10. CLIMATE

10.1 Introduction

This chapter identifies, describes, and assesses the potential significant direct and indirect effects on climate arising from the construction and operation of the Proposed Development and has been completed in accordance with the EIA guidance and legislation set out in Chapter 1: Introduction. The full description of the Proposed Development is detailed in Chapter 4 of this EIAR. The Proposed Development is a component of a larger residential development project (Proposed Project). The Proposed Project involves the construction of more than 500 residential units, and the development will require separate, individual planning applications for each part of the project.

The objective of this assessment is to assess the potential effects that the Proposed Development may have on Climate and sets out proposed mitigation measures to avoid, reduce or offset any potential significant effects that are identified.

10.1.1 Background

The Proposed Development will consist of a mix of residential units, open spaces, creche and all other site related infrastructure. The Environmental Impact Assessment Report (EIAR) Study Area is 8.74 hectares (ha) in extent and is situated at Knocknacarra, County Galway which lies approximately 3.1 kilometres (km) west of Galway City Centre. The Proposed Development site can be accessed via both the Western Distributor Road which is located to the north of the site and the Kingston Road (R337) which runs in an east west direction to the south of the site. Both of these roads provide connectivity to Galway City and beyond.

The site itself is comprised of a mixture of agricultural grassland and brownfield. Stone walls and treelines are also present within the boundary of the site. There is an existing dwelling in the centre of the site along with some agricultural buildings. The surrounding area is urban in character and the site is surrounded by a number of residential estates and commercial and industrial buildings.

10.1.2 Chapter Structure and Climate Study Areas

This chapter of the EIAR provides an assessment of the potential significant direct and indirect effects on climate arising from all phases of the Proposed Development.

The chapter structure is as follows:

- A review of all relevant climate change legislation policy and guidance applicable to the Proposed Development in an international, national, and local context (Section 10.2)
- Presentation of the baseline environment (Section 10.3 below), including:
    - A description of the current baseline environment established from desk study, utilising relevant datasets and data provided within other sections of the EIAR (Section 10.3.1 below)
    - A description of the future baseline environment, established from desk study, utilising relevant datasets and data provided within other sections of the EIAR (Section 10.3.2 below)
- An overview of the Sustainability Statement for the Proposed Development (Section 10.4 below)
- A detailed carbon assessment, which considers how the Proposed Development will affect the greenhouse gas emissions associated in Ireland as a result of activities

associated with the construction and operational phases (inclusive of both carbon losses and carbon savings) (Section 10.5 below)
- Presents an assessment of the potential likely significant effects on climate arising from the Proposed Development during the construction (Section 10.6.2) and operation (Section 10.6.3) based on the information gathered and the analysis and assessments undertaken.
    - All required mitigation measures to prevent, minimise, reduce or offset the likely significant environmental effects identified in the construction phase and operational phase is provided in this section.
- An assessment of potential cumulative impacts is provided in Section 10.7 and details any potential cumulative effects on climate between the Proposed Development and other permitted or proposed projects and plans in the area, for the construction phase and operational phase.

By their very nature, the impacts and resulting effects of greenhouse gas emissions are global rather than affecting one localised area. For the purposes of this EIAR, the overall Climate Study Area for the Proposed Development is defined as the national environment (Ireland), where the receptor is the climate and the global atmosphere. As stated in the Institute of Environmental Management and Assessment (IEMA) 2022 guidance *'Assessing Greenhouse Gas Emissions and Evaluating their Significance*[1]. Therefore, effects arising from the potential impacts on climate are considered to impact on a national level. National, regional and local data has been considered where relevant and available. The study areas considered across the different assessments provided within this report are detailed below.

Baseline Environment

- Current Baseline
    - Current Baseline Study Area: defined as the EIAR Study Area, as defined in Section 1.2.1 of Chapter 1 of this EIAR. Relevant information taken from EIAR Chapters for inclusion in the current baseline assessment is within the relevant discipline's specific assessment boundary, as identified in each cited EIAR Chapter.
- Future Baseline
    - Future Baseline Study Area: defined as the EIAR Study Area, i.e., the primary study area for the EIAR as defined in Section 1.2.1 of Chapter 1 of this EIAR. Relevant information taken from relevant EIAR Chapters for inclusion in the future baseline assessment will be within the relevant discipline's specific assessment boundary, as identified in each cited EIAR Chapter.

Carbon Assessment

- Carbon Assessment Study Area: defined as the EIAR Study Area, as defined in Section 1.2.1 of Chapter 1 of this EIAR.

10.1.3 Statement of Authority

This section of the EIAR has been prepared by Catherine Johnson and reviewed by Eoin O'Sullivan, both of MKO. Catherine is an Environmental Scientist and Climate Practitioner at MKO with over three years of consultancy experience in climate and sustainability. Catherine has expertise in international climate law and policy, earth science, and sustainability/ESG processes. Catherine

[1] *IEMA (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition. Available online at: https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions*

possesses skills in mapping and design, which complement her experience in preparing comprehensive reports for EIAs with a particular focus on climate change. Catherine has a BSc in Earth and Ocean Science and an LLM in Global Environment and Climate Change Law. Eoin O'Sullivan is a Project Director at MKO with over 15 years of experience in the environmental assessment of a wide range of energy and infrastructure related projects and working in the fields of environmental and human health risk assessment, waste management, waste policy and permitting. Eoin has also experience in completing Environmental Impact Assessment Reports for renewable energy projects, quarries and a number of non-hazardous landfill sites and anaerobic digesters for both public and private clients. Eoin holds a BSc (Hons) in Environmental Science & Technology and an MSc in Environmental Engineering. Eoin's key strengths include project strategy advice for a wide range and scale of projects, project management and liaising with the relevant local authorities, Environmental Protection Agency (EPA) and statutory consultees as well as coordinating the project teams and sub-contractors. Eoin is a Chartered Member of the Chartered Institute of Water and Environmental Management and Chartered Environmentalist with the Society of Environment.

10.2 Climate Change and Greenhouse Gases

Although variation in climate is thought to be a natural process, the rate at which the climate is changing has been accelerated rapidly by human activities. Climate change is one of the most challenging global issues facing the world today and is primarily the result of increased levels of greenhouse gases in the atmosphere. Increasing human emissions of carbon dioxide and other greenhouse gases cause a positive radiative imbalance at the top of the atmosphere, meaning energy is being trapped within the climate system. The imbalance leads to an accumulation of energy in the Earth system in the form of heat that is driving global warming.[2,3] Greenhouse gases come primarily from the combustion of fossil fuels in energy use.

In March 2024 the European Environment Agency (EEA) published the European Climate Risk Assessment.[4] This assessment states that Europe is the fastest warming continent on the planet and is warming at about twice the global rate. The average global temperature in the 12-month period between February 2023 and January 2024 exceeding pre-industrial levels by 1.5°C. 2023 was the warmest year on record in more than 100,000 years, at 1.48°C above pre-industrial levels, with the world's ocean temperature also reaching new heights.

The Intergovernmental Panel on Climate Change (IPCC), in their AR6 Synthesis Report: Climate Change 2023[5], state that widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred. This has led to widespread adverse impacts and related losses and damages to people and nature due to the pressures of climate change and the inability to adapt to a rapidly changing environment. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

Relevant legislation, policy, and guidance in an international (Section 10.2.1), national (Section 10.2.2), and local (Section 10.2.3) context are detailed below.

[2] *Hansen, J.; Sato, M.; Kharecha, P. et al. Earth's Energy Imbalance and Implications. Atmospheric Chemistry and Physics 2011, 11 (24), 13421–13449. https://doi.org/10.5194/acp-11-13421-2011*
[3] *von Schuckmann, K.; Palmer, M. D.; Trenberth, K. E. et al. An Imperative to Monitor Earth's Energy Imbalance. Nature Clim Change 2016, 6 (2), 138–144. https://doi.org/10.1038/nclimate2876.*
[4] *European Environment Agency (2024) European Climate Risk Assessment <https://www.eea.europa.eu/publications/european-climate-risk-assessment>*
[5] *IPCC AR6 Synthesis Report: Climate Change 2023. https://www.ipcc.ch/report/sixth-assessment-report-cycle/*

10.2.1 International Greenhouse Gas Emission and Climate Targets

Globally, governance relating to climate change has changed significantly since 1994 when the United Nations Framework Convention on Climate Change (UNFCCC) entered into force. Greenhouse gas emissions have been a primary focus of climate related international agreements for almost two decades.

Table 10-1 below identifies international instruments relating to greenhouse gases and climate change targets. The following table provides an overview of the international agreements that have played key roles in establishing climate governance; please refer to Appendix 10-1 '*Climate Legislation, Policy, and Guidance*' for further detail on each of the below international instruments.

Table 10-1 International Instruments Relating to Greenhouse Gas Emissions and Climate Change Targets

International Instrument	Description
Kyoto Protocol	The Kyoto Protocol was adopted on 11th December 1997; this Protocol operationalised the UNFCCC and was the first international agreement that committed countries to reduce their greenhouse gas emissions. The Kyoto Protocol came into effect in 2005, as a result of which, emission reduction targets agreed by developed countries, including Ireland, became binding for the first time.
Doha Amendment to the Kyoto Protocol	In Doha, Qatar, on 8th December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes: › New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from starting in 2013 and lasting until 2020. › A revised list of greenhouse gases to be reported on by Parties in the second commitment period.
Conference of the Parties (COP): *Every year since 1995, the Conference of the Parties (COP) has gathered the 196 Parties (195 countries and the European Union) that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments, and is the supreme decision-making body of the UNFCCC.*	**COP21 – Paris** (30th November to 12th December 2015) COP21 closed with the adoption of the first international climate agreement (concluded by 195 countries and applicable to all). The twelve-page text, made up of a preamble and 29 articles, provides for a limitation of the temperature rise to below 2°C above pre-industrial levels and even to tend towards 1.5°C.
	COP25 – Madrid (December 2nd to December 13th, 2019) At COP25 the European Union launched its most ambitious plan, 'The European Green Deal' which aims to lower CO_2 emissions to zero by 2050.
	COP28 – Dubai (30th of November 2023 to the 13th of December 2023) COP28 resulted in a landmark deal to 'transition away' from fossil fuels, the United Arab Emirates (UAE) Consensus. The agreement calls for 'transitioning away from fossil fuels in energy systems, in a just, orderly, and equitable manner.' COP28 concluded the first ever Global Stocktake under the Paris Agreement. The Global Stocktake recognises that the world is not on track to meet 1.5°C and will require Parties to align their national targets and measures with the Paris Agreement.
	COP29 – Azerbaijan (11th November 2024 to 22nd November 2024)

International Instrument	Description
	COP29 focused on accelerating global efforts to address climate change, in particular global efforts related to climate finance. The New Collective Quantified Goal on Climate Finance (NCQG) was agreed in the final days of COP with developed nations agreeing to triples finance to developing countries, with commitments increasing from USD 100 billion annually to USD 300 billion annually by 2035. Significant progress was made in the discussions surrounding carbon markets, with nearly 200 nations agreeing on critical rules under Article 6 of the Paris Agreement. The adoption of these rules is seen as a crucial step towards operationalising a robust and credible carbon market. Despite the advances, concerns were expressed about the potential for weak governance and risks of exploitation in the system; these issues must be addressed to ensure the market's full functionality.
United Nations Sustainable Development Goals	On the 14th July 2025, the United Nations published 'The Sustainable Development Goals Report 2025' this report finds that, following an assessment of all 169 targets, for which trend data is available, only 17% of the SDG targets are on track, 18% of SDG targets are showing minimum or moderate progress, 47% having stalled in progress and 18% having regressed from 2024.
Climate Change Performance Index	Established in 2005, the Climate Change Performance Index (CCPI)[6] is an independent monitoring tool which tracks individual countries climate protection performance. Ireland, ranked 43rd in 2024, has risen 14 places to 29th for 2025, and is now considered a 'medium' performer in international performance. The CCPI states that Ireland's policies are missing a long-term strategy for phasing out fossil fuel infrastructure and shifting investments from natural gas towards an emissions-neutral energy supply.
State of the Global Climate 2024	In March 2025, the World Meteorological Organisation (WMO) published a report entitled the 'State of the Global Climate 2024. This report provided a summary on the state of the climate indicators in 2023 with sections on key climate indicators, extreme events and impacts. The key messages in the report include: › Greenhouse gases reached record observed levels in 2023. Real time data indicate that they continued to rise in 2024. › The annually averaged global mean near-surface temperature in 2024 was 1.55 °C ± 0.13 °C above the 1850–1900 average used to represent pre-industrial conditions.
European Green Deal	The European Green Deal is a comprehensive package of policy initiatives aimed at achieving climate neutrality across the EU by 2050. It features a wide range of actions and targets in different sectors such as energy, transport, industry, environment and agriculture. The goal is to transform the EU into a resource-efficient, competitive circular economy that is fair and inclusive for every individual and region. The EU has split greenhouse gas emissions into two categories: the Emissions Trading System (ETS) and the non-ETS sectors. Emissions from electricity generation, large industry, aviation, and maritime transport are covered under

[6] *Climate Change Performance Index 2024* <https://ccpi.org/>

International Instrument	Description
	the main ETS, which now requires a 62% reduction by 2030 compared to 2005 levels. A second system, ETS2, will be introduced in 2027 to cover emissions from buildings and road transport. In both systems, participants must purchase allowances for each tonne of emissions, with the overall cap declining annually to support the EU's legally binding target of reducing greenhouse gas emissions by at least 55% by 2030 relative to 1990 levels.
EU Effort Sharing Regulation	Emissions from all other sectors, including agriculture, transport, buildings, and light industry are covered by the EU Effort Sharing Regulation (ESR). This established binding annual greenhouse gas emission targets for Member States for the period 2021–2030. Ireland is required to reduce its emissions from these sectors by 30% by 2030, relative to 2005 levels.
Corporate Sustainability Reporting Directive	On the 5th of January 2023, the Corporate Sustainability Reporting Directive (CSRD) entered into force. This new directive modernises and strengthens the rules concerning the social and environmental information that companies have to publicly report. The CSRD serves as a major update to the Non-Financial Reporting Directive and will place environmental social governance (ESG) considerations at the forefront of European company reporting. The new rules proposed in the Directive will increase the number of companies required to report and will be implemented in phases for different financial sectors to allow for adequate prep time. The CSRD will require its disclosures be made in accordance with the European Financial Reporting Advisory Group (EFRAG) new standards, the European Sustainability Reporting Standards (ESRS).

10.2.2 National Greenhouse Gas Emission and Climate Targets

Ireland has reached a crucial point in addressing climate change with a goal to becoming climate neutral by 2050 and to significantly cut greenhouse gases by 2030. National greenhouse gas emission and climate targets are critical for achieving Irelands climate ambitions.

Table 10-2 below provides an overview of national legislation and reports relating to greenhouse gases and climate change targets in Ireland; please refer to Appendix 10-1 for further detail on each of the below national legislation measures.

Table 10-2 National Legislation and Reports relating to Greenhouse Gas Emission and Climate Change Targets

National Instrument	Description
Programme for the Government – Securing Irelands Future	The Programme for Government – Securing Irelands Future was published in January 2025. The programme notes that the government are committed to reducing greenhouse gas emissions by an average 7% per annum over the next decade in a push to achieve a net zero emissions by the year 2050.
Climate Action and Low Carbon Development Act 2015	The Climate Action and Low Carbon Development Act 2015 established the national framework for the approval of plans by the Government in relation to climate change for the purpose of pursuing the transition to a low carbon, climate resilient and environmentally sustainable economy.
Climate Action and Low Carbon Development (Amendment) Act 2021	The Climate Action and Low Carbon (Amendment) Act 2021 amended the Climate Action and Low Carbon Development Act 2015 and is a piece of legislation which commits the country to move to a climate resilient and climate neutral economy by 2050. This was passed into law in July 2021.

National Instrument	Description
	The Programme for Government has committed to a 7% average yearly reduction in overall greenhouse gas emissions over the next decade, and to achieve net zero emissions by 2050. This Act will manage the implementation of a suite of policies to assist in achieving these annual targets.
Carbon Budgets	The first national carbon budget programme proposed by the CCAC, approved by Government and adopted by both Houses of the Oireachtas in April 2022 comprises three successive 5-year carbon budgets. The total emissions allowed under each budget are shown in Section 1.1.2.5 of Appendix 10-1.
Sectoral Emission Ceilings	The Sectoral Emissions Ceilings were launched in September 2022. The Sectoral Emissions Ceilings alongside the annual published Climate Action Plan provide a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030. The Sectoral Emission Ceilings for each 5-year carbon budget period was approved by the government on the 28th of July 2022 and is shown in Section 1.1.2.6 of Appendix 10-1.
Climate Change Advisory Council	The Climate Change Advisory Council (CCAC) was established on 18th January 2016 under the Climate Action and Low Carbon Development Act 2015. The Annual Review 2025: Built Environment, Industry and Waste was published by the CCAC in September 2025. This report focuses specifically on key findings and recommendations for the Built environment sector, including residential (i.e., Built Environment – Residential sector), industry sector and waste sector. Emissions for residential buildings were 5.6 $MtCO_2eq$ in 2024, an increase of 4.9% compared with 2023. The Built Environment – Residential sector is projected to exceed its first sectoral emissions ceiling under the with additional measures (WAM) scenario by 0.1 Mt CO_2eq (0.3%) and to exceed its second SEC by 4.5 Mt CO_2eq (19.4%).
Climate Action Plan 2025	The National Climate Action Plan (CAP) 2025 was launched in April 2025. CAP 2025 sets out the roadmap to deliver on Ireland's climate ambition. It aligns with the legally binding economy-wide carbon budgets and sectoral ceilings that were agreed by Government in July 2022 following the Climate Action and Low Carbon Development (Amendment) Act 2021, which commits Ireland to a legally binding target of net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030. CAP 2025 highlights the firm commitment that has been made by Ireland in relation to the clean energy transition and provides an outline of precise goals for renewable energy, focusing on solar, onshore wind, and offshore wind.
Irelands Climate Change Assessment	In 2023 the EPA published Irelands Climate Change Assessment (ICCA). This assessment provides a comprehensive overview and breakdown of the state of knowledge around key aspects of climate change with a focus on Ireland. The ICCA report is presented in four volumes. › Volume 1: Climate Science – Ireland in a Changing World › Volume 2: Achieving Climate Neutrality in 2050 › Volume 3: Being Prepared for Irelands Future › Volume 4: Realising the Benefits of Transition and Transformation Please refer to Section 1.1.2.8 of Appendix 10-1 for further information on the ICCA.

National Instrument	Description
Circular Economy and Miscellaneous Provisions Act 2022	In July 2022 the Circular Economy and Miscellaneous Provisions Act 2022 became law in Ireland. This Act underpins Irelands shift from a 'take-make-waste' linear waste model to a more sustainable pattern of production and consumption. This Act defines the circular economy for the first time in Irish domestic law and incentivises the use of reusable and recyclable alternatives to a range of single-use packaging and items and consolidates the government's policy of reducing use of fossil fuels by introducing prohibitions on exploration for and extraction of coal, lignite and oil shale. The move to a circular economy will enable an efficient and resourceful circular economy strategy. The placement of the circular economy on a statutory footing places the use of resources and reduced consumption at the heat of the Irish economy.

10.2.3 Local Greenhouse Gas Emission and Climate Targets

10.2.3.1 Galway County Council Local Authority Climate Action Plan 2024-2029

The Galway County Council Local Authority Climate Action Plan 2024-2029 (Galway LACAP) was adopted on February 19th 2024 and published in March 2024.

The Galway LACAP highlights the current state of climate action in Ireland, and how Galway County Council will be responsible for enhancing climate resilience, increasing energy efficiency, and reducing greenhouse gas emissions, across its own assets and service. The Galway LACAP provides a mechanism for bringing together both adaptation and mitigation actions to help drive positive climate action and outcomes across the local authority and its administrative area. The framework of climate actions set within the plan, configures the arrangement of climate actions within a defined structure that ensures alignment between on the ground actions and the high-level vision that the Galway LACAP aspires to deliver. The Galway LACAP will help address the mitigation of greenhouse gases, the implementation of climate change adaption measures, and will strengthen the alignment between national climate policy and the delivery of effective local climate action.

Overall, the greenhouse gas emissions generated from County Galway equated to 1,905 $ktCO_2$-eq in the baseline year, 2018. The top four emitting sectors within County Galway in terms of total greenhouse gas emissions in the baseline year were Agriculture, Transport, Land Use, Land Change and Forestry (LULUCF) and Residential, producing 44%, 16%, 16% and 15% respectively of total emissions in County Galway. Galway County Council, along with all public sector entities must reduce greenhouse gas emissions by 51% by 2030 as compared to 2018 in line with the National Climate Action Plan 2025 (Section 10.2.2 above).

During the operational phase, the Proposed Development will assist in alleviating the shortage of housing supply in Galway and brings into use lands zoned specifically for that purpose. Furthermore, the construction industry, through projects such as the Proposed Development, makes a significant contribution to economic development in Ireland. The Proposed Development will provide a significant supply of mixed residential units which will contribute towards the aim of growing the population of the Galway Metropolitan Area Strategic Plan (MASP) in a sustainable manner in accordance with national, regional and local planning policy.

The Galway County Development Plan 2022-2028[7] (GCDP) sets out the overall strategy for the proper planning and sustainable development of the County over a 6-year period. The GCDP includes

[7] *The Galway County Development Plan 2022-2028,* https://consult.galway.ie/en/consultation/adopted-galway-county-development-plan-2022-2028

numerous objectives on sustainability and climate within, as well as a Housing Strategy (Section 2.5 of Chapter 2 of the GCDP).

10.2.3.2 Galway City Council Climate Action Plan 2024-2029

The Galway City Council Local Authority Climate Action Plan 2024-2029[8] (Galway City LACAP) was published in February 2024 in line with Climate Action and Low Carbon Development (Amendment) Act 2021. The Galway City LACAP has been prepared to create a low carbon and climate resilient City, by delivering and promoting best practice in climate action, at the local level. This is aligned to the Government's overall National Climate Objective set out in the Climate Action and Low-Carbon Development National Policy Position Ireland, which seeks to pursue and achieve, by no later than the end of 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy.

Overall, the greenhouse gas emissions generated from Galway City equated to 493,503 tCO_2-eq in the baseline year, 2018. The top three emitting sectors within Galway City in terms of total greenhouse gas emissions in the baseline year were Residential, Commercial (incl. Industry), Transport and Social Housing, producing 41%, 35%, 18% and 4% respectively of total emissions in Galway City.[9] Galway City Council, along with all public sector entities must reduce greenhouse gas emissions by 51% by 2030 as compared to 2018 in line with the National Climate Action Plan 2025 (Section 10.2.2 above).

During the operational phase, the Proposed Development will assist in alleviating the shortage of housing supply in Galway and brings into use lands zoned specifically for that purpose. Furthermore, the construction industry, through projects such as the Proposed Development, makes a significant contribution to economic development in Ireland. The Proposed Development will provide a significant supply of mixed residential units which will contribute towards the aim of growing the population of Galway City in a sustainable manner in accordance with national, regional and local planning policy.

The Galway City Development Plan 2023-2029[10] (Galway City DP) sets out the overall strategy for the proper planning and sustainable development of Galway City over a 6-year period. The Galway City DP includes numerous objectives on sustainability and climate within with detailed information on Climate Action (Chapter 2), Housing (Chapter 3), and Sustainable Transport (Chapter 4).

10.2.4 Relevant Guidance

The climate section of this EIAR is carried out in accordance with the 'EIA Directive' as amended by Directive 2014/52/EU and has been prepared in accordance with guidance listed in Section 1.7.2 of Chapter 1: Introduction. Consideration has also been given to the 'Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107' (Transport Infrastructure Ireland, December 2022), and Transport Infrastructure Ireland Carbon Tool for Road and Light Rail Projects: User Guidance Document, GE-ENV-01106 (TII 2022).

10.3 Climate and Weather

Climate change projections show that the Earth is getting warmer and extreme weather events are increasing in frequency on an annual basis. Changes to climate and weather in Ireland will occur as a

[8] *Galway City Council (2024) Local Authority Climate Action Plan 2024-2029* <https://www.galwaycity.ie/services/climate-action/climate-action-plan>
[9] *Galway City Council (2024) Baseline Emissions Inventory* <https://files.galwaycity.ie/gccfiles/?r=/download&path=L0RlcGFydG1lbnRzL0Vudmlyb25tZW50L0NMSU1BVEUvR2Fsd2F5IENpdHkgRW1pc3Npb25zIEludmVudG9yeSBCYXNlbGluZSBSZXBvcnQgLSBSZWxlYXNlIDExLjIwMjMucGRm>
[10] *The Galway City Development Plan 2023-2029* < https://www.galwaycity.ie/services/planning/development-plan-2023-2029>

result of climate change, for further details on the natural disaster risks associated with the Proposed Development please refer to Chapter 14: Major Accidents and Natural Disasters.

10.3.1 Baseline Environment

10.3.1.1 Data Sources

A review of literature and data relating to climate change in Ireland was undertaken and utilised to provide an overview of the current baseline environment. The following key data sources were reviewed:

- Met Éireann 30-Year Averages[11]
- Irelands Climate Averages 1991-2020 Summary Report[12]
- Ireland's National Inventory Report 2025[13]
- Climate Status Report for Ireland 2020[14]
- Annual Review 2025 – Our Changing Climate in 2024[15]

10.3.1.2 Physical Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Shannon Airport which is located approximately 65km to the south of the site, is the nearest weather and climate monitoring station to the Proposed Development that has meteorological data recorded for the 30-year period from 1991-2020. Meteorological data recorded at the Shannon Airport weather station over the 30-year period from 1991-2020 is shown in Table 10-3 below. The wettest months are November and December, with April and May being the driest. July is the warmest month with an average temperature of 16° Celsius.

More recent monthly meteorological data recorded at Athenry, located approximately 2km west of the site, from January 2022 to January 2025 is available at: https://www.met.ie/climate/available-data/monthly-data. July 2023 was the wettest month in this time period, with 224.1 of rainfall recorded, while March 2022 was the driest month with 39mm of rainfall. June 2023 was the warmest month in this time period, with a mean monthly temperature of 16.7° Celsius. December 2022 was the coldest month in this time period with a mean monthly temperature of 3.4° Celsius.

Table 10-4 below provides a summary of the current physical baseline environment with reference to relevant chapters within the EIAR where further information is available.

[11] https://www.met.ie/climate/30-year-averages
[12] *Department of Housing, Local Government and Heritage (2024) Irelands Climate Averages 1991-2020 Summary Report* <https://edepositireland.ie/bitstream/handle/2262/108695/Ireland%27s_climate_averages_1991-2020_rev2.pdf?sequence=1&isAllowed=y>
[13] *EPA (2025) Ireland's National Inventory Report* <https://www.epa.ie/publications/monitoring-assessment/climate-change/air-emissions/Ireland's-NID-2025.pdf>
[14] *EPA (2021) Climate Status Report for Ireland 2020* <https://www.epa.ie/publications/research/climate-change/research-386-the-status-of-irelands-climate-2020.php>
[15] *Climate Change Advisory Council (2025) Annual Review 2025 – Our Changing Climate in 2024* <https://www.climatecouncil.ie/councilpublications/annualreviewandreport/CCAC%20AR25%20Our%20Changing%20Climate-final.pdf>

Table 10-3 Data from Met Éireann Weather Station at Shannon Airport from 1991-2020

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	8.9	9.4	10.9	13.4	16	18.3	19.5	19.1	17.5	14.2	11.1	9.2	14
Mean daily min	3.3	3.3	4	5.8	8.1	10.8	12.6	12.4	10.7	8.1	5.5	3.7	7.4
Mean temperature	6.1	6.3	7.5	9.6	12	14.5	16	15.8	14.1	11.2	8.3	6.4	10.7
Absolute max.	14.7	15.5	19.6	23	27.8	32	30.2	29.2	25.6	21.9	17.2	15.4	32
Absolute min.	-11.2	-5.1	-5.8	-2.9	0.1	3.1	6.2	4.4	1.7	-2.3	-6.6	-11.4	-11.4
Mean num. of days with air frost	5.2	4.6	3.2	0.6	0	0	0	0	0	0.4	1.9	4.4	20.3
Mean num. of days with ground frost	13	11.8	11.9	7.7	2.9	0.2	0	0	0.8	3.3	8	11.3	70.9
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	87.8	87.9	85	79.3	76.2	76.6	80	82.3	85.1	87.4	89.9	88.9	83.9
Mean at 1500UTC	81.2	75.4	69.8	64.1	63.5	64.6	69.3	69.1	70	75	81	83.5	72.2
SUNSHINE (Hours)													
Mean daily duration	1.7	2.4	3.6	5.4	5.9	5.5	4.4	4.6	3.9	3	2.1	1.5	3.7
Greatest daily duration	8.1	10.2	11.5	13.6	15.6	15.8	15.7	14.4	12.2	10.1	8.3	7.1	15.8
Mean num. of days with no sun	9.1	5.9	5.3	2.3	1.9	1.8	2.1	2.1	2.6	5.1	7.7	10.1	56
RAINFALL (mm)													
Mean monthly total	103.8	86.7	75.8	62.3	63.1	69.6	75.8	87.6	77.4	95.5	106.6	115.4	1019.7
Greatest daily total	38.2	33.8	34.8	40.2	25	45.3	39.5	51	52.3	36.9	29.4	33.5	52.3
Mean num. of days with >= 0.2mm	21.3	18.3	18	16.2	16.2	15.5	18.3	19	17.7	19.9	21.6	21	223
Mean num. of days with >= 1.0mm	16.9	13.9	13.4	11.4	12.1	11.3	13.5	13.7	12.9	15.4	16.8	17.2	168.5
Mean num. of days with >= 5.0mm	7.8	5.8	5.5	4.7	4.6	4.8	4.9	5.8	4.8	7	8	8.5	72.2
WIND (knots)													
Mean monthly speed	10	10.1	9.6	9.2	9	8.5	8.4	8.3	8.4	8.9	9.1	9.7	9.1
Max. gust	75	86	63	66	52	51	52	61	58	66	69	83	86
Max. mean 10-minute speed	47	61	44	45	37	37	38	44	44	47	50	57	61
Mean num. of days with gales	2.1	1.2	1.4	0.5	0.5	0.1	0	0.1	0.6	0.9	1	1.5	9.8

WEATHER (Mean No. of Days With:)													
Snow or sleet	1.5	1.8	1.2	0.3	0	0	0	0	0	0	0.1	1	5.9
Snow lying at 0900UTC	0.2	0	0.1	0	0	0	0	0	0	0	0	0.1	0.5
Hail	3.1	3.4	2.8	2	0.7	0	0	0.1	0.1	0.5	1	2.3	16
Thunder	0.9	0.4	0.3	0.3	0.5	0.4	0.7	0.5	0.2	0.3	0.3	0.4	5.2
Fog	3.4	2.2	2.4	1.8	1.3	1	0.9	1.6	2.8	3.1	4	3.8	28.3

Table 10-4 Summary of Current Physical Baseline Environment

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
Air Temperature	Climate change is impacting air temperatures in the Northern European region, with a range of observable effects including rising temperature, increased frequency of heatwaves, changes in seasonal temperature patterns and milder winters[16]. Irelands Climate Averages 1991-2020 Summary Report identifies that the annual mean air temperature for Ireland over the period 1991-2020 is 9.8°C. The annual mean air temperature ranges from approximately 8.5°C to 10.8°C. Comparing the 1991-2020 annual mean air temperature for Ireland with that of the 1961-1990 period, there has been an increase of approximately 0.7°C. The Climate Status Report for Ireland 2020[17] states that air temperatures in Ireland have '*been increasing at an average rate of 0.078°C per decade since 1900 and that the annual average temperature is now approximately 0.9°C higher than it was in the early 1900s'.* Temperatures in Ireland are increasing, with sixteen of the top 20 warmest years on record occurring since 1990[18]. On 10th July 2024 Met Éireann confirmed that 2023 was Irelands wettest and warmest year on record (records going back to 1900).[19]	Chapter 9 Air Quality

[16] *IPCC (2021) Climate Change 2021: The Physical Science Basis* <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>
[17] *Government of Ireland (2020) Climate Status Report for Ireland 2020* <https://www.epa.ie/publications/research/climate-change/Research_Report_386.pdf>
[18] *Irelands Climate Change Assessment (2023) Volume 1 Climate Science – Ireland in a Changing World* <https://www.epa.ie/publications/monitoring-assessment/climate-change/irelands-climate-change-assessment-volume-1.php>
[19] https://www.met.ie/2023-confirmed-as-irelands-wettest-year-on-record

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
	Due to the moderating influence of the North Atlantic, Ireland has, and will continue to, experience much milder air temperatures as compared to mainland Europe and other continental countries.[20] However, this moderating influence could be in jeopardy if the Atlantic Meridional Overturning Circulation (AMOC) continues to weaken[21]. The AMOC is a large system of ocean currents responsible for carrying warm water from the tropics into the North Atlantic and the strength of this current is a function of global mean temperature. The weakening of this current would counterbalance the warming effects of climate change creating instability for local ecosystems, agriculture, and fisheries.	
Precipitation	Climate change is impacting precipitation patterns in the Northern European region, with a range of observable effects including increased precipitation, more extreme precipitation events, seasonal variations and impacts on hydrological regimes[22]. Precipitation has been measured systematically in Ireland since the late 19th century and is a key indicator of changes in the climate; measurements and analysis of rainfall are essential for assessing the effects of climate change on the water cycle, water balance and for flood mitigation. Met Éireann highlights that it is already observing these trends, with the national annual average rainfall over the period 1991-2020 being approximately 1,288mm, which represents an increase of 7% from the previous 30-year monitoring period (1961-1990)[23]. Irelands Climate Averages 1991-2020 Summary Report obtained averages for the annual, seasonal and monthly number of rain days (number of days with rainfall ≥ 0.2 mm), wet days (number of days with rainfall ≥ 1 mm) and very wet days (number of days with rainfall ≥ 10 mm). Over the period 1991-2020, on an annual basis, the average number of rain days ranges from 201 days to 272 days; the average number of wet days ranges from 147 days to 226 days; and the average number of very wet days ranges from 22 days to 68 days.	Further detail on rainfall and evaporation data is provided in Section 8.3.2 in Chapter 8 Hydrology and Hydrogeology.

[20] https://www.met.ie/climate/what-we-measure/temperature#:~:text=The%20moderating%20influence%20of%20the,mild%20winters%20and%20cool%20summers.
[21] IPCC (2019) IPCC Special Report on the Ocean and Cryosphere in a Changing Climate Chapter 6. Extremes, Abrupt Changes, and Managing Risk <https://www.ipcc.ch/site/assets/uploads/sites/3/2022/03/08_SROCC_Ch06_FINAL.pdf>
[22] IPCC (2021) Climate Change 2021: The Physical Science Basis <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>
[23] Department of Housing, Local Government and Heritage (2024) Irelands Climate Averages 1991-2020 Summary Report <https://edepositireland.ie/handle/2262/108695>

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
Wind and Storms	Climate change is impacting wind patterns in the Northern European region with a range of observable effects including increased wind speeds, changes in wind direction and seasonal variations[24]. Irelands Climate Averages 1991-2020 Summary Report identifies that the annual mean hourly wind speed ranges from 9 knots at Shannon Airport to 15 knots at Malin Head. Winds are generally strongest in the northwest of the country. The strongest winds are observed during the winter months and range from 10 knots at Shannon Airport to 18 knots at Malin Head. The lightest winds are observed during the summer months and range from 8 knots at Valentia Observatory to 13 knots at Malin Head. In late 2023 and early 2024, Ireland experienced a very active storm season; the county was affected by 13-14 severe storms[25]. In 2025 there has been 5 no. named storms at the time of writing, with Storm Eowyn, occurring in January 2025, reaching hurricane force winds (maximum wind speed recorded as 184km/h).[26] The increased frequency and intensity of storm events will lead to associated increases in precipitation (see above). As stated in 'Air Temperature' above, the AMOC has a moderating influence on Europe, however as identified by the IPCC, the strength of the AMOC is directly correlated to global mean temperature, and as global mean temperature increases, the AMOC will weaken[27]. The weakening of this current would result in increased storm activity in Northern Europe.	Section 14.4.1 of Chapter 14 Major Accidents and Natural Disasters

[24] *IPCC (2021) Climate Change 2021: The Physical Science Basis <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>*
[25] *Met Éireann (2024) Human-caused Climate Change Brings Increased Storm Rainfall <https://www.met.ie/human-caused-climate-change-brings-increased-storm-rainfall>*
[26] *Met Éireann Strom Centre https://www.met.ie/climate/storm-centre*
[27] *IPCC (2019) IPCC Special Report on the Ocean and Cryosphere in a Changing Climate Chapter 6. Extremes, Abrupt Changes, and Managing Risk <https://www.ipcc.ch/site/assets/uploads/sites/3/2022/03/08_SROCC_Ch06_FINAL.pdf>*

10.3.1.3 Existing Greenhouse Gas Emissions

Greenhouse gas emissions arise from a large majority of anthropogenic activities. The main sectors which release emissions in Ireland are detailed in Section 1.1.2.6 of Appendix 10-1 Climate Legislation Policy and Guidance. These sectors include:

- Electricity
- Transport
- Built Environment
    - Residential
    - Commercial
- Industry
- Agriculture
- Land Use, Land Use Change, and Forestry (LULUCF)
- Other (F-Gases, Waste, Petroleum refining)
- Unallocated savings

The most recent inventory report for Ireland, National Inventory Document 2025 (NID 2025)[28], was published in 2025 and refers to the greenhouse gas inventory timeseries for the years 1990-2023. From 1990-2001, total emissions of greenhouse gases (excluding LULUCF) increased steadily from 55,734.9 $ktCO_2e$ in 1990 to 70,848.8 $ktCO_2e$ in 2001, which is the highest level of greenhouse gas emissions ever reported in Ireland. Emissions then plateaued until 2008 with estimates ranging from 70,149.9 $ktCO_2e$ to 67,927 $ktCO_2e$. There was then a sharp decrease from 67,927 $ktCO_2e$ in 2008 to 57,836.3 $ktCO_2e$ in 2011. In 2023, total emissions of greenhouse gases including indirect emissions from solvent use (excluding LULUCF) in Ireland were 54,934.4 $ktCO_2e$, which is 6.8% lower than emissions in 2022, and the lowest level in the time series.

The Built Environment sector (including residential and commercial buildings) is the largest source of emissions, contributing to 61.3% of total emissions in Ireland in 2023. In 2023, Road transport contributed to 16.7% of the total CO_2 emissions. Further reductions in the emissions of SO_2, NO_X and Non-Methane Volatile Organic Compounds (NMVOC) will occur in the coming years as Ireland continues to implement programmes to comply with various EU legislation aimed at air quality improvement and emissions control.

10.3.2 Future Environment

Ireland is experiencing climate change in line with global trends, with current projections, detailed below, indicating that these effects will intensify in the coming decades. The baseline environment, detailed in the above sections, will undergo significant shifts, influencing Ireland's environment, economy, and society. Predicted changes include rising temperatures, altered precipitation patterns, and increased frequency of extreme weather events.

Visible changes in global climate are evident worldwide, with climate change projections suggesting further, more pronounced impacts in the future. These impacts will have wide-ranging effects on both natural and man-made environments across various sectors and regions, resulting in socio-economic repercussions. Referred to as the 'costs of inaction,' these economic impacts of climate change are increasingly influencing policy discussions.[29] It has become clear that even if greenhouse gas emissions were to cease immediately, climate alterations would persist for many decades. Therefore, alongside

[28] *EPA (2024) National inventory Report 2025* <https://www.epa.ie/publications/monitoring-assessment/climate-change/air-emissions/Ireland's-NID-2025.pdf>
[29] *European Environment Agency (2007) Climate change: the cost of inaction and the cost of adaptation* <https://www.eea.europa.eu/publications/technical_report_2007_13/download>

efforts for mitigation, it's imperative to develop effective adaptive strategies (adaptation) to mitigate damages or seize opportunities arising from climate change.

This section provides a description of the future predictions for climate change.

10.3.2.1 Data sources

A review of literature and data relating to climate change in Ireland was undertaken and utilised to provide an overview of the future baseline environment. The following key data sources were reviewed:

- High-resolution Climate Projections for Ireland – A Multimodel Ensemble Approach (report No. 339)[30]
- Climate Status Report for Ireland 2020[31]
- Climate Ireland[32]

10.3.2.1.1 *Physical Environment*

This section describes the future baseline for the Proposed Development site's physical environment under the Representative Concentration Pathways (RCP) 8.5 high emission scenario. RCPs represent climate change scenarios used in modelling the possible future climate evolution, and are based on a wide suite of assumptions, to specify the greenhouse gas concentrations that will result in defined radiative forcing by 2100. The RCP 8.5 combines assumptions about high population and relatively slow income growth with modest rates of technological change and energy intensity improvements, leading in the long term to high energy demand and greenhouse gas emissions in absence of climate change policies. Compared to the total set of RCPs, RCP 8.5 thus corresponds to the pathway with the highest greenhouse gas emissions[33]. The physical environment of the Proposed Development under the RCP 8.5 scenario is discussed under the following headers:

- Air Temperature;
- Precipitation and Flood Risk;
- Wind and Storms.

Air Temperature

Annual surface air temperatures[34] in Ireland are now approximately 1°C higher than they were in the early 1900's (2013 – 2022 period relative to 1903 - 1912).

The upward trend in air temperatures is predicted to continue for all seasons: annual air temperatures may increase by over 3°C by the end of the 21st century relative to a 1976 to 2005 reference period under an RCP 8.5 high emission scenario[35].

Met Éireann projections[36] indicate an increase of 1–1.6°C in mean annual temperatures in Ireland, with the largest increases seen in the east of the country. Warming is enhanced for the extremes (i.e. hot or cold days), with highest daytime temperatures projected to rise by 0.7–2.6°C in summer and lowest night-time temperatures to rise by 1.1–3°C in winter. Averaged over the whole country, the number of

[30] *EPA Research (2020) High-resolution Climate Projections for Ireland – A Multimodel Ensemble Approach* <https://www.epa.ie/publications/research/climate-change/Research_Report_339_Part1.pdf>
[31] https://www.epa.ie/publications/research/climate-change/Research_Report_386.pdf
[32] https://www.climateireland.ie/
[33] *Climate Change (2011) A scenario of comparatively high greenhouse gas emissions* <https://link.springer.com/article/10.1007/s10584-011-0149-y>
[34] https://www.epa.ie/publications/monitoring--assessment/climate-change/irelands-climate-change-assessment-volume-1.php
[35] *Irelands Climate Change Assessment (2023) Volume 1 Climate Science – Ireland in a Changing World*
[36] https://www.met.ie/climate/climate-change#Reference3

frost days (days when the minimum temperature is less than 0°C) is projected to decrease by 62% for the RCP 8.5 high emissions scenario[37,38].

Precipitation and Flood Risk

Climate change is expected to have a significant impact on Ireland's precipitation patterns. Ireland is predicted to experience greater seasonality in precipitation, with more extreme fluctuations between wet and dry periods. Winter and autumn are anticipated to see increased rainfall, while spring and summer are projected to become drier, leading to more frequent droughts. The EPA's climate projections indicate that very wet days (i.e., days with more than 30mm of rainfall) will become more common, increasing by 31% under a high emissions scenario (RCP 8.5).

Due to Ireland's location in the west of Europe, exposure to Atlantic storms is of concern and this is particularly the case in the context of rising sea levels which will enhance the impacts of storm surges.[39]

Extreme rainfall events, such as those currently expected only once every 50 years, could become twice as frequent by the end of the century. This means more frequent flooding risks, particularly during the winter months[40]. Further information on flood risk is presented in the section below.

Flood Risk

Chapter 8 Hydrology and Hydrogeology, and the accompanying Flood Risk Assessment (FRA) (Appendix 8-1) detail the flood risk of the Proposed Development site.

No indications of flood-prone lands were identified in the historical maps. Additionally, Office of Public Works (OPW) flood mapping records show no history of recurring flood incidents within the study area.

There are no recurring flood incidents within the study area boundary according to the OPW's flood mapping. The site is not located within any areas designated as "Benefiting Lands" – a dataset developed by the OPW highlighting lands that may benefit from Arterial Drainage Schemes and are typically subject to poor drainage or periodic flooding.

A Stage 2 - Flood Risk Assessment (FRA) has been prepared for the Proposed Development (Tobin, 2025). This report determined that the site is within Flood Zone C and concluded that the site is not liable to fluvial, coastal, or groundwater flooding. The assessment also found that the risk to the site from pluvial flooding will be minimal with appropriate drainage design.

Wind and Storms

Future climate and weather predictions indicate a slight reduction in mid-century (2041 – 2060) average wind speeds around Ireland (-2.47% for RCP 8.5 high emissions scenario compared to the 1981 – 2000 baseline), with these decreases being more pronounced during the summer months.[41] Predictions also point towards less frequent, but more intense storm activity around Ireland. Correspondingly, projections indicate a decrease in average and extreme wave heights towards the end of the century, but an increase in the frequency and severity of storm surges in coastal regions of western Ireland,

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[37] *Nolan, P. 2015. EPA Report: Ensemble of Regional Climate Model Projections for Ireland. EPA climate change research report no. 159. EPA: Wexford.*
[38] *O'Sullivan, J., Sweeney, C., Nolan, P. and Gleeson, E., 2015. A high-resolution, multi-model analysis of Irish temperatures for the mid-21st century. International Journal of Climatology. doi: 10.1002/joc.4419.*
[39] https://www.epa.ie/our-services/monitoring--assessment/climate-change/climate-ireland/impact-of-climate-change-on-ireland/climate-hazards/coastal-flooding.
[40] *EPA (2005) Climate Change Regional Climate Model Predictions for Ireland <*https://www.epa.ie/publications/research/climate-change/climate-change-regional-climate-model-predictions-for-ireland-.php*>*
[41] https://www.climateireland.ie/impact-on-ireland/future-climate-of-ireland/windspeed/

particularly in winter months[42]. Storm surge levels over a 20-to-30-year return period are anticipated to increase by up to 9cm by 2100[43].

10.3.2.2 Greenhouse Gas Emissions Projections

In its approach to decarbonisation, the EU has split greenhouse gas emissions into two categories: the Emissions Trading System (ETS) and the non-ETS sectors. Emissions from electricity generation, large industry, aviation, and maritime transport are covered under the main ETS, which now requires a 62% reduction by 2030 compared to 2005 levels[44]. A second system, ETS2, will be introduced in 2027 to cover emissions from buildings and road transport. In both systems, participants must purchase allowances for each tonne of emissions, with the overall cap declining annually to support the EU's legally binding target of reducing greenhouse gas emissions by at least 55% by 2030 relative to 1990 levels.[45]

Emissions from all other sectors, including agriculture, transport, buildings, and light industry are covered by the EU Effort Sharing Regulation (ESR[46]). This established binding annual greenhouse gas emission targets for Member States for the period 2021–2030. Please see Section 10.2.1 above and Section 1.1.1.8 of Appendix 10-1 for further details on the EU ESR.

Emissions from the Built Environment – Residential Sector arise from fuel combustion for domestic space and hot water heating such as natural gas, oil, coal and peat. Residential energy demand is influenced by the weather and fuel prices. This sector contributed 10.4% of Ireland's total emissions in 2024 (excluding LULUCF)[47]. 2024 marks the first year of emissions increasing after three continuous years of reductions since the start of the COVID-19 pandemic in 2020 which saw emissions of 7.3 Mt of CO_2eq, the highest for the sector since 2011. Within the different fuels used in household space and water heating, increases were seen in 2024 for all fossil fuels except peat; coal, kerosene and natural gas usage increased by 6.6%, 8.5% and 3.3% respectively, while peat usage decreased by 8.6%.[48] The Residential sector is on track and needs a 3.6% reduction in 2025 to meet its sectoral emission ceiling.[49]

The EPA publish Ireland's greenhouse gas emission projections and at the time of writing, the most recent report, *'Ireland's Greenhouse Gas Emissions Projections 2024-2055'*[50] was published in May 2025. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2030 set under the ESR.

The EPA has produced two scenarios in preparing these greenhouse gas emissions projections: a "With Existing Measures" (WEM) scenario and a "With Additional Measures" (WAM) scenario. These scenarios forecast Irelands greenhouse gas emissions in different ways. The WEM scenario assumes no additional policies and measures, beyond those already in place by the end of 2023. This is the cut off point for which the latest national greenhouse gas emission inventory data is available. The WAM scenario has a higher level of ambition and includes government policies and measures to reduce

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[42] https://www.epa.ie/publications/research/climate-change/research-339-high-resolution-climate-projections-for-ireland-.php
[43] https://www.climateireland.ie/impact-on-ireland/future-climate-of-ireland/waves-surges/
[44] https://www.europarl.europa.eu/news/en/press-room/20230414IPR80120/fit-for-55-parliament-adopts-key-laws-to-reach-2030-climate-target
[45] https://climate.ec.europa.eu/eu-action/effort-sharing-member-states-emission-targets/effort-sharing-2021-2030-targets-and-flexibilities_en
[46] *Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris There was a significant drop in emissions from the Energy Industries sector between 2022 and 2023 (down 2.1 Mt CO2eq or 21.4%). This reduction in emissions was partly due to a 12-fold increase in the amount of imported electricity (9.5% of electricity supply in 2023), in combination with an increase in the share of renewable energy from 38.6% in 2022 to 40.7% in 202Agreement and amending Regulation (EU) No 525/2013 (Text with EEA relevance)*
[47] *EPA (2025) Irelands Provisional Greenhouse Gas Emissions* <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Provisional-1990-2024-GHG-Report-1716.pdf>
[48] *Ibid.*
[49] *Ibid.*
[50] *EPA (2025) Ireland's Greenhouse Gas Emissions Projections 2024-2055*

emissions such as those in Ireland's Climate Action Plan 2024 that are not yet implemented. As implementation of policies and measures occurs, they will be migrated into the WEM Scenario. Please note, CAP25 is not specifically referenced in this report as it had yet to be published during the preparation phase of the 2024-2055 projections. A review was undertaken and there are no significant additional measures in CAP25 therefore no major omissions in these projections.

The EPA Emission Projections Update notes the following key trends:

- Ireland is not on track to meet the 51% emissions reduction target by 2030 (as compared to 2018 levels) based on most up to date EPA projections which include many of Climate Action Plan 2024 measures.
- The first two carbon budgets (2021-2030), which aim to support achievement of the 51% emissions reduction goal, are projected to be exceeded by a significant margin.
    - Carbon Budget 1 to be exceeded by a margin of 8 to 12 $MtCO_2eq$.
    - Carbon Budget 2 to be exceeded by a margin of 77 to 114 $MtCO_2eq$ (with carryover from Carbon Budget 1).
- Sectoral emissions ceilings for 2025 and 2030 are projected to be exceeded by the Buildings, Electricity, Industry and Transport Sectors and met by the Other sector.
    - Please note, a direct comparison of emissions in the Agriculture sector against its Sectoral Emission Ceiling is no longer viable due to significant refinement of the Agriculture inventory.
- From 21.4 MtCO2eq in 2018, total emissions from the Agriculture sector are projected to be between 18.0 and 21.6 $MtCO_2eq$ in 2030 (a 16% reduction in WAM and 1% increase in WEM).
    - Without full implementation of all planned policies and measures, there will be a net increase in emissions in this sector by 2030.
- Transport emissions are projected to decrease from 12.3 $MtCO_2eq$ in 2018 to between 9.7 $MtCO_2eq$ and 11.2 $MtCO_2eq$ in 2030 (a 9 to 21% reduction).
- From 10.6 $MtCO_2eq$ in 2018, emissions from the Energy Industries sector are projected to decrease to between 3.4 and 4.4 $MtCO_2eq$ in 2030 (a 59 to 68% reduction).
    - Renewable energy generation at the end of the decade is projected to range from 69 to 68% of electricity generation.
- Emissions from the Energy Industries sector are projected to decrease by between 57 and 62% over the period 2022 to 2030.
    - Renewable energy generation at the end of the decade is projected to range from 69 to 80% of electricity generation.
- Total emissions from the LULUCF sector are projected to increase over the period 2018 to 2030 by between 1.5 and 3.8 MtCO2eq (an increase of 39 to 95%).
- Ireland is not projected to meet its EU target, set under the Effort Sharing Regulation, of a 42% emissions reduction by 2030 (compared to 2005) even with flexibilities applied.
    - Under the WEM Scenario Ireland is projected to receive a 9.5% emission reduction from 2005 levels by 2030.
    - Under the WAM Scenario Ireland is projected to achieve a 21.7% emission reduction from 2005 levels by 2030.

10.3.3 Summary

As outlined in the preceding sections, Ireland is and will continue to experience climate change in line with global trends, with current projections indicating that these effects will intensify in the coming decades. The design of the Proposed Development considered the potential climate change effects under both the baseline and future environment, and it is considered that the Proposed Development will not be negatively impacted by climate change, nor will it have a negative impact on climate change over its operational lifetime.

Further information on the vulnerability of the Proposed Development to major accidents and natural disasters is detailed in Chapter 14 Major Accidents and Natural Disasters.

10.4 Climate Scheme Sustainability Statement

A Climate Scheme Sustainability Statement has been prepared by Moloney Fox Consulting for the Proposed Development and is outlined in Appendix 4-2 of the EIAR.

It has become imperative to prioritize sustainability in the design of mechanical and electrical systems within residential buildings. The efficient operation of these systems is vital not only for the comfort and well-being of residents but also for minimizing environmental impact. The mechanical and electrical systems in apartments play a crucial role in ensuring a comfortable and efficient living environment. Sustainable design principles focus on optimizing these systems to reduce energy consumption, minimize carbon emissions, and enhance the overall environmental performance of buildings.

Energy efficiency is a cornerstone of sustainable design. Upgrading to high-efficiency HVAC (Heating, Ventilation, and Air Conditioning) systems, using advanced insulation materials, and implementing smart controls for lighting and temperature regulation can significantly reduce energy consumption and associated greenhouse gas emissions. This not only benefits the environment but also results in cost savings for residents through reduced utility

The Proposed Development has been designed to be a Net Zero Energy Building (NZEB). A NZEB is a building that has a very high energy performance where the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources including energy from renewable sources produced on-site or nearby. In order to achieve this, a target of 20% Renewables Energy Ratio (RER) has been set as the NZEB energy target from renewable sources onsite or nearby. In addition to the reduced energy usage, all new buildings must generate 20% of their energy from renewable energy sources, although this may be reduced to 10% where the energy performance of the building is more than 10% better than the reference building. This option of further reducing energy use is likely to be selected for most buildings. As part of the design process, consideration shall be taken in account with regards to the requirements of NZEB to ensure the building meets with its requirements.

Demand Control Ventilation (DCV) will be provided to provide controlled natural ventilation to each dwelling. DCV is an energy-saving strategy used in building ventilation systems to optimize the amount of fresh air brought into a space based on its actual occupancy and ventilation requirements. DCV systems improve indoor air quality while reducing energy consumption by delivering the right amount of ventilation air when and where it is needed.

Light emitting diode (LED) lighting and advanced lighting controls shall be implemented into the houses and apartments. LEDs have become the lighting technology of choice in modern apartment buildings due to their numerous advantages over traditional lighting options. LED lights are highly energy-efficient, consuming significantly less electricity than incandescent or fluorescent bulbs. They convert a higher percentage of electrical energy into light, minimizing wasted energy as heat. LED lighting and lighting control systems have transformed modern buildings, offering energy-efficient illumination, improved user experiences, and sustainable practices. The combination of LED technology and advanced controls provides residents with flexibility, comfort, and cost savings while promoting environmental stewardship in residential communities.

Please see section 10.6.3 below for further sustainability and low carbon measures to be implemented as part of the operational phase of the Proposed Development.

Measures to promote sustainable and active modes of transport for staff and visitors who will be visiting/working at the Proposed Development site are further detailed in Section 11.2 of this EIAR: Traffic and Transport.

Circular Economy

The circular economy is defined by the European Commission as '*a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products as long as possible.*'[51] The circular economy is further defined in Irish domestic law in the Circular Economy and Miscellaneous Provisions Act 2022, detailed in Section 10.2.2 above.

A circular economy aims to keep products, components and materials at their highest utility and value at all times. Within the built environment, the circular economy focuses on maximising resource efficiency and minimising waste throughout a building's entire lifecycle. Embedding circular principles into the built environment can reduce environmental impact, extend the value of materials, and create buildings that are not only resource-efficient but also resilient and future-proof.[52] The core principles of a circular economy for the built environment as defined in the World Green Building Council Circular Built Environment Playbook[53] are:

- Reduction in consumption of materials and resources;
- Optimisation of lifespan for material and product use;
- Design for disassembly, reuse and recycling, and the elimination of all waste;
- Regeneration of nature.

The Proposed Development has been designed with due consideration to the principles of circular economy. Please see Section 3.6 and Section 3.7 of Chapter 3 Reasonable Alternatives for further information on alternative layouts and design considerations for the Proposed Development; a full description of the Proposed Development is provided in Chapter 4.

10.5 Calculating Carbon Losses from the Proposed Development

10.5.1 Background

A higher emphasis on the decarbonisation of all sectors has been stressed due to the sharp increase in fossil fuel cost following the Russian invasion of Ukraine. The EU is looking to remove dependencies on Russia and REPowerEU[54] gives the Industry sector a further incentive to reduce costs through increasing efficiency and moving towards more sustainable and renewable energy options.

The EU Corporate Sustainability Reporting Directive (Section 10.2.1) requires increased transparency on ESG impacts associated with an entity, this includes increased energy transparency requirements that will further assist in the decarbonisation of the Industry sector.

[51] *Circular economy: definition, importance and benefits (May 2023)* <https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits#:~:text=The%20circular%20economy%20is%20a,reducing%20waste%20to%20a%20minimum.>
[52] https://www.igbc.ie/circularity-built-environment/
[53] *World Green Building Council (2023) The Built Environment Circular Playbook* <https://worldgbc.org/wp-content/uploads/2023/05/Circular-Built-Environment-Playbook-Report_Final.pdf>
[54] *European Commission, REPowerEU (2022)* <https://data.europa.eu/doi/10.2775/076377>

10.5.2 Calculating Carbon Losses

Carbon emissions or losses associated with embodied carbon of materials used in the construction and operational phase of the Proposed Development have been identified. Embodied carbon refers to the emissions associated with procuring, mining and harvesting raw materials, the transformation of those materials into construction products, transporting them to site, installation of these materials during a construction phase, and the subsequent replacement, removal, and disposal of these materials.[55]

The emissions associated with the embodied carbon, along with the construction phase transport movements are considered using the Transport Infrastructure Ireland (TII) Carbon Tool (TII 2022)[56]. The TII Carbon Tool is customised for road and light rail projects in Ireland, using emission factors from recognised sources during the construction, maintenance and operation of TII projects in Ireland.

Chapter 15 of this EIAR outlines traffic generation numbers relative to quantum of materials required for the construction of the Proposed Development, the details of which have been utilised to determine the emissions associated with these activities and are included in Appendix 10-2.

10.5.2.1.1 *Carbon Losses*

In relation to emissions associated with embodied carbon and associated transport movements, the TII Carbon Tool has been utilised to assess the impacts of the Proposed Development in terms of potential carbon losses, and in particular construction phase transport emissions.

A copy of the outputs is provided as Appendix 10-2 of this EIAR, *'Carbon Calculations'*. Where available and relevant, site-specific information was inserted into the online carbon calculators. Otherwise, default values were used.

The main CO_2 losses due to the Proposed Development are summarised in Table 10-5.

Table 10-5 CO_2 Losses from the Proposed Development

Origin of Losses	CO_2 Losses (tonnes CO_2 equivalent)
Losses associated with embodied carbon in construction materials	10,524
Losses associated with construction phase transport movements	159.6
Losses associated with construction waste streams	420
Total	**11,103.6**

The worksheet models and online tools calculate that the Proposed Development will give rise to 11,103.6 tonnes of CO_2 equivalent losses per annum. Of this total figure, losses due to embodied carbon accounts for 95% or 10,524 tonnes, and losses due to construction phase transport emissions accounts for 1% or 159.6 tonnes. Losses associated with construction waste accounts for 420 tonnes or 4%.

[55] *Irish green Building Council – What is embodied carbon?* <https://www.igbc.ie/what-is-embodied-carbon/>
[56] *Transport Infrastructure Ireland Carbon Tool for Road and Light Rail Projects: User Guidance Document* https://www.tiipublications.ie/library/GE-ENV-01106-01.pdf

The figure of 10,524 tonnes of CO_2 arising from the embodied carbon of construction materials associated with the Proposed Development is calculated based the types of materials available in the TII Carbon tool such as, concrete, steel, cement and granular fill. The figure of 159.6 tonnes of CO_2 arising from transport movements associated with construction activities associated with the Proposed Development is calculated based on the traffic volumes outlined in Section 15.1.9.6, along with the assumption that material will be imported locally. Due to the number of unknowns associated with operational transportation total distances, carbon calculations for this element of the Proposed Development have not been completed. Please see Section 15.1.9.7 of EIAR Chapter 15 for further detail on operational phase transport movements.

The figure of 420 tonnes of CO^2 arising was determined based on the relevant disposal method as identified in Table 4 of the Construction and Demolition Waste Management Plan (CDWMP) (Appendix A to Appendix 10-2). However, where it was not possible to apply a reuse disposal method to the waste stream (i.e., where only incineration was identified), the relevant quantity of waste was calculated under the 'landfill' disposal method under a theoretical precautionary scenario. Therefore, actual CO_2 losses are expected to be lower than the 420 tonnes presented in Table 10-5 above.

When considering these greenhouse gas emissions within the context of the national Built Environment – Residential Sector Emissions Ceilings detailed in Section 10.2.2, Carbon Budget 1 (2021-2025) has a Built Environment – Residential Sector budget of 29 $MtCO_2eq$. and Carbon Budget 2 (2026-2030) has a Built Environment – Residential Sector budget of 23 $MtCO_2eq$. The information presented in Table 10-5 shows the total amount of CO_2eq arising from the Proposed Development, in tonnes, is 11,103.6. With regards to the sectoral emissions ceilings for the Built Environment – Residential sector, these emissions account for 0.04% of the first carbon budgeting period and 0.05% of the second carbon budgeting period.

Details on the assumptions made for the modelling of embodied carbon and construction phase transport emissions are included in Appendix 10-2: Carbon Calculations.

10.6 Likely Significant Effects and Associated Mitigation Measures

10.6.1 'Do-Nothing' Scenario

If the Proposed Development was not developed, the site will continue to function as it does at present, with no changes made to the current land-use. The potential for additional investment and employment in the area in relation to the Proposed Development would be lost.

10.6.2 Construction Phase

10.6.2.1 Greenhouse Gas Emissions

Proposed Development

The construction of the Proposed Development will require construction materials (such as cement), and the operation of construction vehicles and plant on and off-site, and the transport of workers to and from the Proposed Development site, please see Section 4.4 of Chapter 4 for further information on proposed construction works). Greenhouse gas emissions, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides, associated with the production of construction materials, and operation of vehicles and plant will arise as a result of the construction activities. This effect will be short-term negative and slight only, which is not significant, given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. Mitigation measures to reduce this effect are presented below.

Some potential long-term imperceptible negative effects will occur due to the removal of carbon fixing vegetation and habitat. This effect will be long-term, negative and imperceptible only, given the quantity of greenhouse gases that will be emitted to the atmosphere and is not significant.

Transport

The transport of construction materials to the site will also give rise to greenhouse gas emissions associated with the transport vehicles and exhaust emissions. This impact will be short-term and imperceptible only, given the quantity of greenhouse gases that will be emitted and will be restricted to the duration of the construction phase, therefore it is not significant. Mitigation measures to reduce this effect are presented below.

Waste Disposal

Construction waste will arise from the construction of the Proposed Development, mainly from excavation and unavoidable construction waste including material surpluses, damaged materials and packaging waste. As identified above in Table 10-5, the identified waste streams (Table 4 in the CDWMP), will give rise to greenhouse gas emissions resulting in a short-term slight negative impact on climate. Given the quantity of greenhouse gases associated with the generation and management of these waste streams and the restriction of these emissions to the construction phase, this impact is not significant. Waste management will be carried out in accordance with '*Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects'* (2021) produced by the EPA.

Please refer to Section 4.5.5.1 of Chapter 4 of this EIAR and Section 3.10 of the Construction and Environmental Management Plan (CEMP) (Appendix 4-1) for detailed processes on waste management during the construction phase of the Proposed Development.

Mitigation for the Proposed Development

- Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required;
- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise;
- When stationary, delivery and on-site vehicles will be required to turn off engines.
- Aggregate materials for the construction of the Proposed Development will be obtained from local appropriately authorised quarries local to the site. This will reduce journey distances of the delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements;
- A Traffic Management Plan (TMP) will be agreed with Galway City Council prior to works commencing on site:
    - The approved TMP and any revisions thereof will be set up and implemented on site. All necessary signage will be erected in the weeks prior to any works commencing along and on adjacent roads to the Proposed Development giving advance warning to traffic, pedestrians / members of the public;
- Areas of excavation will be kept to a minimum, and stockpiling of excavated material will be minimised by coordinating excavation;
- All excavated material will be removed to an authorised waste recovery facility or, if suitable, stockpiled and reused for backfilling and landscaping where appropriate;
- A CEMP (Appendix 4-1) will be in place throughout the construction phase;

- The CEMP (Appendix 4-1) includes a Resource Waste Management Plant (RWMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material;
    - The Proposed Development and the required materials have been designed with the principles of the circular economy in mind;
    - Sustainable and recyclable building materials will be used where possible to allow for a high recycling rate of building materials should they need to be recycled in the future;
- Reuse of existing material:
    - Existing underlying gravel material on site to be used in pavement construction where feasible
    - Externally the project will use:
        - Recycled material for non-structural concrete frame elements,
        - Sub-bases for temporary hard standing
        - Mats or general fill to reduce the impact on new resources;
- To reduce construction and demolition waste (C&D waste) disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials the contractor will be required to abide by the Best Practice Guidelines for resource and C&D waste management set out by the EPA (EPA, 2021) and to develop and implement a construction and demolition waste management plan to include:
    - Waste diversion goals
    - Specify whether materials will be separated or commingled and
    - Describe the diversion strategies planned for the project
    - Provide a final report detailing all major waste streams generated, including disposal and diversion rates;
- The structural design ensures service routes and risers can be incorporated with minimal structural complication leading to reduced impact from future usage changes;
- Externally the project will use recycled material for non-structural concrete frame elements, sub-bases for temporary hard standing, mats or general fill to reduce the impact on new resources will be employed;
- Incorporation of Sustainable Drainage (SuDS) features into the drainage design as far as possible;
- Where applicable, low carbon intensive construction materials will be sourced and utilised onsite;
- All oils, fuels, paints and other chemicals will be stored in a secure bunded construction hardstand area;
- Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any drainage system:
    - A response procedure will be put in place to deal with any accidental pollution events and spillage kits will be available and construction staff will be familiar with the emergency procedures and use of the equipment.
    - Refuelling will be completed in a controlled manner using drip trays at all times.
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- On-road vehicles to comply to set emission standards;
- All non-road mobile machinery (NRMM) to be fitted with appropriate exhaust system and to be regularly serviced;
- Haul routes to be hard surfaced and cleaned and appropriate speed limits applied around the site;
- The methods of working will comply with all relevant legislation and best practice guidelines in reducing the environmental effects of the works.

Following implementation of the mitigation measures above, residual effects of greenhouse gas emissions arising from the construction phase of the Proposed Development will have a short-term imperceptible negative effect and is not significant. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate, which is not significant.

When considering these greenhouse gas emissions within the context of the national Built Environment – Residential Sector Emissions Ceilings detailed in Section 10.2.2, Carbon Budget 1 (2021-2025) has an Built Environment – Residential Sector budget of 29 $MtCO_2eq$. and Carbon Budget 2 (2026-2030) has an budget of 23 $MtCO_2eq$. Within the context of the 5-year Carbon Budget periods, the Proposed Development will give rise to 11,103.6tCO_2eq or 0.01110358$MtCO_2eq$; this accounts for **0.04%** of the available budget in the first carbon budgeting period and **0.05%** of the available budget in the second carbon budgeting period. Therefore, there will be greenhouse gas emissions associated with the construction of the Proposed Development, and these will take place under the Built Environment – Residential sector emissions ceiling and will have a long-term permanent imperceptible negative effect on Climate.

Significance of Effect

Based on the assessment above there will be no significant effects.

10.6.3 Operational Phase

Proposed Development

The operational phase of the Proposed Development has the potential to release greenhouse gas emissions, primarily through the burning of fossil fuels, in particular natural gas for heating purposes. This is a long-term slight negative effect on Climate, which is not significant.

Transport

The operational phase of the Proposed Development has the potential to release greenhouse gas emissions, primarily through the burning of fossil fuels, in particular diesel and petrol for transportation purposes associated with periodic maintenance and daily travel of residents This will result in a long-term slight negative effect, which is not significant, on climate, given the quantity of greenhouse gases that will be emitted as part of the Proposed Development.

The Proposed Development will provide for a network of footpaths throughout the Proposed Development will provide a high rate of accessibility to the local facilities within the area. The inclusion of these attractive, well designed walking routes will encourage pedestrians to access the local facilities on foot which would result in a reduction of transportation emissions.

Waste

The operational phase of the Proposed Development has the potential to release greenhouse gas emissions, primarily through the burning of fossil fuels, in particular methane for waste management purposes.

Waste will arise from the Proposed Development during the operational phase, mainly unavoidable household waste. Waste management will be carried out in accordance with all relevant guidelines provided by the EPA and national legislation (i.e., Waste Management Act 1996 as amended). Due to the nature of the Proposed Development, it will have a long-term slight negative effect, which is not significant, on climate, given the quantity of greenhouse gases that will be emitted as part of the Proposed Development.

Wastewater from the Proposed Development will be connected to the main sewer network and will be directed to the Mutton Island Wastewater Treatment Plant in Co. Galway. Greenhouse gas emissions will arise as a result of these activities and will have a short-term imperceptible negative impact on climate, which is not significant

Mitigation for the Proposed Development

- DCV will be provided to provide controlled natural ventilation to each dwelling;
- LED lighting and advanced lighting controls shall be implemented into the houses and apartments;
- Incorporating renewable energy sources, such as solar photovoltaic panels, and heat pumps, into the electrical systems of apartments;
- Utilisation of energy-efficient lighting technologies, such as LED bulbs, and employing smart controls, occupancy sensors, and daylight harvesting systems to optimize lighting and energy consumption;
- Implementation of water-efficient fixtures, such as low-flow toilets and showerheads, can reduce water consumption;
- Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise.

Residual Effect

When considering the greenhouse gas emissions associated with the operational phase of the Proposed Development, within the context of the national Built Environment – Residential Sector Emissions Ceilings detailed in Section 10.2.2, the Proposed Development will have a long-term slight negative effect on Climate.

Significance of Effects

Based on the assessment above there will be no significant effects.

10.7 Cumulative Assessment

Potential cumulative effects on climate between the Proposed Development and other permitted or proposed projects and plans in the area, as set out in Section 2.6 in Chapter 2 of this EIAR, were also considered as part of this assessment. The developments considered as part of the cumulative effect assessment are described in Section 2.6 of this EIAR.

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed with the Proposed Project, was considered. The Proposed Project involves the construction of more than 500 residential units, and the development will require separate, individual planning applications for each part of the project. The individual planning applications will be subject to separate planning applications and Environmental Impact Assessment Reports. Each EIAR will include a cumulative assessment, which combines the individual project's impacts with those from other past, present, and future projects to understand the cumulative effect of the Proposed Project.

During the construction phase of the Proposed Development and other permitted or proposed projects and plans in the area as set out in Section 2.6 in Chapter 2 of this EIAR, that are yet to be constructed, there will be greenhouse gas emissions arising from production of construction materials (such as cement), and the operation of construction vehicles and plant. As outlined in Section 10.1.2 above, the impacts and resulting effects of greenhouse gas emissions are global rather than affecting one localised area; therefore, for the purposes of this EIAR, the overall Climate Study Area for the Proposed Development is defined as the national environment (Ireland), where the receptor is the climate and the

global atmosphere. However, as this cumulative assessment cannot cumulatively assess all projects in the country, all existing and proposed projects within 1km of the EIAR Study Area was considered. Should these developments be constructed simultaneously, there is the potential for a short-term slight negative cumulative effect on climate. A list of these proposed and permitted developments are outlined in Table 2-2 and Appendix 2-1 in Chapter 2 of this EIAR. When considering these greenhouse gas emissions within the context of the national Built Environment – Residential Sector Emissions Ceilings, the total emissions arising from the construction phase account for 0.04% of the first carbon budgeting period and 0.05% of the second carbon budgeting period. Therefore, there will be greenhouse gas emissions associated with the construction of the Proposed Development along with other permitted or proposed projects, and these will take place under the Built Environment – Residential sector emissions ceiling and will have a long-term permanent imperceptible negative effect on Climate.

The nature of the Proposed Development is such that, once operational, it will have a long-term, imperceptible, negative effect on climate. Emissions greenhouse gases during the operational phases of the Proposed Development and other developments, will be minimal and will take place under the relevant carbon budget and associated sectoral emissions ceiling, along with other planned or permitted projects. Thus, there will be no cumulative effects arising on climate from the Proposed Development and other permitted or proposed projects and plans in the area as set out in Section 2.6 in Chapter 2 of this EIAR.

Given the nature of scale of the Proposed Development and the limited number and size of other developments in the vicinity, there will be no significant cumulative effects on climate.

10.8 Conclusion

This Chapter of the EIAR followed relevant guidance and best practice to provide an assessment of potential effects from the Proposed Development on climate, either alone or cumulatively considered with other relevant activities in the vicinity of the site. It is concluded that there will be no significant effects on climate from the Proposed Development.