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 July 2022 and are shown in **Table 18.2**. Buildings (Residential) have a 40% reduction requirement and a 2030 emission ceiling of 4 $MtCO_{2eq}$[23].

Table 18.1: 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025

Sector	Reduction Required	2018 Emissions ($MtCO_2eq$)
2021-2025	295 Mt CO_{2eq}	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_{2eq}	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_{2eq}	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 18.2: Sectoral Emission Ceilings 2030

Sector	Reduction Required	2018 Emissions ($MtCO_{2eq}$)	2030 Emission Ceiling ($MtCO_{2eq}$)
Electricity	75%	10.5	3
Transport	50%	12	6
Buildings (Commercial and Public)	45%	2	1
Buildings (Residential)	40%	7	4
Industry	35%	7	4
Agriculture	25%	23	17.25
Other (F-Gases, Waste & Petroleum refining)	50%	2	1

In December 2022, CAP23 was published (Government of Ireland 2022). This is the first CAP since the publication of the carbon budgets and sectoral emissions ceilings, and it aims to implement the required changes to achieve a 51% reduction in carbon emissions by 2030. 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. CAP23 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. CAP23 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.

The Fingal Development Plan outlines the need for climate adaptation so as to reduce the vulnerability of our environment, society and economy and increase resilience to climate change. This plan features a range of objectives to help support the CAP23. Fingal County Council (2019) released the Climate Change Action Plan 2019–2024 which identifies five areas when looking at climate action, including Energy and Buildings, Transport, Flood Resilience, Nature-Based Solutions and Resource Management. The resilience of

[23] Mt CO_{2eq} denotes million tonnes carbon dioxide equivalent.

developments to climate change and the climate mitigation actions for buildings are key features when looking at this Plan. The elements of the Plan have been reviewed in reference to the proposed development.

18.2.1.2 Climate Assessment Significance Criteria

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.
- 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.

The significance criteria for each assessment are described below.

Significance Criteria for GHGA

The Transport Infrastructure Ireland (TII) guidance document entitled *PE-ENV-01104 Climate Guidance for National Rods, 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 approach is based on comparing the '*Do Something*' scenario and the net project GHG emissions (i.e. *Do Something – Do Minimum*) to the relevant carbon budgets (Department of the Taoiseach 2022). With the publication of the Climate Action Act in 2021, sectoral carbon budgets have been published for comparison with the Net CO_2 project GHG emissions from the proposed development. The Residential Buildings sector emitted approximately 7 $MtCO_{2eq}$ in 2018 and has a ceiling of 4 $MtCO_{2eq}$ in 2030, which is a 45% reduction over this period (see **Table 18.2**).

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 (2022) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports'.

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 therefore 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.

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 state 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*".

Significance is determined using the criteria outlined in **Table 18.3** (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.

Table 18.3: GHGA Significance Criteria

Effects	Significance level Description	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.

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.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 18.4 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale. Where residual medium or high vulnerabilities exist, the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks.

Table 18.4: Vulnerability Matrix

		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

18.2.2 Construction Phase

18.2.2.1 Climate

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 18.3). The impact of the proposed development on climate is determined in relation to this baseline. As per the IEMA guidance (2022) where expected emissions will not increase by over 1% compared with the baseline scenario then no further assessment is required as there is no potential for significant impacts to climate. The construction stage activities and potential for GHG emissions have been reviewed as part of the construction stage climate assessment and a quantitative assessment conducted.

Construction stage embodied carbon of the proposed development was quantified using the TII Online Carbon Tool (TII, 2022b). 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. Information on the material quantities, waste materials and construction traffic were input into the TII carbon tool by JB Barry, the project engineers. The TII Online Carbon Tool (TII 2022b) uses emission factors from recognised sources, including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013), UK National Highways Carbon Tool v2.4 and UK Government 2021 Greenhouse Gas Reporting Conversion Factors. 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 TII Online Carbon Tool (TII 2022b) has been commissioned by TII to assess GHG emissions associated with infrastructure projects using Ireland-specific emission factors and data. While specific to TII infrastructure projects it can be applied to other non-infrastructure projects in the absence of other easily accessible Ireland-specific carbon tools. The calculator also considers personnel travel, site energy and waste management and the associated embodied carbon.

18.2.3 Operational Phase

18.2.3.1 Climate Change Vulnerability Assessment

The operational phase 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, 2021); 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 18.3, 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.

The initial stage of an assessment is to establish a scope and boundary for the assessment taking into account the following criteria:

- Spatial boundary: As per PE-ENV-01104 (TII, 2022a), the study area with respect to the GHGA is Ireland's Climate budget. The study area with respect to the CCRA can be considered the project boundary and its assets. The study area will be influenced by current and future baselines (Section 18.3). This study area is influenced by the input of other experts within the EIAR team;
- Climate hazards: The outcomes of the climate screening i.e. vulnerability assessment and baseline assessment; and
- Project receptors: TII state that the project receptors are the asset categories considered in the climate screening. In addition, any critical connecting infrastructure and significant parts of the surrounding environment e.g. water bodies that should be considered as a part of the indirect, cumulative and in combination impact assessment should also be considered project receptors.

Technical guidance on the climate-proofing of infrastructure in the period 2021-2027 (European Commission, 2021a) outlines an approach for undertaking a climate change risk assessment where there is a potentially significant impact on the proposed development due to climate change. The risk assessment assesses the likelihood and consequence of the impact occurring, leading to the evaluation of the significance of the impact. The role of the climate consultant in assessing the likelihood and impact is often to facilitate the climate change risk assessment process with input from the design team or specific specialists such as hydrology.

The climate screening risk assessment or vulnerability assessment is carried out by determining the sensitivity and exposure of the project to climate change. Firstly the project asset categories must be assigned a level of sensitivity to climate hazards irrespective of the project location (example: Sea level rise will affect seaport projects regardless of specific location). PE-ENV-01104 (TII, 2022a) provides 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 project-by-project 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, as shown in Table 18.4.

18.2.3.2 Climate & 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 UK Highways Agency DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency, 2019) contains the following scoping criteria to determine whether a detailed climate assessment is required for a proposed project during the operational stage. If any of the road links impacted by the proposed development meet or exceed the below criteria, then further assessment is required.

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

There are no road links that will experience a change of over 10% in the 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 scoped out of this assessment.

18.3 Baseline Scenario (Existing Environment)

PE-ENV-01104 (TII, 2022a) 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.

Data published in 2022 (EPA, 2022b) predicts that Ireland exceeded (without the use of flexibilities) its 2021 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 2.71 Mt CO_{2eq} as shown in **Table 18.5**. The sector with the highest emissions in 2021 was agriculture at 35.3% of the total, followed by transport at 20.3%. Ireland's greenhouse gas emissions increased by 4.7% in 2021 compared to 2020. For 2021 total national emissions (excluding LULUCF) were estimated to be 61,528 kt CO_{2eq} as shown in **Table 18.5** (EPA, 2022b).

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, 2022a) 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 CAP23, 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 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.

Table 18.5:Total National GHG Emissions in 2021

Category	2021 Kilotonnes CO_{2eq}	% of Total GHG emissions
Waste	937	1.5%
Energy Industries	10,272	16.7%
Residential	7,040	11.4%
Manufacturing Combustion	4,593	7.5%
Commercial Services	817	1.3%
Public Services	663	1.1%
Transport	10,912	17.7%
Industrial Processes	2,460	4.0%
F-gases	738	1.2%
Agriculture	23,097	37.5%

Total	**61,528**	**100%**

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, 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, 2021b):

- 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, 2020c) 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 per cent 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, 2020c) 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, 2020c). While individual storms are predicted to have more severe winds, the average wind speed has the potential to decrease (EPA, 2020c).

TII's Guidance document PE-ENV-01104 (TII 2022a) 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 2020d). 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 will be a substantial decrease of approximately 50%, which is projected 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.

18.4 Impact Assessment

18.4.1 Do Nothing

In the Do Nothing scenario, no construction works will take place and the site will remain as it currently is. The climate baseline will continue to develop in line with the identified trends (see Section 18.3). This scenario is considered neutral in relation to climate.

18.4.2 Construction Phase

18.4.2.1 Climate GHGA

There is the potential for the release of a number of greenhouse gas emissions into the atmosphere during the construction of the proposed development.

The unmitigated embodied carbon within the construction materials has been calculated. This calculation was based on the online TII Carbon tool (TII 2022b), and the breakdown of the activities between the different phases of the proposed development has been assessed. Activities are broken down into Pre-Construction, which includes land-clearance activities and site preparation works; Embodied Carbon, which includes the embodied carbon of construction materials; Construction Activities; Construction Waste and Operational Use, which includes land-use changes and ongoing maintenance/replacement of materials. As shown in Table 18.6, the assessment indicates that the key source of GHG emissions is associated with the embodied carbon of the construction materials.

The proposed development is estimated to result in total construction phase GHG emissions of 81,145.8 tonnes embodied CO_2eq. The construction phase is predicted to be 2 – 3 years, therefore, the total construction phase GHG emissions can be annualised over a 3 year period to allow for direct comparison with annual GHG targets. The total annualised GHG emissions equate to 0.68% of Ireland's 2030 emissions ceiling for either the Residential Buildings Sector or the Industry Sector (see Table 18.2 for sectoral emission ceilings). Additionally, when compared with the baseline scenario, the annualised construction phase GHG emissions from the proposed development are 0.13% of Ireland's total non-ETS GHG emissions in 2021 of 61,528 ktCO_2eq (**Table 18.5**).

Table 18-6: Construction Stage Greenhouse Gas Emissions

Activity	Tonnes CO_2eq / Total	% Of Total
Pre-Construction	0.53	0.001%
Embodied Carbon	79,910.62	98.48%
Construction Activities	58.8	0.07%
Construction Waste	1,182.58	1.46%
Operational Use	-6.73	-0.008%
All	81,145.8	100%
Averaging Time	**% Of 2030 Residential Buildings Budget**	**% Of 2030 Industry Budget**
Over 1 years:	0.68%	0.68%

18.4.3 Operational Phase

18.4.3.1 Climate and Traffic Emissions

There is the potential for increased traffic volumes to impact climate. The change in traffic was reviewed against the DMRB screening criteria outlined in Section 18.2.3.2 (UK Highways Agency, 2019) and a detailed climate assessment of traffic emissions was scoped out.

18.4.3.2 Climate Change Vulnerability Assessment

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. Wildfire and landslides were not considered relevant to the proposed development due to the project location and have been screened out of the assessment.

The sensitivity of the proposed development to the above climate hazards is assessed irrespective of the project location. **Table 18.7** 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 18.4**. The results of the vulnerability assessment are detailed in **Table 18.7** below.

Table 18.7: Climate Change Vulnerability Assessment

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (coastal, pluvial, fluvial)	3 (High)	1 (Low)	3 (Medium)
Extreme Heat	3 (High)	1 (Low)	3 (Medium)
Extreme Cold	3 (High)	1 (Low)	3 (Medium)
Drought	2 (Medium)	1 (Low)	2 (Low)
Extreme Wind	2 (Medium)	1 (Low)	2 (Low)
Lightning & Hail	1 (Low)	1 (Low)	1 (Low)
Fog	1 (Low)	1 (Low)	1 (Low)

The proposed development has a worst-case medium vulnerability to flooding, extreme heat and extreme cold. The Flood Risk Assessment (FRA) carried out by JB Barry and Partners and submitted with this planning application states that the site is located in Flood Zone C with an annual probability of flooding (fluvial and coastal) of less than 0.1%. The FRA report notes that the site does not have a significant risk to groundwater flooding and there has been no indication of pluvial-related flood risk at the site, further details are provided in the FRA. Therefore, flooding on site is not a significant risk.

In relation to extreme temperatures, both extreme heat and extreme cold, have the potential to impact the building materials and some related infrastructure. However, high-quality, durable building materials will be selected for the proposed development. Therefore, extreme temperatures are not considered a significant risk.

18.5 Mitigation Measures

18.5.1 Construction Phase

Embodied carbon of materials and 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:

- 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.
- Sourcing materials locally where possible to reduce transport related CO_2 emissions.

18.5.2 Operational Phase

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

The proposed development has been designed to reduce the impact on climate as a result of energy usage during operation. Such measures included in the proposed development to reduce the impact to climate from energy usage are:

- The development will be in compliance with the requirements of the Near Zero Energy Building (NZEB) Standards.
- A renewable energy rating (RER) of 20% will be achieved to comply with Part L (2021) of the NZEB regulations.
- A Building Energy Rating (BER) of A2/A3 is being targeted.
- Improved building thermal transmittance (U-Values), air permeability and thermal bridging.
- Use of air source heat pumps.

These measures will aid in reducing the impact to climate during the operational phase of the proposed development.

18.6 Cumulative Impact

With respect to the requirement for a cumulative assessment PE-ENV-01104 (TII, 2022a) states that *"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."

However, 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.

18.7 Residual Impact

The proposed development will result in some impacts to climate through the release of GHGs. TII state 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, the development will comply with the do-minimum standards set through regulation (NZEB and Part L 2021). As per the assessment criteria in **Table 18.3** the impact of the proposed development in relation to GHG emissions is considered *long-term, moderate adverse* and *significant*.

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.

18.8 Monitoring

No monitoring is recommended.

18.9 References

- BSI (2016) Publicly Available Specification (PAS) 2080:2016 on Carbon Management in Infrastructure
- Civil Engineering Standard Method of Measurement (CESSM) (2013) Carbon and Price Book database.
- Department of the Taoiseach (2022) Carbon Budgets Available at https://www.gov.ie/en/publication/9af1b-carbon-budgets/
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19 CUMULATIVE EFFECTS AND ENVIRONMENTAL INTERACTIONS

The EIA Directive and its transposing regulations require that in addition to assessing impacts on population & human health, biodiversity, land & soils, water, air, climate, landscape, material assets and cultural heritage on the environment, the inter relationship between these factors must be considered.

It is also required that the cumulative effects of the proposed development and other permitted development in the study area be considered.

This chapter of the EIAR was prepared and collated by Carlos Lara Gonzalez of RPS. The interactions were provided by the relevant EIAR specialists.

19.1 Cumulative Effects

Cumulative assessment is undertaken to ensure that the combined effects of the proposed development and other influences are assessed together and not as individual aspects of the environmental assessment.

Cumulative effects are defined as changes to the environment that are caused by an action in combination with other actions, arising from:

- the interaction between all of the different (existing and/or approved) projects in the same area; as required by Annex IV, point 5(e) of the EIA Directive;
- the interaction between the various impacts within a single project.

The EU Guidance on the preparation of the EIAR guidance states that it is important to consider effects, not in isolation, but cumulatively, as this may show that individually analysed impacts can become significant when they are added together or with other effects.

The coexistence of impacts may increase or decrease their combined impact. Impacts that are considered to be insignificant, when assessed individually, may become significant when combined with other impacts.

The overall summary of the assessment of the likely cumulative effects, and interactions, between the proposed development and other projects in the vicinity is presented herein, along with appropriate mitigation measures to address any identified cumulative effects.

The following guidelines and publications were considered when determining the other projects to be considered for their potential to generate cumulative effects with the proposed development site:

- *Guidelines of the Information to be Contained in Environmental Impact Assessment Reports, EPA, 2022;* and,
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (2018)

19.1.1 Cumulative Effects

The first stage in determining cumulative effects entailed the identification of projects in the locality that exist or have been approved. Existing and/or approved projects have the potential to have an impact in combination with the subject development based on available information. This stage involved a desktop study in reviewing all existing and/or approved projects that are located in close proximity to the site and those that fall outside of the site boundary but still have the potential to interact with the development.

This review was carried out using the local authority planning web portals and any other sources to identify other projects that have the potential to interact with the proposed development.

Following on from this inclusion or exclusion criteria were applied to the existing and/or approved projects to determine whether they had any potential to give rise to cumulative effects in each of the technical specialisms (**Chapters 6 – 18**) with respect to the following criteria inter alia:

- Temporal Scope – is there any temporal overlap and potential for interaction between the subject development due to the relative construction operation and decommissioning programmes of other projects?

- Scale and Nature of the other existing and/or approved projects - Due to the scale and nature of the other projects, are they likely to interact with the proposed development to result in a cumulative effect? Statutory definitions of major development and EIA screening thresholds were considered in determining issues of scale.
- Other Factors - such as the nature and/or capacity of the receiving environment, that would make significant cumulative effects with 'other developments' more or less likely. A source-pathway receptor approach was used to inform the assessment of other factors.

19.1.2 Assessment of Cumulative Effects

Each of the technical chapters has considered the cumulative impact of the subject development and other pertinent projects. The cumulative impact is detailed in each of these chapters. Other projects identified in these chapters include, inter alia:

- **Ref. SHD/008/21 (Whitehaven SHD)**

In March 2023, ABP granted permission for a SHD known as Whitehaven adjoining the subject site to the east. The proposed development will consist of the construction of a residential development comprising of 5 no. apartment blocks of 5-9 storeys containing 255 no. apartment units with a childcare facility, shared residential services in a single-storey between Blocks 2 and 3, and open spaces over a shared basement. The permitted development also includes for the provision of a childcare facility capable of accommodating c. 70-75 no. children.

- **Ref. SHD/015/19 (Blackwood Square SHD)**

In March 2020, ABP granted permission for a SHD known as Blackwood Square comprising of 4 no. 8-storey apartment blocks consisting of 329 apartment units; a multi-functional area; a gym; childcare facility, 5 no. mixed-use units; 338 no. car parking; 760 no. cycle parking spaces; and associated site works. In April 2021 the terms of conditions attached were altered under case Ref. ABP-309416-21, resulting in the number of apartments increasing to 330 no. units and a childcare facility to accommodate a minimum of 62 childcare places. The development is now completed.

- **Ref. F18A/0421 (Northwood 1 – Phase 1) & Ref. F18A/0438 (Northwood 1 – Phase 2):**

In March 2019, planning permission was granted under ref. F18A/0421 (phase 1) for a mixed-use residential scheme comprising 99 no. apartments, concierge, creche, residents lounge and meeting rooms on lands approximately 180 m to the southwest of the subject site, south of Northwood Avenue.

In April 2019, planning permission was granted under Ref. F18A/0438 (phase 2) for a mixed-use development comprising 2 no. 6-storey blocks containing 99 no. apartments in total, four storey office building (c. 2,536 sq.m) and other associated development. The application forms phase 2 of the development permitted under Ref. F18A/0421 and is located approximately 180 m to the southwest of the subject site, south of Northwood Avenue.

- **Ref. SHD/011/21 and Ref. ABP 313179 (Northwood SHD)**

In March 2023, ABP granted permission for a development known as Northwood SHD. The proposed SHD consists of 2 no. apartment blocks with 268 no. build-to-rent apartments units and an office block, has been recently permitted by ABP (Ref. ABP-313179-22). The permitted development also includes for the provision of a childcare facility capable of accommodating c. 38 no. children.

- **Ref. F18A/0675, F21A/0175 and F22A/0591 (Sports Surgery Clinic):**

In July 2019, FCC issued a split decision for development at the Sports Surgery Clinic, Northwood Avenue, Santry, Dublin 9. The permitted retention permission element of the application included 3 no. storage sheds and modifications to the surface car park layout permitted under Ref. F15A/0482. The refused permission element of the development sought the extension of the car park to provide an additional 72 no. spaces, new access to car park, new lighting, landscaping, and all associated site works.

In June 2021, FCC granted permission for a single-storey extension to the existing Sports Surgery Clinic under planning application with Ref. F21A/0175. The proposal consisted of the relocation of 4 no. existing surface car parking spaces, the provision of 3 no. additional car parking spaces and external plant within an enclosed yard area (20 sq.m). The single storey extension (3.9 m in height) will include an MRI room, an equipment room, changing rooms, a control room, and a toilet (total GFA 94 sq.m) and all associated site works.

In April 2023, FCC granted permission for an extension to the existing Sports Surgery Clinic under F22A/0591. The proposal comprises an extension of c. 6,365 sq.m accommodate in 4 storeys plus plant room with an overall height of 1.92m over a c. 4,696sq.m.

No significant cumulative impact of the development and other projects has been identified.

19.2 Inter-Relationships Interactions

The potential interaction between environmental aspects arising from within the development was considered, to ensure that the combination of impacts was correctly examined, and any required mitigation measures included.

Each technical chapter of the EIAR details individual environmental baseline information and identifies the significant potential and residual construction and operational effects/impacts of the proposed development. In addition, the potential for other environmental interactions is identified, and the relevant impact either on, or from, these other aspects is analysed via a data exchange between and assessment review by the relevant experts.

Table 19.1 is a matrix table indicating the significant interactions that are likely to occur between the various environmental disciplines regarding the proposed scheme. Where a tick exists in a box in a table, this indicates that a relationship exists between the two environmental areas. The purpose of the table is to allow interaction between two various disciplines to be recognised, although the level of interaction will vary in each case. It is assumed in presenting this table that an environmental discipline has a potential inter relationship during either the construction or operational phase of the scheme or both.

Table 19.1: Interactive Effect on Receptors (interactions are outlined horizontally from right to left)

Interactive / Cumulative Effect on Receptor	Biodiversity	Land, Soil, and Hydrogeology	Water and Hydrology	Air Quality	Microclimate: Sunlight and Daylight	Microclimate: Wind	Noise and Vibration	Cultural Heritage	Landscape and Visual	Material Assets: Traffic and Transport	Material Assets: Built Services	Population and Human Health	Climate
Biodiversity		◆	◆	◆			◆		◆				◆
Land, Soil, and Hydrogeology	◆			◆			◆	◆		◆		◆	
Water and Hydrology	◆												
Air Quality	◆	◆								◆	◆	◆	◆
Microclimate: Sunlight and Daylight												◆	
Microclimate: Wind									◆			◆	
Noise and Vibration										◆	◆	◆	
Cultural Heritage									◆				
Landscape and Visual	◆							◆				◆	
Material Assets: Traffic and Transport		◆		◆				◆			◆	◆	
Material Assets: Built Services		◆								◆			
Population and Human Health			◆	◆	◆	◆	◆		◆	◆			◆
Climate	◆	◆	◆	◆	◆	◆	◆			◆	◆	◆	

19.3 Interdisciplinary Interactions

The principal interactions requiring information exchange between the environmental specialists and the design team are summarised below. The assessment of impacts described in **Chapters 6 -18** has taken into account the interactions listed below.

19.3.1 Biodiversity (Chapter 6)

19.3.1.1 Construction and Operation Interactions

Land, Soils and Hydrogeology

Exposed soils during the construction phase of the development may indirectly result in runoff into the River Santry during periods of heavy rain through the existing surface water drainage system. This would have the potential to affect water quality and aquatic species present in the River Santry. In conjunction with existing attenuations systems, design measures (e.g., SuDS) and management measures outlined in the CEMP will ensure no pollution of the River Santry occurs. It was concluded in the Appropriate Assessment Screening report accompanying the planning application that there is no possibility of likely significant effects on European sites from the proposed development.

Air Quality and Climate

Dust generated during the construction works could impact on vegetation within the surrounding area; see **Chapter 9** (Air Quality) and **Chapter 18** (Climate) of Volume 2 of this EIAR. Due to the urban nature of the surrounding environs, it is unlikely to affect vegetated habitats, none of which are Annex I habitats nor sensitive to dust deposition, occurring in an urban environment that is subject to considerable levels of traffic and NOx concentrations.

Water and Hydrology

There is potential for surface waters carrying silt and other pollutants to enter the River Santry via existing surface water drainage systems. This would impact the water quality and fauna species present in the River Santry. The mitigation measures outlined in the CEMP will ensure no pollution of the River Santry during the construction phase of the proposed development. SuDS measures proposed as part of the development will prevent the pollution of the River Santry during the operational phase of the proposed development. For reasons outlined in the AA Screening accompanying this planning application (Scott Cawley, 2023) there will be no impacts on European sites in Dublin Bay as a result of surface water pollution arising from this proposed development.

Foul waters will be produced as a result of this development and processed at Ringsend WWTP. For reasons outlined in **Chapter 6** (Biodiversity) of the EIAR and the AA Screening (Scott Cawley, 2023) accompanying this planning application, there will be no impacts on national or European sites in Dublin Bay as a result of foul waters arising from this development.

Noise & Vibration

Noise and vibration resulting from the construction and operational phases of the proposed development may cause disturbance to wildlife. No long-term impacts on wildlife are expected as a result of the proposed development due to the reasons outlined in **Chapter 6** (Biodiversity) of the EIAR.

Landscape

Vegetation removal is proposed as part of the landscape management plan. The removal of treelines, dry meadows and hedgerow habitat will impact on birds, bats and other mammals within the subject lands. The mitigation measures (i.e., avoidance of vegetation clearance in the breeding bird season) proposed in the biodiversity chapter of the EIAR will reduce the negative impacts of the development on wildlife.

All potential cumulative effects and environmental interactions of the project's construction and operational stages are included in **Chapter 19** (Cumulative Effects and Environmental Interactions). All mitigation measures for the proposed development resulting from the individual assessments, and the cumulative effects and environmental assessment are listed in detail in **Chapter 20** (Schedule of Environmental Commitments) and included in Section 6 of the Construction Environmental Management Plan (CEMP) accompanying the application. Provided the prescribed mitigation measures as listed in the environmental chapters are implemented in full during construction and/or operation, the overall impact on the environment, even considered in combination, is considered negligible.

19.3.2 Land, Soil and Hydrogeology (Chapter 7)

19.3.2.1 Construction Interactions

Biodiversity

Earthworks involving the removal of trees and hedgerows have the potential to impact on habitats.

Impacts from runoff from the exposed ground and construction areas have the potential to affect surface water resources and ecology

Data provided by the land and soils team assisted the biodiversity specialist in this assessment.

Air Quality

The construction activities have the potential to generate dust.

Noise

The activities associated with the land and soil environment (earthworks) will contribute to the noise emission from the site.

Cultural Heritage

Information on the depths of earthworks and excavations was provided to the Cultural Heritage specialist to assist in determining the likelihood of unearthing buried archaeology during construction works.

Material Assets: Traffic & Transport

Soil excavation will influence the traffic volumes entering and leaving the site during construction.

Population and Human Health (incl. land use)

Geological Heritage site assessments are required for the assessment of impacts on Material Assets. Quarries and their reserves are assessed as part of the Population and Human Health land use section.

19.3.3 Water and Hydrology (Chapter 8)

19.3.3.1 Construction and Operation Interactions

Biodiversity

The proposed development will interact with the water environment by discharging surface water runoff to the existing surface water network before discharge to the Santry River. Discharges of wastewater will be to the public sewer.

The water specialist provided details on the discharges and impacts on water quality to assist the biodiversity specialist in his assessment.

19.3.4 Air Quality (Chapter 9)

19.3.4.1 Construction and Operation Interactions

Biodiversity; Land, Soil & Hydrogeology; Traffic & Transport; Built Services; Population & human Health; and Climate

An adverse impact due to air quality in either the construction or operational phase has the potential to cause human health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact complies with all ambient air quality legislative limits and, therefore, that the predicted residual impact is short-term, negative and imperceptible during the construction phase, and long-term, neutral and imperceptible during the operational 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 AADT on roads close to the site. In this assessment, the impact of the interactions between traffic and air quality during both construction and operational phases are considered to be imperceptible.

With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interaction between air quality and land and soils.

19.3.5 Microclimate: Sunlight and Daylight (Chapter 10)

19.3.5.1 Construction and Operation Interactions

Human Health

Daylight

As is always the case where development will result in a change to the daylight environment within existing buildings, the impacts of the development on daylight access will result in interactions with the population and human health.

The Institute of Public Health in Ireland in Health Impacts of the Built Environment: a review (July 2006) highlights the implications of daylight access for human health as follows: *"Levels of illumination, particularly the amount of daylight exposure, can impact on psychological well-being. An association has been found between depression and lack of adequate daylight. Furthermore, there may be an association between the amount of natural light in schools and pupil motivation and effective learning time."*

Site layout planning for daylight and sunlight: a guide to good practice (the BRE Guide) does not suggest levels of daylight required to ensure human health or discuss the implications of a reduction in daylight access on human health. However, while the following documents are not relevant to the assessment of the impact of development on daylight access, the below comments on the importance of daylight to human health are considered instructive. Section 3.2: Daylight and health of the British Standard, BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting (the British Standard; withdrawn in May 2019) acknowledged *"the role of the circadian system (which controls daily and seasonal body rhythms)" in linking functions of the body with the cycle of day and night. It went on to state that "it is important that occupants of buildings … are given access to high levels of daylight, particularly in the mornings, to assist the entrainment of circadian rhythms."*

The British Standard also noted that "mood can be modified by lighting" and that exposure to daylight can reduce symptoms in those suffering from seasonal affective disorder (SAD). European Document EN 17037: 2018 Daylight in Buildings (adopted in Ireland as I.S. EN 17037:2018) does not make reference to the health implications of daylight access in buildings other than stating: "Daylight openings provide views and connection to the outside and contribute to the psychological well-being of occupants".

Sunlight

As is always the case where development will result in a change to the sunlight environment within existing buildings, the impacts of the development on sunlight access will result in interactions with the population and human health.

The Building Research Establishment's Site layout planning for daylight and sunlight: a guide to good practice (the BRE Guide) states: *"People like sunlight. In surveys around 90% said they appreciated having sunlight in their homes. The sun is seen as providing light and warmth, making rooms look bright and cheerful and also having a therapeutic health giving effect."*

Whereas the BRE Guide point out that sunlight access has implications for human health and recommends minimum levels for sunlight access, the BRE Guide does not suggest levels of sunlight required to ensure human health or discuss the implications of a reduction in sunlight access on human health.

19.3.6 Microclimate: Wind (Chapter 11)

19.3.6.1 Construction and Operation Interactions

Landscape

The proposed landscaping acts as a mean of mitigation to the incoming winds at the pedestrian level. In particular, the landscaping proposed or existing has a beneficial effect as it reduces the wind speed and produces a shielding effect. Through CFD Wind Modelling, the effects of landscaping trees/planting were implemented on the wind flowing through the urban environment. The landscape trees were simulated as comprising effects of porous zones within the modelled areas. This was an essential tool for accurately assessing the actual wind speed and pattern at a pedestrian level.

Population

Pedestrian Wind Comfort is measured in function of the frequency of wind speed threshold exceeded based on the pedestrian activity. In particular, the distress criteria relate to the physical well-being of the individual. For this assessment, to consider the wider population categories that are expected on the development, both general publics, both frail person/cyclists were considered. This has implied that the threshold values for the evaluation of the acceptance criteria of a pedestrian category were adapted to suit the frailest categories of public.

19.3.7 Noise & Vibration (Chapter 12)

19.3.7.1 Construction and Operation Interactions

Material Assets: Traffic & Transport

Construction traffic will have the potential for noise and vibration impacts. The Noise & Vibration chapter has been prepared in close cooperation with the traffic consultant, and potential noise and vibration impacts in respect of construction traffic are assessed in Chapter 12 (Noise and Vibration). The noise impact assessment concludes that the construction traffic noise level increases associated with the proposed development will be imperceptible at the nearest noise-sensitive properties. The traffic levels associated with the operational phase will be substantially lower than any levels of traffic that could contribute to increasing the road traffic noise in the study area, and hence there will be a negligible noise impact.

Material Assets: Built Services

Services noise associated with the building services has the potential to impact on existing noise-sensitive locations and new noise-sensitive locations that will be built as part of this development. Noise emissions from operational plants and activities will be designed in accordance with the criteria detailed within Chapter 12 (Noise and Vibration), which is based on guidance within BS 4142 Methods for Rating and Assessing Industrial and Commercial Sound. The resultant residual noise impact from this source will be of negative, not significant, long-term impact.

Population and Human Health

Construction noise and vibration may have an impact on sensitive locations in the vicinity, particularly those within 45m of the development boundary. Residents and Landowners will be consulted throughout the project, and mitigation to prevent these potential impacts is included in Chapter 12 (Noise and Vibration). The application of noise limits and limits on the hours of operation, along with the implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum. Due to the distance between the site and the nearest sensitive locations, vibration impacts generated during construction are expected to be negligible. Construction noise and vibration will be typically limited to daytime periods only. In terms of health effects, these are typically associated with long-term exposure to elevated levels of noise and/or vibration, which will not be the case in relation to construction sources. There are no health risks associated with operational noise resulting from the construction of the development subject to implementation of good site management practices and mitigation measures as required, as outlined in the relevant sections of the noise assessment and referenced documents. In essence, the noise levels from the proposed development on a day-to-day basis at the nearest noise-sensitive locations are predicted to be within relevant noise criteria that have been adopted here. The noise limits at the nearest noise sensitive locations are set in line with EPA NG4 (2016) guidelines and those espoused by the WHO Guidelines for Community Noise (WHO 1999) document in order to avoid any daytime annoyance or speech interference and/or night-time sleep disturbance, etc. Taking the above into consideration, operational noise from the development will be designed to be below the adopted criteria that are based on the thresholds below which there is no evidence of significant effects in relation to long-term exposure to noise on human health. There are no health risks associated with operational noise resulting from the development.

19.3.8 Cultural Heritage (Chapter 13)

19.3.8.1 Construction and Operation Interactions

No significant interactions that are likely to occur between Cultural Heritage and the various other environmental disciplines have been identified.

19.3.9 Landscape and Visual (Chapter 14)

19.3.9.1 Construction and Operation Interactions

Biodiversity

Interactions between landscape and biodiversity have been considered. An adverse impact to the biodiversity of the lands during either the construction or operational phases has the potential to negatively impact the landscape's character. The landscape mitigation measures will ensure that the new planting scheme is proposed that will improve and extend native planting area on the subject lands. Therefore, the measures proposed to mitigate the impact on the landscape character will result in a positive impact on the biodiversity value of the lands. This impact would be considered moderate in magnitude and long-term in duration.

Cultural Heritage

Interactions between landscape and cultural heritage have been considered. The proposed development has the potential to impact on cultural heritage in the local area. Landscape character, history and visual characteristics can be considered a part of cultural heritage. The proximity of the subject lands to historic landscape spaces such Santry Park and the walled gardens within, the former location of the subject lands within the Santry Demesne and the proximity to the Santry River could all be considered to have a potential impact on cultural heritage.

Population & Human Health

Interactions between landscape and Population and Human Health have been considered. Landscape has the potential to impact greatly on human health by providing external spaces which provide for communities in various ways, such as recreational use, visual enhancement of streets and external spaces, sports and play facilities and so on. The landscape mitigation measures include a significant amount of designed usable spaces for both future and existing residents, which will have a significant positive impact on Population and Human Health.

All potential cumulative effects and environmental interactions of the project's construction and operational stages are included in **Chapter 19**. All mitigation measures for the Project resulting from the individual assessments, and the cumulative effects and environmental assessment are listed in detail in **Chapter 20** and the Outline CEMP. Provided the suggested mitigation measures as listed in the environmental chapters are employed during construction and/or operation, the overall impact on the environment, even considered in combination, is considered negligible.

19.3.10 Material Assets: Traffic and Transport (Chapter 15)

19.3.10.1 Construction and Operation Interactions

Land, Soils & Hydrogeology

Soil excavation will influence the traffic volumes entering and leaving the site during the construction period.

Noise

The future traffic volumes were reviewed to predict the noise levels during construction and operation. The predicted traffic volumes were inputted into the noise model to predict future noise levels.

Air quality

The future traffic volumes were required to predict the associated change in air quality. The change in air quality was assessed against standard thresholds required to avoid impacts on public health.

Material Assets: Built Services

Impacts on the road network asset resulting from wear and tear will be dependent on the volume of future traffic predicted.

Population and Human Health

There will be a potential nuisance to the local population resulting from possible traffic delays due to increased traffic. Changes in air quality due to increases in traffic have the potential to impact Human Health.

19.3.11 Material Assets: Built Services (Chapter 16)

19.3.11.1 Construction and Operation Interactions

Material Assets: Traffic and Transport

Impacts on the road network asset resulting from wear and tear will be dependent on the predicted volume of future traffic.

19.3.12 Population & Human Health (Chapter 17)

19.3.12.1 Construction Interactions

Water and Hydrology

The provision of water infrastructure for the proposed development would involve construction activities within the subject lands. Provided that the proposed mitigation measures as set out in **Chapter 8** (Water and Hydrology) of this EIAR are implemented, the impact of the proposed development during the construction stage will be of a temporary nature and will be minimised. Therefore, the impact on human health and population in this regard is considered to be insignificant. A number of mitigation measures are outlined in **Chapter 8** (Water and Hydrology). An Outline CEMP, which details mitigation measures for the above issues, has been prepared J.B. Barry & Partners Ltd and is included under separate cover.

Traffic & Accessibility

The increase in traffic flows because of the construction of the site is considered negligible compared to the existing traffic and is not predicted to give rise to adverse impacts for the existing residential or working community in the area.

To facilitate the construction works of the proposed development, the existing surface car parking area catering for Swift Square Office Park personnel will be temporarily relocated to a new temporary carpark, that is located to the north of Gulliver's Retail Park. This temporary carpark will also provide spaces for construction staff. There are two options for temporary site access based on surrounding development, with further details in **Chapter 15** (Material Assets: Traffic and Transport).

Potential impacts in respect of traffic are examined further in the respective sections of this EIAR and are not considered to be of a magnitude, duration or timing to impact health and are not considered significant. As set out in **Chapter 15** (Material Assets: Traffic and Transport), a construction traffic management plan will include measures to safeguard safety and prevent traffic hazard.

Noise and Vibration

During the construction phase, there will be extensive site works, involving construction machinery, construction activities on site, and construction traffic, which will all generate noise. The highest noise levels will be generated during the general construction activities. The closest noise-sensitive locations to the main building works are at a distance of approximately 45m from the potential construction works.

During periods when construction works are occurring at distances of up to 45 m from the nearest noise sensitive locations to the site boundary, there is potential for temporary, negative, moderate noise impacts to occur. Mitigation measures with respect to noise emissions are detailed in **Chapter 12** (Noise and Vibration).

Air Quality

During the construction phase, site clearance and ground excavation works have the potential to generate dust emissions rising from the operation and movement of machinery on site. This has a potential impact on population and human health.

Best practice mitigation measures are proposed for the construction phase of the proposed development, which will focus on the proactive control of dust and other air pollutants to minimise the generation of emissions at the source. The mitigation measures that will be put in place during the construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values, which are based on the protection of human health. Therefore, the impact of the construction of the proposed development is likely to be negative, short- term and imperceptible with respect to human health.

Mitigation measures with respect to air quality and climate are detailed in **Chapter 9** (Air Quality), and **Chapter 18** (Climate).

Landscape and Visual

The construction phase will have short-term landscape and visual impacts. The impacts are not considered significant on population and human health, particularly given the level of screening to site boundaries.

19.3.12.2 Operation Interactions

Water and Hydrology

The impact of the operational phase of the proposed development on the public water supply will increase the demand on the existing supply. SUDS will be implemented in accordance with the recommendations of the GDSDS and FCC requirements. In addition, *The Planning System and Flood Risk Management Guidelines for Planning Authorities* will be adhered to. The quality of the surface water runoff will also improve as a result of the SuDS measures.

The potential impact on population and human health in this regard is considered to be insignificant.

Sunlight and Daylight

Access to sunlight and daylight is important in promoting and maintaining good health. It is considered that the proposed development meets pertinent sunlight and daylight standards as detailed in **Chapter 10** (Microclimate: Sunlight and Daylight), and therefore the level of access to sunlight and daylight will not have any discernible impact on human health.

Noise and Vibration

The main potential for altering the noise environment once the development is operational, and thus impacting neighbouring residential receptors, is road traffic noise associated with the development as a result of increased movements on the site. However, in the context of the existing noise environment, the overall contribution of induced traffic is considered to be of neutral, imperceptible and long-term impact on nearby residential locations.

Noise levels associated with building services plants are expected to be well within the adopted day and night-time noise limits at the nearest noise-sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels for not exceed the adopted design goals, the resultant residual noise impact from this source will be neutral, imperceptible, long term impact.

Air Quality

The operational phase of the proposed development will result in a slight impact on local air quality, primarily as a result of the requirements for new buildings to be heated and the increased traffic movements associated with the development. Emissions of air pollutants are predicted to be significantly below the ambient air quality standards, which are based on the protection of human health.

Traffic-related air emissions have the potential to impact air quality which can affect human health. However, the change in traffic associated with the proposed development is not of the magnitude to result in significant impacts. It can be determined that the impact on human health during the operational stage is long-term, direct, neutral and imperceptible, as stated in **Chapter 9** (Air Quality).

19.3.13 Climate (Chapter 18)

19.3.13.1 Construction and Operation Interactions

Biodiversity; Land, Soil & Hydrogeology; Water & Hydrology; Air Quality; Sunlight & Daylight; Wind; Traffic & Transport; Built Services; and Population & Human Health.

The climate change vulnerability assessment outlined the interactions of climate with the various other disciplines and its effect on each. As discussed above, climate change has the potential to increase flood risk over time. However, adequate attenuation and drainage have been provided for to account for increased rainfall in future years, as part of the design of the proposed development. Therefore it can be determined that there is no significant risk to the proposed development as a result of increased rainfall and climate. No significant interactions between Climate, Hydrology and Land, Soils and Geology are predicted.

Traffic emissions have the potential to impact climate through the release of carbon dioxide (CO2) emissions and other greenhouse gases (GHGs). This is an interaction between Material Assets – Traffic, Air Quality and Climate. It was found that no significant interactions between Climate and Traffic or Air Quality are predicted. Predicted impacts are long-term, neutral and imperceptible.

There is the potential for interactions between Climate and Material Assets – Waste. There will be quantities of demolition wastes generated as part of the proposed development, which will have an associated embodied carbon which impacts climate, where possible wastes should be reused on site or recycled to reduce the embodied carbon of the development.

No other significant interactions with Climate have been identified.

20 SCHEDULE OF ENVIRONMENTAL COMMITMENTS

All mitigation and monitoring commitments detailed within this EIAR have been included in a separate compendium and are presented in **Table 20.1** below. Together these tables form the Schedule of Environmental Commitments, which will be implemented as required during the construction and operational phases of the proposed residential development at lands to the north of Northwood Avenue, Santry, Dublin 9.

In addition, the following reinstatement commitments must be fully implemented upon completion of the construction phase:

- All temporary construction compounds and site entrances are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architect's plan and engineer's drawings;
- All construction waste and/or scrapped building materials are to be removed from the site on completion of the construction phase;
- Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase; and,
- Any remaining liquids are to be removed from the site and disposed of at an appropriately licenced waste facility.

Table 20.1: Environmental Commitments - Mitigation Measures (Construction and Operational Phases)

Item Ref.	Env. Topic	Schedule of Env. Commitments Mitigation Measures	Construction Phase	Operational Phase
N/A	**Biodiversity** (Chapter 6)	**Construction Environmental Management Plan (CEMP)** A CEMP summarises the overall environmental management strategy that will be adopted and implemented during the construction phase of the proposed development. The purpose of the CEMP is to demonstrate how the proposed construction works can be delivered in a logical, sensible, and safe sequence with the incorporation of specific environmental control measures relevant to construction works of this nature. The CEMP sets out the mechanism by which environmental protection is to be achieved during the construction phase of the proposed development. The CEMP has been prepared in accordance with the following industry best practice guidance: • TII's Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (TII 2007); and • Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015). The CEMP has been prepared in conjunction with the Environmental Impact Assessment (EIA) Report with input from members of the design team. The CEMP supports the information already provided in the EIA Report. The CEMP has been prepared and is included as part of the planning application package. The CEMP will be updated by the client prior to the commencement of the construction phase so as to include any additional measures required pursuant to conditions attached to any decision to grant approval. The CEMP has regard to the guidance contained in the TII Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan and the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015). The CEMP will be implemented in full by the appointed contractor to the satisfaction of the client.	◆	
BBM1; BBM2		**Breeding Birds** The following mitigation measures are proposed to comply with legislation protecting birds and their nests: • BBM1: In order to avoid disturbance of breeding birds, their nests, eggs and/or their unflown young, any tree felling, or hedgerow,	◆	

Item Ref.	Env. Topic	Schedule of Env. Commitments Mitigation Measures	Construction Phase	Operational Phase
		scrub or brash removal works will be undertaken outside of the nesting season (1st March to 31st August inclusive). Where this seasonal restriction cannot be observed, then: • BBM2: A check of woodland, trees and hedgerows within the proposed development site for breeding birds will be undertaken during the appropriate season (between 1st March and 31st August) by a suitably qualified and experienced ecologist. The appointed ecologist will confirm whether birds are nesting within suitable habitats affected by or immediately adjacent to the proposed development site. Should nesting birds be encountered during these checks, the vegetation removal in the vicinity of the nest(s) will be delayed until nesting has finished. This will comprise another inspection by an ecologist to check that young birds have fledged, and no new nests are present on site.		
BM1; BM2; BM3; BM4; BM5	**Biodiversity** (Chapter 6)	**Bats** All bat species and their roost sites are strictly protected under both European and Irish legislation, including: • Wildlife Act, as amended Council Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna, as amended European Communities (Birds and Natural Habitats) Regulations, as amended It is an offence under Section 23 of the Wildlife Acts and under Section 51 of the European Communities (Birds and Natural Habitats) Regulations to kill a bat or to damage or destroy the breeding or resting place of any bat species. Under the European Communities (Birds and Natural Habitats) Regulations, it is not necessary that the action should be deliberate for an offence to occur. This places an onus of due diligence on anyone proposing to carry out works that might result in such damage or destruction. Under Section 54 of S.I. 477 of 2011, a derogation may be granted by the Minister where there is no satisfactory alternative, and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range. Bats could occupy suitable roosting features at any time prior to the commencement of works. Therefore, there is an inherent risk that bats could be affected by the proposed felling works. The following mitigation procedures will be followed: • BM1: The trees in the lands that are scheduled for removal will be rechecked by a suitably qualified ecologist for the presence of PRFs immediately prior to felling. This measure is proposed as PRFs could potentially develop in the period between the completion of surveys to inform this report and the commencement of tree-felling works. Where no PRF features are identified during the recheck, no further actions will be taken. Where PRFs are identified on trees, the following measures will be undertaken: • BM2: Felling of confirmed and potential tree roosts will be undertaken between September and February, when bats are least likely to be utilising tree roosts in an urban context. • BM3: Subject to the health and safety considerations with regard to access to PRFs, PRFs will be inspected using an endoscope device by a suitably licenced and experienced professional to check for the presence of roosting bats. Access to the PRFs may be facilitated by using a mobile elevated working platform (MEWP) or similar or using tree climbing equipment. Where a bat or signs of a bat are identified in a PRF feature during the pre-felling checks of the tree, all works to the relevant tree will	◆	

Item Ref.	Env. Topic	Schedule of Env. Commitments Mitigation Measures	Construction Phase	Operational Phase
		cease. A bat mitigation strategy will be prepared for the tree pruning/removal works, and a derogation licence will be sought from the Minister for Housing, Local Government and Heritage to facilitate the legal removal of a roost. Where a PRF or a set of PRFs on a tree are identified as being of low suitability for bats/unlikely to host roosting bats, e.g., due to their extent, condition, exposure etc., then felling/pruning of the relevant section of tree / relevant tree will proceed at the discretion of the tree surgeon and under the supervision of a suitably qualified ecologist. Where a PRF, or a set of PRFs, is assessed as being of greater than low suitability for roosting bats, the following will apply: • BM4: Where it is safe and appropriate to do so for both bats and humans, such trees may be felled using heavy plant to push over the tree. In order to ensure the optimum warning for any roosting bats that may still be present, the tree will be pushed lightly two to three times using the heavy plant machinery, with a pause of approximately 30 seconds between each nudge to allow bats to become active. The tree should then be pushed to the ground slowly and should remain in place until it is inspected by a bat specialist. **Or** • BM5: Trees will be felled "in section" where the sections can be rigged to avoid sudden movements or jarring of the sections. Felled sections to be inspected when on ground and left in place for 24hrs before mulching.		
TM1	**Biodiversity** (Chapter 6)	**Retained Trees** The following mitigation measures are proposed to protect the trees to be retained on site: • TM1: In order to preserve the trees to be retained within the proposed development, the root protection area must be calculated by a qualified arborist. Protective barriers as per standard guidance BS 5837:2012 must be installed to exclude construction activities from the root protection area of the trees	◆	
N/A	**Biodiversity** (Chapter 6)	**Landscape Design** As outlined in **Chapter 14: Landscape and Visual**. SuDs has been incorporated into the design with a key design feature in respect of biodiversity relating to the inclusion of green roofs. Proposed landscape planting incorporated into the proposed development design will be implemented by the appointed contractor. The Landscape Masterplan for this proposed development (**Chapter 14: Landscape and Visual** of Volume 2 of this EIAR) and accompanying Landscape Report includes the following: use of native species, pollinator-friendly species, hedgerows, treelines, wildflower meadows and micro woodland.		◆
N/A	**Biodiversity** (Chapter 6)	**Use of Native species** As part of the iterative design process, consultations between the ecologist and landscape designer have ensured that the landscape design is cognisant of incorporating biodiversity into developments, a theme that is also identified in the third National Biodiversity Action Plan to "mainstream biodiversity". The tree population associated with the proposed development site is predominantly young (less than 20 years old). These are trees that have been planted as part of the Swift Square Office Park and associated temporary car park, by the applicant. The removal of these trees will be mitigated by the creation of 194m^2 of a "micro woodland", planting 120 no. semi-mature trees and 40 no. multi-stem trees (native or varieties of native species), and 420m of linear hedge. In this regard, the replanting ofnear to 100% native tree species will be undertaken, with species		◆

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		including silver birch *Betula pendula*, downy birch *Betula pubescens*, Scots pine *Pinus sylvestris*, bird cherry *Prunus padus*, pedunculate oak *Quercus robur* and white willow *Salix alba*.		
N/A	**Biodiversity** (Chapter 6)	**Pollinator Friendly species** The Landscape Masterplan for this proposed development (**Chapter 14: Landscape and Visual** of Volume 2 of this EIAR) has been designed to include biodiversity and ecological enhancement measures to strengthen green infrastructure within the wider landscape. This includes the use of ornamental shrub and herbaceous groundcover planting, with an emphasis on those species listed as pollinator friendly under the All-Ireland Pollinator Plan 2021-2025. The full species list is specified in the Landscape Masterplan drawing which accompanies this report.		◆
WLM1	**Biodiversity** (Chapter 6)	**Woodlands** Mitigation for the removal of woodland habitats recorded during the habitat survey (outlined in section 6.2.9.1 Habitats and Flora Survey) are as follows: • WLM1: The creation of 194m^2 of a "micro woodland which will consist of native tree species (e.g. those tree species included in treelines below, as well as alder Alnus glutinosa, hazel, hawthorn, holly *Ilex aquifolium*, blackthorn *Prunus spinosa*, dog-rose *Rosa canina* and gorse *Ulex europaeus*) planted closely together in a "Miyawaki Method" style, which is used to encourage more biodiversity. The micro woodland will include native canopy trees, and mostly native midstorey and understorey planting, with the full species list specified in the accompanying Landscape Masterplan.		◆
HM1	**Biodiversity** (Chapter 6)	**Hedgerows** Mitigation for the removal of hedgerow habitats recorded during the habitat survey (outlined in section 6.2.9.1 Habitats and Flora Survey) are as follows: • HM1: The planting of 420 m of linear hedgerows with a range of native herbaceous and tree/shrub species (e.g., *wild privet Ligustrum vulgare* and *hornbeam Carpinus betulus*) will be planted along the western perimeter of and proposed development. When established, this will allow for the development of biodiversity corridors for fauna.		◆
TM1; TM2	**Biodiversity** (Chapter 6)	**Treelines** Mitigation for the removal of treeline habitats recorded during the habitat survey (outlined in section 6.2.9.1 Habitats and Flora Survey) are as follows: • TM1: The planting of native 120 no. semi-mature trees and 40 no. multi-stem trees (native or varieties of native species, e.g. silver birch *Betula pendula*, scots pine *Pinus sylvestris*, bird cherry *Prunus padus* and pedunculate oak) will allow for the development of roosting and foraging habitats to establish over time. • TM2: The tree root protection areas as defined in BS 5837:2012, will be maintained so as to avoid compaction form human traffic.		◆
WMM1	**Biodiversity** (Chapter 6)	**Wild Meadows** Mitigation for removal of grassland: • WMM1: Pollinator friendly wildflower meadow areas will be encouraged to develop with native species along the peripheries of grassy areas, of which in total there will be 1572m^2. Mowing of grassy areas should ideally follow the		◆

Item Ref.	Env. Topic	Schedule of Env. Commitments Mitigation Measures	Construction Phase	Operational Phase
		advice given in the All-Ireland Pollinator Plan Advice to Councils (NBDC, 2021), which gives a variety of grass management options, including the six-week meadow. This allows five cuts to occur at specific periods in April, May, July, August and October, with grass cuttings removed to encourage wildflowers to grow.		
BM6	**Biodiversity** (Chapter 6)	**Bats** • BM6: Lighting proposals for the operational phase have been reviewed as part of this biodiversity assessment. The lighting columns will be fitted with baffles as appropriate to minimise light spill to retained/replanted trees and hedgerows and outside the proposed development site boundary to below 3 lux and include not orientating fittings above the horizontal plain.		◆
BBM3	**Biodiversity** (Chapter 6)	**Birds** • BBM3: In order to provide additional nesting opportunities for birds whilst the new planting is established, 3 no. 1B Schwegler nest boxes[24] or similar will be installed within the proposed development site. The nest boxes will be installed at a minimum of 3m above ground level to ensure against disturbance from humans and domestic animals such as cats. The boxes will be deployed across the site in appropriate locations, as advised by a suitably qualified ecologist.	N/A	
BM7	**Biodiversity** (Chapter 6)	**Bats** • BM7: Although no bat roosts were confirmed during the surveys and the potential for same was considered as being of low suitability, additional roosting opportunities for bats are proposed, to include 3 no. Schwegler 2F bat boxes[25] to be erected on suitable retained trees in suitable locations across the site, the location of which to be decided by a suitably qualified and experienced bat ecologist. The boxes will be installed on the tree at a height of 3-5 and firmly fixed to tree trunk: ○ Where practicable, the bat boxes will be installed in an East, South and West orientation and protected from undue disturbance by selective placement away from light spill and at a height >3.5m. ○ There will be 1m clearance (e.g., no overhanging branches or ivy encroachment near installed box) around each bat box opening. ○ Installed bat boxes will labelled and data (reference number, GPS location and photographic record) will be supplied to Bat Conservation Ireland (BCI), Local Authority Biodiversity Officer and NPWS. ○ BM7 has been proposed as an enhancement measure for the proposed development site rather than a mitigation measure as no confirmed roosting sites have been identified.	N/A	
N/A	**Land, Soils and Hydrogeology** (Chapter 7)	As no significant impacts were predicted, no specific mitigation measures are proposed. However, in advance of work starting on site the works Contractor will prepare a Construction Environment Management Plan (CEMP) which will include the schedule of any mitigation measures included with this EIAR. The plan will have regard to the guidance contained in the handbook published by Construction		◆

[24] Bird boxes are available to purchase online from NHBS www.nhbs.com and similar websites

[25] Bat boxes are available to purchase online from NHBS www.nhbs.com and similar websites

Item Ref.	Env. Topic	Schedule of Env. Commitments Mitigation Measures	Construction Phase	Operational Phase
		Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site, CIRIA 2005. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. The following mitigation measures have been identified which will form part of a Construction Environmental Management Plan (CEMP) which will include measures for reduction or elimination of pollution and the schedule of mitigation measures in this EIAR. • Contractor Guidance set out in the Control of Water Pollution from Construction Sites (CIRIA, 2001) shall be adhered to. Good construction management practices will be employed. During the construction stage, all potentially harmful substances (e.g., oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds. • Designated impermeable cement washout areas must be provided; • All oils and fuels will be stored in bunded tanks with the provision of a storage/retention capacity of 110%of tank storage. Care and attention will be taken during refuelling and maintenance operations. • Adequate means to absorb or contain any spillages of these chemicals will be available at all times. • Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996-20122.		
N/A	**Land, Soils and Hydrogeology** (Chapter 7)	As there is no operational interaction or impacts on the land, soils and hydrogeological environments, no mitigation is proposed apart from good practice.		◆
N/A	**Water and Hydrology** (Chapter 8)	• In advance of work starting on site the works Contractor will prepare a Construction Environment Management Plan (CEMP) and a Construction and Demolition and Waste Management Plan (CDWMP) which will include the schedule of any mitigation measures included with this EIAR. The plan will have regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site, CIRIA 2005. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development. **Flood Risk to Surrounding Areas** • The attenuation storage and the required outlet control to attenuate the discharge flow will be constructed as early as possible in the construction stage; and • During construction, the surface run-off will be directed through the existing stormwater drainage system. This will ensure that the discharge to the Santry River shall not exceed greenfield run-off rates. Following the implementation of mitigation, no significant residual impacts are predicted. **Water Quality** The following mitigation measures have been identified which will form part of a Construction Environmental Management Plan (CEMP) which	◆	

Item Ref.	Env. Topic	Schedule of Env. Commitments Mitigation Measures	Construction Phase	Operational Phase
		will include measures for reduction or elimination of pollution and the schedule of mitigation measures in this EIAR. • Contractor Guidance set out in the Control of Water Pollution from Construction Sites (CIRIA, 2001) shall be adhered to. Good construction management practices will be employed. During the construction stage, all potentially harmful substances (e.g. oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds. • Foul drainage from all site facilities will be to a public sewer. • When cast in-place concrete is required, all work must be done in the dry and effectively isolated from any flowing water (or water that may enter rivers or streams) for a period sufficient to ensure no leachate from the concrete; • No direct discharges to be made to waters where there is potential for cement or other contaminant residues in discharges; • Designated impermeable cement washout areas must be provided; • Within the site boundary fence, temporary earth bunds will be constructed to contain surface water run-off and channel it to a silt trap or settlement pond before discharge to the drainage network; • Any excavated vegetation, soil and subsoil will be temporarily stockpiled away at least 20 m from any surface water features in order to reduce the likelihood of any suspended solids reaching them; • Discharge points to the drainage network will entail a mechanism for containment of run-off in the event of accidental spillage to enable clean-up and appropriate disposal through licensed facilities. • Any soil contaminated from an accidental spillage will be contained and treated appropriately, and disposed of in accordance with the Waste Management Act 1996-2012. Following implementation of mitigation, the significance of the impact on water quality will be imperceptible.		
N/A	**Water and Hydrology** (Chapter 8)	Potential operational impacts are substantially mitigated through avoidance by the implementation of good management systems and sensible practices. **Flooding** The design of the drainage system has inbuilt mitigation, as outlined in Chapters 8 and 16. No flooding of the site and surrounding area are predicted. Consequently, no further mitigation is proposed. **Water Quality** The incorporation of hydrocarbon interceptors will ensure that any spill is contained before reaching the Santry River. Following the implementation of mitigation, the significance of the impact on water quality will be imperceptible.		◆
N/A	**Air Quality** (Chapter 9)	The pro-active control of fugitive dust will ensure the prevention of significant emissions rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the dust mitigation measures. The key aspects of controlling dust are listed below. Full details of the dust mitigation measures can be found in Section 9.5 of **Chapter 9.** In summary, the measures which will be implemented will include: • Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic. • Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.	◆	

Item Ref.	Env. Topic	Schedule of Env. Commitments Mitigation Measures	Construction Phase	Operational Phase
		• Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads. • Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph. • Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary. • Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods. • During the movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions. At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed, and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.		
N/A	**Microclimate: Sunlight and Daylight** Chapter 10)	No mitigation measures are considered necessary with respect to Microclimate: Sunlight and Daylight (Chapter 10).		
N/A	**Microclimate: Wind** (Chapter 11)	No mitigation measures are considered necessary with respect to Microclimate: Wind (Chapter 11).		
N/A	**Noise and Vibration** (Chapter 12)	• Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. • 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. 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. • 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. The following best practice migration measures should be considered: ○ Site compounds should be located away from noise-sensitive boundaries within the site constraints. The use lifting bulky items, and dropping and loading of materials within these areas should be restricted to normal working hours. ○ For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over the normal operation. Mobile plants should be switched off when not in use and not left idling. ○ For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system. ○ For percussive tools such as pneumatic breakers, a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensure any leaks in the air lines are sealed.		