CHAPTER 09:

CLIMATE

09

CHAPTER CONTENTS

9.0 CLIMATE

9.1 INTRODUCTION

This chapter assesses the likely climate impacts associated with the proposed development at 1 North Wall Quay, Dublin 1. A full description of the development is available in Chapter 2 'Description of Proposed Development'.

9.1.1 Proposed Development

The Proposed Development relates to 1 North Wall Quay, Dublin 1, D01 T8Y1. The proposed development provides for the demolition of the existing building and construction of a new building ranging in height from 9 no. to 17 no. storeys over lower ground floor and double basement comprising of office accommodation, arts/community/cultural uses and a retail/café/restaurant unit. Office accommodation is provided from lower ground floor to 15th floor level, arts/community/cultural uses are provided at lower ground, ground, 1st and 16th floor level with a retail/café/restaurant unit at ground floor level. Landscaped terraces are located at 8th, 9th, 10th, 11th, 15th, 16th floor level with winter terraces located at 4th, 6th 9th floor level. Provision of a new landscaped street to the east of the building to include external arts/community/cultural uses. The double basement comprises 30 no. car parking spaces, 923 no. bicycle parking spaces and 6 no. motorbike spaces as well as shower/changing facilities and plantroom. A full description of the proposed development is outlined in Chapter 2 'Description of the Proposed Development' of this EIAR.

9.2 METHODOLOGY

This chapter has been prepared having regard to the following guidelines:

- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA, 2022);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) on the assessment of the effects of certain public and private projects on the environment (the EIA Directive);
- European Union (EU) Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law');
- 2030 Climate and Energy Policy Framework (European Commission 2014);
- 2030 EU Climate Target Plan (European Commission, 2021b);
- Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2021 Climate Act) (No. 32 of 2021) (Government of Ireland, 2021b);
- Climate Action Plan 2024 (hereafter referred to as CAP24) (DECC, 2023);
- National Adaptation Framework (hereafter referred to as the NAF) (DECC, 2018);
- Dublin City Council (DCC) Climate Change Adaptation Strategies (DCC, 2023);
- Transport Infrastructure Ireland (TII) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022);

- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (UK Highways Agency, 2019);
- Institute of Environmental Management and Assessment (IEMA) Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition (IEMA, 2022); and
- IEMA EIA Guide to: Climate Change Resilience and Adaptation (IEMA, 2020).

A Whole Lifecycle Carbon Assessment was prepared by BPC Engineers. The analysis assessed the whole life-cycle carbon for the proposed development versus an 'Extend and Refurbish' option. The 'Extend & Refurbish' option assumes that the majority of the existing structure (foundations, floor slabs, beams, columns) is retained and that the building is extended so that the floor area is the same as the proposed development.

The embodied carbon emissions are calculated in line with EN 15978 for the carbon life-cycle stages A1-A5, B1-B5 and C1-C4 using Life-Cycle Analysis (LCA) software. The software is aligned with the calculation requirements for EN 15978 and provides a comprehensive Environmental Product Declaration (EPD) database to choose from. Refer to Appendix A of the Whole Lifecycle Carbon Assessment for further details on OneClick LCA software.

9.2.1 Criteria for Rating of Impacts

9.2.1.1 Climate Agreements & Policies

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

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2021a) and a third update in December 2022 (Government of Ireland, 2022).

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019, followed by the publication of the *Climate Action and Low Carbon Development (Amendment) Bill 2021* (hereafter referred to as the 2021 Climate Bill) in March 2021. The Climate Act was signed into

Law on the 23rd July 2021, giving statutory effect to the core objectives stated within the CAP.

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

In relation to carbon budgets, the *2021 Climate Action and Low Carbon Development (Amendment) Act* states *'A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')'*. The carbon budget is to be produced for 3 sequential budget periods, as shown in Table 9.1. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published in CAP24 in December 2023 and are shown in Table 9.2. Buildings (Residential) have a 40% reduction requirement and a 2030 emission ceiling of 4 Mt carbon dioxide equivalent (CO_2eq).

Budget Period	**Carbon Budget**	**Reduction Required**
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 9.1 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025 (DECC, 2023)

Sector	Baseline ($MtCO_2eq$)	Carbon Budgets ($MtCO_2eq$)		2030 Emissions ($MtCO_2eq$)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Transport	12	54	37	6	50
Electricity	10	40	20	3	75
Built Environment – Residential	7	29	23	4	40
Built Environment – Commercial	2	7	5	1	45
Agriculture	23	106	96	17.25	25
Industry	7	30	24	4	35
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach (see chapter 17 of CAP24).			
Total	**68**				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

Table 9.2 Sectoral Emission Ceilings 2030 (DECC, 2023)

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

In April 2023 the Government published a draft *Long-term Strategy on Greenhouse Gas Emissions Reductions* (Government of Ireland, 2023). This strategy provides a long-term plan on how Ireland will transition towards net carbon zero by 2050, achieving the interim targets set out in the Climate Action Plan. The strategy will be updated on the basis of a second round of public consultation throughout 2023 with an updated strategy published after this is complete.

The *Dublin City Council Climate Action Plan 2019 – 2024*, published in 2019 (DCC, 2019), outlines a number of goals and plans to prepare for and adapt to climate change. There are six key action areas within the plan: Energy & Buildings, Transport, Flood Resilience, Nature-Based Solutions and Resource Management. Some of the measures promoted within the Action Plan under the key areas involve building retrofits, energy master-planning, development of segregated cycle routes, development of flood resilient designs, promotion of the use of green infrastructure and water conservation initiatives. The implementation of these measures will enable the Dublin City Council area to adapt to climate change and will assist in bringing Ireland closer to achieving its climate related targets in future years. New developments need to be cognisant of the Climate Adaptation Strategy and incorporate climate friendly designs and measures where possible.

9.2.1.2 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 Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document* (TII, 2022) 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 in CAP24. 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 Mt CO_2eq in 2030 which is a 45% reduction over this period (see Table 9.2).

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022) is based on IEMA guidance (IEMA, 2022) which is broadly 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, 2022) 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 9.3 (derived from Table 6.7 of PE-ENV-01104 (TII, 2022)) 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.

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	The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. The project has gone well beyond existing and emerging policy requirements; and Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

Table 9.3 GHGA Significance Criteria

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 9.4 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale. TII guidance (TII, 2022) and the EU technical guidance (European Commission, 2021a) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. The impact from climate change on the proposed development can, therefore, considered to be not significant. However, 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.

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

Table 9.4 Vulnerability Matrix

9.2.2 Construction Phase

Climate change is a natural phenomenon but in recent years human activities, through the release of GHGs, have impacted on the climate (IPCC, 2022). The release of anthropogenic GHGs is altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. This effect is causing an increase in the atmosphere's heat trapping abilities resulting in increased average global temperatures over the past number of decades. The release of CO_2 as a result of burning fossil fuels, has been one of the leading factors in the creation of this 'Greenhouse Effect'. The most significant GHGs are CO_2, methane (CH_4) and nitrous oxide (N_2O).

GHGs have different efficiencies in retaining solar energy in the atmosphere and different lifetimes in the atmosphere. In order to compare different GHGs, emissions are calculated on the basis of their Global Warming Potential (GWPs) over a 100-year period, giving a measure of their relative heating effect in the atmosphere. The *IPCC Sixth Assessment Report (AR6)* (IPCC, 2021) sets out the global warming potential for 100-year time period (GWP100) for CO_2 as the basic unit (GWP = 1) whereas methane gas (CH_4) has a global warming potential equivalent to 27-30 units of CO_2 and N_2O has a GWP100 of 273.

There is the potential for GHG emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions.

The Institute of Air Quality Management document *Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2023) states that site traffic and plant is unlikely to make a significant impact on 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.

The Irish Green Building Council in partnership with One Click LCA Ltd. Have developed the Carbon Designer for Ireland tool (One Click LCA Ltd., 2023) for use on Irish specific building projects. The Carbon Designer tool is promoted by the EPA and the Land Development Agency. It allows users to assess the carbon impact of buildings at an early stage using typical default materials and values. Inputs to the tool include the gross floor area and number of stories above ground level along with the building frame type. Once the baseline is established using generic data the tool allows for optioneering and optimization of the carbon impact by highlighting the key areas within the building with the highest carbon impact and provides options for lower carbon intensive materials. The Carbon Designer for Ireland tool has been used to assess the embodied carbon impact of the residential units.

9.2.3 Operational Phase

9.2.3.1 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, 2022) 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 9.3, 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, 2022), 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. 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, 2022) provide the below list of asset categories and climate hazards to be considered. The asset categories will vary for project type and need to be determined on a 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 9.4.

9.2.3.2 Climate and Traffic Emissions

Emissions from road traffic associated with the proposed development have the potential to emit 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 meet or exceed the criteria for further assessment during the operational phase of the proposed development. As a result, a detailed assessment of traffic related CO_2 emissions was not conducted.

9.2.4 Forecasting Methods and Difficulties Encountered

9.3 RECEIVING ENVIRONMENT

9.3.1 Current GHGA Baseline

PE-ENV-01104 (TII, 2022) 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.

Climate impacts are assessed at a national level and in relation to national targets and sectoral emission ceilings. The study area for climate is the Republic of Ireland and the baseline is determined in relation to this study area.

Ireland's GHG emissions are estimated to be 60.76 million tonnes carbon dioxide equivalent (Mt CO_2eq), which is 1.9% lower (or 1.19 Mt CO_2eq) than emissions in 2021 (61.95 Mt CO_2eq) and follows a 5.1% increase in emissions reported for 2021 (EPA, 2023). In 2022 emissions in the stationary ETS sector decreased by 4.3% and emissions under the ESR (Effort Sharing Regulation) decreased by 1.1%. When Land Use, Land-use Change and Forestry (LULUCF) is included, total national emissions decreased by 1.8%. The sector with the highest emissions in 2022 (excluding LULUCF) was agriculture at 38.4% of the total, followed by transport at 19.1%. Decreased emissions in 2022 compared to 2021 were observed in the largest sectors except for transport, waste and commercial services. These 3 sectors showed increases in emissions (6.0%, 4.9% and 0.2% respectively). For 2022, the total national emissions (excluding LULUCF) were estimated to be 68,069 kt CO_2eq as shown in Table 9.5 (EPA, 2023).

Sector	2021 Emissions (Mt CO_2eq)	2022 Emissions (Mt CO_2eq)	% Total 2022 (including LULUCF)	% Change from 2021 to 2022
Agriculture	23.626	23.337	34%	-2.1
Transport	10.978	11.634	17%	6.0
Energy Industries	10.262	10.076	15%	-1.8
Residential	6.992	6.105	9%	-12.7
Manufacturing Combustion	4.614	4.288	6%	-7.1
Industrial Processes	2.475	2.289	3%	-7.5
F-Gases	0.745	0.741	1%	-0.5
Commercial Services	0.765	0.767	1%	0.2
Public Services	0.672	0.659	1%	-1.9
Waste Note 2	0.726	0.867	1%	4.9
Land Use, Land-use Change and Forestry (LULUFC)	7.338	7.305	11%	-0.5
National Total excluding LULUFC	61.955	60.764	89%	-1.9
National Total including LULUFC	62.293	68.069	100%	-1.8

Table 9.5 Total National GHG Emissions in 2022 Note 1

Note 1: Reproduced from Latest emissions data on the EPA website (EPA, 2023)
Note 2: Waste includes emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste

9.3.2 Future GHGA Baseline

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII, 2022) 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 Regulation was amended in April 2023 and Ireland must now limit its greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters Including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and thus includes GHG emissions from transport, residential and commercial buildings and agriculture.

9.3.3 Current CCRA Baseline

The region of the constraints area has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Dublin Airport Metrological station is the nearest weather and climate monitoring station to the contains area with meteorological data recorded for the 30-year period from 1991 to 2020. The historical regional weather data for Dublin Airport Metrological station is representative of the current climate in the region of the constraints area. The data for the 30-year period from 1991 to 2020 indicates that the wettest months at Dublin Airport Metrological station were November and December, and the driest month on average was June. July was the warmest month with a mean temperature of 15.4 Celsius. January was the coldest month with a mean temperature of 5.2 Celsius.

Met Éireann's 2023 Climate Statement (Met Éireann, 2024) states 2023's average shaded air temperature in Ireland is provisionally 11.20 °C, which is 1.65°C above the 1961-1990 long-term average. Previous to this 2022 was the warmest year on record, however 2023 was 0.38 °C warmer (see Figure 9.1).

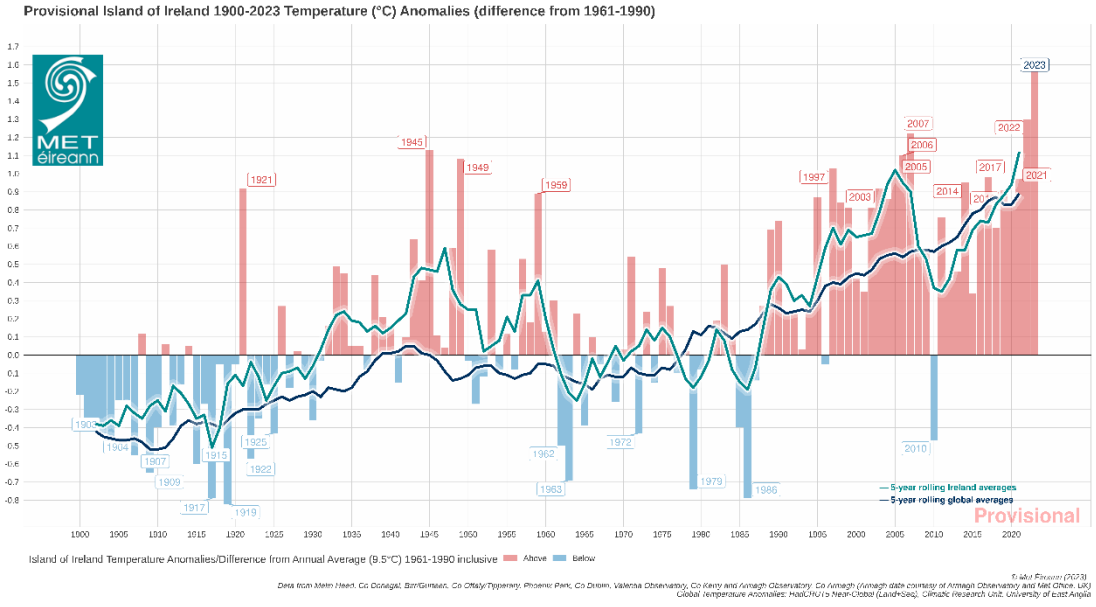

Figure 9.1 1900-2023 Temperature (°C) Temperature Anomalies (differences from 1961-1990) (Met Éireann, 2024)

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

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

9.3.4 Future CCRA Baseline

The EPA's *State of the Irish Environment Report (Chapter 2: Climate Change)* (EPA, 2020b) notes that projections show that full implementation of additional policies and measures, outlined in the 2019 Climate Action Plan, will result in a reduction in Ireland's total GHG emissions by up to 25% by 2030 compared with 2020 levels. Climate change is not only a future issue in Ireland, as a warming of approximately 0.8°C since 1900 has already occurred. The EPA state that it is critically important for the public sector to show leadership and decarbonise all public transport across bus and rail networks to the lowest carbon alternatives. The report (EPA, 2020b) 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. 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, 2020b). While individual storms are predicted to have more severe winds, the average wind speed has the potential to decrease (EPA, 2020b).

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, 2020a). The future climate was simulated under both Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. This study indicates that by the middle of this century (2041–2060), mid-century mean annual temperatures are projected to increase by 1 to 1.2°C and 1.3 to 1.6°C for the RCP4.5 and RCP8.5 scenarios, respectively, with the largest increases in the east. Warming will be enhanced at the extremes (i.e. hot days and cold nights), with summer daytime and winter night-time temperatures projected to increase by 1 to 2.4°C. There is a projected substantial decrease of approximately 50%, for the number of frost and ice days. Summer heatwave events are expected to occur more frequently, with the largest increases in the south. In addition, precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events. Climate change also has the potential to impact future energy supply which will rely on renewables such as wind and hydroelectric power. More frequent storms have the potential to damage the communication networks requiring additional investment to create resilience within the network.

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

National Framework for Climate Services (NFCS) was founded in June 2022 to streamline the provision of climate services in Ireland and will be led by Met Éireann. The aim of the NFCS is to enable the co-production, delivery and use of accurate, actionable and accessible climate information and tools to support climate resilience planning and decision making. In addition to the NFCS, further work has been ongoing into climate projects in Ireland through research under the TRANSLATE project. TRANSLATE (Met Éireann, 2023) has been led by climate researchers from University of Galway – Irish Centre for High End Computing (ICHEC), and University College Cork – SFI Research Centre for Energy, Climate and Marine (MaREI), supported by Met Éireann climatologists. TRANSLATE's outputs are produced using a selection of internationally reviewed and accepted models from both CORDEX and CMIP5. Representative Concentration Pathways (RCPs) provide a broad range of possible futures based on assumptions of human activity. The modelled scenarios include for "least" (RCP2.6), "more" (RCP4.5) or "most" (RCP8.5) climate change, see Figure 9.2.

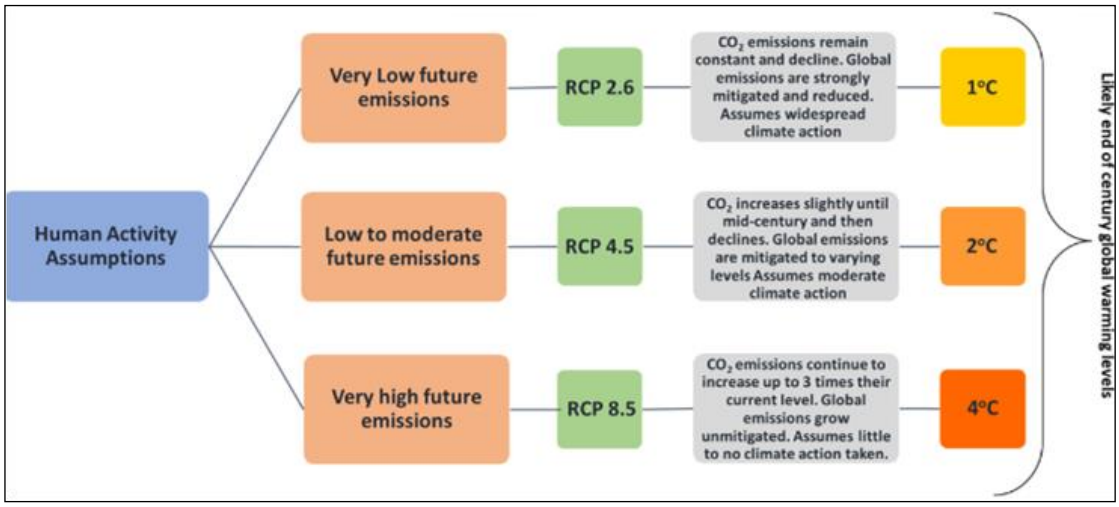

Figure 9.2 Representative Concentration Pathways Associated Emission Levels

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

TRANSLATE (Met Éireann, 2023) provides the first standardised and bias-corrected national climate projections for Ireland to aid climate risk decision making across multiple sectors (for example, transport, energy, water), by providing information on how Ireland's climate could change as global temperatures increase to 1.5˚C ,2˚C, 2.5˚C, 3˚C or 4˚C (see Figure 9.3). Projections broadly agree with previous projections for Ireland. Ireland's climate is dominated by the Atlantic Meridional Overturning Circulation (AMOC), a large system of ocean currents – including the Gulf Stream – characterised by a northward flow of warm water and a southward flow of cold water. Due to the AMOC, Ireland does not suffer from the extremes of temperature experienced by other countries at a similar latitude. Recent studies have projected that the AMOC could decline by 30 – 40 % by 2100, resulting in cooler North Atlantic Sea

surface temperatures (SST)s (Met Éireann, 2023). Met Éireann projects that Ireland will nevertheless continue to warm, although the AMOC cooling influence may lead to reduced warming compared with continental Europe. AMOC weakening is also expected to lead to additional sea level rise around Ireland. With climate change Ireland's temperature and rainfall will undergo more and more significant changes e.g. on average summer temperature could increase by more than 2°C, summer rainfall could decrease by 9% while winter rainfall could increase by 24%. Future projects also include a 10-fold increase in the frequency of summer nights (values > 15°C) by the end of the century, a decrease in the frequency of cold winter nights and an increase in the number of heatwaves. A heatwave in Ireland is defined as a period of 5 consecutive days where the daily maximum temperature is greater than 25°C.

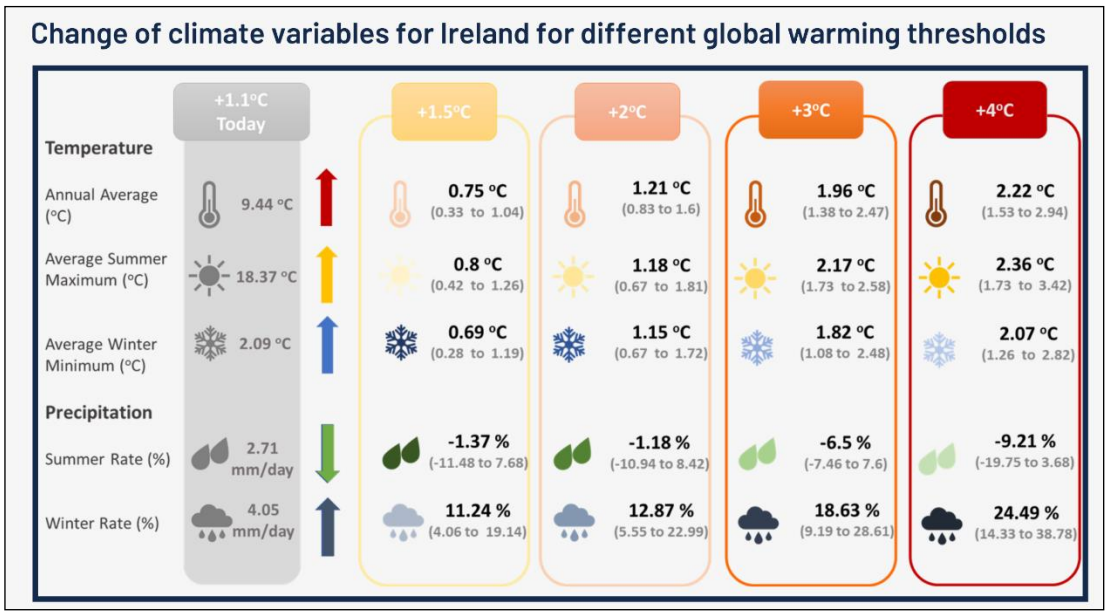

Figure 9.3 Change of Climate Variables for Ireland for Different Global Warming Thresholds

Source TRANSLATE Project Story Map (Met Éireann, 2023)

9.3.5 Climate Change Vulnerability

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, 2021). 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, 2021):

- 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.

9.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The Proposed Development relates to 1 North Wall Quay, Dublin 1, D01 T8Y1. The site is bound by North Wall Quay to the south and Commons Street to the west. The Proposed Development comprises the demolition of the existing office building and the construction of a new 17 storey landmark office development over 2 no. levels of basement with an overall gross floor area of c. 87,244 sq. metres. Impacts to climate will occur during both the construction and operational phases of the developments.

During the construction stage the main source of climate impacts will be as a result greenhouse gas (GHG) emissions and embodied carbon associated with construction materials and construction activities for new buildings. During the operational phase vehicle emissions from traffic accessing the site has the potential to release carbon dioxide (CO_2) and other GHGs which will impact climate. In addition, the vulnerability of the proposed development in relation to future climate change must be considered during the operational phase.

9.4.1 Construction Phase

During the construction stage the main source of climate impacts will be as a result of GHG emissions and embodied carbon associated with the proposed construction materials and activities for the proposed development.

9.4.2 Operational Phase

During the operational phase, traffic accessing the site for maintenance purposes has the potential to impact on climate. However, this traffic will not be of the magnitude to cause a significant impact. In addition, the vulnerability of the proposed development in relation to future climate change must be considered during the operational phase.

9.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

BPC Engineers conducted a Whole Lifecycle Carbon Assessment that involved calculating the entire carbon emissions throughout the building's lifecycle, which was assumed to be 60 years. This calculation combined the embodied carbon emissions and the operational carbon emissions.

9.5.1 Construction Phase

9.5.1.1 Greenhouse Gas Assessment

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

A Whole Lifecycle Carbon Assessment has been prepared as part of the planning application by BPC Engineers. This states that an operational energy target of <55 kWh/m^2.yr and an embodied carbon target of <750 $kgCO_2e/m^2$ has been set in line with the 'RIBA 2030 Climate Challenge' target for 2030.

The embodied carbon emissions were calculated by BPC Engineers in line with EN 15978 for the carbon life-cycle stages A1-A5, B1-B5 and C1-C4 using Life-Cycle Analysis (LCA) software. The software is aligned with the calculation requirements for EN 15978 and provides a comprehensive Environmental Product Declaration (EPD) database to choose from. The proposed development is estimated to result in total GHG emissions of 180,171,409 tonnes embodied CO_2eq for the embodied and

operational processes. This is equivalent to 0.08% of the 2030 Buildings (Residential) or Industrial Sector Budgets (both have same 2030 Budget) when annualised over the project lifespan (assumed 60 years).

According to LETI (Low Energy Transformation Initiative), for buildings that are currently in the design stage: a good design should achieve a LETI band C, meaning that the embodied carbon stages A1-A5 should be between 475 and 600 kg CO_2eq/m^2. The upfront embodied carbon calculated for the new building is in line with the benchmarks presented. The LETI 2020 upfront embodied carbon benchmark for stages A1-A5) is <600 kg CO_2eq/m^2. The upfront embodied carbon calculated for the refurbished building is lower than the existing benchmarks for new buildings.

A second aspirational target of 600 kg CO_2/m^2 has been set in line with the LETI targets from their 'Climate Emergency Design Guide' (2020).

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase. As part of the overall embodied carbon reduction strategy, the design is targeting that 30% of the cement will be replaced by Ground Granulated Blast Furnace Slag (GGBS). GGBS is a by-product of iron and steel making processes. It is dried and ground in to a white powder which can be used to replace anywhere between 30% and 80% of the cement in concrete. During detailed design, if technically viable this percentage will be increased. The project will also target 90% recycled steel in rebar and 20% recycled content in structural steel.

Provided the targets set out in the climate action energy statement are met during detailed design, which aim to have an embodied carbon between 475 kg CO_2eq/m^2 and 600 kg CO_2eq/m^2, then in accordance with the significance criteria set out in Section 9.2.1.2, the potential impact on climate from embodied carbon is considered ***minor adverse, negative and long-term.***

9.5.1.2 Climate Change Risk Assessment

Examples of potential climate impacts are included in Annex D (Climate proofing and environmental impact assessment) of the *Technical Guidance on the Climate Proofing of Infrastructure* (European Commission, 2021a). Potential impacts of climate change of the proposed development include:

- Flood Risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding;
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather;
- Reduced temperatures resulting in ice or snow;
- Geotechnical impacts; and
- Major Storm Damage – including wind damage.

Each of these potential risks are considered with respect to the operational phase of the proposed development as detailed in Section 9.2.3.1. During the construction phase no assessment is required; however, consideration will be given to the project's vulnerability to climate impacts. During construction, the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures.

Temperatures can affect the performance of some materials, and this will require consideration during construction.

During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

9.5.2 Operational Phase

There is the potential for increased traffic volumes to impact climate. The change in AADT values is not of the magnitude to require a detailed climate assessment as per the screening criteria outlined in Section 9.2.3.2. It can therefore be determined that the likelihood of traffic related CO_2 emissions during the operational phase are not significant and therefore scoped out for any further detailed assessment.

A Workplace Travel Plan has been prepared by CS Consulting, with the following objectives:

- To encourage/increase the use of public transport, walking and cycling for development occupants and visitors, and to facilitate travel by bicycle, bus, light rail and train.
- To minimise the overall number of single-occupant vehicles trips for journeys to work and work-related travel.
- To integrate mobility management into the development decisions, policies and practices, and to work closely with governing bodies on means and use of transport services around the vicinity of the development site.
- To provide information and have resources readily available to increase awareness and continue education on sustainable modes of travel for both development occupants and visitors to the development.

Within the development, bicycle parking for occupants and visitors has been provided in accordance with the requirements of the Dublin City Development Plan 2022-2028.

A Part L Compliance Assessment has been prepared as part of the planning application by BPC Engineers. The following passive strategies will be implemented to reduce the energy consumption for the proposed development:

- Low air permeability;
- High performance u-values;
- Limiting thermal bridging;
- Optimisation of solar gain and
- Maximising daylight.

The design will ensure it meets criteria set out in the following:

- Building Regulations 2017 Part L (SI No. 538 2017);
- Building regulations TGD L – Buildings Other than Dwellings: Conservation of Fuel and Energy; and
- Dublin City Council Development Plan 2022-2028.

The Climate Action Energy Statement states that a baseline target of <55 kWh/m^2.yr has been set in line with the 'RIBA 2030 Climate Challenge' target for 2030. A second aspirational target of 600 kg CO_2/m^2 has been set in line with the LETI targets from their 'Climate Emergency Design Guide' (2020). A multifunctional air source heat pump is proposed for the building.

BPC Engineers determined the embodied energy of the new build option to be 62,563,671 kg CO_2eq. The operational carbon emissions for the new building were calculated based on an annual operational energy figure of 150 kWh/m^2, resulting in 117,607,738 kg CO_2eq. Therefore, the total whole life-cycle carbon emissions amount to 180,171,409 kg CO_2eq under a worst-case scenario.

For further details, refer to the full Whole Lifecycle Carbon Assessment.

Provided the targets set out in the climate action energy statement, and future CAP policy updates are met during detailed design, including the A3 BER and aim to have an embodied carbon between 750 kg CO_2/m^2 and aspirations to reduce this close to 600 kg CO_2/m^2, then in accordance with the significance criteria set out in Section 9.2.1.2 the potential impact on climate from operational carbon is considered ***minor adverse, not significant*** and ***long-term.***

9.5.2.1 Climate Change Risk 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 9.6 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 9.4. The results of the vulnerability assessment are detailed in Table 9.6 below.

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

Table 9.6 Climate Change Vulnerability Assessment

The proposed development has a worst-case low vulnerability to the identified climate hazards. The Site-Specific Flood Risk Assessment (SFRA) completed by CS Consulting indicates that the site is contained almost entirely within Flood Zone C. A minor portion of the application area (at the north-eastern boundary along Clarion Quay) is within Flood Zone B.

The Liffey Catchment Flood Risk Assessment and Management Study (CFRAMS) project indicates that the development site is not at risk from a 0.1% AEP fluvial flooding event, making the risk of fluvial flooding negligible even during a 1-in-1000-year occurrence. No mitigation measures are deemed necessary for fluvial flooding. Predicted flood hazard mapping for fluvial events shows low risk for the development site.

Regarding pluvial flooding, the site may experience flooding up to 0.5m due to high-intensity rainfall, but there are no historical records of such events in the area. The risk of pluvial flooding is considered negligible based on local topography. The proposed development includes an attenuation system and on-site storage to address stormwater runoff, reducing the potential risk of pluvial flooding. Predicted flood hazard mapping indicates a moderate risk from pluvial and tidal events, and demountable flood barriers are proposed at the entrance to mitigate this risk. For tidal/coastal flooding, the site is largely within the area at risk from a 0.1% AEP tidal event, indicating a 1-in-1000-year occurrence. Concerning groundwater, the site overlays both a locally important gravel aquifer and a locally important bedrock aquifer, moderately productive only in specific zones. The area is categorized as having moderate groundwater vulnerability.

The development design incorporates adequate attenuation and drainage in compliance with relevant standards, addressing additional rainfall resulting from climate change to minimize the site's risk. The proposed development includes an attenuation system to limit stormwater runoff, utilizing Blue Roofs for on-site attenuation storage. This system releases stormwater in a controlled manner after the peak storm duration.

To prevent groundwater seepage into the properties, the Finished Floor Levels (FFL) will be set above road and garden levels, with a minimum FFL of 3.65m AOD. Flood risk mitigation involves providing Sustainable Urban Drainage Systems (SUDS)

capable of storing water for a 1-in-100-year storm event, plus a 30% allowance for climate change. This approach significantly reduces stormwater volume leaving the site during extreme storms, thereby lessening the impact on the public drainage system and lowering the risk of flooding on neighbouring sites due to runoff from the development.

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

No significant vulnerabilities to other climate hazards have been identified.

Climate vulnerability has been considered throughout the design of the proposed development and will be further during detailed design. This consideration has been completed to ensure that future climate change risks will not significantly impact the proposed development.

9.5.2.2 Climate and Traffic Emissions

There is the potential for increased traffic volumes to impact climate during the operational phase. However, traffic related impacts have been screened out of this assessment as per the criteria in Section 9.2.3.2. Impacts to climate as a result of traffic emissions are considered neutral.

9.6 MITIGATION MEASURES

9.6.1 Construction Phase

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase.

The Whole Life Carbon Assessment provide by BPC has identified opportunities to reduce embodied carbon. The following elements/resources with the highest life-cycle embodied carbon should be considered to reduce embodied carbon:

- Ready-mix concrete for external walls and floors:
  - Increasing GGBS % (30% currently assumed).
  - Replacing a percentage of the Portland cement (Pc) with low carbon alternatives can significantly reduce the EC of concrete.
- Raised flooring systems:
  - Alternative system types, e.g. calcium sulphate raised floors.
- Aluminium in Façade
  - Assess shading to ensure all aluminium fins, overhangs, etc. are required for solar control and minimised where they are only performing an aesthetic function.
  - Increase the recycled content of aluminium and use renewable energy supplies in its production.
- Structural steel and steel profiles:
  - Increasing recycled content (20% recycled content in structural steel and 90% recycled content in steel reinforcement (rebar) currently assumed).
  - Reducing the amount of steel required where possible and maximising the recycled content.

- HVAC components and equipment:
    - Reducing amount of equipment/material.
        - Considering equipment EC when specifying equipment and selecting lower EC options where possible. (Whole lifecycle needs to be considered including operational energy.)
        - Consider number of pieces of equipment required and reduce length/size of pipe runs and ventilation ductwork.
    - Consider equipment EC when specifying equipment and selecting lower EC options where possible.
        - Particular attention to be paid to AHUs where units may be custom and may offer more flexibility with regard to specifications compared to other equipment.
    - Whole lifecycle needs to be considered including operational energy.

Additionally, 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.
- Waste materials will be re-used on site where possible and where re-use is not possible on-site they will be sent off-site for recycling, re-use or recovery.
- Sourcing materials locally where possible to reduce transport related CO_2 emissions.

9.6.2 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 (see Section 9.2.3.1).

The proposed development has been designed to reduce the impact on climate as a result of energy usage during operation. The Part L Compliance Assessment by BPC Engineers and submitted under separate cover with this planning application details a number of incorporated design mitigation measures that have been incorporated into the design of the development to reduce the impact on climate wherever possible. Such measures included in the proposed development to reduce the impact to climate from energy usage are:

- A3 BER rating;
- Compliance for the Apartments to Part L 2021/ NZEB;
- Energy Performance Coefficient (EPC) < 1.00;
- Carbon Performance Coefficient (CPC) < 1.15;
- Achieve air tightness standards of 3 $m^3/m^2/hr$;
- Ensure thermal bridging details are designed to achieve thermal bridging factors of 1.91W/mK or less;
- Building fabric U-Value and G-Value calculations will be completed to at least meet TGD Part L 2022 minimum elemental u-values with the exception of the

curtain wall and glazing. Further information on the construction assignment is provided in Appendix A of BPC Engineer's Part L Compliance Assessment.

- Lighting will be designed to limit the energy required and effect on surrounding environment including existing flora and fauna. External lighting will comply with the latest standards and achieve:
    - Low-level lighting
    - Utilise low voltage LED lamps
    - High efficiency LED lighting design coupled with PIR occupancy sensing where appropriate.
- Each light fitting is to be controlled via an individual Photoelectric Control Unit (PECU). The operation of the lighting shall be on a dusk-dawn profile. All lighting will be 100% LED.
- Air Source Heat Pumps are proposed for the heating requirements for the Proposed Development.
- Where possible, take quantitative performance approaches to and satisfy minimum standards for daylight provisions as outlined in *'Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (March 2018)*' and in guides like the BRE guide *'Site Layout Planning for Daylight and Sunlight' (2nd edition)* or *BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'*. This will reduce requirement for continuous daylighting;
- Exceed the minimum U-Value standards identified in *Part L 2022 Dwellings;*
- Provide an appropriate combination of technologies to ensure energy consumption is in line with *Part L 2022 Dwellings* requirements (Renewable Energy Ratio (RER) > 0.1);
- Install infrastructure for EV charging for car parking spaces, to allow for future installation of recharging points;
- A waste management strategy will be in place, with grey, brown and green bin distinction. Composting and glass bins will be provided throughout;
- Green and blue roofs shall be provided on the proposed building's flat roof areas and terraces, mostly in the form of combined green/blue roof systems. Green and blue roofs reduce and slow water from rain-fall as they retain any water before naturally releasing it back into the environment. This will contribute towards a building sustainable drainage system and will reduce the risk of flooding and pollution in urban areas;
- Durable building materials with long life-cycles will be selected to prevent the need for frequent replacement or maintenance, thereby reducing the embodied footprint of the development. All timber will be from sustainable sources;
- Access to public transport and reduced reliance on private transport has been considered as the application site is near established rail and bus transport services as well as established social and community services of North Wall Quay; and
- Bicycle parking and storage has been generously provided in the proposed scheme.

These identified measures will aid in reducing the impact to climate during the operational phase of the proposed development in line with the goals, relevant policies and objectives of the *Dublin City Council Development Plan 2022-2028* and *Dublin City Climate Change Action Plan 2019-2024*, including climate mitigation measures. Further details on some of the incorporated design measures can be found in the *Part L Compliance Assessment Energy Statement* prepared by BPC Engineering in respect of this planning application.

9.7 MONITORING OR REINSTATEMENT MEASURES

No monitoring is required for the development during the construction or operational phase. Reinstatement is not applicable to climate.

9.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

The impact to climate as a result of a proposed development must be assessed as a whole for all phases. 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*".

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.

9.8.1 Construction Phase

The proposed development with mitigation measures is estimated to result in total GHG emissions of 189,633 tonnes embodied CO_2eq over the 60 year lifetime of the proposed development, or 3,161 tonnes embodied CO_2eq when annualised. This is equivalent to 0.08% of the 2030 Buildings (Residential) or Industrial sector budgets (both have same 2030 budget) when annualised over the lifespan.

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).

9.8.2 Operational Phase

There is the potential for a number of greenhouse gas emissions to atmosphere during the operational phase of the development. Due to the nature of this development the impact on climate from the operational phase is predicted to be imperceptible. The increase in traffic was scoped out for climate in accordance with the TII guidance.

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*".

As per the assessment criteria in Table 9.3 the impact of the proposed development as a whole for all phases in relation to GHG emissions is considered ***direct***, ***long-term, minor adverse*** and ***not significant*** in EIA terms

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the proposed development as a result of climate change.

9.9 CUMULATIVE IMPACTS OF THE PROPOSED DEVELOPMENT

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

The cumulative impact of the proposed development in relation to GHG emissions is considered ***direct***, ***long-term, minor adverse*** and ***not significant*** in EIA terms.

9.10 REFERENCES

Department of the Environment, Climate and Communications (DECC) (2018) National Adaptation Framework (NAF)

Department of the Environment, Climate and Communications (DECC) (2023) Climate Action Plan 2024

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

Dublin City Council (DCC) (2019) Dublin City Council Climate Action Plan 2019 - 2024

Environmental Protection Agency (EPA) (2020) State of the Irish Environment Report (Chapter 2: Climate Change)

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

Environmental Protection Agency (EPA) (2023) Ireland's Final Greenhouse Gas Emissions 1990-2021

European Commission (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment

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