Renaissance Engineering, in relation to the development. The primary elements with respect to reducing climate impacts and optimising energy usage are summarised in Section 0.

9.8.1.2.1 Operational Traffic Emissions

There is the potential for increased traffic volumes to impact climate during the operational phase. To provide for a worst-case assessment and to assess potential cumulative impacts, the traffic data has included specific cumulative developments within the area (see Chapter 12 Material Assets: Transportation and Traffic and Transportation Assessment for further details).

The predicted concentrations of CO_2e for the future years of 2030 and 2045 are detailed in Table 0.29. These are significantly less than Ireland's national 2030 target set out under EU legislation (targets beyond 2030 are not available) and the 2030 sectoral emissions ceilings. It is predicted that in 2030 the proposed development will increase CO_2 emissions by 41 tonnes CO_2e. This equates to 0.0001% of the 2030 national emission ceiling or 0.0007% of the 2030 Transport sector emissions ceiling (see Table 0.29). Similarly low increases in CO_2 emissions are predicted to occur in 2045 with emissions increasing by 37 tonnes CO_2e. This equates to 0.0001% of the 2030 national emission ceiling or 0.0006% of the 2030 Transport sector emissions ceiling (see Table 0.29).

Table 0.29: Operational Phase Traffic Emissions GHG Impact Assessment

Year	Scenario	CO_2e (tonnes/annum)
2030	Do Nothing	168
	Do Something	209
2045	Do Nothing	164
	Do Something	201
Increment Change in 2030		41
National Emission Ceiling 2030 (Tonnes) Note 1		**33,381,312**
Impact in 2030 (as % of national emissions ceiling)		0.0001%
Transport Sector 2030 Emission Ceiling		**6,000,000**
Impact in 2030 (as % of transport sector emissions ceiling)		0.0007%
Increment Change in 2045		37
National Emission Ceiling 2030 (Tonnes) Note 1		**33,381,312**
Impact in 2045 (as % of national emissions ceiling)		0.0001%
Impact in 2045 (as % of transport sector emissions ceiling)		0.0006%

Note 1 Target under Commission Implementing Decision (EU) 2020/2126 of 16 December 2020 on setting out the annual emission allocations of the Member States for the period from 2021 to 2030 pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council.

9.8.1.3 GHGA Significance of Effects

The TII guidance states that the following two factors should be considered when determining significance:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

The level of mitigation described in Section 9.9 has been taken into account when determining the significance of the proposed development's GHG emissions. According to the TII significance criteria described in Section 0 and Table 0.24 the significance of the GHG emissions during the construction and operational phase is minor adverse.

In accordance with the EPA guidelines (EPA, 2022), the above significance equates to a significance of effect of GHG emissions during the construction and operational phase which is ***direct, long-term, negative*** and ***slight,*** which is overall ***not significant*** in EIA terms.

9.8.2 Climate Change Risk Assessment

9.8.2.1 Construction Phase

A detailed CCRA of the construction phase has been scoped out, as discussed in Section 0 and Section 0, which state that there are no residual medium or high risk vulnerabilities to climate change hazards and a detailed CCRA is not required (TII, 2022a). However, consideration has been given to the proposed development's vulnerability to the following climate change hazards with best practice mitigation measures proposed in Section 9.9:

- Flood risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding;
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather;

- Reduced temperatures resulting in ice or snow; and
- Major storm damage – including wind damage.

9.8.2.2 Operational Phase

In order to determine the vulnerability of the proposed development to climate change the sensitivity and exposure of the development to various climate hazards must first be determined. The following climate hazards have been considered in the context of the proposed development: flooding (coastal, pluvial, fluvial), extreme heat, extreme cold, wildfire, drought, extreme wind, lightning, hail, landslides and fog.

The sensitivity of the proposed development to the above climate hazards is assessed irrespective of the project location.

Table **0.30** details the sensitivity of the proposed development on a scale of high (3), medium (2) and low (1). Once the sensitivity has been established the exposure of the proposed development to each of the climate hazards is determined, this is the likelihood of the climate hazard occurring at the project location and is also scored on a scale of high (3), medium (2) and low (1). The product of the sensitivity and exposure is then used to determine the overall vulnerability of the proposed development to each of the climate hazards as per Table 0.25. The results of the vulnerability assessment are detailed in

Table **0.30**.

Table 0.30: Climate Change Vulnerability Assessment

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (Coastal)	1 (Low)	1 (Low)	1 (Low)
Flooding (Pluvial)	1 (Low)	1 (Low)	1 (Low)
Flooding (Fluvial)	1 (Low)	1 (Low)	1 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	2 (Medium)	2 (Low)
Wildfire	1 (Low)	1 (Low)	1 (Low)
Drought	1 (Low)	1 (Low)	1 (Low)
Extreme Wind	1 (Low)	1 (Low)	1 (Low)
Lightning & Hail	1 (Low)	1 (Low)	1 (Low)
Landslides	1 (Low)	1 (Low)	1 (Low)
Fog	1 (Low)	1 (Low)	1 (Low)

The sensitivity and exposure of the area was determined with reference to a number of online tools and with input from the various discipline specialists on the project team. It was concluded that proposed development does not have any significant vulnerabilities to the identified climate hazards as described in the below sections. All vulnerabilities are classified as low. There are no residual medium or high risk vulnerabilities to climate change hazards and as such, a detailed CCRA is not required (TII, 2022a).

9.8.2.2.1 Flooding

A Site-Specific Flood Risk Assessment (SSFRA) for the proposed development was undertaken by Kilgallen & Partners Consulting Engineers, and is submitted with this planning application. In relation to coastal flooding due to the location of the proposed development inland, coastal flooding is not a risk at the proposed development.

The SSFRA concluded that the site is not within an area at risk of fluvial flooding. In relation to pluvial flooding, the FRA has assessed the development with respect to the OPW recommended 30% High End Future Scenario (HEFS) which aligns with RCP8.5. The FRA states that the stream channels and culverts have sufficient capacity to convey peak flows plus a 30% climate change factor. Therefore, the SSFRA concludes that the proposed development was found to be not at risk of flooding even in the HEFS for climate change. Appropriate mitigation measures have been incorporated into the design of the development to ensure flood risk is minimised. The vulnerability of the development to coastal, fluvial and pluvial flooding is categorised as 'Low'.

9.8.2.2.2 Extreme Wind, Fog, Lightning and Hail

In relation to extreme winds, the buildings shall be designed to the appropriate standards to account for the relevant wind loadings. If required as part of the building design, lightning protection shall be provided for. Hail and fog are not predicted to significantly affect the buildings due to their design.

9.8.2.2.3 Wildfire

In relation to wildfires, the *Think Hazard!* tool developed by the Global Facility for Disaster Reduction and Recovery (GFDRR, 2023), indicates that the wildfire hazard is classified as low for the Dublin area. This means that there is between a 4% and 10% chance of experiencing weather that could support a problematic wildfire that may cause disruptions and low but tangible risk of life and property loss in any given year. Future climate modelling indicates that there could be an increase in the weather conditions which are favourable to fire conditions, these include increases in temperature and prolonged dry periods. However, due to the project location in a suburban area the risk of wildfire is further lessened and it can be concluded that the proposed development is of low vulnerability to wildfires.

9.8.2.2.4 Landslide

The GSI landslide susceptibility mapping database (GSI, 2023) was reviewed in order to determine the risk from landslides at the proposed development. There have not been any historical landslide events in the vicinity of the proposed development and the area has a low susceptibility to future landslides. Therefore, landslides are not a risk for the proposed development site.

9.8.2.2.5 Extreme Temperatures (Heat & Cold) & Drought

In relation to extreme temperatures, both extreme heat and extreme cold, these have the potential to impact the building materials and some related infrastructure. However, the building materials selected at the detailed design stage will be of high quality and durability. Therefore, extreme temperatures are not considered a significant risk.

9.8.2.2.6 Summary

Overall, the proposed development has at most low vulnerabilities to the identified climate hazards. Therefore, no detailed risk assessment is required.

9.8.2.3 CCRA Significance of Effects

With design mitigation in place, there are no significant risks to the proposed development as a result of climate change. In accordance with the EPA Guidelines (EPA, 2022), the significance of effect of the impacts to the proposed development as a result of climate change are ***direct, long-term, negative*** and ***imperceptible***, which is overall ***not significant*** in EIA terms***.***

9.8.3 Cumulative Effects

With respect to the requirement for a cumulative assessment PE-ENV-01104 (TII, 2022c) states that *"the identified receptor for GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. Therefore, the assessment approach is considered to be inherently cumulative".*

The traffic data used for the operational phase assessment included cumulative traffic from existing and permitted developments in the surrounding area. Therefore, this impact assessment is cumulative.

As per the above, the cumulative 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.

9.9. Mitigation

9.9.1 Construction Phase Mitigation

Embodied carbon of materials and GHG emissions from construction activities will be the primary source of climate impacts during the construction phase. During the construction phase the following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

- Creating a construction program which allows for sufficient time to determine reuse and recycling opportunities for construction wastes;
- Materials will be reused on site where possible;
- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods;
- Ensure all plant and machinery are well maintained and inspected regularly;
- Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site;
- Material choices and quantities will be reviewed during detailed design, to identify and implement lower embodied carbon options where feasible;

- Sourcing materials locally where possible to reduce transport related CO_2 emissions; and
- The project shall review and determine compliance with the requirements set out in the EU Taxonomy Regulation (Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment and amending Regulation (EU) 2019/2088 (Text with EEA relevance) in relation to circular economy. This is specific to reuse, recycling and material recovery of demolition and construction wastes.

In terms of impact on the proposed development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

9.9.2 Operational Phase Mitigation

As per the Energy & Sustainability Report prepared by Renaissance Engineering (submitted under separate cover with this planning application) the development will be a Nearly Zero Energy Building (NZEB) in accordance with the Building Regulations Technical Guidance Document L 2021 and the relevant sustainability policies within the South Dublin County Council Development Plan 2022-2028. The report details a number of measures that have been incorporated into the design of the development to reduce the impact on climate wherever possible. Such measures included in the proposed development to reduce the impact to climate from energy usage are:

- The units are targeting a Building Energy Ratio (BER) of A2.
- The development will be designed and constructed to limit heat loss, and where appropriate, limit heat gains through the fabric of the building. The thermal insulation for each of the plane elements will meet or exceed the U-Values requirements as specified in Part L.
- Reasonable care will be taken during the design and construction to limit the air permeability.
- Air-source heat pumps will be installed for the residential units to achieve the A2 BER.
- PV panels will be installed.
- A-rated, low-energy LED lamps will be utilised throughout the development.
- The development will achieve an Energy Performance Coefficient (EPC) < 0.30;
- The development will achieve a Carbon Performance Coefficient (CPC) < 0.35;
- The development will achieve a Renewable Energy Ratio (RER) > 0.20;

The above measures will assist in optimising the energy consumed by the development and will also have the benefit of reducing the impact to climate during the operational phase of the development.

Some measures have been incorporated into the design of the development to mitigate the impacts of future climate change. For example, adequate attenuation and drainage have been incorporated to avoid potential flooding impacts due to increased rainfall events in future years. These measures have been considered when assessing the vulnerability of the proposed development to climate.

9.10. Residual Impact Assessment

The proposed development will result in some impacts to climate through the release of GHGs. TII reference the IEMA guidance (IEMA, 2022) which states that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*". The proposed development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible. As per the assessment criteria in Table 0.24 the 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.

9.11. Risk of Major Accidents or Disasters

As detailed in Section 0, climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. However, the potential for flooding on site has been reviewed and adequate attenuation and drainage have been provided for to account for increased rainfall in future years. The proposed development has been assessed as having only low vulnerabilities to various climate change related hazards and there is no significant risk to the site as a result of climate change. Therefore, the impact will be ***neutral*** and ***imperceptible***.

9.12. Interactions

9.12.1 Land, Soils, Geology and Water

The impact of flood risk has been assessed and the surface water drainage network will be designed to cater for increased rainfall in future years as a result of climate change. The effect of the interactions between climate and land, soils and geology (see Chapter 6 Land, Soils and Geology) and water (Chapter 7 Water) are ***direct, short-term, negative*** and ***imperceptible*** during the construction phase and ***direct, long-term, negative*** and ***imperceptible*** during the operational phase, which is overall ***not significant*** in EIA terms.

9.12.2 Air Quality

Air quality (Chapter 8 Air Quality) and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs in relation to traffic emissions are utilised within the climate chapter (see Chapter 9 Climate). There is no impact on climate due to air quality; however, the sources of impacts on air quality and climate are strongly linked.

9.12.3 Traffic and Transportation

During the construction and operational phase, there is the potential for interactions between climate and traffic (for more information see Chapter 12 Material Assets: Transportation). Vehicles accessing the site will result in emissions of CO_2, a greenhouse gas. The effects of the proposed development on climate are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the effects of

the interactions between traffic and climate are considered to be ***direct, short-term, negative*** and ***not significant*** during the construction phase and ***direct, long-term, negative*** and ***not significant*** during the operational phase

9.12.4 Waste

Waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling (see Chapter 13 Material Assets: Resource & Waste Management). The effect of the interactions between waste and climate are considered to be ***direct, short-term, negative*** and ***not significant*** during the construction phase and ***direct, long-term, negative*** and ***not significant*** during the operational phase.

9.13. Monitoring

There is no proposed monitoring during the construction phase or during the operational phase.

9.14. References

Standard Method of Measurement (CESSM) (2013) Carbon and Price Book database
Department of Environment, Climate and Communications (DECC) (2023a) Climate Action Plan (CAP) 2024
Department of Environment, Climate and Communications (DECC) (2023b) Long-term Strategy on Greenhouse Gas Emissions Reductions (draft)
Department of Housing, Planning & Local Government (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment
Environmental Protection Agency (EPA) (2020a) State of the Irish Environment Report (Chapter 2: Climate Change)
Environmental Protection Agency (EPA) (2020b) Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach.
Environmental Protection Agency (EPA) (2021a) Critical Infrastructure Vulnerability to Climate Change Report no. 369
Environmental Protection Agency (EPA) (2021b) What impact will climate change have for Ireland? [Online] Available at https://www.epa.ie/environment-and-you/climate-change/what-impact-will-climate-change-have-for-ireland/
Environmental Protection Agency (EPA) (2022) Guidelines on the Information to be contained in Environmental Impact Assessment Reports
Environmental Protection Agency (EPA) (2024) Ireland's Provisional Greenhouse Gas Emissions 1990-2023
European Commission (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment
European Commission (2014) 2030 Climate and Energy Policy Framework
European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report
European Commission (2021a) Technical guidance on the climate proofing of infrastructure in the period 2021-2027
European Commission (2021b) 2030 EU Climate Target Plan
European Union (2018) Regulation 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
Geological Society of Ireland (GSI) (2024) Landslide Susceptibility Map https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b68cf1e4a9044a5981f950e9b9c5625c

Global Facility for Disaster Reduction and Recovery (GFDRR) (2023) Think Hazard! Tool https://thinkhazard.org/en/
Government of Ireland (2015) Climate Action and Low Carbon Development Act
Government of Ireland (2019) Climate Action Plan 2019
Government of Ireland (2021) Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021)
Highways England (2021) UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate
Institute of Environmental Management & Assessment (IEMA) (2020a) EIA Guide to: Climate Change Resilience and Adaptation
Institute of Environmental Management & Assessment (IEMA) (2020b) GHG Management Hierarchy
Institute of Environmental Management & Assessment (IEMA) (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance
Met Éireann (2023a) 2023 Climate Statement
Met Éireann (2023b) TRANSLATE: One Climate Resource for Ireland. [Online] Available at: https://www.met.ie/science/translate
One Click LCA Ltd. (2023) Carbon Designer for Ireland Tool
Transport Infrastructure Ireland (TII) (2022a) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document
Transport Infrastructure Ireland (TII) (2022b) PE-ENV-01105: Climate Assessment Standard for Proposed National Roads
Transport Infrastructure Ireland (TII) (2022c) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document
Transport Infrastructure Ireland (TII) (2022d) TII Roads Emissions Model (REM) and Model Development Report (GE-ENV-01107)

10.0. Noise

10.1. Introduction

This section of the EIAR has been prepared by AWN Consulting Ltd (AWN) to assess the potential noise and vibration impact of the proposed development in the context of current relevant standards and guidance.

This chapter includes a description of the receiving ambient noise climate in the vicinity of the subject site and an assessment of the potential noise and vibration impact associated with the proposed development during both the short-term construction phase and the long-term operational phase on its surrounding environment. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment. An assessment of noise from existing sources inward on the development has also been completed.

Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated in an environmentally sustainable manner in order to ensure minimal impact on the receiving environment.

This assessment has been prepared by Abe Scheele (Acoustic Consultant) who holds a City and Guilds Level 1 and 2 in Sound Engineering and City and Guilds Music Technology and has completed the Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control. Abe has been working in the field of acoustics since 2016. He is experienced in environmental, building and architectural acoustics. He has knowledge of surveying, computer modelling, impact assessment of environmental noise and architectural acoustic assessments for various sectors including, industrial, commercial, and residential.

10.2. Assessment Methodology

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out in the following sections. In addition to specific noise and vibration guidance documents, the following Environmental Protection Agency (EPA) guidelines were considered and consulted in the preparation of this Chapter:

- 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 – (2022); and
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);

The study has been undertaken using the following methodology:

- An environmental noise survey has been undertaken in the vicinity of the subject site in order to characterise the existing baseline noise environment;
- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- Predictive calculations have been performed during the construction phase of the project at the nearest sensitive locations to the development site;

- Predictive calculations have been performed to assess the potential impacts associated with the operation of the development at the most sensitive locations surrounding the development site;
- A schedule of mitigation measures has been proposed to reduce, where necessary, the identified potential outward impacts relating to noise and vibration from the proposed development; and
- An inward noise impact assessment from the existing noise sources on the proposed development.

10.2.1 Construction Phase – Noise Impacts

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities typically control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise.

ABC Method

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities, depending on context.

BS 5228-1:2009+A1:2014 sets out guidance on permissible noise levels relative to the existing noise environment. Table 10.1 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors.

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A [A]	Category B [B]	Category C [C]
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Evenings and weekends D	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

Table 10.1: **Example Threshold of Significant Effect at Dwellings**

A. Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B. Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C. Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D. 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5 dB. If the construction noise exceeds the appropriate category value, then a significant effect is deemed to occur. It should be noted that this assessment method is only valid for residential properties and if applied to commercial premises without consideration of other factors may result in an excessively onerous thresholds being set.

The closest neighbouring noise sensitive properties to the proposed development are some 20m to the nearest areas of general construction at the south west of the proposed development site.

Proposed Threshold Noise Levels

Taking into account the proposed documents outlined above and making reference to the baseline noise environment monitored around the development site (see Section 10.3), BS 5228-1:2009+A1:2014 has been used to inform the assessment approach for construction.

The following Construction Noise Threshold (CNT) levels are proposed for the construction stage of this development:

- For residential and cemetery NSLs it is considered appropriate to adopt 65 dB(A) CNT depending on location. Given the baseline monitoring carried out, it would indicate that Category A values are appropriate using the ABC method.

Interpretation of the CNT

In order to assist with interpretation of CNTs, Table 10.2 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of *DMRB: Noise and Vibration* and adapted to include the relevant significance effects from the *EPA Guidelines* (EPA 2017).

Guidelines for Noise Impact Assessment Significance (DMRB)	CNT per Period	EPA EIAR Significance Effects	Determination
Negligible	Below or equal to baseline noise level	Not Significant	Depending on CNT, duration & baseline noise level
Minor	Above baseline noise level and below or equal to CNT	Slight to Moderate	
Moderate	Above CNT and below or equal to CNT +5 dB	Moderate to Significant	
Major	Above CNT +5 to +15 dB	Significant, to Very Significant	
	Above CNT +15 dB	Very Significant to Profound	

Table 10.2: Construction Noise Significance Ratings

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely impacts during the construction stages.

10.2.1.3 Construction Phase – Noise Impacts

In order to assist with the interpretation of construction traffic noise, Table 10.3 includes guidance as to the likely magnitude of impact associated with changes in traffic noise levels along an existing road. This is taken from Table 3.17 of the *DMRB Noise and Vibration* (UKHA 2020).

Magnitude of Impact	Increase in Traffic Noise Level (dB)
Negligible	Less than 1.0
Minor	Greater than or equal to 1.0 and less than 3.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Major	Greater than or equal to 5.0

Table 10.3: Likely Effect Associated with Change in Traffic Noise Level – Construction Phase

In accordance with the *DMRB Noise and Vibration*, construction noise and construction traffic noise impacts shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- Ten or more days or night in any 15 consecutive day or nights;
- A total number of days exceeding 40 in any six consecutive months.

10.2.2 Construction Phase – Vibration

Vibration standards address two aspects: those dealing with cosmetic or structural damage to buildings and those with human comfort. For the purpose of this scheme, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

10.2.2.1. Building Damage

With respect to vibration, British Standard BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero. It is therefore common, on a cautious basis to use this lower value. Taking the above into consideration the vibration criteria in Table 10.4 are recommended.

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:		
Less than 15Hz	15 to 40Hz	40Hz and above
12 mm/s	20 mm/s	50 mm/s

Table 10.4: Recommended Vibration Criteria During Construction Phase

Expected vibration levels from the construction works will be discussed further in Section 10.5.

10.2.2.2 Human Perception

People are sensitive to vibration stimuli at levels orders of magnitude below those which have the potential to cause any cosmetic damage to buildings. There are no current standards which provide guidance on typical ranges of human response to vibration in terms of PPV for continuous or intermittent vibration sources.

BS5228-2:2009+A1:2014, provides a useful guide relating to the assessment of human response to vibration in terms of the PPV. Whilst the guide values are used to compare typical human response to construction works, they tend to relate closely to general levels of vibration perception from other general sources.

Table 10.5 below summarises the range of vibration values and the associated potential effects on humans.

Vibration Level, PPV	Effect
0.140mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies. At lower frequencies people are less sensitive to vibration.
0.3mm/s	Vibration might be just perceptible in residential environments.
1mm/s	It is likely that a vibration level of this magnitude in residential environments will cause complaint.

Table 10.5: Guidance on Effects of Human Response to PPV Magnitudes

Vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin and or the duration of vibration is known. For example, ground breaking can typically be tolerated at vibration levels up to 2.5 mm/s if adequate public relations are in place and timeframes are known. These values refer to the day-time periods only.

During surface construction works (demolition and ground breaking etc.) the vibration limits set within Table 10.5 would be perceptible to building occupants and have the potential to cause subjective effects. The level of effect is, however, greatly reduced when the origin and time frame of the works are known and limit values relating to structural integrity are adequately communicated. In this regard, the use of clear communication and information circulars relating to planned works, their duration and vibration monitoring can significantly reduce vibration effects to the neighbouring properties.

Interpretation of the Human Response to Vibration

In order to assist with interpretation of vibration thresholds, Table 10.6 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS5228-2:2009+A1:2014.

Criteria	Impact Magnitude	Significance Rating
≥10 mm/s PPV	Very High	Very Significant
≥1 mm/s PPV	High	Moderate to Significant
≥0.3 mm/s PPV	Medium	Slight to Moderate
≥0.14 mm/s PPV	Low	Not significant to Slight
Less than 0.14 mm/s PPV	Very Low	Imperceptible to Not significant

Table 10.6: Human Response Vibration Significance Ratings

10.2.3. Operational Phase – Noise

10.2.3.1 Mechanical Plant

The most appropriate standard used to assess the impact of a new continuous source (i.e. plant items) to a residential environment is BS 4142 *Methods for rating and assessing industrial and commercial sound* (2014). This standard describes a method for assessing the impact of a specific noise source at a specific location with respect to the increase in "background" noise level that the specific noise source generates. The standard provides the following definitions that are pertinent to this application:

- "*Specific sound level,* $L_{Aeq,\ Tr}$" is equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *T*. This level has been determined with reference to manufacturers information for specific plant items.

- "*Rating level*" $L_{Ar,Tr}$ is the specific noise level plus adjustments for the character features of the sound (if any), and;

- *"Background noise level"* is the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T.* This level is expressed using the L_{A90} parameter. These levels were measured as part of the baseline survey.

The assessment procedure in BS4142: 2014 is outlined as follows:
1. determine the specific noise level;
2. determine the rating level as appropriate;
3. determine the background noise level, and;
4. subtract the background noise level from the specific noise level in order to calculate the assessment level.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific source will have an adverse impact or a significant adverse impact. A difference of +10 dB or more is likely to be an indication of a significant adverse impact. A difference of around +5 dB is likely to be an indication of an adverse impact, dependent on the context. Where the rated plant noise level is equivalent to the background noise level, noise impacts are typically considered to be neutral.

10.2.3.2 Additional Vehicular Traffic on Surrounding Roads

There are no specific guidelines or limits relating to traffic related sources along the local or surrounding roads. Given that traffic from the development will make use of existing roads already carrying traffic volumes, it is appropriate to assess the calculated increase in traffic noise levels that will arise because of vehicular movements associated with the development. In order to assist with the interpretation of the noise associated with additional vehicular traffic on public roads, Table 10.7 is taken from DMRB Design Manual for Roads and Bridges (DMRB), Highways England Company Limited, Transport Scotland, The Welsh Government and The Department for Regional Development Northern Ireland, (2020).

Change in Sound Level (dB)	Subjective Reaction	Magnitude of Impact	EPA Glossary of Effects[12]
10+	Over a doubling of loudness	Major	Significant
5 – 10.9	Up to a doubling of loudness	Moderate	Moderate
3 – 4.9	Perceptible	Minor	Slight
0.1 – 2.9	Imperceptible	Negligible	Imperceptible
0	None	No Change	Neutral

Table 10.7: Significance in Change of Noise Level

The guidance outlined in Table 10.7 will be used to assess the predicted increases in traffic levels on public roads associated with the proposed development and comment on the likely long-term impacts during the operational phase.

10.2.3.3 Vibration

The development is residential in nature, therefore it is not anticipated that there will be any impact associated with vibration during the operational phase.

10.2.3.4 . Inward Noise – ProPG Planning & Noise

The Professional Practice Guidance on Planning & Noise (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a government document, since its adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk-based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,

- Stage 2 – Involves a full detailed appraisal of the proposed development, where deemed to be necessary, covering four “key elements” that include:

  - Element 1 - Good Acoustic Design Process;
  - Element 2 - Noise Level Guidelines;
  - Element 3 - External Amenity Area Noise Assessment
  - Element 4 - Other Relevant Issues

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 10.1 presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

12 EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (2022)

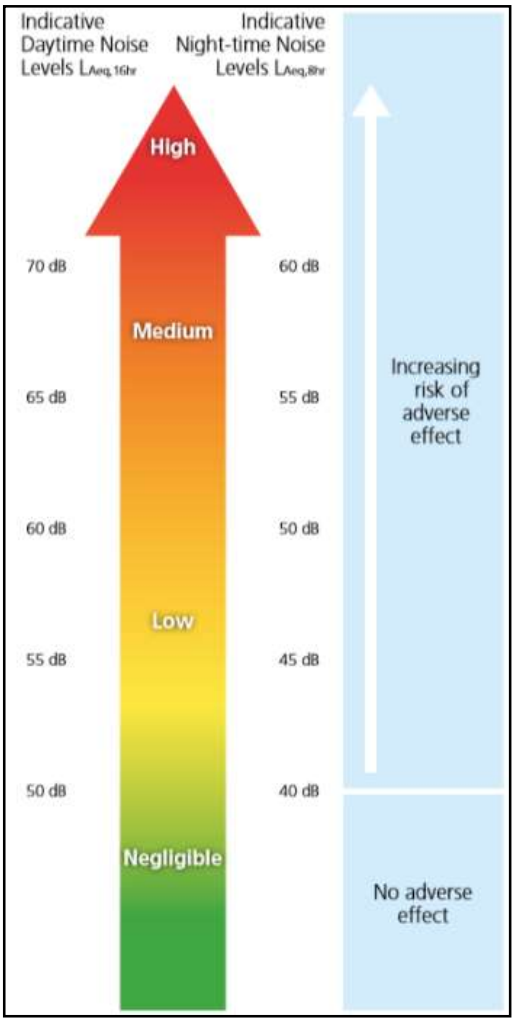


Figure 10.1: ProPG Stage 1 - Initial Noise Risk Assessment

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 10.8 and are based on annual average data, that is to say they omit occasional events where higher intermittent noisy events may occur.

Activity	Location	Day (07:00 to 23:00hrs) dB $L_{Aeq,16hr}$	Night (23:00 to 07:00hrs) dB $L_{Aeq,8hr}$
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-

Activity	Location	Day (07:00 to 23:00hrs) dB $L_{Aeq,16hr}$	Night (23:00 to 07:00hrs) dB $L_{Aeq,8hr}$
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB $L_{Amax,T}$*

Table 10.8: ProPG Internal Noise Levels

*Note The document comments that the internal $L_{AFmax,T}$ noise level may be exceeded no more than 10 times per night without a significant impact occurring.

In addition to these absolute internal noise levels ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development: "The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."

10.3. Receiving Environment

The subject site is located within the Oldcourt, Bohernabreena, Dublin area, bound to the north by Dodderbrook drive, to the east by the Oldcourt road and Ballycullen Green, to the west and south by agricultural land. The surrounding environment in the vicinity of the development site is mixed in nature with residential and agricultural making up the majority of the surrounding building and land uses.

10.3.1 Baseline Noise Environment

Baseline noise monitoring has been undertaken across the development site to determine the range of noise levels at varying locations across the site.

10.3.1.1 Environmental Noise Survey

An environmental noise survey has been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise.* Specific details are set out below.
Choice of Measurement Locations

The measurement locations are described below and shown in Figure 10.2.

AN1 located to the North West of the site in Ely Close residential estate.
AN2 located to the North of the site in Dodderbrook Drive residential estate.
AN3 located to the West of the site near residential properties approximately 4m from the road edge of Bohernabreena road.
UN1 unattended noise monitor located inside the Northern site boundary adjacent Dodderbrook Drive residential estate.

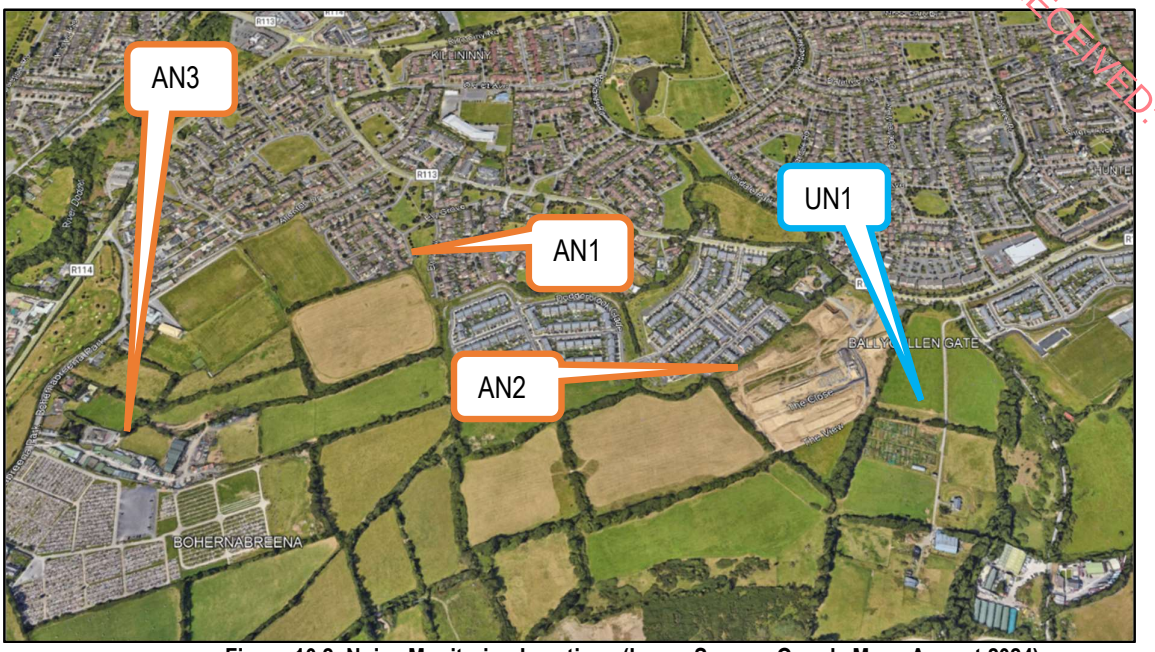


Figure 10.2: Noise Monitoring Locations (Image Source: Google Maps August 2024)

Survey Periods

The noise survey was carried out over the following periods:

Aspect	Survey Position	Survey Period
Noise	AN1	12:30hrs on 20 June to 16:00hrs on 20 June 2024
	AN2	
	AN3	
	UN1 (unattended)	16:30hrs on 20 June to 14:00hrs on 24 June 2024

Table 10.10: Survey Periods

Instrumentation

The noise measurements were carried out using the equipment listed below. The instrument was calibrated before and after the survey with no significant drift noted.

Measurement	Manufacturer	Equipment Model	Serial Number	Calibration date
Sound Level Meter	Rion	NL-52	186667	13/06/2023
Calibrator	Brüel & Kjær	Type 4231	2615338	25 oct 2023

Table 10.11: Noise Monitoring Equipment Details

Measurement Parameters

The noise survey results are presented in terms of the following parameters.

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2x10-5 Pa.

Survey Results and Discussion

The results of the noise survey at the four monitoring locations are summarised below.

Location AN1

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
20 June 2024	12:40	38	66	33
	13:50	44	65	41
	14:55	51	85	40

Table 10.12: Measured Noise Levels at AN1

20 June 2024

At this location, the primary noise sources were children playing on nearby GAA field and noise from party/function at GAA clubrooms on the other side of the GAA pitch. Other noises observed to be audible, occasional local traffic within the residential estate and birdsong. Third round elevated L_{Amax} was due to a delivery van delivering shopping to local houses and slamming rear van doors shut. Ambient noise levels were in the range of 38 to 51 dB L_{Aeq}. Background noise levels were in the range of 33 to 41 dB L_{A90}.

Location AN2

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
20 June 2024	13:02	41	60	33
	14:10	48	60	37
	15:15* note 1	57	85	46

Table 10.13: Measured Noise Levels at AN2

20 June 2024

At this location the primary noise sources were observed to be agricultural activities taking place in nearby agricultural land, children playing in residential estate where the SLM was located and occasional local traffic within the residential estate to vary degrees.

Note 1, During the third round of monitoring noise levels were elevated due to locals talking directly into the sound level meter. As such it is not representative of the baseline noise environment.

Ambient noise levels were typically in the range of 41 to 48 dB L_{Aeq}. Background noise levels were typically in the range of 33 to 37 dB L_{A90}.

Location AN3

Date	Time	Measured Noise Levels (dB re. 2x10^{-5}Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
20 June 2024	13:28	66	83	40
	14:32	68	84	42
	15:37	69	86	45

Table 10.14: Measured Noise Levels at AN3

At this location the primary noise sources were observed to be road traffic noise and vehicle pass-by's from the Bohernabreena road. Other occasional noise came from pedestrian chatter. Ambient noise levels were in the range of 66 to 69 dB L_{Aeq}. Background noise levels were in the range of 40 to 45 dB L_{A90}.

Location UN1
The unattended measurements collected over the survey period are summarised below.

Date	Period	Measured Noise Levels (dB re. 2x10^{-5} Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
20 June	Day	51	42	64
	Night	46	32	58
21 June	Day	55	46	69
	Night	45	37	59
22 June	Day	51	41	65
	Night	47	33	60
23 June	Day	51	40	66
	Night	47	33	59

Table 10.15: Measured Noise Levels at UN1

On installation and collection at this location the primary noise sources were observed to be construction noise from the construction site including machinery, banging and construction workers talking to each other. Other noises audible were birdsong and birdcall and distant road traffic noise. Daytime ambient noise levels ranged from 51 to 55 dB L_{Aeq} with an average of 53 dB L_{Aeq}. Daytime background noise levels ranged from 40 to 46 dB L_{A90} with an average of 46 dB L_{A90}.

Night-time ambient noise levels ranged from 45 to 47 dB L_{Aeq} with an average of 46 dB L_{Aeq}. Night-time background noise levels ranged from 32 to 37 dB L_{A90} with an average of 34 dB L_{A90}. Night-time maximum noise

levels were in the range of 58 to 60 dB L_{AFmax} with an average of 59 dB.

In addition, the L_{AFmax} values were measured over 15-minute intervals over the duration of the unattended monitoring survey. Figure 10.3 presents the number of measured L_{AFmax} events for each decibel level during the night period measured at Location UN1. On review of the maximum noise levels the value of 70 dB L_{AFmax} is not regularly exceeded on a given night (less than 10 events).

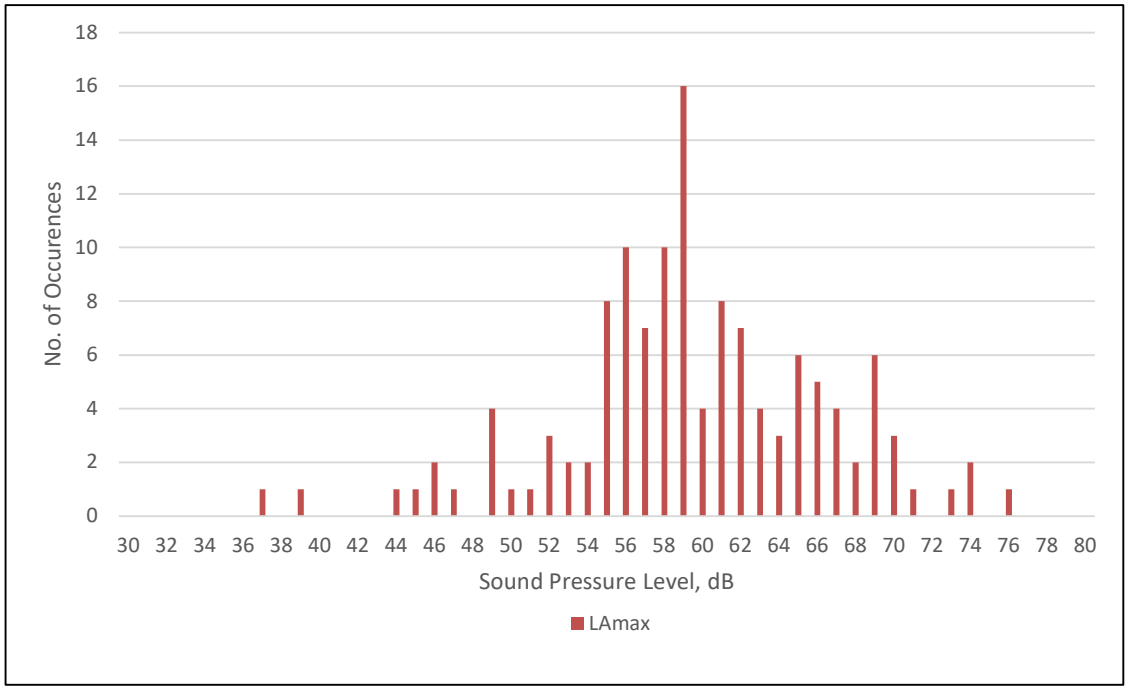


Figure 10.3: Number of LAFmax events at each decibel level measured during the night period at location UN1

Survey Summary

The baseline noise levels were typical of an suburban location. At Location AN1 the noise environment was dominated by recreational activities from nearby GAA club. Others noises such as birdsong and occasional local traffic within the residential estate was also audible at the monitoring location. At location At AN2 the noise environment was dictated more so by local agricultural sources, children playing and vehicular activity around residential units. At AN3 the noise environment was dominated by nearby road traffic.

A review of the noise maps has confirmed that measured daytime levels from the baseline noise survey show general agreement with the unattended daytime noise levels measured. Night-time noise levels were in-line with those measured during the baseline noise survey.

10.3.2 Review of EPA Noise Mapping

Round 4 Noise Maps for Roads – Dublin Agglomeration have been referred to when assessing the baseline noise environment.

The above road noise maps are provided for the overall day evening night period in terms of L_{den} and for the night-time period in terms of L_{night}.

All road noise data has been sourced from the Environmental Protection Agency Website https://gis.epa.ie/EPAMaps/.

10.3.2.1 Road Traffic Noise

- Transport Infrastructure Ireland (TII) have produced noise maps for major roads in Dublin City and County. Figure 10.4 and Figure 10.5 present the predicted noise levels across the development site for road traffic in terms of L_{den} . The TII noise map indicates that the development is situated in outside of the lowest contours, <55 dB L_{den} and <45 dB L_{night}.

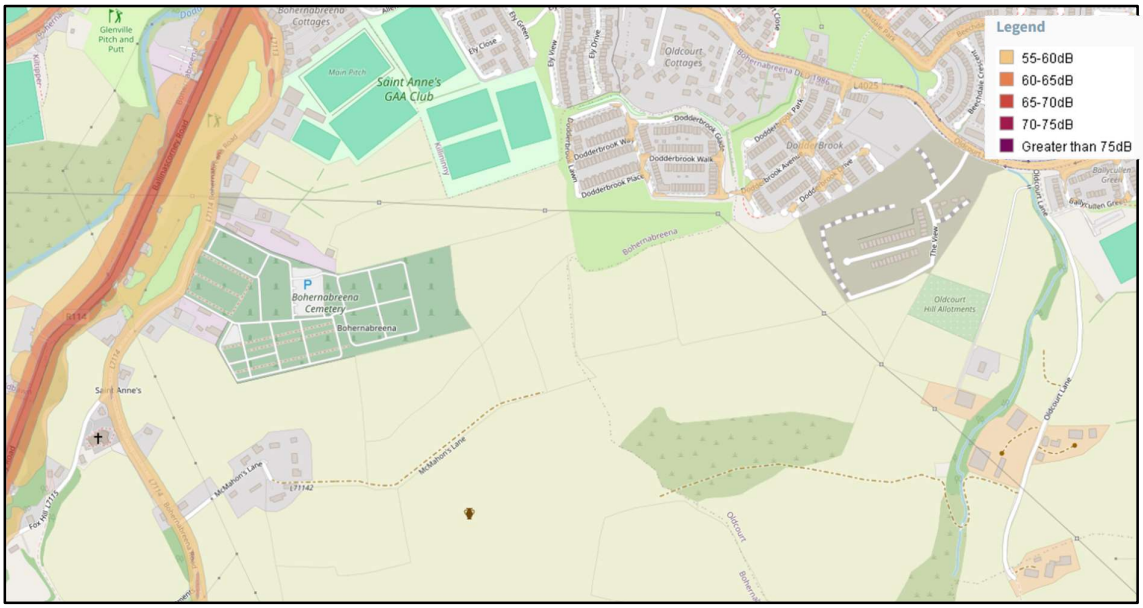


Figure 10.4: L_{den} Road Traffic Noise Levels

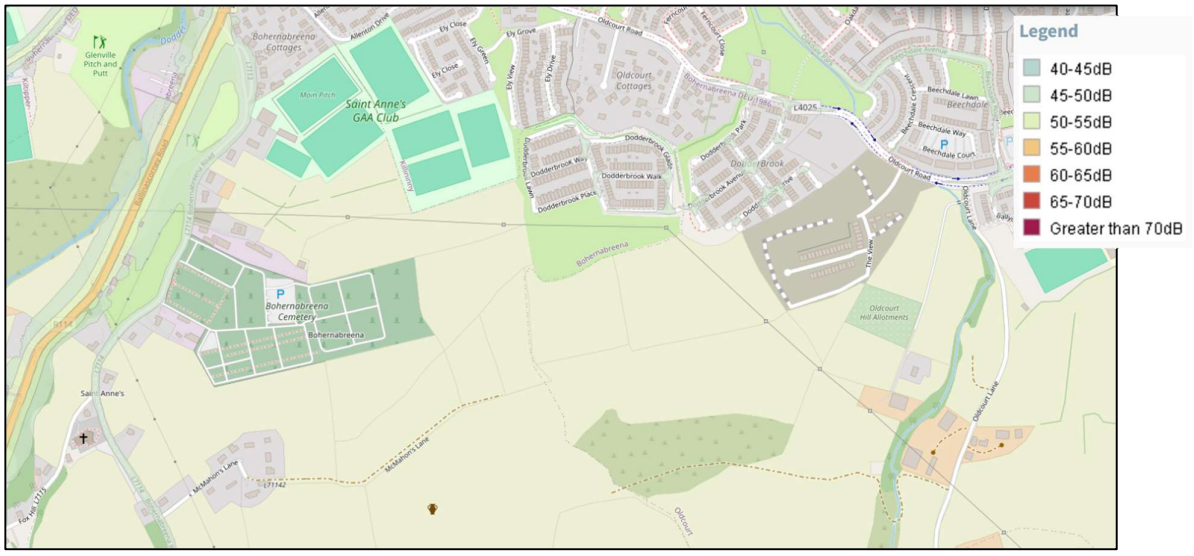


Figure 10.5: L_{night} Road Traffic Noise Levels

10.3.1.2 Do Nothing Scenario

In the absence of the proposed development being constructed, the noise environment at the nearest noise sensitive locations and within the development site will remain largely unchanged.

10.4. Characteristics of the Proposed Development

10.4.1 General Characteristics

Capami Ltd. intends to apply for permission for a Large-scale Residential Development on a site measuring c.20.4Ha, located in the townlands of Bohernabreena, Oldcourt, and Killininny, Dublin 24. The development site is located to the east of Bohernabreena Road, north and east of Bohernabreena cemetery, south and south-east of St. Anne's GAA club, south and south-west of the Dodderbrook residential estate, west of the Ballycullen Gate residential development (currently under construction) and west of Oldcourt Road (the R113).

The proposed development consists of 523 no. residential units comprised of 255 no. 2, 3 & 4 bed detached, semi-detached and terraced houses, 206 no. 1, 2 & 3 bed duplex units in 20 no. 2 & 3 storey blocks, and 62 no. 1, 2 & 3 bed apartments in 4 no. 3 & 3-4 storey blocks, along with a 2-storey childcare facility of c. 457sq.m.

Private amenity space for the residential units is provided in the form of rear gardens for houses and ground floor terraces / upper floor balconies for apartments and duplex units. The proposed development provides for c. 7.38Ha of public open space and c. 5,545sq.m of communal open space associated with proposed residential units.

Vehicular access to the development will be via 4 no. access points, as follows: (i) from the west of the site via 2 no. accesses located off Bohernabreena Road, (ii) from the north of the site via 1 no. access at Dodderbrook Place, and (iii) from Oldcourt Road (the R113) to the east, via adjoining residential development. The proposed development includes for pedestrian and cyclist connections and accesses to adjoining lands to the north, east and west, and includes for cycling and pedestrian routes and infrastructure throughout the development.

The proposed development also includes the demolition of existing buildings / structures on the site (c.3,800sq.m), hard & soft landscaping, boundary treatments, SuDs features, drainage infrastructure, services infrastructure, bin stores, bicycle stores, car parking (including EV parking facilities), bicycle parking, public lighting etc. and all associated site development works.

When considering a development of this nature, the potential noise and vibration impact on the surroundings is considered for each of two distinct stages:

- Construction and demolition phase; and,
- Operational phase.

The construction phase will involve demolition, excavation over the development site, construction of foundations and buildings, landscaping, and vehicle movements to site using the local road network. This phase will generate the highest potential noise impact due to the works involved, however the time frame is short term in nature.

The primary sources of outward noise in the operational context are deemed to be long term in duration and will comprise traffic movements to the development site using the existing road network and plant noise emissions from the completed buildings. These issues are discussed in detailed in the following sections.
Inward noise incident on the development from existing noise sources, namely road traffic has been assessed.

10.5. Potential Impacts

The potential noise and vibration impacts associated with the construction and operational phases of the proposed development are discussed in the following sections.

10.5.1 Construction Phase

10.5.1.1 Noise

During the construction phase of the proposed development, a variety of items of plant will be in use, such as excavators, dumper trucks, compressors and generators. AWN has been advised that initial site investigations indicate that it is not anticipated that piling or rock breaking will be required during the construction of building foundations.

Due to the nature of daytime activities undertaken on a construction site of this nature, there is potential for generation of significant levels of noise. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels.

Taking into account the outline construction programme, it is possible to predict typical noise levels using guidance set out in BS 5228-1:2009+A1:2014. Table 10.16 outlines typical plant items and associated noise levels that are anticipated for various phases of the construction programme.

Activity	Item of Plant *(BS5228 Ref)*	L_{Aeq} at 10m
Site Clearance/Demolition	Tracked excavator (C2.21)	71
	Dump Truck (C2.30)	79
	Tracked Mobile Crane (C4.50)	71
General Construction	Tracked excavator (C2.21)	71
	Compressor (D7.8)	70
	Hand Tools (C7.79)	75
	Diesel Generator (C4.76)	61
Road Works/Landscaping	Asphalt Paver & Tipping Lorry (C5.30)	75
	Electric Water Pump (C5.40)	68
	Vibratory Roller (C5.20)	75

Table 10.16 Reference Plant Noise Emissions

The calculations also assume that the equipment will operate for 66% of the 12-hour working day (i.e. 8 hours) and that a standard site hoarding, typically 2.4m height will be erected around the perimeter of the construction site for the duration of works. It is assumed that construction works will take place during normal working hours only.

The closest noise sensitive locations have been identified as shown in Figure 10.6 and described below.

NSL1 Cemetry, some 5m from the nearest significant site works, located to the south of the proposed development site;
NSL 2 Residential houses at Bohernabreena Park some 50m from the nearest significant site works;

NSL 3 Residential dwellings at Dooderbrook Place located to the north of the proposed site some 80m from the nearest significant site works;

NSL4 Commercial and dwelling units, some 120m from the nearest significant site works, located to the east of the proposed development site. and,

NSL 5 Residential development to the north of the proposed development at Ely Cl some 150m from the nearest significant site works.

Review of the baseline noise survey and the Construction Noise Thresholds detailed in Section 10.2.1.2 indicates that the appropriate daytime CNTs for construction noise at residential and commercial properties are as follows:

65 dB $L_{Aeq,1hr}$

It is assumed that construction works will take place during normal working hours only.

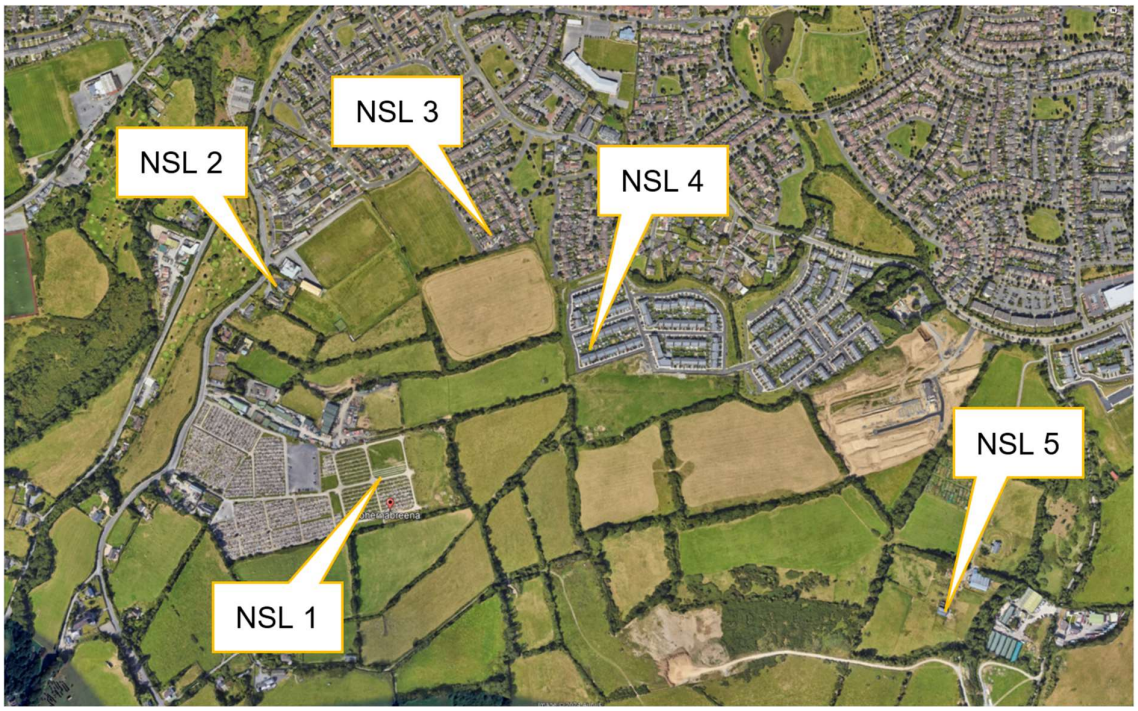


Figure 10.6: Site Context & Noise Assessment Locations (Image Source: Google Maps July 2024)

Table 10.17 below and overleaf presents the predicted daytime noise levels from an indicative construction period at these noise sensitive locations (NSLs).

Construction Phase	Item of Plant (BS 5228-1 Ref)	L_{Aeq} at distance (m)				
		10m (NSL1)	50m (NSL2)	80m (NSL3)	120m (NSL4)	150m (NSL5)
Site Clearance and Demolition	Tracked excavator (C2.21)	63	45	40	36	33

Construction Phase	Item of Plant (BS 5228-1 Ref)	L_{Aeq} at distance (m)				
		10m (NSL1)	50m (NSL2)	80m (NSL3)	120m (NSL4)	150m (NSL5)
	Dump Truck (D2.30)	71	54	49	44	42
	Tracked Mobile Crane (C4.50)	60	43	38	33	31
	Cumulative Site Clearance and Demolition	72	55	50	45	43
General Construction	Tracked excavator (C2.21)	65	47	42	38	35
	Compressor (D7.8)	61	44	39	34	32
	Hand Tools (C7.79)	59	42	37	32	30
	Diesel Generator (C4.76)	41	24	19	14	12
	Cumulative General Construction	67	50	45	40	38
Road Works/ Landscaping	Asphalt Paver & Tipping Lorry (C5.30)	67	49	44	40	37
	Electric Water Pump (C5.40)	55	38	33	28	26
	Vibratory Roller (C5.20)	64	47	42	37	35
	Cumulative Landscaping and Road Works	69	51	46	42	39

Table 10.17: Indicative Construction Noise Levels at Nearest Noise Sensitive Locations

At a distance of 10m from areas of major construction, representative of the closest graves of the nearby cemetery to the closest areas of construction works (NSL1), the predicted construction noise levels are above the 65 dB(A) CNT. In the absence of mitigation the effect of impact of this, is ***negative***, ***moderate*** to ***significant*** and ***temporary*** during the general construction phase and the road works/ landscaping stage. During the site clearance and demolition phase of construction there is the potential for ***negative***, ***significant*** to ***very significant*** and ***temporary*** effect of impact in the scenario where there are cemetery visitors at the closest graves while works are occurring at the closest areas of construction. As works move through the proposed site or at areas further into the cemetery noise levels will be reduced. A wall exists between the cemetery and the proposed development which will provide additional screening not accounted for in the predicted construction noise levels.

At a distance of 25m from areas of major construction, taking into account the measured ambient noise levels and the derived CNT, i.e. 65 dB(A), the individual construction activities noted in Table 10.17 are predicted to be in line or below the CNT. Considering a worst case scenario whereby several of these activities may occur at the same time, a ***negative***, ***moderate*** to ***significant*** and ***short-term*** effect of impact is predicted, in the absence of mitigation.

At greater distances, representative of NSL's 2,3,4 and 5, predicted construction noise levels are lower, therefore any effect of impact is expected to be ***negative***, ***moderate*** and ***short-term***.

Construction Traffic

The noise levels associated with mobile plant items such as concrete mixer trucks, loaders etc. operational on site have been included as part of the construction noise assessment and calculated noise levels in Table 10.18. Consideration should also be given to the addition of construction traffic along the site access routes. Access to the development site for construction traffic will be via the site entrance on Bohernabreena Park to the west of the proposed development site and The Rise to the east.

It is possible to calculate the noise levels associated with the passing vehicle using the following formula.

$L_{Aeq,T} = L_{AX} + 10\log_{10}(N) - 10\log_{10}(T) + 10\log_{10}(r_1/r_2)$ dB

where:

$L_{Aeq,T}$ is the equivalent continuous sound level over the time period T in seconds);
L_{AX} is the "A-weighted" Sound Exposure Level of the event considered(dB);
N is the number of events over the course of time period T;
r_1 is the distance at which L_{AX} is expressed;
r_2 is the distance to the assessment location.

A calculation distance of 5m from the road has been used to assess noise levels at the closest buildings along the construction routes. The mean value of Sound Exposure Level for truck moving at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 82 dB L_{AX} at a distance of 5 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions. The construction vehicle numbers for the various construction phases are summarised below:

Construction Phase	No. of trucks/peak hour	Calculated Noise level at edge of road (5m), dB $L_{Aeq,1hr}$
Site Clearance	12	61
Excavation	12	61
General Construction	8	60

Table 10.18: Calculated Construction Traffic Noise Levels at Edge of Road

The predicted noise level associated with construction vehicle traffic numbers above is in the range 60-61 dB $L_{Aeq,1hr}$. This level is below the construction noise threshold and the prevailing noise levels along Bohernabreena Park and The Rise, and would result in a ***negative***, ***slight*** and ***short-term*** effect of impact.

10.5.1.2 Vibration

During demolition and ground-breaking in the excavation phase, there is potential for vibration to propagate through the ground. Empirical data for this activity is not provided in the BS 5228- 2:2009+A1:2014 standard, however the likely levels of vibration from this activity is expected to be below the vibration threshold for building damage on experience from other sites.

AWN have previously conducted vibration measurements under controlled conditions, during trial construction works, on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- tonne hydraulic breaker on small CAT tracked excavator
- tonne hydraulic breaker on large Liebherr tracked excavator

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

The range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity likely required on the proposed site. This range of vibration magnitudes indicate vibration levels at the closest neighbouring buildings are likely to be below the limits set out in Table 10.4 to avoid any cosmetic damage to buildings.

In terms of disturbance to building occupants, works undertaken within close proximity to the residential receptors on the site perimeter have the potential to emit perceptible vibration levels.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration threshold set out in Table 10.4 during all activities. Further discussion on mitigation measures during this phase are discussed in Section 10.6.1.

It is anticipated that excavations will be made using standard excavation machinery, which typically do not generate appreciable levels of vibration close to the source. Taking this into account and considering the distance that these properties are from the works and the attenuation of vibration levels over distance, the resultant vibration levels are expected to be well below a level that would cause disturbance to building occupants or even be perceptible.

10.5.2 Operational Phase

10.5.2.1 Mechanical Plant

Building and mechanical services plant items are proposed that will serve the apartments and ground floor commercial/retail units.

The selection of building services plant will ensure that noise levels comply with the criteria described in Section 10.2.3.1. It is acknowledged that the selection of the specific plant items is subject to change during the detailed design stage, and this is normal industry practice. However, noise from any new plant items will be designed and/or controlled so as not to give rise to any adverse effects at the nearest noise sensitive locations.

The effect associated with building services plant, once designed to achieve the relevant noise criteria, is categorised as ***negative***, ***imperceptible*** and ***permanent***.

10.5.2.2 Additional Traffic on Adjacent Roads

During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site on some surrounding roads.

A traffic impact assessment relating to the proposed development has been prepared by Pinnacle Consulting Engineers, as part of this EIAR. Using this information, the related noise impacts along the relevant road links has been assessed.

Figure 10.7 below outlines the breakdown of sections of road and Table 10.20 displays the predicted change in noise level at different road links around the site for the year of opening and the design year using the Annual Average Daily Traffic (AADT) flows along the road links under consideration.

Figure 10.7: Traffic Assessment – Road Links

Road Link	Opening Year (2030)		
	AADT Without Development	AADT With Development	Change in Noise Level (dB)
1A	12,404	12,574	+0.1
1B	24,606	24,941	+0.1
1C	17,428	17,666	+0.1
1D	13,249	13,429	+0.1
2A	11,402	11,966	+0.2
2B	8,151	8,554	+0.2
2C	2,060	2,162	+0.2
2D	8,953	9,396	+0.2
3A	5,712	7,093	+0.9
3B	5,620	6,979	+0.9

Road Link	Opening Year (2030)		
	AADT Without Development	AADT With Development	Change in Noise Level (dB)
3C	2,902	3,603	+0.9
Road Link	Design Year (2045)		
	AADT Without Development	AADT With Development	Change in Noise Level (dB)
1A	13,327	13,496	+0.1
1B	26,435	26,771	+0.1
1C	18,724	18,962	+0.1
1D	14,234	14,415	+0.1
2A	12,249	12,813	+0.2
2B	8,757	9,160	+0.2
2C	2,213	2,315	+0.2
2D	9,619	10,062	+0.2
3A	6,137	7,517	+0.9
3B	6,038	7,397	+0.9
3C	3,118	3,819	+0.9

Table 10.20: Predicted Change in Noise Level associated with Vehicular Traffic

For the opening year (2030) traffic flows, the predicted changes in noise level along the road links range from +0.1 to +0.9 dB. For the design year (2045) traffic flows, the predicted changes in noise level along the road links also range from 0.1 to +0.9 dB.

With reference to Table 10.7, the predicted change in noise level associated with additional traffic on the existing road network, is negligible in magnitude. Therefore a ***negative***, ***not significant***, and ***long term*** effect of impact is predicted.

Giving consideration to the noise levels presented in the previous sections the initial site noise risk assessment has concluded that the level of risk across the site lies within the low noise risk categories.

ProPG states the following with respect to low, medium and high risks areas:

Low Risk At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

Given the above it can be concluded that the development site may be categorised as *Low Risk* and as such the Acoustic Design Statement (following here and also in Section 10.6.3.3) is not required.
It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used,

"2.12 It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as low risk. A site considered as negligible risk is likely to be acceptable from a noise perspective

and need not normally be delayed on noise grounds. A potentially problematical site will be flagged at the earliest possible stage, with an increasing risk indicating the increasing importance of good acoustic design."

ProPG Stage 1 Noise Risk Assessment

The potential noise risk of the residential development has been undertaken using the ProPG approach. The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 10.1 presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Paragraph 2.9 of ProPG states that: -

"The noise risk assessment may be based on measurements or prediction (or a combination of both) as appropriate and should aim to describe noise levels over a "typical worst case" 24 hour day either now or in the foreseeable future."

Figure 10.1 summarises the ProPg Initial Noise Risk Assessment for the site using noise levels ranges for each category. Measured noise levels at UN1 at the site are compared to noise level ranges outlined in Figure 10.1. Noise levels measured at this monitoring location are considered representative of the prevailing noise environment. There are no known planned developments in the vicinity that would change the noise environment in the foreseeable future.

Review of the baseline noise levels measured at UN1, concludes the following:

- **Daytime:** Noise levels measured in the range of 51 – 55 dB $L_{Aeq,16hr}$ at UN1 fall within the *low noise risk* category.
- **Night-time:** The ambient night-time noise level within the range of 46 to 47 dB $L_{Aeq,8hr}$ at UN1 fall within the *low noise risk* category.

Giving consideration to the noise levels measured at UN1 and the EPA maps, the initial site noise risk assessment has concluded that the level of risk across the site lies within the low risk category. The range of noise levels across the site indicates that the low risk values are at the lower end of the risk scale.

Further consideration of the range of internal noise levels within the development buildings is set out in the following section to determine if any specific noise control measures are required on site.

Internal Noise Levels

In the first instance, it is important to note the typical level of sound reduction offered by a partially open window is typically applied as 15dB[13] to 18dB.

[13] Section 2.33 of ProPG, additional information can be found in the DEFRA NANR116: 'Open/Closed Window Research' Sound Insulation Through Ventilated Domestic Windows'

Considering the internal design criteria outlined in Table 1 (BS 8233) and a sound reduction across an open window of 15dB, the free-field noise levels that would be required to ensure that internal noise levels do not exceed good internal noise levels with windows open have been summarised in Table 10.21.

Typical situations	Design Range, $L_{Aeq,T}$ dB	
	Daytime $L_{Aeq,16hr}$ (07:00 to 23:00hrs)	Night-time $L_{Aeq,8hr}$ (23:00 to 07:00hrs)
Living / Dining Rooms	50 - 60	n/a
Bedrooms	50 - 55	45 -50

Table 10.21: Recommended indoor Ambient Noise Levels for Dwellings with windows open

Making reference to the measured baseline noise levels at the site and EPA noise maps, during the daytime period internal noise levels will be reasonable to good and set back distances from the road edge of the nearest houses. During night time periods reasonable to good internal noise levels for living rooms and bedrooms will be achieved across an open window across all areas of the site with windows open. Good internal noise levels can be achieved across the full site with windows closed. No further noise control measures are required for the site.

External Noise Levels

ProPG notes that is it desirable that external areas used for amenity spaces such as gardens and patios noise levels should not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$

These values are achieved on site for gardens, balcony areas and external communal open space.

The development site is categorised as a ***Low Risk*** in accordance with ProPG. The effect of impact is predicted to be **Neutral, Not significant** and **Long-term**.

10.6. Mitigation Measures

Mitigation measures for the construction phase are set out below in order to reduce potential impacts as far as practicable to within the adopted criteria for noise and vibration.

10.6.1 Construction Phase – Noise

The contract documents will clearly specify the construction noise criteria included in this chapter which the construction works must operate within. The Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of BS 5228-1:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise* and the *European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001*. These measures will ensure that:

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise.
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.

- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- Any plant, such as generators or pumps that is required to operate outside of normal permitted working hours will be surrounded by an acoustic enclosure or portable screen.

BS 5228 -1:2009+A1 2014 includes guidance on several aspects of construction site practices, which include, but are not limited to:

- selection of quiet plant;
- noise control at source;
- screening;
- liaison with the public, and;
- monitoring.

Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

10.6.1.1 Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

10.6.1.2 Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be considered:

- Where practical, site compounds will be located in excess of 30m from noise sensitive receptors within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.
- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant should be switched off when not in use and not left idling.
- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.

- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

10.6.1.3 Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m2 to provide adequate sound insulation.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

10.6.1.4 Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

10.6.1.5 Monitoring

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*.

10.6.1.6 Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. During excavation/ demolition or other high noise generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.

10.6.2 Construction Phase – Vibration

The vibration from construction activities will be limited to the values set out in Section 10.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction

work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.

10.6.3. Operational Phase – Noise

10.6.3.1 Additional Traffic on Adjacent Roads

During the operational phase of the development, noise mitigation measures with respect to the outward impact of traffic from the development are not deemed necessary.

10.6.3.2 Mechanical Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

10.6.3.3 Inward Noise

The development site itself has been categorised as a ***Low*** Risk in accordance with ProPG. With regard to the criteria outlined in section 10.2.3.4, review of the location of residential buildings on site, the external noise levels and the internal noise levels with windows open, the assessment has determined that specific noise mitigation measures are not required to the site boundary or site buildings to control noise intrusion to internal spaces or to control noise in the external amenity spaces.

10.6.4 Operational Phase – Vibration

No vibration mitigation measures are required applicable the operational phase.

10.7. Residual Impacts

10.7.1 Construction Phase

During the construction phase of the project there is the potential for significant and moderate impacts on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits, hours of operation, along with implementation of appropriate noise and vibration control measures, so that noise and vibration will have a ***negative***, ***not significant*** to ***moderate to significant*** and ***short-term*** effect of impact on the surrounding environment.

10.7.2 Operational Phase

10.7.2.1 Additional Vehicular Traffic

The predicted change noise levels associated with additional traffic is predicted to be of imperceptible impact along the existing road network. In the context of the existing noise environment, the overall contribution of induced traffic is considered to be of ***neutral***, ***negligible*** and ***long-term*** effect of impact to nearby residential locations.

10.7.2.2 Mechanical Plant

Assuming the operational noise levels do not exceed the adopted design goals in line with the relevant noise criteria, the resultant residual noise impact from this source will be of ***neutral***, ***imperceptible***, ***long term*** effect of impact.

10.8. Cumulative Impacts

During the construction phase of the proposed development, construction noise on site will be localised and will therefore likely the primary noise source at the nearest noise sensitive receivers. There is a development currently under construction to the east of the proposed development. Should construction of both sites occur simultaneously there is potential for cumulative noise impacts at noise sensitive receivers equidistant from the sites.

In this scenario, liaison between construction sites will be on-going throughout the duration of the construction phase. Contractors shall schedule work in a co-operative effort to limit the duration and magnitude of potential cumulative impacts on nearby sensitive receptors. Cumulative construction noise impacts are expected to be ***negative***, ***significant*** and ***short-term*** at times of high activity on both sites.
The contractor will be required to control noise impacts associated with this development in line with the guidance levels included in Table 10.1 and follow the best practice control measures within BS 5228 -1.
With the above in mind, it is likely that the neighbouring development will be completed before construction commences on the subject development.

In the context of the operational phase, permitted developments are included in the traffic impact and therefore the potential for a cumulative effects of impact has been assessed (and found to be ***negative***, ***negligible***, and ***long-term***).

Any large scale future projects that are not yet proposed or permitted would also need to be the subject of EIA in turn, to ensure that no significant impacts resulting from noise and vibration will occur as a result of those developments.

10.9. Difficulties Encountered

No difficulties were encountered during the preparation of the EIAR chapter.

10.10. References

- 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 – (EPA, 2022);
- BSI (1993). BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration;
- BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound;
- BSI (2014). BS 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise;
- BSI (2014). BS 5228-2:2009+A:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration;
- EPA (2020). EPA Maps [Online] Available from gis.epa.ie/EPAMaps;

- ISO (2016). ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures;
- UK Department of Transport (1998). Calculation of Road Traffic Noise;
- UKHA (2020). Design Manual for Roads and Bridges Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2; and
- (IoA, 2017). Professional Practice Guidance on Planning & Noise (ProPG).

11.0. Material Assets: Built Services

11.1. Introduction

This section of the report assesses and evaluates the likely effects of the proposed development on the existing drainage, watermain & and utilities networks in the vicinity of the site, as well as identifying proposed mitigation measures to minimise any identified effects arising from the proposed residential development at Oldcourt, Ballycullen, County Dublin. The material assets considered in this site services section include for water supply, wastewater drainage, surface water drainage and associated utilities / services.

Material assets are defined in the EPA "Guidelines on Information to be contained in Environmental Impacts Assessment (EPA, 2022) as: "*Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin and the value may arise for either economic or cultural reasons. Examples of natural resources of economic value include assimilative capacity of air and water, non-renewable resources (e.g. minerals, soils, quarries and mines), renewable resources (hydraulic head, wind exposure).*"

This Chapter presents the likely and significant effects associated with the material assets (built services) environments associated with the proposed residential development at Oldcourt, Ballycullen, County Dublin. Relevant mitigation and monitoring measures are also presented.

The information contained within this document should be read in conjunction with the design drawings and suite of reports, which accompany this planning application.

The potential effects associated with the proposed development, if any, are assessed with regards to the following proposed built services:

1. Water;
2. Wastewater;
3. Surface Water;
4. Electricity;
5. Telecommunications.

The assessment of civil infrastructural elements has been prepared by Shaun O'Reilly, Pr Tech Civ Eng, with 40 years civils experience and over 16 years with Pinnacle Engineering Consultants.

The assessment of the proposed built mechanical and electrical services environment has been prepared by Barry Stenson, BA BAI MSc MIEI Senior M& E Engineer, of Renaissance Mechanical & Electrical Consulting Engineers.

11.2. Consultation

The S.247 pre-planning meeting was held with SDCC via Microsoft Teams on 30th June 2023. The pre-planning Ref. No. for the meeting was LRDPP010/23. The formal (Stage 2) "LRD" meeting with the Planning Authority was held on 1st March 2024 online, via Microsoft Teams, under Section 32C of the Planning and Development (Large Scale Residential Developments) Act 2021, under Ref. LRDOP001/24.
A Pre-Connection Enquiry, Ref. No. CDS23009245, was submitted to Uisce Éireann on the 8th of December 2023. A Confirmation of Feasibility (COF) Ref. No. CDS23009245) dated the 12th August 2024, has since been received from Uisce Éireann in respect of same.

Confirmation of Feasibility (COF) was received on the 5th of January 2024 for the Irish Water diversion application DIV23291, pertaining to the 2 No. existing water mains crossing the site.

11.3. Legislation, Policy and Guidance

Material assets are defined in the EPA "Guidelines on Information to be contained in Environmental Impacts Statements (EPA, 2002) as: "*Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin and the value may arise for either economic or cultural reasons. Examples of natural resources of economic value include assimilative capacity of air and water, non-renewable resources (e.g. minerals, soils, quarries and mines), renewable resources (hydraulic head, wind exposure).*"

11.3.1 Methodology

This section assesses the impacts of the proposed residential development site on the surrounding drainage / utility network in the area.

The assessment of the potential impact of the activity on material assets – site services was carried out according to the methodology specified in the following guidance documents:

- "Guidelines on Information to be contained in Environmental Impacts Statements, EPA (2022).
- EPA Advice Notes on Current Practice (in the Preparation of EIS) (2003).
- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report; • Government of Ireland (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018);
- Department of Housing, Planning, Community and Local Government (2017) Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems;
- Department of Housing, Planning, Community and Local Government (2017) Circular PL 1/2017 - Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition;
- Department of Housing, Planning and Local Government (2018) Circular PL 05/2018 -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) And Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;

- Environmental Protection Agency (2017) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft August 2017);
- European Commission (2012) Interpretation suggested by the Commission as regards the application of the EIA Directive to ancillary/associated works;
- European Commission (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions;
- IEMA (2020) guide to: Materials and Waste in Environmental Impact Assessment; and
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA 2003).

The following sources of information were consulted to establish the baseline environment:

- Public Foul Drainage (Uisce Éireann and SDCC Records).
- Public Water Main Networks (Uisce Éireann and SDCC Records).
- Public Surface Water Drainage (Uisce Éireann and SDCC Records).
- Office of Public Works flood mapping data (www.floodmaps.ie).
- The Planning System and Flood Risk Management – Guidelines for Planning Authorities -Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW).
- The Geological Survey of Ireland (GSI) well card and groundwater records
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (CIRIA 532, 2001).
- Base maps – Ordnance Survey of Ireland.
- Topographical Survey
- Building Regulations - Technical Guidance Document Part H (2016)
- Uisce Éireann Code of Practice for Water Infrastructure (July 2020)
- Uisce Éireann Code of Practice for Wastewater Infrastructure (July 2020)
- Uisce Éireann Infrastructure Standard Details (July 2020)
- Uisce Éireann Wastewater Infrastructure Standard Details (July 2020).
- CIRIA SuDS Manual C753 (2015).
- Greater Dublin Regional Code of Practice for Drainage Works (Version 6.0)
- The Greater Dublin Strategic Drainage Study (GDSDS)
- Recommendations for Site Development Works for Housing Areas
- The South Dublin County Council (SDCC) Development Management Plan
- The SDCC Sustainable Drainage Explanatory Design & Evaluation Guide 2022
- Electricity Supply Networks (ESB Networks)
- Telecommunications (Openeir).

The assessment of the effects of the proposed development was carried out according to the methodology specified by the EPA and the specific criteria set out in the 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (May, 2022), Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018), and Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017). All of the above information was reviewed, in order to gain an appreciation of how the development site is currently served and determine its adequacy in terms of the proposed overall mixed-use development.

11.4. Receiving Environment

It is proposed to construct a residential development, which will be accessed off Oldcourt Road to the east & Bohernabreena Road to the west. An previous permission was granted for the main link street connecting the aforementioned roads, with associated access points off this road (Ref.s SD17A/0041 & PL06S.249367).

The total subject site area extends to circa 50.4 acres (20.4 ha), with the majority of the site being greenfield. The new proposed residential development will result in the site being fully developed, with a mix of residential units, associated access roads, car parking and landscaping elements.

11.4.1. Water Supply Infrastructure

Record drawings provided by South Dublin County Council / Uisce Éireann indicate the following watermain records:

- There are two existing 300mm Ø DI and 375mm Ø DI water pipes located along a section of the proposed main link street of the proposed development, currently greenfield, as per Uisce Éireann records and on-site surveys.
- A diversion application pertaining to the aforementioned existing watermains, has been applied for and granted by IW – Ref. DIV24134

11.4.2. Wastewater Drainage Infrastructure

Record drawings provided by South Dublin County Council / Uisce Éireann indicate the following wastewater records:

- There's an existing 225mm Ø foul water line located in Ely View to the north of the proposed development as per Uisce Éireann records. Invert levels will be confirmed on site via on-site investigations.
- There are also two existing 225mm Ø foul water lines located in Dodderbrook Place & Dodderbrook Avenue to the north of the proposed development, as per Uisce Éireann records and on-site surveys. Invert levels will be confirmed on site via on-site investigations.

11.4.3. Surface Water Drainage Infrastructure

Topographical survey information indicates the following surface water features, in conjunction with Uisce Éireann record drawings:

- There are a number of ditches / streams present across the entirety of the lands in question.

- In essence, half of the network from circa the centre of the lands heading east, discharges through the culvert below Oldcourt Road, north of Dodderbrook Phase 1. This then connects into the stream adjacent to Oakdale Park, which discharges into the pond in Ballycragh Park. The outlet from the pond ultimately discharges into the River Dodder to the north, via a 1500mm Ø pipe laid beneath Firhouse Road, to the east of the Church of Scientology.

- The other half of the network from circa the centre of the lands heading west, discharges through the existing 900mm Ø pipe in Ely View, north-west of Dodderbrook Phase 2. This then connects into a 1350mm Ø in Ely Grove, prior to continuing in an easterly direction along Ely Grove. It is unclear as to the exact routing of this outfall sewer, suffice to say that it in all likelihood connects into the River Dodder to the north, via a tributary / pipe network.

Please refer to Engineering Planning Report prepared by Pinnacle Consulting Engineers for further water supply, wastewater drainage and surface water drainage details, which will be submitted as part of the planning application pack.

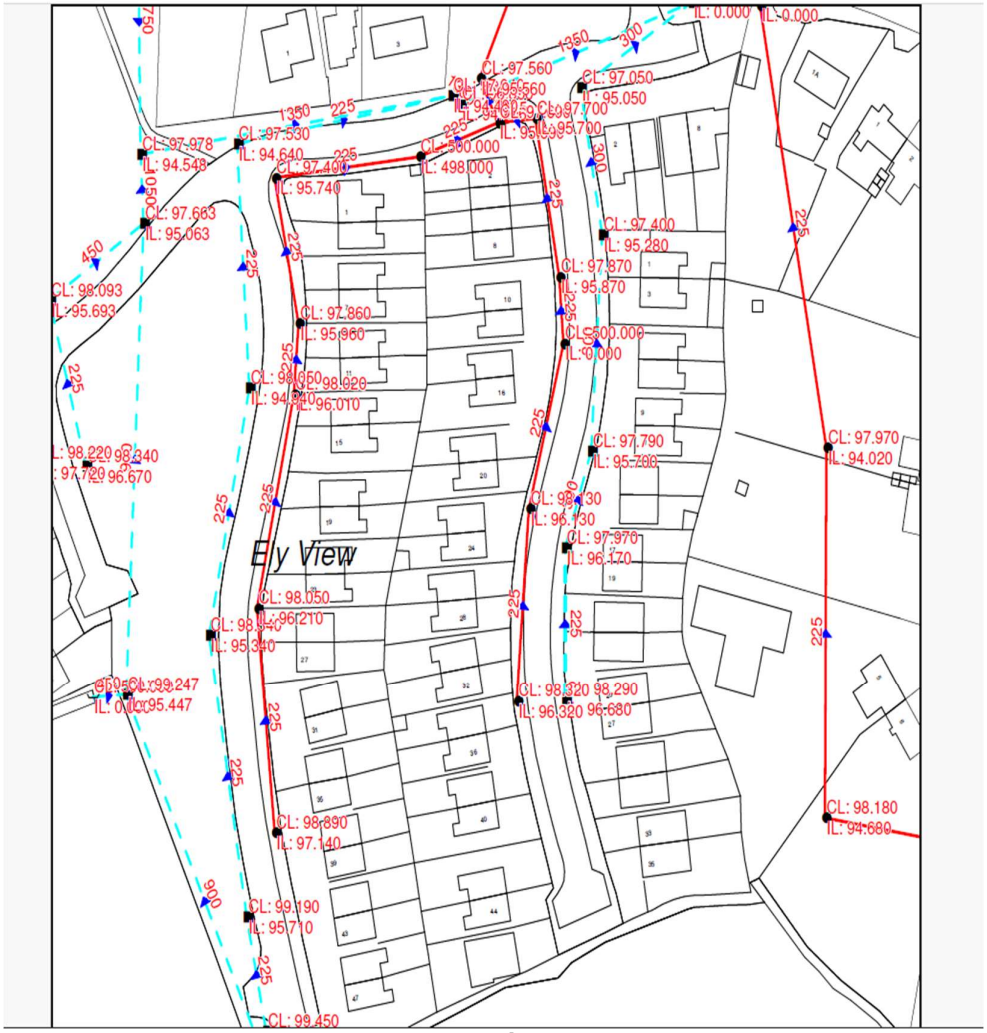


Figure 11.1 – Existing Uisce Éireann Infrastructure.

11.4.4. Electricity Supply

The development shall be supplied from several new proposed ESB substations via connection to the existing electrical network that is adjacent to the site.

ESB have been consulted in the planning process, have confirmed that the electricity supply is available to serve the development and have consulted with the design team in ensuring medium voltage ducting to serve the new large-scale residential development is installed within the service road constructed as part of the current Ballycullen Gate development.

ESB have been consulted as part of the pre-planning preliminary design, specifically with regard to the provision of services within the range of their 110kV pylons, as defined by the "ESB Networks Code of Practice for Avoiding

Danger from Overhead Electricity Lines". Specifically, ESB guidance has been sought on the separation distances for structures and for services such as public lighting from the existing ESB high-voltage infrastructure. ESB liaison will of course remain essential throughout the process.

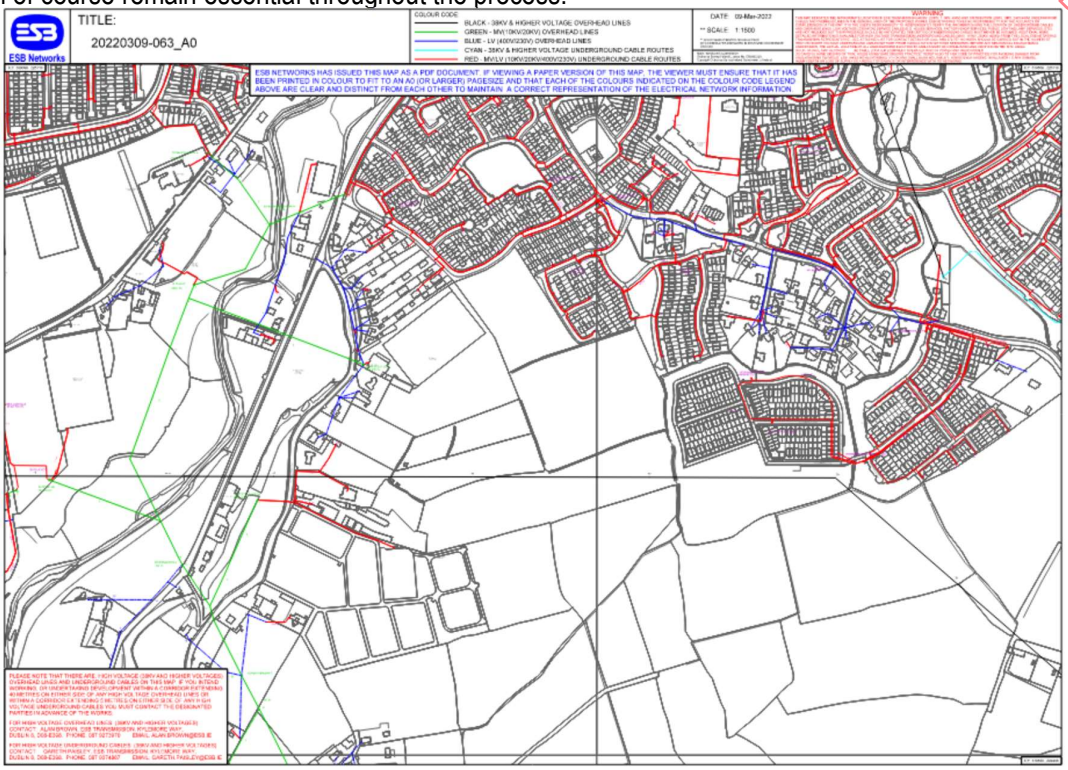


Figure 11.2 – Existing ESB Infrastructure

11.4.5 Telecommunications

The development shall be supplied from the existing telecoms network that runs nearby. Eir, Siro and Virgin Media all have service cables and existing chambers installed within the vicinity of the site and have the capacity to supply fibre and standard copper wire telecom services to the development.

Openeir's national "eMaps" resource has been consulted as part of the pre-planning review process and indicates no significant Eir infrastructure to be present within the proposed development redline, although Eir service is shown to be present in the surrounding area for connection as required.

Figure 11.3 – Existing Broadband and Telecommunications Infrastructure

Virgin Media's Plant Protection officer has been contacted as part of the pre-planning review process and has confirmed no significant Virgin Media infrastructure to be present within the proposed development redline, although Virgin Media service is shown to be present in the surrounding area for connection as required.

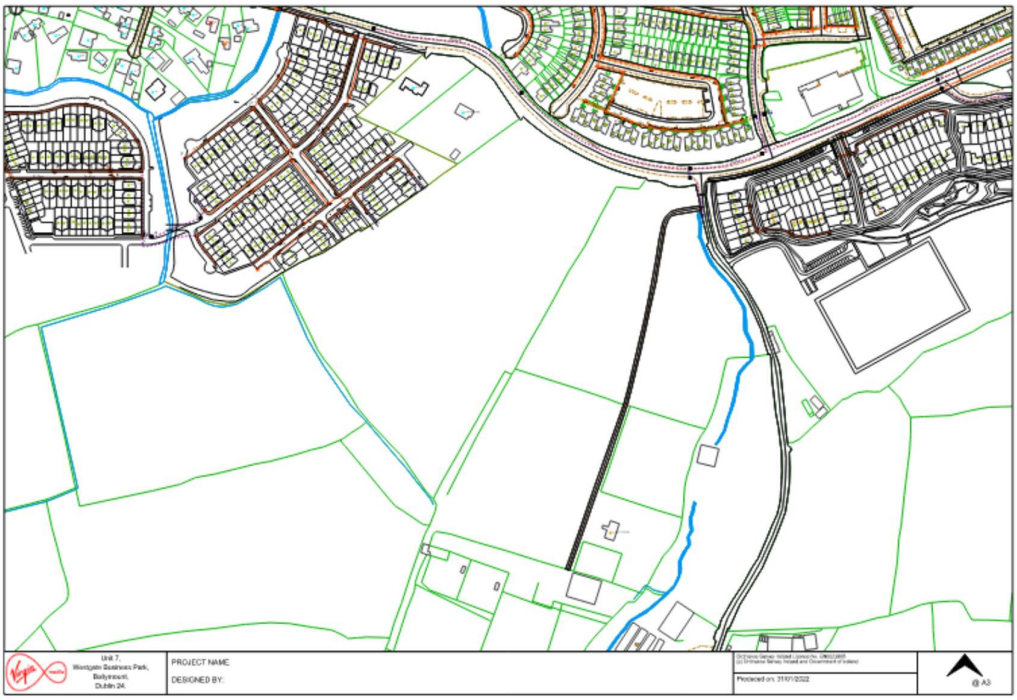


Figure 11.4 – Existing Virgin Infrastructure

11.5. Characteristics of the Proposed Development

Capami Ltd. intends to apply for permission for a Large-scale Residential Development on a site measuring c.20.4Ha, located in the townlands of Bohernabreena, Oldcourt, and Killininny, Dublin 24. The development site is located to the east of Bohernabreena Road, north and east of Bohernabreena cemetery, south and south-east of St. Anne's GAA club, south and south-west of the Dodderbrook residential estate, west of the Ballycullen Gate residential development (currently under construction) and west of Oldcourt Road (the R113).

The proposed development consists of 523 no. residential units comprised of 253 no. 2, 3 & 4 bed detached, semi-detached and terraced houses, 208 no. 1, 2 & 3 bed duplex units in 20 no. 2 & 3 storey blocks, and 62 no. 1, 2 & 3 bed apartments in 4 no. 3 & 3-4 storey blocks, along with a 2-storey childcare facility of c. 457sq.m.

Private amenity space for the residential units is provided in the form of rear gardens for houses and ground floor terraces / upper floor balconies for apartments and duplex units. The proposed development provides for c. 7.37Ha of public open space and c. 5,545 sq.m of communal open space associated with proposed residential units.

Vehicular access to the development will be via 4 no. access points, as follows: (i) from the west of the site via 2 no. accesses located off Bohernabreena Road, (ii) from the north of the site via 1 no. access at Dodderbrook Place, and (iii) from Oldcourt Road (the R113) to the east, via adjoining residential development. The proposed development includes for pedestrian and cyclist connections and accesses to adjoining lands to the north, east and west, and includes for cycling and pedestrian routes and infrastructure throughout the development.

The proposed development also includes the demolition of existing buildings / structures on the site (c.3,800sq.m), hard & soft landscaping, boundary treatments, SuDs features, drainage infrastructure, services infrastructure, bin stores, bicycle stores, car parking (including EV parking facilities), bicycle parking, public lighting etc. and all associated site development works.

Please refer to Chapter 3 of the EIAR for the full description of development.

11.6. Predicted Effects of the Proposed Development

The assessment focuses on predicted effects in relation to the Material Assets – Built Services. The assessment relates to the following:

- The 'do nothing scenario;
- effects occurring during the construction phase of the development and
- the affects during the operational phases of the development.

11.6.1 Construction Phase

Any potentially damaging fluids that spill on natural soils may have an impact on the natural hydrogeological environment. At construction phase, construction workers will require the short-term use of potable water and will create short term foul wastewater.

The contractor will be required to implement best practice measures in accordance with SDCC planning requirements during construction. Accidental spills and leaks are to be managed. Refer to the Land and Soils section of this report

for further discussion regarding the management of accidental spills and leaks.

If the contractor implements best practice measures during construction, the hydrological effects will be limited.

11.6.1.1 Water Supply Infrastructure

A detailed Engineering assessment/planning report has been produced under a separate cover which would be read in conjunction with the below summary. The water supply chapter outlines the existing water infrastructure, proposed connections, network layout, water demand calculations, and necessary diversions for the development. The key points are as follows:

The site is served by two main watermains: a Ø160mm HPPE watermain along Oldcourt Road to the east and a Ø100mm uPVC watermain along Bohernabreena Road to the west. Additionally, two raw water mains (Ø375mm and Ø475mm cast iron pipes) cross the site in an east-west direction.

These two existing pipes are proposed to be diverted into a dedicated roadside servitude along the central spine road of the development. Confirmation of feasibility for this diversion was received from Irish Water under application DIV23291, with preliminary discussions held with Irish Water and the DCC drainage department.

A Pre-Connection Enquiry (PCE) issued to Uisce Éireann (Irish Water) confirmed that water connection is feasible under reference CDS23009245, subject to specific conditions. The primary connection will be from the east, linked to a future 150mm watermain provided by an adjacent development, and a secondary connection from the west, linked to the existing 4" uPVC distribution main, to be used in emergencies.

Once the Western connection becomes a primary source, the existing 100mm watermain on Bohernabreena Road will need to be upgraded to a 150mm pipe, a cost that will be borne by the developer.

The internal water supply network will consist of Ø100mm and Ø150mm HDPE pipes. Water meters, sluice valves, and hydrants will be installed according to Uisce Éireann (Irish Water) specifications and building regulations for fire safety.

Overall, the water supply for the proposed development has been carefully planned, ensuring adequate capacity and compliance with regulatory requirements, with necessary infrastructure upgrades and diversions referenced under COF CDS23009245 and diversion application DIV23291 to support the development.

The water demand for the proposed development has been calculated below, in accordance with Uisce Éireann (Irish Water) regulations:

Residential:	
Dwellings	= 523
PE 2.7 per dwelling	= IW COP
Demand	= 150 litres/head/day:
Daily Water Demand	= 211,815 litres/day
Non-Residential (Creche):	
Estimated occupancy (PE)	= 126
Demand	= 90 litres/head/day
Daily Water Demand	= 11,340 litres/day

Total Water Demand		
Total Daily Water Demand		= 223,155 litres/day
Daily demand		= 2.58
Average Flow	**(= 1.25 x Daily Demand)**	**= 3.23 litres/sec**
Peak Flow	**(= 5 x Daily Demand)**	**= 16.14 litres/sec**

The total daily water demand for the development is estimated at 223,155 litres/day, with a peak flow rate of 16.14 liters/second. This includes both residential and non-residential (creche) demand.

Additional water supply will be required to service the construction phase of the development. This is subject to the exact quantity of construction workers and their requirements. This water use will be short term in nature and will require a temporary connection from Uisce Éireann.

Please refer to Engineering Planning Report prepared by Pinnacle Consulting Engineers for further details regarding water supply use, which will be submitted as part of the planning application pack.

The assessed predicted effects at construction stage without mitigation measures on the Water Supply Infrastructure would be as follows:

- Negative, permeant and significant in EIAR terms on Water Supply Infrastructure

11.6.1.2 Wastewater Drainage Infrastructure

A detailed Engineering assessment/planning report has been produced under a separate cover which would be read in conjunction with the below summary. The foul water chapter details the existing foul sewer infrastructure, proposed drainage systems, required upgrades, and the design of temporary pumping stations for the development.

The site is currently served by an existing Ø225mm foul sewer on the west side, which drains northwards and connects to the broader network. This existing sewer will be integrated into the proposed foul network and will discharge into the public foul sewer system to the northeast, ultimately reaching the Ringsend Wastewater Treatment Works (WWTW).

A Pre-Connection Enquiry (PCE) was submitted to Uisce Éireann, resulting in a Confirmation of Feasibility (COF) under reference CDS23009245. The COF indicates that the wastewater connection is feasible but subject to upgrades:

- Initially, only Phase 1 (130 units) can connect directly to the existing network via gravity.
- The remaining units (393 units, creche, and 3 external units) will require temporary foul water pumping stations due to current capacity limitations in the downstream network.
- These temporary stations will include storage facilities and will be designed to pump effluent during off-peak times. They will be decommissioned once network upgrades by Uisce Éireann allow for a permanent gravity connection.

The development will have three main outfall connections:
- Connection 1: A gravity connection to the northeast, discharging into an existing Ø225mm public sewer.
- Connections 2 and 3: Temporarily pumped connections to the north, each discharging into existing Ø225mm sewers in adjacent residential developments.

The internal foul drainage network will consist of 150/225mm diameter pipes, with each residential unit connected via individual 100mm diameter pipes. All pipes will be uPVC Class SN8, designed to meet Uisce Éireann's standards for self-cleansing velocities and compliance with the Irish Water Code of Practice for Wastewater.

Two temporary pumping stations will be installed, designed with holding tanks to store effluent for off-peak pumping, minimizing pressure on the downstream network. These stations will be located at the lowest points of the catchments and will be designed to be taken offline once the downstream network capacity is increased.

The stations will adhere to Uisce Éireann's Code of Practice (Part 5), ensuring compliance with all relevant standards, including safe access, flood resistance, and minimizing the risk of odour, noise, and vibration.

All proposed foul water infrastructure, including manholes, pipes, and connections, will be constructed in line with Uisce Éireann's Code of Practice for Wastewater Infrastructure and Building Regulations. Strict separation between surface water and foul sewerage will be maintained to prevent inadvertent connections.

The foul water strategy for the proposed development has been carefully planned, ensuring compliance with all relevant regulations and standards, and includes necessary temporary measures to manage capacity constraints in the existing network as outlined in the COF CDS23009245.

The flows for the proposed development have been calculated below, in accordance with Uisce Éireann regulations:-

Residential:

Proposed Dwellings	= 523
Existing Dwellings	= 3 No. (Foul Connection 3 only)
450 litres/unit/day	= IW COP
Total outflow	= 236,700 litres/day (2.74 litres/sec)
Infiltration allowance	= 10%
Dry Weather Flow (DWF)	= 3.01 litres/sec
Peak Flow (= 6 x DWF)	= 18.08 litres/sec

Non-Residential (Creche):

Estimated occupancy	= 126
50 litres/person/day	= IW COP Appendix C
Total outflow	= 6,300 litres/day (0.07 litres/sec)
Infiltration allowance	= 10%
Dry Weather Flow (DWF)	= 0.08 litres/sec
Peak Flow (= 2.5 x DWF)	= 0.2 litres/sec

Total Outflow	**= 243,000 litres/day**
Peak Flow	**= 18.28 litres/sec**

The total foul water discharge for the development is estimated at 243,000 litres/day, with a peak flow rate of 18.28 litres/second. These calculations consider both residential and non-residential (creche) components.

Additional foul drainage will be required to service the construction phase of the development. This is subject to the exact quantity of construction workers and their requirements. This water use will be short term in nature. This supply will be short term in nature and will require a temporary connection from Uisce Éireann.

Please refer to Engineering Planning Report as prepared by Pinnacle Consulting Engineers for further details regarding foul water drainage which will be submitted as part of the planning application pack.

The assessed predicted effects at construction stage without mitigation measures on the Wastewater Drainage Infrastructure would be as follows:

- Negative, permeant and significant in EIAR terms on Wastewater Drainage Infrastructure

11.6.1.3 Surface Water Drainage Infrastructure

A detailed Engineering assessment/planning report has been produced under a separate cover which would be read in conjunction with the below summary. The surface water chapter provides a comprehensive overview of the existing drainage networks, the proposed surface water management systems, and the Sustainable Urban Drainage Systems (SuDS) designed to effectively manage runoff for the development.

The site currently features several agricultural ditches that direct surface water runoff from the south toward the north, ultimately discharging into the Dodder River. According to South Dublin County Council (SDCC) GIS records and site-specific topographical surveys, a Ø450mm surface water sewer is located on the western edge of the site, conveying runoff from the Bohernabreena cemetery northward through the proposed development.

A provisional review of the SDCC Strategic Flood Risk Assessment (SFRA) indicated that the entire site is within Flood Zone C. A Site-Specific Flood Risk Assessment (SSFRA) by Kilgallen and Partners concluded that the proposed development is not at risk of flooding and will not increase flood risk elsewhere, making it appropriate from a flood risk perspective.

The topographical analysis of the site reveals that it slopes from south to north, with a high point at the southern boundary around 119.78m OD Malin. Surface water runoff currently drains freely across agricultural fields toward the north in sheet flow conditions, eventually entering a network of existing drainage ditches. These ditches capture and convey surface water from higher ground south of the site, preventing external runoff from entering the fields designated for development.

Infiltration testing conducted in July 2024 showed that the site's substrate has an adequate infiltration rate (1.4x10-5 m/s), which will be integrated into the SuDS design. The tests also noted groundwater presence at depths of 1.5 to 1.7 meters, and the proposed design accounts for this to avoid any impact on the groundwater table.

The existing Ø450mm surface water sewer on the site will be diverted along a new route within the proposed development. This diversion has been discussed and agreed in principle with SDCC's Water Services division to ensure it maintains the same capacity as the current system. The diversion will remain a piped system rather than an open ditch to prevent potential surface water flood risks associated with upstream discharge. The diverted pipeline will be setback a minimum of 5 meters from all proposed structures, ensuring that both the foul and surface water systems within the development remain completely isolated from this diversion.

The design of the surface water drainage system and SuDS measures for the site follows the guidelines set by the SDCC County Development Plan, the Greater Dublin Strategic Drainage Study (GDSDS), and the CIRIA SuDS Manual. The design aims to replicate natural drainage processes as closely as possible, minimizing the impact on the downstream environment. Given the steep nature of the site, a piped conveyance system has been incorporated as a redundancy measure. This system will engage only if upstream SuDS features are bypassed or overtopped, capturing any excess surface water and discharging it safely through attenuation basins. Roads within the development are also designed to function as overland flow routes during exceedance events, directing surface water to the attenuation basins.

All existing ditches that serve the broader surface water network in the region will be maintained across the site, with culverts installed at road crossings to preserve their function. Post-development, the surface water design will continue to capture, treat, and convey runoff northward, discharging into the existing ditches in a manner consistent with pre-development conditions.

The development site, currently in greenfield condition with some hardstanding areas, will manage surface water runoff by limiting it to the greenfield runoff rate (Qbar). Attenuated runoff will discharge into the existing ditches at a controlled rate proportional to each sub-catchment area. The system will use vortex flow control devices, SuDS features, and overland nature-based solutions like basins, swales, and bio-retention infrastructure. Additionally, runoff will pass through full retention fuel/oil separators before being discharged, ensuring compliance with environmental standards. The overall estimated runoff coefficient for the development area is approximately 0.62, typical for developments of this nature. Refer to Table 0-2: Summary of Proposed Attenuation.

Summary of Surface Water Discharge Rates				
Catchment 1				
	Greenfields/Pre-development (l/s)	Post-development (attenuated) (l/s)	Attenuation required (m^3)	Attenuation Provided (m^3)
Q_{bar}	20.1	-	-	-
1:10	33.5	16.2	-	-
1:30	42.1	16.4	-	-
1:100+20%CC	52.2	17.2	5003	5337
Catchment 2				
	Greenfields/Pre-development (l/s)	Post-development (attenuated) (l/s)	Attenuation required (m^3)	Attenuation Provided (m^3)
Q_{bar}	8	-	-	-
1:10	13.4	5.4	-	-
1:30	16.9	5.5	-	-
1:100+20%CC	20.9	6.2	2011	2416
Catchment 3				
	Greenfields/Pre-development (l/s)	Post-development (attenuated) (l/s)	Attenuation required (m^3)	Attenuation Provided (m^3)
Q_{bar}	23.6	-	-	-
1:10	39.4	23.3	-	-
1:30	49.6	23.6	-	-
1:100+20%CC	61.4	23.6	5893	8024

Table 11-31: Summary of Proposed Attenuation

The SuDS strategy for the development adheres to the principles outlined in the SDCC Development Management Plan and the Sustainable Drainage Explanatory Design & Evaluation Guide 2022. The strategy emphasizes managing surface water runoff as close to its source as possible, incorporating nature-based solutions like green roofs, permeable paving, swales, bio-retention tree pits, rain gardens, and detention basins. These measures not only control runoff quantity and quality but also enhance the site's biodiversity and aesthetic appeal. The SuDS features are designed to meet the requirements of the GDSDS, ensuring that post-development runoff does not exceed pre-development levels.

The conventional surface water drainage network will consist of PVC or concrete pipes, laid to comply with the Building Regulations and SDCC standards. The design includes strict separation of surface water and foul sewerage systems to prevent contamination. Road gullies will be precast trapped gullies to minimize the risk of floating contamination, and concrete bedding will be used where necessary to protect pipes from damage.

During construction, water pollution will be minimized through good practices such as bunding for oil containers, wheel

washers, and dust suppression on site roads. A contingency plan for pollution emergencies will be developed, addressing containment measures, emergency discharge routes, and clean-up procedures. The proximity of the site to watercourses and aquifers has been considered in the planning stages to ensure that appropriate mitigation measures are in place.

Please refer to Engineering Planning Report prepared by Pinnacle Consulting Engineers for further details regarding surface water drainage which is submitted as part of the planning application pack.

The assessed predicted effects at construction stage without mitigation measures on the Surface Water Drainage Infrastructure would be as follows:

- Negative, permeant and significant in EIAR terms on Surface Water Infrastructure

11.6.1.4 Electricity Supply

The following are the likely direct effects of the proposed scheme during the construction stage:

- Electricity cable currently located around the development serving the surrounding areas could be damaged during excavation works. This would result in a loss of power to the wider area.
- The striking of an underground or over ground electricity cable during construction operations could potentially result in serious injury or death of site staff.
- Power will be required for the construction activities, for temporary lighting and temporary signals required during construction works.
- The power demands during the construction phase on the existing electricity network are considered to be slight, negative and of short-term impact.
- The following are the likely indirect effects of the proposed scheme during the construction stage:
- Due to a cable strike outside of the proposed site, the potential to disrupt electricity services inside the development site is a possibility causing moderate effects to the construction programme.

A 'worst-case' scenario resulting from the construction of the development would be a cable strike that could lead to serious injury or death to a worker. However, the mitigation measures outlined will ensure that this should not occur.

11.6.1.5 Telecommunications

The following are the likely direct likely effects of the proposed scheme during the construction stage:

- The striking of an underground/overhead telecommunications lines during construction operations could potentially result in serious downtime of the network in the development site leading to communication difficulties for the Construction Teams.
- The potential impact from the construction phase of the proposed development on the local telecoms network is likely to be imperceptible, short-term and low.
- The following are the likely indirect effects of the proposed scheme during the construction stage:
- The striking of an underground/overhead telecommunications lines outside of the site during the construction operations could potentially result in downtime of the network used on site causing construction delays but is likely to be not significant and neutral.

The striking of an underground/overhead telecommunications lines during construction operations could potentially result in serious downtime of the network in the development and the wider area in a worst case scenario.

11.6.2 Operational Phase

11.6.2.1 Water Supply Infrastructure

The proposed scheme and associated development will utilise additional potable water. If capacity is not available within the existing public networks, upgrades may be required.

The assessed predicted effects at operational stage without mitigation measures on the Water Supply Infrastructure would be as follows:

- Negative, permeant and significant in EIAR terms on Water Supply Infrastructure

11.6.2.2 Wastewater Drainage Infrastructure

The proposed scheme and associated development will generate additional wastewater. Arrangements have been made within the planning design in liaising with Irish Water on the capacity and the aforementioned pumping stations assist with capacity issues.

The assessed predicted effects at operational stage without mitigation measures on the Wastewater Drainage Infrastructure would be as follows:

- Negative, permeant and significant in EIAR terms on Wastewater Drainage Infrastructure

11.6.2.3 Surface Water Drainage Infrastructure

If surface waters are not managed appropriately, it could lead to flooding or surface water surcharging in the downstream pipework.

If flood waters are not managed appropriately, the displaced flood water from the site could lead to flooding of the development, or adjacent premises.
The impact of water supply and waste water is currently being assessed by Uisce Éireann , and it is anticipated that the development is feasible without upgrade to their networks (subject to confirmation by Uisce Éireann). Thus, no ameliorative, remedial or reductive measures are required.

Low flow fixtures are intended throughout the development, and these will serve to reduce the potable water consumption, and thus reduce any foul water discharge.

Surface water from the proposed development will be reduced from current levels to match a greenfield equivalent rate utilising a number of detention basins, swales & permeable paving. Surface water will be treated by infiltration into the ground below the detention basins.

Flood waters from the surrounding area have been assessed with allowance for the proposed development. The development is not subject to any forms of flooding. Appropriate protection has also been provided to adjacent areas to prevent flooding of habitable areas and other associated areas.

Anticipating that Uisce Éireann will advise that the development can be facilitated without upgrade to their potable water and wastewater networks, the predicted impact in this regard is considered to be managed.

Surface water from the development will be managed within the site, with flows reduced to minimise the effect on the adjacent surface water network.

Floodwaters resulting from the development will be facilitated within the existing areas without negatively affecting the surrounding buildings. Further information regarding flood risk is available in the 'Site Specific Flood Risk Assessment' as prepared by Kilgallen & Partners Consulting Engineers and which will be provided as part of the planning application pack.

The assessed predicted effects at operational stage without mitigation measures on the Surface Water Drainage Infrastructure would be as follows:

- Negative, permeant and significant in EIAR terms on Surface Water Infrastructure

11.6.2.4 Electricity

The proposed development will require electricity supplies during the operational phase of the scheme and these will be provided by the installation of a new sub-station within the development in agreement with ESB Networks. As the new cable services will be located underground, this will result in a permanent but imperceptible effect. The residential development will be NZEB compliant and with the incorporation of renewable technology, the demand on the electrical supply should be further reduced. The likely direct effect from the operational phase on the electricity supply network is likely to be long term and moderate.

The indirect effect will allow ESB Networks to provide additional resilience in their network through the provision of the new Sub-Station (Assuming agreement with ESB Networks) which in turn should impact positively on the wider area's electrical infrastructure.

A 'worst-case' scenario resulting from the operation of the development would be a breakage on the cable feeding the sub-station possibly caused by a third party leading to downtime of power supplies in the local network.

With the proposed installation of a new sub-station this should allow ESB Networks to cater for any secondary projects that may arise within the vicinity.
The cumulative effect from the operational phase of the development on the electricity supply network is likely to be long term, positive and moderate.

11.6.2.5 Gas

It is not envisaged the proposed development will use gas.

11.6.2.6 Telecommunications

The proposed development will require telecommunication connections during the operational phase of the scheme and given the number of telecommunication providers with infrastructure available within the area, this will provide the building users with a greater choice of service and will result in a positive effect for the users. As the new services will be located underground this will result in a permanent but imperceptible effect.

The additional demand on the telecoms network is not deemed to have any material effect on the surrounding area as there is sufficient capacity in the telecoms network system to manage the additional demand created by the development. The likely indirect effect from the operational phase on the telecoms network is likely to be long term and low.

The 'worst case scenario' would be an outage created by a third party on the telecoms supply to the development causing loss of service.

The cumulative effect from the operational phase on the telecoms network is likely to be long term and low.

11.7. 'Do Nothing Scenario'

11.7.1 Water Supply Infrastructure

If the proposed development does not proceed, the existing Water Supply infrastructure will remain as is.

11.7.2 Wastewater Drainage Infrastructure

If the proposed development does not proceed, the existing Wastewater Drainage infrastructure will remain as is.

11.7.3 Surface Water Drainage Infrastructure

If the proposed development does not proceed, the existing Surface Water infrastructure will remain as is.

11.7.4 Electricity

If the proposed development were not to go ahead there would be no connection made to the existing electrical infrastructure.

11.7.5 Gas

None.

11.7.6 Telecommunications

If the proposed development were not to go ahead there would be no connections made to existing Telecommunication infrastructure.

11.8. Mitigation Measures

An Outline Construction Management Plan is submitted with this application, which includes the following construction stage mitigation measures. These site specific mitigation measures are tried and tested and proven to be effective and will be implemented in full.

A summary of these mitigation measures, as they affect Material Assets – Built Services, are provided below.

Dust and Dirt Control

Nuisance dust emissions from construction activities are a common and well recognised problem. Fine particles from these sources are recognised as a potential significant cause of pollution.

The main contractor will be required to demonstrate that both nuisance dust and fine particle emissions from the site

are adequately controlled and are within acceptable limits.

Dust and fine particle generation from construction and demolition activities on the site can be substantially reduced through carefully selected mitigation techniques and effective management. Once particles are airborne it is very difficult to prevent them from dispersing into the surrounding area. The most effective technique is to control dust at source and prevent it from becoming air borne, since suppression is virtually impossible once it has become air borne.

The following are techniques and methods which are widely used currently throughout the construction industry, and which may be used in the proposed development.

- The roads around the site are all surfaced, and no dust is anticipated arising from unsealed surfaces.
- Vehicles travelling on any unsurfaced site roads should have their speed restricted to 20 kph.
- A regime of 'wet' road sweeping can be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers.
- Footpaths immediately around the site can be cleaned by hand regularly, with damping as necessary.
- High level walkways and surfaces such as scaffolding can be cleaned regularly using safe 'wet' methods, as opposed to dry methods.
- Vehicle waiting areas or hard standings can be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary.
- Netting can be provided to enclose scaffolding in order to mitigate escape of air borne dust from the existing and new buildings.
- Vehicles and equipment shall not emit black smoke from exhaust system, except during ignition at start up.
- Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.
- Servicing of vehicles and plant should be carried out regularly, rather than just following breakdowns.
- Internal combustion plant should not be left running unnecessarily.
- Exhaust direction and heights should be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions.
- Where possible fixed plant such as generators should be located away from residential areas.
- The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily.
- The transport of dusty materials and aggregates should be carried out using covered / sheeted lorries.
- Material handling areas should be clean, tidy and free from dust.
- Vehicle loading should be dampened down and drop heights for material to be kept to a minimum.
- Drop heights for chutes / skips should be kept to a minimum.
- Dust dispersal over the site boundary should be minimised using static sprinklers or other watering methods as necessary.
- Stockpiles of materials should be kept to a minimum and if necessary, they should be kept away from sensitive receptors such as residential areas etc.
- Stockpiles were necessary, should be sheeted or watered down.
- Methods and equipment should be in place for immediate clean-up of spillages of dusty material.
- No burning of materials will be permitted on site.
- Earthworks excavations should be kept damp where necessary and where reasonably practicable.
- Cutting on site should be avoided where possible by using pre-fabrication methods.
- Equipment and techniques for cutting / grinding / drilling / sawing / sanding etc, which minimise dust emissions and which have the best available dust suppression measures, should be employed.

- Where scabbling is to be employed, tools should be fitted with dust bags, residual dust should be vacuumed up rather than swept away, and areas to be scabbled should be screened off.
- Wet processes should be used to clean building facades if possible. If dry grit blasting is unavoidable then ensure areas of work are sealed off and dust extraction systems used.
- Where possible pre-mixed plasters and masonry compounds should be used to minimise dust arising from on site mixing.
- Prior to commencement, the main contractor should identify the construction operations which are likely to generate dust and to draw up action plans to minimise emissions, utilising the methods highlighted above. Furthermore, the main contractor should prepare environmental risk assessments for all dust generating processes, which are anticipated.
- The main contractor should allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.
- The name and contact details of a person to contact regarding air quality and dust issues should be displayed on the site boundary, this notice board should also include head/regional office contact details.

The contractor will be obliged to implement the mitigation measures outlined in the EIAR in respect of dust / dirt control.

Protection of Surface Waters

- The contractor will appoint a suitably qualified person to oversee the implementation of measures for the prevention of pollution to the receiving surface water environment.
- Where required, settlement pond / silt trap will be installed. Straw bales will be placed at the outfall of the settlement ponds to the overflow. These measures will be implemented and maintained during the construction phase to prevent surface water runoff from discharging directly into the local water course.
- Settlement ponds / silt traps as outlined above will be provided to prevent silt runoff into the existing ditches / watercourses during the drainage works.
- Regular testing of surface water discharges will be undertaken at the outfall from the subject lands. Trigger levels for halting works and re-examining protection measures will be: pH >9.0 or pH <6.0; and/or suspended solids
- >25 mg/l. These trigger levels are based on those outlined within 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'.
- Where silt control measures are noted to be failing or not working adequately, works will cease in the relevant area.
- All fuels and chemicals will be bunded, and where applicable, stored within double skinned tanks / containers with the capacity to hold 110% of the volume of chemicals and fuels contents. Bunds will be located on flat ground a minimum distance of 50 m from any watercourse or other water conducting features.
- All existing services will be located using service records, GPR surveys and slit pumps to ensure that their position accurately identified before excavation works commence.

Refuelling

Construction plant and equipment will only be parked over-night within the site compound. Construction plant and equipment will be checked daily for any visual signs of oil or fuel leakage, as well as wear and tear.

Fuel will not be stored on site for the duration of the construction phase. Fuel will only be brought to site via mobile fuel bowser. For any liquid other than water, this will include storage in suitable tanks and containers which will be housed in the designated area surrounded by bund wall of sufficient height and construction so as to contain 110 percent (110%) of the total contents of all containers and associated pipework. The floor and walls of the bunded areas will be impervious of all containers and associated pipework. The floor and walls of the bunded area will be impervious to both

water and oil. The pipes will vent downwards into the bund.

Where Contractors are required to refuel vehicles, this will only be carried out at the designated refuelling location within the site storage compound, which must employ pollution control mechanisms to prevent escape of fluids to the river. No refuelling is permitted on site, i.e., within the river or adjacent due to risk of spillage.

The local authority will be informed immediately of any spillage or pollution incident that may occur on-site during the construction phase.

All small plant such as generators and pumps bunded and stood in drip trays capable of holding 110% of their tank contents.

All small plant will be positioned on the bridge itself (within the designated works area – refer to Preliminary Traffic Management Plan), on the secured scaffolding/work platforms, or within the dewatered, 'dry' sections of the dammed river during the works.

Waste oils, empty oil containers and other hazardous wastes will be disposed of in accordance with the requirements of the Waste Management Act, 1996.

Monitoring, Inspection and Record Keeping

The Main Contractor will supervise the sampling of suspended solids downstream prior to commencement of works, and weekly during remediation works. Samples will be analysed on site. Should results show a 10% increase in suspended solids downstream of the site, suitable contingency measures will be instigated.
Routine inspections of construction activities will be carried out on a daily basis by the contractor staff to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place. Environmental inspections will ensure that the works are undertaken in compliance with the Project CEMP and that the requirements of the Conditions of Planning, the NIS and associated documentation are being adhered to during construction.

The Contractor will develop their own site inspection programme, which will include an inspection procedure and relevant forms to record any issues.

Only suitably trained staff will undertake environmental site inspections.

The Main Contractor will keep records of works undertaken.

Prior to and during the construction, the contractor will liaise with the each of the relevant utilities' provider. The contractor will apply for the relevant permit/licence to and comply with each utility providers requirements.
Utility mapping will be carried out in advance of any excavations. Once identified, each utility owner will be notified in advance of any excavation. No excavation adjacent to any unities will be allowed to be carried out without the relevant licence from the utility owner. This is to ensure that there are no interruptions to existing services.

All works near any existing utilities will be carried out in ongoing consultation with the relevant utility company and/or Local Authority and will be in compliance with any requirements or guidelines they may have.

The implementation of the following measures will minimise the effect on the Material Assets/Built Services in the area

of the proposed development during the construction phase:

11.8.1 Construction Phase

11.8.1.1 Water Supply Infrastructure

Exclusion zones and setback requirements to the existing trunk watermains have been established in consultation and agreement with Uisce Éireann at pre-application design stage. Construction method statements are to be agreed with IW in advance of a connection agreement or commencement of works.

Specific and detailed cross sections of all built assets crossing the existing watermains have been agreed with Uisce Éireann Asset Management section and are shown on the submitted Pinnacle Engineering Consultants drawings included in the application.

The construction compound's potable water supply will be protected from contamination by any construction activities or materials through the adoption of Uisce Éireann Code of Practice for Water Infrastructure for all temporary installations.

11.8.1.2 Wastewater Drainage Infrastructure

The wastewater discharge from the site during construction stage is to be managed by a licenced waste disposal contractor in accordance with the agreement of Uisce Éireann.

As construction sites have managed toilet blocks, foul drainage from the construction compound will be removed off site to a licensed facility until the connection to the public foul drainage network has been established.

The overburden thickness, low permeability nature of the till sub-soil and lack of fracture connectivity within the limestone will minimise the rate of off-site migration for any indirect discharges of leaking toilet blocks to ground at the site.

There is a minimal risk of contamination by direct pathway to local watercourses due to the overburden thickness, low permeability nature of the till sub-soil and lack of fracture connectivity within the limestone will minimise the rate of off-site migration for any indirect discharges of leaking toilet blocks to ground at the site.
As such the is no potential for a change in the ground water body status or significant source pathway linkage through the aquifer to any Natura 2000 site due to the overburden thickness, low permeability nature of the till sub-soil and lack of fracture connectivity within the limestone will minimise the rate of off-site migration for any indirect discharges of leaking toilet blocks to ground at the site. Construction of the proposed new foul rising main will be fully coordinated with Uisce Éireann in order to ensure there is no disruption to the users of the existing infrastructure.

All new wastewater pipes/manholes will be laid in accordance with the Uisce Éireann Code of Practice for Wastewater Infrastructure & Standard Details for Wastewater Infrastructure.

All foul drainage infrastructure will be pressure tested and CCTV surveyed in order to reduce the risk of defective or leaking sewers.

In addition to 1 No. gravity connection, it is proposed to drain the site to 2 No. centrally located foul pumping stations, as indicated on Pinnacle Engineering Consultants drawings included in the application. From the pumping stations,

foul water will be pumped via 100mm Ø rising mains to the existing foul water line located in Elm View.

The proposed foul pumping stations are to be in accordance with the Uisce Éireann Code of Practice for Wastewater Infrastructure 2017 – Part 5 – Pumping Stations Note that the foul pumping stations are below ground and are proposed to have only 2No.above ground kiosks visible as per the IW standards as per the below extracts from IW STD-WW-30A and 31A.

The pumping stations have been located to provide the minimum separation distance of 15m to the nearest existing habitable building and the proposed building.

Layout, levels, gradients, pipe sizes and details of the proposed foul drainage infrastructure can be viewed on the Pinnacle Engineering Consultants drawings included in the application.

11.8.1.3 Surface Water Drainage Infrastructure

The following mitigation measures have been proposed to ensure that no potential adverse effects will arise from construction-related surface water discharges from the Proposed Development. The construction contractor will be required to implement the following specific mitigation measures, for release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters control:

- Specific measures to prevent the release of sediment over baseline conditions to local water courses and Dublin Bay during the construction work, which will be implemented as the need arises. These measures include, but are not limited to, the use of silt traps, silt fences, silt curtains, settlement ponds and filter materials. This is particularly important when undertaking any works/upgrading to the surface and foul water drainage networks at the Proposed Development site;
- Provision of exclusion zones and barriers (e.g. silt fences) between earthworks, stockpiles and temporary surfaces to prevent sediment washing into the Local water courses and/or existing drainage systems and hence the downstream receiving water environment;
- Silt traps shall not be constructed immediately adjacent to the Local water courses, i.e. a buffer zone between the trap and the watercourse with natural vegetation must be left intact. Imported materials such as terrain, straw bales, coarse to fine gravel should be used either separately or in-combination as appropriate to remove suspended matter from discharges;
- Monitoring shall be carried out on surface water discharge (if necessary and as specified in any Discharge Licence associated with the construction phase of the project);
- Provision of temporary construction surface drainage and sediment control measures to be in place before the construction of the pipeline and/or earthworks commence;
- Weather conditions will be taken into account when planning construction activities to minimise risk of run-off from the site;
- Prevailing weather and environmental conditions will be taken into account prior to the pouring of cementitious materials for the works adjacent to the Local water courses and/or surface water drainage features, or drainage features connected to same.
- Pumped concrete will be monitored to ensure no accidental discharge. Mixer washings and excess concrete will not be discharged to surface water drainage systems.
- Concrete washout areas will be located remote from the Local water courses or any surface water drainage features, where feasible, to avoid accidental discharge to watercourses;
- Any fuels of chemicals (including hydrocarbons or any polluting chemicals) will be stored in a bunded area to prevent any seepage of into the Local water courses, local surface water network or groundwater, and care and attention taken during refuelling and maintenance operations;

- Temporary oil interceptor facilities shall be installed and maintained where site works involve the discharge of drainage water to receiving waters;
- All containment and treatment facilities will be regularly inspected and maintained;
- All mobile fuel bowsers shall carry a spill kit and operatives must have spill response training. All fuel containing equipment such as portable generators shall be placed on drip trays. All fuels and chemicals required to be stored on-site will be clearly marked;
- Implementation of response measures to potential pollution incidents;
- Emergency procedures and spillage kits will be available and construction staff will be familiar with emergency procedures in the event of accidental fuel spillages;
- All trucks will have a built-on tarpaulin that will cover excavated material as it is being hauled off-site and wheel wash facilities will be provided at all site egress points;
- Water supplies shall be recycled for use in the wheel wash. All waters shall be drained through appropriate filter material prior to discharge from the construction sites;
- The removal of any made ground material, which may be contaminated, from the construction site and transportation to an appropriate licenced facility shall be carried out in accordance with the Waste Management Act, best practice and guidelines for same;
- A discovery procedure for contaminated material will be prepared and adopted by the appointed contractor prior to excavation works commencing on site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase; and
- Implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste (most notably wet concrete, pile arisings and asphalt).

Surface water runoff from topsoil stripped areas is to be directed towards on-site settlement ponds. Upstream of the piped surface water outfalls, temporary settlement ponds/filter trench are to be constructed consisting of a geotextile lined stone filled trench with a further inclusion of baled straw filter at the inlet – all to catch any site washed silt during the construction process and before the development is completed. This filter trench is to be inspected and maintained regularly by the contractor throughout the construction stage. Such measures are to be taken to capture, remove and treat sediment prior to discharge of the filtered runoff to the receiving watercourses.

To minimise the adverse effects, the prevailing weather conditions and time of year is to take into account when the site development manager is planning the stripping back of the topsoil. For example, by avoiding excavation and movement of topsoil ahead of any known upcoming heavy rainfall event.

The removal of the topsoil layer will be carried out in a carefully managed process and in coordination with the construction phasing management of the development.

Sand, gravel or other loose materials brought to the site shall be stored in locations a minimum of 10m from any local water course and are not to be positioned where rainfall run-off could wash silt towards the watercourse. Any cement is to be stored in bags under cover from the elements at a location remote from the watercourse.

The site layout shall be such that it includes a dedicated set down area for deliveries to the site and temporary storage of construction materials. The area is to be clearly demarcated and managed to avoid haphazard placement of materials throughout the site.

The set down location shall be managed to ensure it is well ordered and tidy in line with good site management practice.

A Construction Management Plan will be prepared by the appointed Main Contractor. The use of construction best practices is to take place to avoid the risk of contamination of the receiving watercourses or ground water.

Preconstruction meetings to be held with all sub-contractors to explain works method statements and site management practices. Periodic, documented inspections of the site and subcontractor activities are to be carried out to improve overall site safety, efficiency and mitigate the risk of pollution of the stream or groundwater. Subcontractor method statements will be formally reviewed to ensure that comply with the requirements of the Construction Regulations 2006 and the Construction Management Plan.

The site supervisor will conduct documented site inspections, using a Site Inspection Checklist on a weekly basis or greater to ensure compliance. Potential spillages from storage tanks must not be allowed to seep into the ground and Spill kits are to be made available.
An Outline Construction Management will be developed and will be implemented during the construction phase. This will include Site personnel inductions to ensure all site personnel are made aware of the procedures and best practice with regards to the management of surface water runoff and ground water protection.

Concrete batching will take place off site and wash out of concrete trucks will take place off site (at authorized concrete batching plant in full compliance with relevant planning and environmental consents).

Wheel wash down facilities will be provided in specifically designated areas and managed in accordance with the OCMP. Discharge from these areas will be directed into settlement/treatment areas and this will prevent uncontrolled runoff site.

All fuel stored will be bunded within a secure hardstanding area with strict management control and access to same. Bunding is to be 100% + 10% of the volume stored.

Fuel spill clean-up kits will be kept in the designated re-fuelling areas.

Topsoil stockpiles will be located in such a manner as to minimise the risk of washing away into local drainage or watercourses.

The contractor will have a full time Site Manager responsible for the site management. The Manager will be fully aware of the relevance of the works in relation to the watercourse and will ensure all staff on site are made aware. A site noticeboard will be positioned in a suitably located prominent location on the site with the contact details of the person responsible for ensuring the pollution prevention methodology.

The construction management of this project will incorporate protection measures to minimise as far as possible the risk of spillage that could lead to surface and ground contamination.

Dewatering of trenches should be used where deemed necessary and cannot be avoided and all run off from dewatering areas is to be directed to the designated settlement/treatment areas.

11.8.1.4 Electrical Supply

The locations of the electricity network infrastructure relative to the proposed works will be confirmed as part of the Detailed Design Phase.

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with ESB Networks.

Prior to excavation the Contractor will carry out additional site investigation, including slit trenches, in order to determine

the exact location of the electricity network in close proximity to the works area. This will ensure that the underground electricity network will not be damaged during the construction phase.

All works in the vicinity of ESB Networks infrastructure will be carried out in ongoing consultation with ESB Networks and will be in compliance with any requirements or guidelines they may have including procedures to ensure safe working practices are implemented when working near live overhead/underground electrical lines.

11.8.1.5 Telecommunications

The locations of the telecommunications network infrastructure relative to the proposed works will be confirmed as part of the Detailed Design Phase.

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant telecommunication provider.

Prior to excavation the Contractor will carry out additional site investigation, including slit trenches, in order to determine the exact location of the telecommunications network in close proximity to the works area. This will ensure that the underground telecommunications network will not be damaged during the construction phase.

All works in the vicinity of the telecommunications provider's infrastructure will be carried out in ongoing consultation with the relevant provider and will be in compliance with any requirements or guidelines they may have.

- Where new services are required, the Contractor will apply to the relevant provider for a connection permit where appropriate and will adhere to their requirements.
- It is considered that any likely impacts to overhead cables in the vicinity will be mitigated by applying standard construction practices.

11.8.2 Operational Phase

11.8.2.1 Water Supply Infrastructure

Usage of low flush toilets will reduce the demand on the public water supply infrastructure and the wastewater infrastructure.

11.8.2.2 Wastewater Drainage Infrastructure

Operational waste will be removed from the completed development using only licenced contractors to appropriately licensed facilities.

The wastewater drainage infrastructure has been designed in accordance with the Uisce Éireann Code of Practice for Wastewater Infrastructure.

The foul pump stations will be located as indicated in the Pinnacle Engineering Consultants drawings included in the application, fitted with a pump system complete as per the Uisce Éireann Standard Detail, STD-WW- 28A-Rev2. The pumping stations will be designed in accordance with the IW COP and includes real time remote monitoring, alarms and telemetry connected to the SDCC pumping station control centre using a "SCADA" system.

The pumping stations have also been designed to incorporate a duty and stand-by duty pump in case of failure of any single pump. Furthermore, the pumping stations can accommodate 24hrs overflow storage below ground in the chamber designed. Refer to Pinnacle Engineering Consultants drawings included in the application for further detail.
Watermain supply to the site is to be monitored by Uisce Éireann using the required and designed flow meters as have been approved under the IW SDC design review. Refer to the submitted Pinnacle Engineering Consultants drawings included in the application for location of same.

11.8.2.3 Surface Water Drainage Infrastructure

As detailed in Chapter 7 "Water", the implementation of the following measures will minimise the impact on the Hydrology and Water Services in the area of the proposed development during the operational phase of the development.

The surface water collected from the project has been designed in accordance with the CIRIA SuDS Manual and the Greater Dublin Strategic Drainage Study and the appropriate treatment train process has been applied in the design.

Regular maintenance of all SuDS features by the development management team will be carried out until such a stage that the Local Authority take in charge the project.

The road and block levels design has been carried out following the existing natural site contours and replicating where possible the natural flow paths.

In accordance with best practice, appropriate SuDS features included in this development include filter drains, roadside filter swales, permeable paving in parking bays, green roofs, tree pits, bioretention area, buildings, silt-trap/catchpit manholes, permeable geocellular attenuation storage, vortex flow control limiting devices and petrol interceptors.

The surface water drainage infrastructure has been designed to allow for a 20% increase in rainfall due to climate change in accordance with the GDSDS.

The surface water runoff from the site will be limited to the greenfield runoff rate and the attenuated flows are to be stored in detention basins in accordance with the GDSDS. Further detailed information relating to the site development drainage and water infrastructure is outlined in a separate document prepared by Pinnacle Engineering Consultants entitled "Engineering Planning Report".

All designated waste storage areas will have gullies connected to the foul drainage network to facilitate wash down as required.

11.8.2.4 Electrical Supply

The power demands during the operational phase on the existing electricity network are considered to be imperceptible due to the energy efficient design including LED lighting, high performance heating equipment.
The design and construction of the required electrical services infrastructure in accordance with the relevant guidelines and codes of practice is likely to mitigate any potential effects during the operational phase of the development, with the exception of any routine maintenance of the site services.

11.8.2.5 Telecommunications

The telecommunications demand during the operational phase on the existing telecommunications network are considered to be imperceptible due to the resilience built into the networks by the relevant providers.

The design and construction of the required Telecommunication services infrastructure in accordance with the relevant guidelines and codes of practice is likely to mitigate any potential effects during the operational phase of the development, with the exception of any routine maintenance of the site services.

11.9. Monitoring

11.9.1 Water Supply Infrastructure

Metering will allow the water supply to the development to be monitored, this is to be done to the requirements of Uisce Éireann / South Dublin County Council.

11.9.2. Wastewater Drainage Infrastructure

11.9.2.1 Construction Phase

Monitoring during the Construction Phase of the development will consist of the following:

- Normal quality control inspection of the works;
- Monitoring of discharges to the existing network is also required by South Dublin County Council to ensure that no unauthorised discharges are occurring;
- Pressure testing and CCTV inspections of the foul sewers following completion of stages of the construction is recommended to ensure that the required construction standards are being maintained;
- Upon completion of the development, monitoring of the discharges from the development will be undertaken as required.

11.9.2.12 Operational Phase

During the operational phase the proposed development will operate in accordance with the current limits set out in the Engineering Planning Report, as permitted by Uisce Éireann . Therefore, no monitoring of foul effluent from the development is considered to be necessary.

11.9.3 Surface Water Drainage Infrastructure

11.9.3.1 Construction Phase

Monitoring during the Construction Phase of the development should consist of the following:

- Normal quality control inspection of the works.
- Monitoring of possible discharges to the existing culverted watercourse at its outfall may also be required by SDCC to ensure that no unauthorised discharges are occurring.
- Pressure testing and CCTV inspections of the surface water drains following completion of stages of the construction is recommended to ensure that the required construction standards are being maintained.
- Upon completion of the development, monitoring of the discharges from the development will be undertaken as required.

11.9.3.1 Operational Phase

Monitoring during the operational phase of the development is recommended as follows:

- All filters, silt traps, hydro-brakes and overflows should be inspected regularly and in particular after heavy rainfall events to ensure that they are not blocked.
- Gullies in the public road should be inspected and cleaned as required
- Pollutants which accumulate within the oil petrol interceptor on site should be regularly monitored and removed as necessary.

11.9.4. Electrical Supply

The electricity network will be monitored by ESB networks.

11.9.5 Telecommunications

Telecoms will be monitored by EIR.

11.10. Residual Effects

11.10.1 Construction Phase

Implementation of the mitigation measures as discussed above will ensure that the potential effects of the proposed development on the site's material assets do not occur during the construction phase and that any residual impacts will be as follows.

- Slight negative, not significant and short term in EIAR terms for on Water Supply Infrastructure
- Slight negative, not significant and short term in EIAR terms for on Surface Water Drainage Infrastructure
- Slight negative, not significant and short term in EIAR terms for on Wastewater Drainage Infrastructure

11.10.1.2 Electricity

Neutral Impact - Taking into account the above mentioned mitigation measures there will be no residual effects to the electrical infrastructure following the construction phase. Any residual effects on the built services during the construction phase is considered to be temporary in nature and not significant, where service is unavoidably disrupted to facilitate the construction phase.

11.10.1.3 Telecommunications

Neutral Impact - Taking into account the above mentioned mitigation measures there will be no residual effect to the telecommunications infrastructure following the construction phase. Any residual effects on the built services during the construction phase is considered to be temporary in nature and not significant, where service is unavoidably disrupted to facilitate the construction phase.

11.10.2 Operational Phase

Due to the development of the lands, there will be an increase in demand for water, wastewater, electrical power, gas and telecommunications supply. There is existing infrastructure network available local to the site and available

capacity, subject to upgrades, to facilitate the demands this development will impose. The development of the lands will be constructed in phases, with the final phase being due for completion circa 2032.

11.11. Reinstatement

The attenuated run-off from the development will drain into the existing network as described.

Specific details of which will be agreed between the Landscape Architects and the SDCC Public Realm Department in advance of works commencing.

It is proposed to drain the site to a centrally located foul pumping – refer Pinnacle Engineering Consultants drawings included in the application. From the pumping station, foul water will be pumped via a 100mm rising main to the existing foul water line located in Ely View. This will necessitate localised landscaping and reseeding of grass along the pipeline route. Specific details of which will be agreed between the Landscape Architects and the SDCC Public Realm Department in advance of works commencing.

The proposed development will be supplied from the aforementioned existing 160mmØ watermain, that will be extended along the entire length of the main link street and connect into the existing 100mm Ø on Bohernabreena Road. Within the boundary of the site new construction is considered and no reinstatement will be required.

11.12. Interactions and Cumulative Effects

11.12.1 Interactions

During construction, excavated soil, stone, gravel etc will be generated from excavations for site levelling, construction of foundations, installation of underground services and attenuation.

This spoil will be mounded to create a berm and in turn will allow for the material to be deposited onto the HGVs by excavator. The HGVs will only reverse onto site to a hard standing area, receive the load and leave site. This negates the need for vehicles to drive into site to the dig site and receive the load from the point of excavation and in turn reduce unnecessary spoil being brought onto the public road. The haulage contractor will be required to organise the HGVs in an efficient manner to prevent the build-up of vehicles waiting outside the curtilage of the site.

Removal of material from the site will result in more construction traffic, waste generation which will be taken for reuse or recovery or disposal.

11.12.2 Cumulative Effects

11.12.2.1 Water Infrastructure

The proposed development will increase demand on local Water Infrastructure.

The cumulative effects of the operation would be permeant during the operation of the proposed development including:

- Slight negative and not significant in EIAR terms on surface Water Infrastructure

11.12.2.2 Wastewater Drainage Infrastructure

In reference to the submitted Hydrological & Hydrogeological Qualitative Assessment prepared by AWN, the Pinnacle Engineering Consultants Engineering Planning Report and based on the implementation of the suitable mitigation measures, such as using the appropriate SuDS designs and proper planning compliance, within this and on other local development sites, it can be concluded that the in-combination effects of surface water arising from the proposed development, taken together with that from other developments, will not be significant based on the low potential chemical and sediment loading.

Therefore, due to the low possible loading of any hazardous material during construction and operation there is subsequently no potential for impact on downstream Natura 2000 habitat in Dublin Bay located some 12km from the subject site.

Recent water quality assessments show that Dublin Bay meets the criteria for "unpolluted" water quality status (EPA, data until July 2021). The currently under construction upgrade works to the Ringsend WWTP will result in improved water quality by the end of 2023 to ensure compliance with Water Framework Directive requirements.

In applying similar restrictions to the above named other local development sites and in compliance with the GDSDS and SuDS treatment train design philosophy, the combined greenfield run-off rates will have a negligible effect on the receiving waters.

The wastewater from the proposed development is to be discharged to the Uisce Éireann infrastructure and ultimately treated downstream at the Ringsend Wastewater Treatment Plant (WWTP) prior to discharge to Dublin Bay. Environmental Report (AER 2020) shows it is currently operating for a peak loading of 2.27million PE while originally designed for 1.64million PE. However, the current maximum hydraulic load (832,269m3 /day) is less than the Peak hydraulic capacity as constructed (959,040m3 /day), i.e., prior to any upgrade works. These upgrade works have commenced and are expected to be fully complete by 2025.

Even without upgrade to the WWTP, the peak effluent discharge from the site is calculated at 17.98 l/s for the proposed development, would not impact on the overall water quality within Dublin Bay and therefore would not have an impact on the current Water Body Status (as defined in the Water Framework Directive). Implementation of the mitigation measures described in section 16.7, will prevent and minimise the potential impacts of the above risk sources. Assessment was considered the effect of cumulative events such as release of sediment laden water combined with a hydrocarbon leak. As there is adequate assimilation and dilution between the site and the Natura 2000, circa 12km downstream of the site, it is concluded that there will be no perceptible impact on water quality at the Natura 2000 site as a result of construction or operation arising from the proposed development or with that of other proposed developments or planned development pursuant to statutory plans in the Greater Dublin, Meath and Kildare areas discharging to Ringsend WWTP.
In the received Uisce Éireann (IW) Confirmation of Feasibility letter, it is noted that connection can be provided with specific criteria in respect to Wastewater, as detailed in Chapter 16.6.1.2 (Wastewater) & upgrades to the Watermain network as detailed in Chapter 16.6.1.1 (Water). Once the specified criteria and upgrades have been applied and carried out, it can be concluded that there is sufficient capacity within the network to minimise the cumulative impacts.

The cumulative effects of the operation would be permeant during the operation of the proposed development including:

- Slight negative and not significant in EIAR terms on surface Wastewater Drainage Infrastructure

11.12.2.3 Surface Water Drainage Infrastructure

Surface water will be discharged at green field run off rates, via an attenuation, system and as a result there will be no cumulative effects on local surface water infrastructure.

The cumulative effects of the operation would be permeant during the operation of the proposed development including:

- Neutral and not significant in EIAR terms on the Surface Water Drainage Infrastructure.

11.13. References

- ESB National Code of Practice
- https://www.esbnetworks.ie/staying-safe/contractor-safety/digging-and-excavation-work
- https://cbyd.emaps.eircom.ie/Eircom-CBYD/

12.0. Material Assets: Transportation

12.1. Introduction

This chapter of the EIAR reports on the likely significant transport and accessibility effects to arise from the construction phase, operational and maintenance stage, and decommissioning phase of the Proposed Development.

The chapter describes the transport and accessibility policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely transport and accessibility effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

NOTE: In addition to this EIAR, this LRD is accompanied by two separate, standalone documents that have also been prepared by Pinnacle Consulting Engineers ,and should be read in conjunction with this EIAR:

- Traffic & Transport Assessment
- Construction Traffic Management Plan

12.2. Statement of Authority

This chapter of the EIAR assesses the likely significant effects of the proposed development in terms of vehicular, pedestrian and cycle access during the construction phase, operational and maintenance phase and decommissioning phase of the Proposed Development.

This Chapter of the EIAR has been prepared by the following:

- **Ronan Kearns, BA, BAI, MSc, MBA, CEng MIEI**
  Chartered Engineer

Ronan is a Chartered Engineer with 19 years' post graduate experience. Projects worked on include roads, drainage and civil infrastructure design and project management for residential, retail, data centres, commercial and development developments from feasibility through to construction.

Ronan has led numerous planning applications and infrastructure designs for a variety of developments. These developments have ranged from small scale residential projects to developments in excess of 600 residential units.

Ronan specialises in transportation planning and site assessment, preliminary design and detailed design of development. Ronan has completed a number of Traffic and Transport EIAR chapters on sites throughout Ireland.

The chapter describes: the methodology; the receiving environment at the application site and surroundings; the characteristics of the proposal in terms of physical infrastructure; the potential impact that proposals of this kind would be likely to produce; the predicted impact of the proposal examining the effects of the overall project on the local road network; the remedial or mitigation measures required to prevent, reduce or offset any significant adverse effects; and residual effects.

12.3. Consultations

The contents of this EIAR chapter are based on consultations with South Dublin County Council as part of the LRD process.

12.4. Methodology

IEMA (Institute of Environmental Management and Assessment) Environmental Assessment for Road Traffic has been used for the appraisal of traffic impacts likely to arise from the Proposed Development. The Environmental Assessment for Road Traffic offers a systematic approach to the assessment of the traffic impacts for developments on the local highway network.

The Environmental Assessment for Road Traffic provides a checklist for the assessment of environmental impacts arising from the changes in traffic levels during the mobilisation, construction, operational, maintenance and decommissioning phase of the project. These impacts include driver severance and delay, pedestrian severance and delay, pedestrian amenity, accidents and safety and hazardous and dangerous roads.

The sensitive receptors are pedestrians, cyclists and road users that use the local road network. The study area includes links and junctions which provided the most direct access routes to the application site and are, therefore, most likely to be affected by site traffic (construction and operational) traveling to/from the development site.

Any links that do not meet the defined selection criteria have not been considered as part of the study area and have been excluded from further analysis.

A site visit was carried out in May 2024 to assess the existing local conditions.

Construction Phase

The IEMA Guidelines state that two rules need to be considered when assessing the impact of development traffic on a highway link:

- Include highway links where traffic flows would increase by more than 30% (or the number of heavy goods vehicles (HGVs) would increase by more than 30%); and
- Include any other specifically sensitive areas where traffic flows would increase by 10% or more.

Less than a 30% increase is considered to result in imperceptible changes in the environmental effects of traffic. The IEMA Guidelines consider that projected changes in traffic flows of less than 10% create no discernible environmental effect.

Specifically, sensitive areas referred to above may include accident 'black spots', conservation areas, hospitals or links with high pedestrian flows.

This is a similar approach to that outlined in TII's Traffic and Transport Assessment Guidelines (PE-PDV-02045). The Traffic and Transport Assessment Guidelines set out advisory thresholds, with respect to traffic movements, for when a Traffic and Transport Assessment is required as follows:

- 100 trips in / out combined in the peak hours for the proposed development.
- Development traffic exceeds 10% of turning movements at junctions with and on National Roads.

- Development traffic exceeds 5% of turning movements at junctions with National Roads if location has potential to become congested or sensitive.

Should the development exceed 100 trips in / out combined in the peak hours for the proposed development as well as exceeding 10% of turning movements at junctions with and on National Roads or Development traffic exceeds 5% of turning movements at junctions with National Roads if location has potential to become congested or is a sensitive area a full Traffic and Transport Assessment would be required.

The Construction Phase assessment has been limited to roads immediately adjacent to the application site and any roads further afield where traffic would increase by greater than 30% or 10% at nodes such as accident 'black spots', conservation areas, hospitals or links with high pedestrian flows.

Operational Phase

The Proposed Development is anticipated to be completed and fully operational in 2032, when all units are fully built and occupied. The assessment considers the full quantum of development at this future year.

Estimated trip generation for the Proposed Development was provided for the assessment. Trips were distributed onto the local highway network based upon the directional splits from the 2024 traffic survey data that was commissioned as part of this application.

Estimated trip generation for the Proposed Development will be provided as part of this assessment.

Effects on Pedestrian /Cyclist

Pedestrian / Cyclist severance, delay, amenity, fear and intimation will be assessed by considering the baseline traffic flows and future traffic flows. The effect on Pedestrian / Cyclists is directly linked to the increase in traffic levels, the proportion of HGV traffic and vehicle speeds.

Driver Delay

This assessment considers the duration of delays or benefits i.e., less time to get through the network as a result of network improvements, occurring to the road users on the local road network based upon the estimated increase in traffic as a result of the Proposed Development during the construction phase and operational phase.

Accidents and Safety

An assessment of the effect of the change in traffic flows on the potential increase/decrease in the number of accidents recorded will be undertaken for both the construction phase and operational phase.

12.5. Policy Review

The following policies have been applied when developing the methodology for this assessment:

- Environmental Protection Agency (EPA) Guidelines on The Information to Be Contained in The EIAR (2022).
- IEMA Impact Assessment Guide to Delivering Quality Development (2016).
- Transport Infrastructure Ireland (TII) Traffic and Transportation Assessment Guidelines (2014).

- 'Traffic Management Guidelines' Dublin Transportation Office & Department of the Environment and Local Government (May 2003).
- 'Guidelines for Traffic Impact Assessments' The Institution of Highways and Transportation (1994).
- National Roads Unit 16.1 - Expansion Factors for Short Period Traffic Counts (PE-PAG-02039) (October 2016) - TII; and
- The Route to Sustainable Commuting NTA (2001).

This chapter of the EIAR has been drafted based on the following legislation, policies and published guidance:

National Legislation:

- National Planning Framework (NPF) 2019

Regional Policy:

- The Traffic Management Guidelines
- Guidance on Transport Assessment
- Design Manual for Urban Road and Streets for sightlines
- South Dublin County Development Plan 2024-2028
- Ballycullen - Oldcourt LAP Main Link Street Traffic and Transport Assessment

National guidance and industry standards:

- IEMA Environmental Assessment for Road Traffic, 2023
- Environmental Protection Agency (EPA) Guidelines on The Information to Be Contained in The EIAR (2022)

12.5.1 National Planning Framework Project Ireland 2040 (NPF) 2019

The National Planning Framework (NPF) was published in February 2018, and updated in January 2019, setting out a vision for Ireland in land use and planning terms to 2040. The NPF replaced the National Spatial Strategy, once it was adopted, as the long-term land use and planning vision for Ireland.

National Policy Objective 55 states the following:

'Promote renewable energy use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a low carbon economy by 2050.'

12.5.2 South Dublin County Development Plan 2022-2028

The County Development Plan 2022-2028 sets out the framework to guide future development in South Dublin with the focus placed on the places we live, the places we work, and how we interact and move between these places while protecting our environment. The aim is to progress to a more sustainable development pattern for South Dublin in the immediate and long-term future up to 2040 and beyond.

12.5.3 EMA Environmental Assessment for Road Traffic, 2023

IEMA methodology has been used for the appraisal of traffic impacts from the Proposed Development. It should be

noted that Republic of Ireland forms part of the IEMA Regional Network.

The purpose of the IEMA Guidelines is to provide the basis for a systematic, consistent, and comprehensive coverage for the appraisal of traffic impacts for a wide range of development projects.

The EIA process should be a continuous activity running throughout the planning and design stages of a project.

To ensure the comprehensive coverage of the environmental impacts arising from changes in traffic levels, the IEMA Guidelines identify a checklist of potential impacts such as driver severance and delay, pedestrian severance and delay, pedestrian amenity, accidents and safety, hazardous and dangerous roads etc.

According to the IEMA Guidelines the assessment of the environmental impacts of traffic requires the following stages:

- Determination of existing and forecast traffic levels and characteristics.
- Determining the time period suitable for assessment.
- Determining the year of assessment; and
- Identifying the geographical boundaries of assessment.

Further to the above, the study area would be defined by identifying any link or location where it is considered that significant environmental effects may occur as a result of the proposed scheme.
The IEMA Guidelines state two rules to be considered when assessing the impact of development traffic on a highway link:

- Include highway links where traffic flows would increase by more than 30% (or the number of heavy goods vehicles (HGVs) would increase by more than 30%); and
- Include any other specifically sensitive areas where traffic flows would increase by 10% or more.

Less than a 30% increase is considered to result in imperceptible changes in the environmental effects of traffic. The IEMA Guidelines considered that projected changes in traffic flows of less than 10% create no discernible environmental effect.

Specifically, sensitive areas referred to above may include accident 'black spots', conservation areas, hospitals, or links with high pedestrian flows.

12.5.4 EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, 2022

The Guidelines have the primary objective of improving the quality of EIARs. The guidance presents the terminology of effects which has been applied to this report, where appropriate.

12.6. Baseline surveys / Data Gathering

12.6.1 Technical Scope

The technical scope of the assessment has considered the potential impacts of the traffic generation during construction phase, operational phase (including maintenance) and decommissioning phase of the Proposed

Development on relevant receptors.

12.6.2 Spatial Scope

In accordance with the IEMA Guidelines, the study area has been defined by identifying any link or location where it is considered that significant environmental effects could occur as a result of the Proposed Development.

The local highway network study area has been informed by the following two rules, as set out in IEMA Guidelines in 16.4 of this Chapter. Thus,

1. The assessment has been undertaken when the perceived environmental impact is at its greatest during the construction stage.
2. The assessment has considered the 'Do Nothing scenario', which assumes no proposed development, against the 'Do Something' scenario, which includes the same baseline traffic as the 'Do Nothing' but also includes Proposed Development traffic.

Construction traffic will travel to/from the development area using primary, secondary, and tertiary roads. Key haulage routes are likely to coincide with the primary, secondary, and tertiary roads that lead to the site.

Key nodes for the development are outlined in Figure 12.1.

To quantify the volumes of traffic movements at key points on the road network adjacent to the site, a set of classified turning movement traffic counts were commissioned.

Accordingly, classified counts were carried out on the 14th of May 2024 at locations as shown in Figure 12.1.

Figure 12.27: Traffic survey locations