RATHMULLAN ROAD, OLDBRIDGE, DROGHEDA, CO. MEATH

Climate Change Impact Assessment Report

Earlsfort Developments Drogheda Limited

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1 INTRODUCTION

DNV has been commissioned to produce a Climate Change Impact Assessment Report (CCIA) on behalf of Earlsfort Developments Drogheda Limited for a Proposed Large-Scale Residential Development on lands at Rathmullan Road, Oldbridge, Drogheda, Co. Meath (hereafter referred to as the Proposed Development). A full project description is in included in Section 1.1 of this report.

1.1 Quality Assurance and Competency of Experts

This Change Impact Assessment (CCIA) Report has been prepared by Aoife Grogan, Senior Environmental Consultant at DNV. Aoife holds a BA Hons in Geography and English and an MSc in Climate Change (both from Maynooth University). She has also completed two additional Professional and Advanced Diplomas in the areas of Geographic Information Science (TU Dublin) and Planning and Environmental Law (Kings Inns). Aoife specialises in the areas of air quality, climate change, and sustainability; and has provided technical input to a diverse range of projects in this context. Aoife has considerable experience in preparing CCIAs for both commercial and residential developments in response to national and local authority requirements. She is also experienced in aligning the assessment with the EU Taxonomy Regulation to provide a thorough examination of climate-related risks and opportunities.

1.2 Methodology

In accordance with national and Meath County Council (MCC) planning requirements, the Report will assess the impact of climate change on the Proposed Development and ensure that the policies and objectives produced and implemented by the local authority in relation to climate change and climate change protection measures, particularly in relation to drainage design, as set out within the Meath County Development Plan 2021-2027 (MCDP), have been incorporated into the Proposed Development design. The relevant policies and objectives of the MCDP have also been carefully considered in the context of associated UN Sustainable Development Goals (SDGs), and their incorporation into the Proposed Development design.

This assessment has been undertaken in accordance with Regulation (EU) 2020/852 of the European Parliament and of the Council (the 'Taxonomy Regulation'), Commission Delegated Regulation (EU) 2021/2139 (the 'Supplementing Regulation'), and 'Technical Annex B: Climate Change Risk Assessment' of the 'Local Authorities Climate Action Planning Guidelines' and provides a qualitative Climate Change Risk Assessment ('CCRA'). A qualitative CCRA supports the identification and prioritisation of potential future climate risks for more detailed analysis and provides a broad understanding of where adaptation actions could be required.

The physical climate risks which may affect the performance of the Proposed Development during its expected lifetime have been identified through a climate risk screening. Climate projections across the existing range of future scenarios have been examined, along with the Proposed Development location, to gain an understanding of the future risks that climate change may have on the Proposed Development. The vulnerability of the Proposed Development to these risks has been subsequently assessed taking account of relevant adaptation and mitigation measures which have been incorporated into the Development design.

This Report provides information to support the relevant public body in carrying out its functions in a manner consistent with national climate plans and strategies (such as the National Climate Action Plan 2025) and furthering the achievement of the national climate objective as set out under Section 15 of the Climate Action and Low Carbon Development Act 2015, as amended in 2021. Under the Act each local authority is required to prepare a local authority climate action plan for its administrative area. The plans are consistent with the most recent climate action plan and national adaptation framework. The plans are to address, and integrate, mitigation of greenhouse gases, climate change adaptation and strengthened alignment with national climate policy, delivering effective local climate action. The current CCIA report should be reviewed alongside the relevant and current Local Authority Climate Action plan to ensure alignment with relevant objectives and targets.

1.3 Scope and Limitations

This report assesses the impact of climate change on the Proposed Development (physical climate risks, vulnerability and adaptation measures) following Annex II, Section 7.1 of Commission Delegated Regulation (EU) 2021/2139 as a methodological framework only. It does not assess the impact of the development on climate (i.e., embodied/operational greenhouse gas emissions), which is addressed separately in Chapter 9 (Climate) of the Environmental Impact Assessment Report. This report has not been prepared for the purpose of assessing compliance with the EU Taxonomy Regulation. Accordingly, it does not make any determination regarding 'Do No Significant Harm' or other Taxonomy criteria for environmental objectives beyond adaptation.

1.4 Project Description

The Proposed Development will consist of the following:

(i) demolition/removal of all existing farm buildings/structures and associated hard standing on site;

(ii) construction of a large-scale residential development (LRD) of 249 no. units comprising 170 no. two-storey houses (including 37 no. two-bedroom houses, 111 no. three-bedroom houses and 22 no. four-bedroom houses), 16 no. three-storey duplex buildings (accommodating 16 no. one-bedroom and 16 no. two-bedroom units) and a mix of 8 no. three-storey and 3 no. four-storey apartments blocks accommodating a total of 22 no. one-bedroom and 25 no. two-bedroom apartments);

(iii) construction of a new vehicular entrance and access road off Rathmullan Road with associated junction works and associated internal access road network with pedestrian and cyclist infrastructure;

(iv) provision of a three-storey creche facility (411sq.m) with external play areas at ground and second floors and vehicular/bicycle parking area; and,

(v) all ancillary site and infrastructural works, inclusive of removal of existing vehicular entrances, general landscaping and public open space provision, vehicular parking provision (396 no. spaces in total), bicycle parking, boundary treatments, foul/surface water drainage, attenuation areas, provision of a pumping station and provision of an ESB substation, as necessary to facilitate the proposed development. Each house will be served by vehicular parking to the front and private amenity space in the form of a rear garden. Each duplex building will be

served by vehicular parking to the front and private amenity space in the form of balcony/terrace spaces to the rear. Each apartment block will have shared access to adjoining car parking bays with communal amenity space and bicycle/bin stores provided to the rear and each apartment will be provided with private amenity space in the form of a balcony or terrace. The development includes provision of a landscaped area of public open space to the north of the site, with 2 no. pedestrian/cyclist connections (via the northern/eastern site boundaries) to Rathmullan Road which will be subsequently ceded to Meath County Council.

The application is accompanied by a Natura Impact Statement (NIS) and an Environmental Impact Assessment Report (EIAR).

1.5 Legislative and Strategic Context

1.5.1 The EU Taxonomy Framework

Regulation (EU) 2020/852 of the European Parliament and of the Council (the 'Taxonomy Regulation') establishes the criteria for determining whether an economic activity qualifies as environmentally sustainable for the purposes of establishing the degree to which an investment is environmentally sustainable. Commission Delegated Regulation (EU) 2021/2139[1] (the 'Supplementing Regulation') establishes the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives.

The technical screening criteria as outlined within the Supplementing Regulation have been adopted for the purpose of this assessment.

The Supplementing Regulation establishes the technical screening criteria specific to certain economic activities. The Proposed Development, located at Rathmullan Road, Oldbridge, Drogheda, Co. Meath consists of the construction of a Large-Scale Residential Development. Therefore, in accordance with Annex II, Section 7.1, of the Supplementing Regulation, the relevant technical screening criteria for the Proposed Development are set out under the "Construction of new buildings".

Annex II Section 7.1 of the Supplementing Regulation sets out the relevant technical screening criteria for the project to make a *'Substantial Contribution to Climate Change Adaptation'.* These technical screening criteria have been adopted in the current assessment to conduct a climate risk and vulnerability assessment and determine the adaptive capacity of the Proposed Development. [2]

[1] Commission Delegated Regulation (EU) of 4.6.2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives.

[2] These criteria have been adopted for assessment purposes only and do not suggest that the Proposed Development qualifies as an 'environmentally sustainable' economic activity under the Taxonomy Regulation.

Table 1-1 overleaf details the criteria for *"Substantial Contribution to Climate Change Adaptation"* and the associated sections of this Report in which these criteria have been addressed.

Table 1-1: Substantial Contribution to Climate Change Adaptation Screening Criteria

Substantial Contribution to Climate Change Adaptation Screening Criteria[3]	Relevant Section of this Report
The economic activity has implemented physical and non-physical solutions ('**adaptation solutions**') that substantially reduce the most important physical climate risks that are material to that activity.	See Section 4 of this report for Climate Risk and Vulnerability Assessment.
The physical climate risks that are material to the activity have been identified from those listed in Appendix A to this Annex by performing a robust **climate risk and vulnerability assessment** with the following steps: a) screening of the activity to identify which physical climate risks from the list in Appendix A to this Annex may affect the performance of the economic activity during its expected lifetime; b) where the activity is assessed to be at risk from one or more of the physical climate risks listed in Appendix A to this Annex, a climate risk and vulnerability assessment to assess the materiality of the physical climate risks on the economic activity; c) an assessment of adaptation solutions that can reduce the identified physical climate risk. The climate risk and vulnerability assessment is proportionate to the scale of the activity and its expected lifespan, such that: a) for activities with an expected lifespan of less than 10 years, the assessment is performed, at least by using climate projections at the smallest appropriate scale; b) for all other activities, the assessment is performed using the highest available resolution, state-of-the-art climate projections across the existing range of future scenarios consistent with the expected lifetime of the activity, including, at least, 10 to 30 year climate projections scenarios for major investments.	See Section 2 of this report for Climate Change Projections. See Section 3 of this Report for Climate Risk Screening. See Section 4 of this report for Climate Risk and Vulnerability Assessment.
The **climate projections** and assessment of impacts are based on best practice and available guidance and take into account the state-of-the-art science for vulnerability and risk analysis and related methodologies in line with the most recent Intergovernmental Panel on Climate Change (IPCC) reports, scientific peer-reviewed publications and open source or paying models.	See Section 2 of this report for Climate Change Projections.

[3] as set out in Annex II, Section 7.1 of the Supplementing Regulation.

Substantial Contribution to Climate Change Adaptation Screening Criteria[3]	Relevant Section of this Report
The **adaptation solutions** implemented: a) do not adversely affect the adaptation efforts or the level of resilience to physical climate risks of other people, of nature, of cultural heritage, of assets and of other economic activities; b) favour nature-based solutions or rely on blue or green infrastructure to the extent possible; c) are consistent with local, sectoral, regional or national adaptation plans and strategies; d) are monitored and measured against pre-defined indicators and remedial action is considered where those indicators are not met; e) where the solution implemented is physical and consists in an activity for which technical screening criteria have been specified in this Annex, the solution complies with the do no significant harm technical screening criteria for that activity.	See Section 4 of this report for Climate Risk and Vulnerability Assessment. See Section 5 of this report for Meath County Development Plan 2021-2027: Relevant Policies and Objectives This report has not been prepared for the purposes of assessing compliance with the Taxonomy Regulation and therefore does not demonstrate compliance with the relevant criteria for Do No Significant Harm as they relate to the remaining five environmental objectives.

1.5.2 IPCC Sixth Assessment Reports (AR6)

The Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to assess the science related to climate change so that government organisations at all levels would have a scientific basis from which to make decisions regarding climate change. The IPCC assessments of scientific research relating to climate change is written and reviewed by leading scientists worldwide, and then reviewed by experts in their field to ensure the reports reflect the full range of views in the scientific community. The IPCC reports undergo multiple rounds of drafting and review to ensure they are comprehensive and objective and produced in an open and transparent way.

The role of the Intergovernmental Panel on Climate Change (IPCC) is to critically assess the scientific, technical and socio-economic information relevant to understanding the physical science and impacts of human-induced climate change and natural variations, including the risks, opportunities and options for adaptation and mitigation.

The most up to date IPCC report is the Sixth Assessment Report (AR6)[4], which comprises of three Working Group Reports and a Synthesis Report, three Special Reports, and a refinement to its latest Methodology Report; these are as follows:

- **The Working Group I (WGI)** contribution to the Sixth Assessment Report, *Climate Change 2021*: *The Physical Science Basis* was released on 9 August 2021.
- **The Working Group II** contribution, *Climate Change 2022: Impacts, Adaptation and Vulnerability* was released on 28 February 2022.
- **The Working Group III** contribution, C*limate Change 2022: Mitigation of Climate Change* was released on 4 April 2022.
- Special Report 1: *Global Warming of 1.5 ºC* (SR15, October 2018)
- Special Report 2: *Climate Change and Land* (SRCCL, August 2019)
- Special Report 3: *Ocean and Cryosphere in a Changing Climate* (SROCC, September 2019)
- The **AR6 Synthesis Report** integrates the three Working Group reports as well as the findings from the three cross-Working Group Special Reports prepared during this assessment cycle.

AR6 has adopted a unified framework of climate risk, supported by an increased focus in WGI on low-likelihood, high impact outcomes. Systematic risk framing is intended to aid the formulation of effective responses to the challenges posed by current and future climatic changes and to better inform risk assessment and decision-making. AR6 also makes use of the ‘storylines’ approach, which contributes to building a robust and comprehensive picture of climate information, allows for a more flexible consideration and communication of risk, and can explicitly address low-likelihood, high-impact outcomes.

[4] Intergovernmental Panel on Climate Change (2022) Sixth Assessment Report (AR6).

The climatic impact-driver (CID) framework adopted in Chapter 12 of IPCC AR6 WGI allows for assessment of changing climate conditions that are relevant for regional impacts and for risk assessment.

The scientific findings summarised here underpin the climate projections and risk assessments applied to the Proposed Development in Sections 2 and 3 of this Report.

1.5.3 Meath County Council Planning Requirements

1.5.3.1 Meath County Council Climate Action Plan 2024-2029

In February 2024, Meath County Council published the Meath County Council Climate Action Plan 2024-2029 (MCC CAP). The CAP includes a range of climate change mitigation actions aimed at reducing Countywide greenhouse gas emissions. It also includes climate adaptation actions aimed at improving the resilience of the county to the impacts of climate change. These actions include those for which the Council is fully accountable across its own buildings, operations, services, and functions; and actions for which the Council can influence, co-ordinate, facilitate and advocate for climate action.

Actions are divided across five thematic areas including:

- Governance and Leadership
- Built Environmental and Transport
- Natural Environment and Green Infrastructure
- Communities: Resilience and Transition
- Sustainability and Resource Management

The CAP sets out how Meath County Council will be responsible for enhancing climate resilience, increasing energy efficiency, and reducing greenhouse gas emissions, across its own assets, services, and infrastructure, for which it is fully accountable, whilst also demonstrating a broader role of influencing, advocating, and facilitating other sectors, to meet these climate targets and ambitions. This is necessary to ensure that the environmental, social, and economic benefits that come with climate action, can be fully realised. The Council will also continue its efforts in rolling out ambitious climate action projects, drawing down available sources of funding, pursuing citizen and stakeholder engagement, all supported by a progressive policy framework.

The sector of the CAP which most closely aligns with the Proposed Development is Built Environment and Transport. According to the Plan, built environment includes buildings of domestic, public, industrial, and commercial nature across the County of Meath as well as critical infrastructure like roads, bridges, drainage networks, utilities, energy, and communications infrastructure. Buildings contribute a significant proportion of the county's emissions. Optimising energy efficiency and switching to low carbon heat sources in buildings will need to be prioritised in addition to securing renewable energy infrastructure to contribute to national grid decarbonisation and deliver a low carbon alternative to fossil fuels. The protection of the built environment from the negative impacts of climate change is also a priority focus to minimise the exposure of key infrastructure (such as Council owned buildings, roads, stormwater drains, public facilities, and the energy grid) to climate-related hazards. This

will require appropriate planning, preparedness, and asset management in liaison with key stakeholders and agencies such as the OPW on flood risk.

As part of the development of the CAP, Meath County Council has undertaken a Climate Change Risk Assessment. The Climate Change Risk Assessment has identified the impacts which climate change is currently having on the County and is likely to have into the future. The Climate Change Risk Assessment is linked with the ongoing planning for Meath County Council in terms of adaptation to the changing climate and continued support services to citizens and businesses.

The risk assessment methodology and findings within the MCC CAP have been considered in Section 3 of this report.

1.5.3.2 Meath County Development Plan 2021-2027

The Meath County Development Plan 2021-2027 (MCDP) is the key strategy document which structures the proper planning and sustainable development of land-use across County Meath over the six-year statutory period of the plan. The Plan seeks to address the physical, economic, social, and environmental needs of the community, in terms of supporting structured new development, protecting the environment, enhancing valued assets and amenities.

The Plan provides a positive vision for Meath which will enable the county to continue to make a significant contribution to the national economy by promoting sustainable development and facilitating stable economic growth thus delivering long term benefits for the citizens of the county.

The Strategic Vision of the Development Plan is as follows:

'*To improve the quality of life of all citizens in Meath by creating an environment that supports a vibrant growing economy and a well-connected place to live, learn and do business.'*

Whilst Climate Change policies and mitigation measures are set out at a National and International level, Local Authorities have a central role in the implementation of these policies and in promoting behavioural and attitude change towards climate change.

One of the key objectives contained within the plan is to 'support the transition to a low carbon economy and lead on climate action'. Climate change is a cross-cutting theme of the Plan; and climate change is specifically addressed in detail as part of Chapter 10 Climate Change.

Chapter 10 of the MCDP 2021-2027 outlines the approach to climate change adaptation and greenhouse gas mitigation, as required by the Planning and Development Act 2000, as amended. The chapter examines how mitigation and adaptation strategies have been integrated into the main body of the Plan. This is to ensure that the climate change strategy has been developed collaboratively and is fully integrated and consistent with the Policies and Objectives of the Plan; as climate change is one of the cross-cutting themes of the Plan.

Relevant policy objectives as outlined within the MCDP 2021-2027 and their incorporation into the Proposed Development design have been considered in Section 5 of this report.

1.5.4 Development Strategy for South Drogheda Environs – Joint Urban Area Plan (UAP)

While a statutory Joint Urban Area Plan (UAP) for Drogheda has not yet been finalised, the Regional Spatial and Economic Strategy (RSES) requires it as a priority strategic mechanism. As outlined in the pre-draft Strategic Issues Paper for the Joint Local Area Plan (JLAP), the emerging objectives include defining the functional urban boundary, coordinating strategic housing and serviced land delivery, and embedding resilience to flood risk through a Strategic Flood Risk Assessment (SFRA). The forthcoming UAP/JLAP will also require flood zone mapping, support for the Drogheda-Baltray Flood Relief Scheme, and integration of sustainable drainage systems (SuDS) and green/blue infrastructure in line with best-practice water-sensitive urban design.

These emerging objectives have direct relevance to this CCIA Report as they set the future policy framework for managing flood risk, surface water, and climate adaptation within the urban area. In particular, the CCIA has been prepared to ensure that proposed drainage and flood resilience measures are consistent with the policy direction of the UAP/JLAP, enabling the development to remain compliant with evolving statutory requirements.

1.5.5 Climate Action and Low Carbon Development Act

The Climate Action and Low Carbon Development Act 2015 (the principal act) set national climate policy on a statutory footing for the first time in Ireland, with the target of pursuing the transition to a low-carbon, climate-resilient, and environmentally sustainable economy by 2050. The principal act was subsequently amended by the Climate Action and Low Carbon Development (Amendment) Act 2021 (the '2021 Act') which sets Ireland on a legally binding path to net-Zero emissions no later than 2050, and to a 51% reduction in emissions by the end of this decade.

The 2021 Act provides a legally binding framework with clear targets and commitments set in law, and ensures the necessary structures and processes are embedded on a statutory basis to ensure Ireland achieves its national, EU and international climate goals and obligations in the near and long term.

The 2021 Act also introduces a requirement for each local authority to prepare a Climate Action Plan, which will include both mitigation and adaptation measures and be updated every five years. Local authority Development Plans will also align with their Climate Action Plan.

Furthermore, Public Bodies are obliged to perform their functions in a manner which is consistent with national climate plans and strategies and furthering the achievement of the national climate objective; this is set out under Section 15 of the Climate Action and Low Carbon Development Act 2015, as amended in 2021:

"Duties of certain bodies

15. *(1) A relevant body shall, in so far as practicable, perform its functions in a manner consistent with—*

(a) the most recent approved climate action plan,

(b) the most recent approved national long term climate action strategy,

(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,

(d) the furtherance of the national climate objective, and

(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

This CCIA Report has been prepared having regard to the most recent national Climate Action Plan (CAP25) and the National Adaptation Framework (2024), in line with the duty under Section 15 of the Climate Action and Low Carbon Development Act 2015 (as amended). In addition, the assessment aligns with the Meath County Council Climate Action Plan 2024–2029 and the Meath County Development Plan 2021–2027, which implement national climate policy at local level. While consistency with the MCC CAP supports the delivery of national objectives, it is acknowledged that Section 15 compliance is assessed by reference to national plans and strategies. This report therefore demonstrates consistency, so far as practicable, with the national CAP and NAF, and evidences how local adaptation measures embedded in the Proposed Development contribute to those objectives.

Consistency with national climate objectives, as required under Section 15, is demonstrated through the adaptation-focused risk assessment and mitigation measures presented in Sections 3 and 4 of this Report.

1.5.6 National Adaptation Framework (NAF)

Ireland's statutory National Adaptation Framework (NAF) was published in June 2024 and was developed under the Climate Action and Low Carbon Development Act 2015. The NAF sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts.

The NAF builds on the work already carried out under the National Climate Change Adaptation Framework (NCCAF, 2012). The NAF outlines a whole of government and society approach to climate adaptation in Ireland. It also aims to improve the enabling environment for adaptation through ongoing engagement with civil society, the private sector, and the research community.

Under the NAF, several government departments are required to prepare sectoral adaptation plans in relation to the priority areas that they are responsible for, which is to be reviewed once every five years. Local authorities are required to prepare local adaptation strategies. The NAF also aims to ensure ongoing engagement with civil society, the private sector, and the research community.

The NAF's emphasis on proactive adaptation is implemented through the climate risk and vulnerability assessment in Sections 3 and 4 of this Report.

1.5.7 Climate Action Plan 2025

Climate Action Plan 2025 (CAP25) (Government approval 15 April 2025) is the third statutory annual update under the Climate Act 2021. It refines actions to deliver Ireland's economy-wide carbon budgets and sectoral emissions ceilings to 2030 and charts the pathway to climate neutrality by 2050. CAP25 builds on CAP24, with a focused Annex of Actions for 2025, and cross-cutting measures in energy, buildings, transport, enterprise, land use and the adaptation agenda.

Greenhouse gas mitigation measures are addressed separately in the application, within Chapter 9 (Climate) of the EIAR. The adaptation elements of CAP25 and the 2024 National Adaptation Framework (NAF) underpin this CCIA's approach: identifying material physical risks, integrating SuDS/finished floor levels/drainage resilience, and lifecycle maintenance to ensure performance under future climate risks. On that basis, and so far as is practicable for a residential scheme, this Report demonstrates that the development is consistent with CAP25's adaptation objectives and the 2024 NAF.

The Proposed Development's alignment with CAP25 is demonstrated in Sections 3 and 4, where site-specific climate risks are assessed and adaptation measures are detailed in line with the adaptation objectives of the national plan.

1.5.8 Sustainable Development Goals

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity. The 17 SDGs are integrated—that is, they recognise that action in one area will affect outcomes in others, and that development must balance social, economic, and environmental sustainability. The creativity, knowhow, technology and financial resources from all of society is necessary to achieve the SDGs in every context. At its heart, the SDGs are about global partnership for this call to action. No matter how large or small, and regardless of their industry, all companies can contribute to the SDGs through their sustainability and corporate social responsibility strategies, policies, and processes.

Figure 1-1: UN Sustainable Development Goals

Ireland has published a Sustainable Development Goals National Implementation Plan 2022-2024 to provide a whole-of-government approach to implementing these goals. Sustainable development, climate change and equity are intrinsically intertwined. Climate change impacts can be linked in one way or another to all 17 of the UN Sustainable Development Goals (SDGs). Climate action that considers co-impacts across other SDGs can increase efficiency, reduce costs and support early and ambitious climate action.

This CCIA report focuses primarily on the climate impacts of mitigation and adaptation actions, with identified actions aligning with the objectives of the following SDGs.

Table 1-2: Relevant SDGs

SDG	Goal	Description
	Ensure availability and sustainable management of water and sanitation for all.	Support efforts to achieve universal access to safe and affordable drinking water and sanitation for all.
	Ensure access to affordable, reliable, sustainable, and modern energy for all.	Support efforts to increase the share of renewable energy in the global energy mix; and, to promote investment in clean energy research, technology and infrastructure.
	Make cities and human settlements inclusive, safe, resilient, and sustainable.	Support efforts to enhance inclusive and sustainable urbanisation, and efforts to protect and safeguard the world's cultural and natural heritage. Ensure access for all to basic services including transport and water services.

SDG	Goal	Description
	Ensure sustainable consumption and production patterns.	Support efforts to achieve the environmentally sound management of all wastes throughout their life cycle, to significantly reduce their release to air, water, and soil, and to substantially reduce waste generation through prevention, reduction, recycling, and reuse.
	Take urgent action to combat climate change and its impacts.	Support efforts to strengthen resilience and adaptive capacity to climate-related hazards and natural disasters, and to integrate climate change measures into company policies, strategy, and planning.
	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.	Support efforts to prevent and significantly reduce marine pollution of all kinds.
	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.	Support efforts to ensure the conservation and sustainable use of terrestrial and inland freshwater ecosystems, efforts to halt deforestation and combat desertification, efforts to ensure the conservation of mountain ecosystems and reduce the degradation of natural habitats, and efforts to halt the loss of biodiversity and protect and prevent the extinction of threatened species

The SDGs referenced here are advanced through the practical design responses outlined in Sections 3 and 4 of this Report. In Section 5 of this Report, the relevant policy objectives of the MCC CDP have been carefully considered in the context of the above-listed SDGs, and their incorporation into the Proposed Development design.

1.5.9 Nature

The close relationship between climate and nature emphasises the need for coordinated action that addresses both. While it remains beyond the scope of the current CCIA report, we reiterate our recommendation to consider the impacts of climate and nature in tandem, rather than separately.

Ireland's 4th National Biodiversity Action Plan (NBAP) sets the national biodiversity agenda for the period 2023-2030 and aims to deliver the transformative changes required to the ways in which we value and protect nature. Ireland's planning system has an important role in safeguarding biodiversity by ensuring that new development is sustainable and does not have a negative impact on the environment. The Irish NBAP underscores that there are opportunities to deliver for biodiversity in the assessment of new planning applications, as well as the application of best-practice principles for urban design and landscape management, such as green infrastructure and nature-based solutions.

The NBAP will continue to implement actions within the framework of five strategic objectives, while addressing new and emerging issues:

- Objective 1 - Adopt a Whole of Government, Whole of Society Approach to Biodiversity
- Objective 2 - Meet Urgent Conservation and Restoration Needs
- Objective 3 - Secure Nature's Contribution to People
- Objective 4 - Enhance the Evidence Base for Action on Biodiversity
- Objective 5 - Strengthen Ireland's Contribution to International Biodiversity Initiatives

Local Biodiversity Action Plans (LBAP) further support the objectives of the NBAP and so should also be consulted to identify biodiversity objectives, targets and guidelines for the lifecycle of the proposed development.

Nature acts as a vital regulator of climate, while climate change threatens biodiversity and ecosystem health. To combat these challenges effectively, climate action must integrate efforts to conserve and restore natural ecosystems. By doing so, we can mitigate climate change impacts and protect biodiversity, ensuring a more resilient and sustainable future.

In June 2024, the EU Council formally adopted the Nature Restoration Law. Under the Nature Restoration Law, EU member states will need to restore at least 30% of habitats in poor condition by 2030, 60% by 2040, and 90% by 2050. The regulation sets out specific requirements for different types of ecosystems, including agricultural land, forests, and urban ecosystems. Increasing forest birds' population and making sure there is no net loss on urban green spaces and tree canopy cover until end of 2030 are also key measures of this new law. The regulation will now be published in the EU's Official Journal and enter into force. It will become directly applicable in all member states and specific targets for each sector are likely.

2 CLIMATE CHANGE PROJECTIONS

The Supplementing Regulation establishes the Technical Screening Criteria specific to certain economic activities. Annex II, Section 7.1 of the Supplementing Regulation ('the construction of new buildings') includes specific requirements relating to climate projections:

2. The climate risk and vulnerability assessment is proportionate to the scale of the activity and its expected lifespan, such that:

(a) for activities with an expected lifespan of less than 10 years, the assessment is performed, at least by using climate projections at the smallest appropriate scale;

(b) for all other activities, the assessment is performed using the highest available resolution, state-of-the-art climate projections across the existing range of future scenarios consistent with the expected lifetime of the activity, including, at least, 10-to-30-year climate projections scenarios for major investment.

3. The climate projections and assessment of impacts are based on best practice and available guidance and take into account the state-of-the-art science for vulnerability and risk analysis and related methodologies in line with the most recent Intergovernmental Panel on Climate Change reports, scientific peer-reviewed publications and open source or paying models.

The current assessment has utilised climate projections from IPCC AR6 WGI and the IPCC WGI online Interactive Atlas for Northern Europe; and *Climate Ireland* Climate Change Projection Maps[5] in combination with EPA Research Report No. 339[6]. Due to the expected lifespan of the Proposed Development, climate projections have been provided for mid-term and long-term periods (2041–2060, 2041-2070, and 2081–2100).

A new set of illustrative scenarios have been developed by the IPCC AR6 WGI which cover the range of possible future developments of anthropogenic drivers of climate change found in literature, derived from the Shared Socio-economic Pathways (SSPs). Concentration trajectories known as Representative Concentration Pathways (RCPs) were utilised in EPA Research Report No.339. These RCPs were considered by the IPCC in their Fifth Assessment Report (AR5). For this study, intermediate (SSP2-4.5 and RCP4.5) and very high (SSP5-8.5 and RCP8.5) GHG emissions scenarios were utilised in both the medium and long-term periods; this is considered a conservative assumption of future GHG emission paths. These scenarios are detailed in the following Sections.

All "climate-related hazards" have been classified as either "chronic" or "acute". Chronic effects are gradual slow onset developments (e.g., long term rise in mean annual air temperature); whereas acute effects are rapidly developing climate extremes and/or increased variability (e.g., heatwaves).

[5] Climate Ireland - Climate Change Projection Maps.

[6] P. Nolan and J. Flanagan (2020) High-Resolution Climate Projections for Ireland – a Multi-model Ensemble Approach. EPA Research Report No. 339.

2.1 Overview of Climate Modelling

With increasing atmospheric greenhouse gas concentrations driving changes in all aspects of the climate system, climate change is representing an urgent and potentially irreversible threat to human societies globally. Accurate climate projections are a key scientific input for national policymakers when planning for, and adapting to, the challenges posed by climate change.

Climate projections are produced using climate models, which have been developed by scientists over recent decades and are capable of simulating Earth's past, present, and future climate. Global Climate Models (GCMs) are used to model the global impacts on Earth's climate of increasing greenhouse gas concentrations in the atmosphere at a resolution of ~50km or coarser. Regional Climate Models (RCMs) are used to capture key small-scale atmospheric features on the scale of 1-10km, such as local convection and wind gusts. Multi-model ensembles are often used in climate prediction studies to quantify associated model uncertainty.

RCMs utilise the output of GCMs and model regional climates at higher spatial resolutions; this process is known as dynamic downscaling. This approach allows key climate variables to be modelled more precisely, including precipitation; near-surface temperature; and the number and intensity of low-pressure systems. Low pressure systems are the primary driver of precipitation and wind affecting the country; therefore, the added value of RCMs in the modelling of low-pressure systems is of particular importance for Ireland.

Future greenhouse gas concentrations in the atmosphere are also uncertain. To model possible future climate change, varying greenhouse gas concentrations over time are needed as a GCM input. The core set of SSP scenarios used in the AR6 WGI report cover a broad range of emissions pathways, including new low-emissions pathways. They start in 2015 and include scenarios with high and very high greenhouse gas (GHG) emissions (SSP3-7.0 and SSP5-8.5) and CO_2 emissions that roughly double from current levels by 2100 and 2050, respectively; scenarios with intermediate GHG emissions (SSP2-4.5) and CO_2 emissions remaining around current levels until the middle of the century; and scenarios with very low and low GHG emissions and CO_2 emissions declining to net zero around or after 2050, followed by varying levels of net negative CO_2 emissions (SSP1-1.9, SSP1-2.6).

Concentration trajectories known as Representative Concentration Pathways (RCPs) were utilised in EPA Research Report No.339. These RCPs were considered by the IPCC in their Fifth Assessment Report (AR5) and include the following four scenarios: RCP2.6, RCP4.5, RCP6 and RCP8.5. For the EPA study, two RCPs were chosen, RCP4.5 and RCP8.5. RCP4.5 is considered an intermediate scenario, while RCP8.5 is considered to be representative of a potential worst-case scenario. RCP scenarios are also utilised in the TRANSLATE dataset. TRANSLATE incorporates this EPA data and also uses AR5 (RCP) scenarios. This is the only available climate projection data for Ireland which has been developed for policy makers, and is steered by DECC, the EPA, Met Eireann, and the LA CAROs.

Figure 2-1 illustrates the future annual emissions of CO_2 and of a subset of key non-CO_2 drivers, across the latest five illustrative scenarios developed by the IPCC:

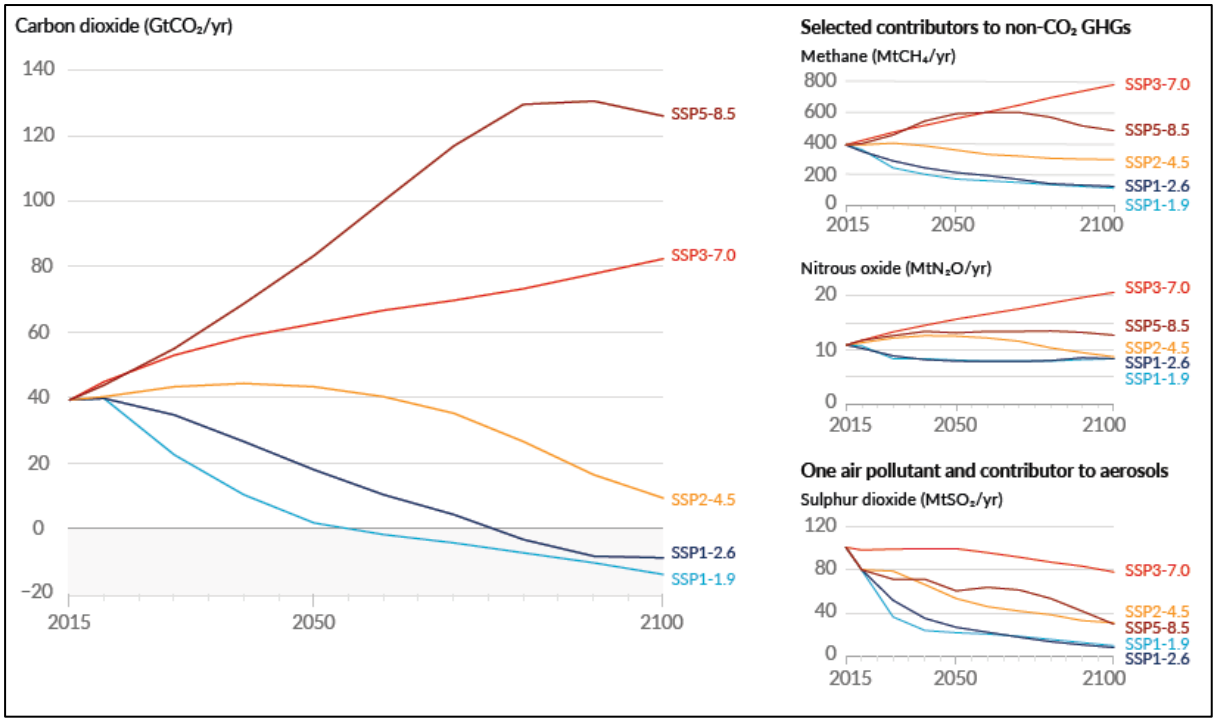

Figure 2-1: Future annual emissions of CO_2 (left) and of a subset of key non-CO_2 drivers (right), across five illustrative scenarios (source: adapted from IPCC AR6 WGI Summary for Policy Makers)

Figure 2-2 illustrates the global surface temperature change relative to 1850-1900 under each scenario:

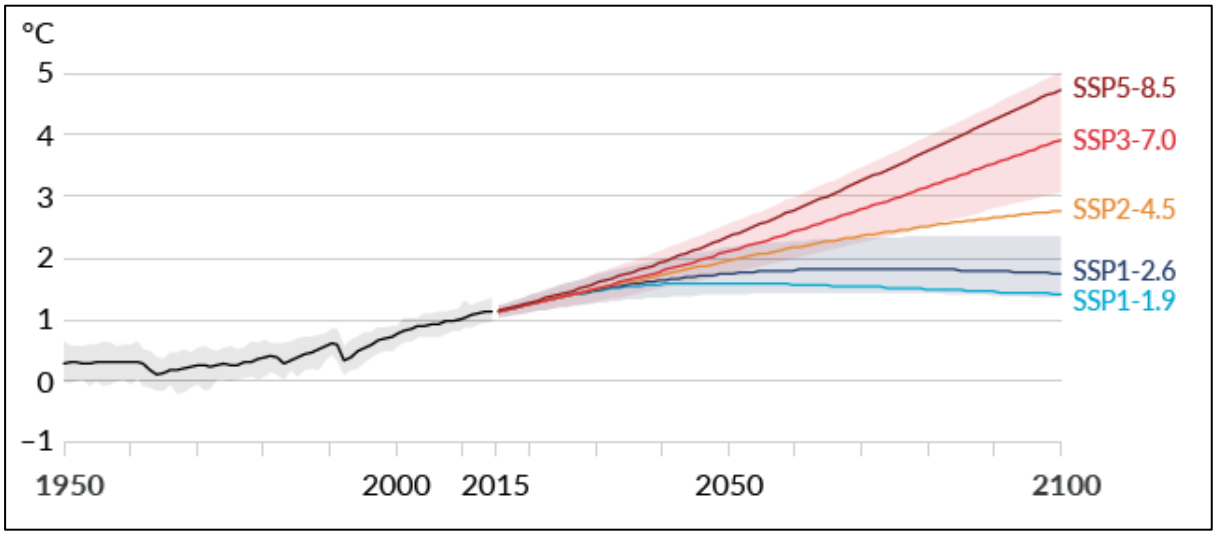

Figure 2-2: global surface temperature change relative to 1850-1900 (source: adapted from IPCC AR6 WGI Summary for Policy Makers)

2.2 IPCC AR6 WGI Regional Climate Projections

IPCC AR6 WGI assesses the current evidence on the physical science of climate change, evaluating knowledge gained from observations, reanalyses, paleoclimate archives and climate model simulations, as well as physical, chemical, and biological climate processes.

The WGI contribution to AR6 is focused on physical and biogeochemical climate science information, with particular emphasis on regional climate changes.

According to IPCC AR6 WGI, sustained changes have been documented in all major elements of the climate system, including the atmosphere, land, cryosphere, biosphere and ocean. Multiple lines of evidence indicate the unprecedented nature of recent largescale climatic changes in the context of all human history. The key findings of the WGI contribution to AR6 are as follows:

- It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred;

- Global surface temperature will continue to increase until at least mid-century under all emissions scenarios considered. Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO_2 and other greenhouse gas emissions occur in the coming decades;

- Observed increases in well-mixed greenhouse gas (GHG) concentrations since around 1750 are unequivocally caused by human activities;

- Each of the last four decades has been successively warmer than any decade that preceded it since 1850;

- The likely range of total human-caused global surface temperature increase from 1850–1900 to 2010–2019 is 0.8°C to 1.3°C, with a best estimate of 1.07°C;

- Globally averaged precipitation over land has likely increased since 1950, with a faster rate of increase since the 1980s;

- It is virtually certain that the global upper ocean (0–700 m) has warmed since the 1970s and extremely likely that human influence is the main driver;

- Global mean sea level increased by 0.20 [0.15 to 0.25] m between 1901 and 2018. The average rate of sea level rise was 1.3 [0.6 to 2.1] mm/year between 1901 and 1971, increasing to 1.9 [0.8 to 2.9] mm/year between 1971 and 2006, and further increasing to 3.7 [3.2 to 4.2] mm/year between 2006 and 2018.

Key model intercomparisons supporting AR6 include the Coupled Model Intercomparison Project Phase 6 (CMIP6) and the Coordinated Regional Climate Downscaling Experiment (CORDEX), for global and regional models respectively. Results using CMIP Phase 5 (CMIP5) simulations are also assessed. Since AR5, large ensemble simulations, where individual models perform multiple simulations with the same climate forcings, are increasingly used to inform understanding of the relative roles of internal variability and forced change in the climate system, especially on regional scales. The broader availability of ensemble model simulations has contributed to better estimations of uncertainty in projections of future change.

Chapter 12 of IPCC AR6 WGI and the online Interactive Atlas have been utilised in this assessment to summarise climate projections and conduct a detailed inspection of projected changes in climate for the region of the Proposed Development. Chapter 12 of IPCC AR6 WGI provides a comprehensive, region-specific assessment of changing climatic conditions that may be hazardous or favourable for various sectors. The online Interactive Atlas is an online tool that complements the WGI Report by providing flexible temporal and spatial analyses of trends and changes in key atmospheric and oceanic variables, extreme indices and climatic impact-drivers (CIDs), as obtained from several global and regional observational and model simulated datasets used in the report. The Interactive Atlas presents detailed projected global and regional climate changes at near-, mid- and long-term periods, 2021–2040, 2041–2060 and 2081–2100, respectively, for a range of emissions scenarios. Within the Interactive Atlas, spatially aggregated regional information is provided for different predefined sets of regions:

- The sub-continental AR6 WGI reference regions;
- WG II continental regions;
- Monsoon regions;
- Major river basins;
- Small-island regions;
- Ocean biological activity regions.

Under the sub-continental AR6 WGI reference regions, Europe is divided into four climatic regions: Northern Europe (NEU), Western and Central Europe (WCE), Eastern Europe (EEU) and Mediterranean (MED). Ireland is part of NEU, therefore aggregated climate information for this region has been derived for this assessment and is summarised in the following Table 2-1.

The IPCC AR6 WGI describe “climate related hazards” as Climatic Impact Drivers (CID). CIDs are defined by the IPCC as physical climate system conditions (e.g., means, events, extremes) that can be directly connected with having impacts on human or ecological systems. This terminology has been retained in this assessment.

In the following Table 2-1, a summary of projections for NEU has been provided for each CID along with detailed climate projection data, sourced using the WGI online Interactive Atlas. The detailed projections provide the median and 25th to 75th percentile range for each variable under the intermediate (SSP2-4.5) and very high (SSP5-8.5) GHG emissions scenarios in both the medium and long-term periods. In some cases, Atlas data was not available for certain variables; IPCC AR6 WGI summary findings were used to supplement Atlas data in this case.

Table 2-1: Climate Projections for Northern Europe (Data Source: IPCC AR6 & IPCC WGI online Interactive Atlas)

IPCC Climate Impact Driver Category	IPCC Climate Impact Driver (CID) / Climate-related hazard	IPCC AR6 Summary Findings[7]	IPCC WGI Interactive Atlas Data[8] (SSP2-4.5 Scenario)[9]	IPCC WGI Interactive Atlas Data[10] (SSP5-8.5 Scenario)[11]
Heat and Cold	Temperature Projections (Chronic)	Since AR5, studies have confirmed that the mean warming trend in Europe is increasing. Irrespective of the scenario, it is virtually certain that warming will continue in Europe, and there is high confidence[12] that the observed increase in heat extremes is due to human activities. All temperature trends are very likely to continue for a global warming level (GWL) of 1.5°C or 2°C and 3°C.	**Increase in mean temperature in Medium Term (2041-2060):** Median: +1.5ºC P25-P75: +1.2ºC to +1.9ºC **Increase in mean temperature in Long Term (2081-2100):** Median: +2.4ºC P25-P75: +1.8ºC to +3.0ºC	**Increase in mean temperature in Medium Term (2041-2060):** Median: +2.0ºC P25-P75: +1.5ºC to +2.5ºC **Increase in mean temperature in Long Term (2081-2100):** Median: +4.4ºC P25-P75: +3.6ºC to +5.5ºC
	Heatwave (Acute)	The frequency of heatwaves observed in Europe has very likely increased in recent decades due to human-induced change in atmospheric composition. It is very likely that the frequency of heatwaves will increase during the 21st century regardless of the emissions scenario in each European region, and for 1.5°C and 2°C GWLs.	**Increase in number of days with a maximum temperature above 35ºC in Medium Term (2041-2060):** Median: 0.1 P25-P75: 0 to 0.1 **Increase in number of days with a maximum temperature above 35ºC in Long Term (2081-2100):**	**Increase in number of days with a maximum temperature above 35ºC in Medium Term (2041-2060):** Median: 0.1 P25-P75: 0 to 0.1 **Increase in number of days with a maximum temperature above 35ºC in Long Term (2081-2100):**

[7] Working Group I contribution to the Sixth Assessment Report, Climate Change 2021: The Physical Science Basis. Chapter 12: Climate Change Information for Regional Impact and for Risk Assessment.

[8] IPCC WGI online Interactive Atlas Parameters: Model projection CMIP6; SSP2-2.4 Scenario; Annual; Relative to 1995-2014 Baseline.

[9] This is a "middle of the road" scenario. CO_2 emissions hover around current levels before starting to fall mid-century, but do not reach net-zero by 2100.

[10] IPCC WGI online Interactive Atlas Parameters: Model projection CMIP6; SSP5-8.5 Scenario; Annual; Relative to 1995-2014 Baseline.

[11] This represents the high end of the range of future pathways. CO_2 emissions triple by 2075.

12 Confidence is a qualitative measure of the validity of a finding, based on the type, amount, quality and consistency of evidence (e.g., data, mechanistic understanding, theory, models, expert judgment) and the degree of agreement.

IPCC Climate Impact Driver Category	IPCC Climate Impact Driver (CID) / Climate-related hazard	IPCC AR6 Summary Findings[7]	IPCC WGI Interactive Atlas Data[8] (SSP2-4.5 Scenario)[9]	IPCC WGI Interactive Atlas Data[10] (SSP5-8.5 Scenario)[11]
			Median: 0.1 P25-P75: 0 to 0.2	Median: 0.5 P25-P75: 0.1 to 0.7
	Frost days (Acute)	The frequency of frost days will very likely decrease for all scenarios and all time-horizons with consequences for agriculture and forests. A simple heating degree day index, characterizing heating demand, shows a large observed decreasing trend for winter heating energy demand in Europe. This trend is very likely to continue through the 21st century, with decreases in the range of 20–30% for Northern Europe.	**Decrease in number of frost days in Medium Term (2041-2060):** Median: -19.8 P25-P75: -28.5 to -12.5 **Decrease in number of frost days in Long Term (2081-2100):** Median: -32.6 P25-P75: -39.2 to -26.4	**Decrease in number of frost days in Medium Term (2041-2060):** Median: -27.6 P25-P75: -35.3 to -20.9 **Decrease in number of frost days in Long Term (2081-2100):** Median: -57 P25-P75: -64.5 to -46.8
Wet and Dry	Precipitation (Chronic)	Precipitation has generally increased in northern Europe. It is very likely that precipitation will increase in Northern Europe in December, January, and February under all climate scenarios except RCP2.6[13]/SSP1-2.6 and for both mid- and end-century periods.	**Increase in total precipitation in Medium Term (2041-2060):** Median: 3.3% P25-P75: 1.8% to 4.9% **Increase in total precipitation in Long Term (2081-2100):** Median: 4.9% P25-P75: 2.3% to 7.6%	**Increase in total precipitation in Medium Term (2041-2060):** Median: 4.6% P25-P75: 2.5% to 7.1% **Increase in total precipitation in Long Term (2081-2100):** Median: 10.3% P25-P75: 7.8% to 13.7%
	River Flood Heavy Precipitation and Pluvial Flood (Acute)		**Increase in maximum 1-day precipitation amount in Medium Term (2041-2060):** Median: 5.9% P25-P75: 4.0% to 7.8%	**Increase in maximum 1-day precipitation amount in Medium Term (2041-2060):** Median: 8.3% P25-P75: 6.0% to 9.5%

[13] RCP 2.6 is a "very stringent" pathway. RCP 2.6 is likely to keep global temperature rise below 2°C by 2100.

IPCC Climate Impact Driver Category	IPCC Climate Impact Driver (CID) / Climate-related hazard	IPCC AR6 Summary Findings[7]	IPCC WGI Interactive Atlas Data[8] (SSP2-4.5 Scenario)[9]	IPCC WGI Interactive Atlas Data[10] (SSP5-8.5 Scenario)[11]
		There is medium confidence that river floods will decrease in Northern Europe under RCP8.5[14] and low confidence under RCP2.6. Heavy precipitation frequency trends have been detected and attributed to climate change in with high confidence in Northern Europe.	**Increase in maximum 1-day precipitation amount in Long Term (2081-2100):** Median: 10.3% P25-P75: 6.3% to 13.9%	**Increase in maximum 1-day precipitation amount in Long Term (2081-2100):** Median: 20.2% P25-P75: 14.1% to 24.1%
			Increase in maximum 5-day precipitation amount in Medium Term (2041-2060): Median: 4.7% P25-P75: 3.5% to 6.1% **Increase in maximum 5-day precipitation amount in Long Term (2081-2100):** Median: 8.2% P25-P75: 4.7% to 11.2%	**Increase in maximum 5-day precipitation amount in Medium Term (2041-2060):** Median: 6.5% P25-P75: 4.3% to 8.9% **Increase in maximum 5-day precipitation amount in Long Term (2081-2100):** Median: 16.2% P25-P75: 12% to 20.6%
	Drought (Acute)	Higher precipitation that outweighs the effects of increased evapotranspiration is expected to result in a decrease in streamflow drought frequency in Northern Europe. A reduction of drought length and magnitude is projected for Northern Europe.	**Likely increase in number of consecutive dry days in Medium Term (2041-2060):** Median: 0.2 P25-P75: -0.1 to 0.7 **Increase in number of consecutive dry days in Long Term (2081-2100):** Median: 0.6	**Likely increase in number of consecutive dry days in Medium Term (2041-2060):** Median: 0.3 P25-P75: -0.1 to 0.7 **Increase in number of consecutive dry days in Long Term (2081-2100):** Median: 1.4

14 In RCP 8.5 emissions continue to rise throughout the 21st century. This high-emissions scenario is frequently referred to as “business as usual”, suggesting that is a likely outcome if society does not make concerted efforts to cut greenhouse gas emissions.

IPCC Climate Impact Driver Category	IPCC Climate Impact Driver (CID) / Climate-related hazard	IPCC AR6 Summary Findings[7]	IPCC WGI Interactive Atlas Data[8] (SSP2-4.5 Scenario)[9]	IPCC WGI Interactive Atlas Data[10] (SSP5-8.5 Scenario)[11]
			P25-P75: 0.1 to 0.11	P25-P75: 0.6 to 2.1
Wind	Surface Wind Speed (Chronic)	There is medium confidence that mean surface wind speeds have decreased in Europe as in many other areas of the Northern Hemisphere over the past four decades. Under RCP4.5[15] and RCP8.5 scenarios, projections indicate a decrease in mean wind speed in Northern Europe (medium confidence).	**Negligible change in mean surface windspeed in Medium Term (2041-2060):** Median: -0.8% P25-P75: -1.7% to 0.2% **Decrease in mean surface windspeed in Long Term (2081-2100):** Median: -1.9% P25-P75: -2.9% to -1.2%	**Decrease in mean surface windspeed in Medium Term (2041-2060):** Median: -1.1% P25-P75: -1.6% to -0.5% **Decrease in mean surface windspeed Long Term (2081-2100):** Median: -2.8% P25-P75: -4.5% to -1.2%
	Severe Windstorms (Acute)	There are large uncertainties in past evolutions of windstorms and extreme winds in Europe. Extreme near-surface winds have been decreasing in the past decades according to near-surface observations. Strong winds and extratropical storms are projected to have a slightly increasing frequency and amplitude in the future in Northern Europe.	*No atlas data available for severe windstorms.*	
Snow and Ice	Snowfall (Chronic)	Widespread and accelerated declines in snow depth and snow water equivalent have been observed in Europe. There is high confidence that future snow cover extent and seasonal duration will reduce.	**Decrease in snowfall (mm/day) in Medium Term (2041-2060):** Median: -2.8	**Decrease in snowfall (mm/day) in Medium Term (2041-2060):** Median: -3.9

[15] RCP 4.5 is described by the IPCC as an intermediate scenario. Emissions in RCP 4.5 peak around 2040, then decline. It is a scenario of long-term, global emissions of greenhouse gases, short-lived species, and land-use-landcover which stabilizes radiative forcing at 4.5 Watts per meter squared (W m^2, approximately 650 ppm CO_2-equivalent) in the year 2100 without ever exceeding that value.

IPCC Climate Impact Driver Category	IPCC Climate Impact Driver (CID) / Climate-related hazard	IPCC AR6 Summary Findings[7]	IPCC WGI Interactive Atlas Data[8] (SSP2-4.5 Scenario)[9]	IPCC WGI Interactive Atlas Data[10] (SSP5-8.5 Scenario)[11]
			P25-P75: -4.0 to -1.8 **Decrease in snowfall (mm/day) in Long Term (2081-2100):** Median: -4.8 P25-P75: -5.6 to -3.7	P25-P75: -5.0 to -2.6 **Decrease in snowfall (mm/day) in Long Term (2081-2100):** Median: -7.9 P25-P75: -9.6 to -6.2
	Heavy snowfall, ice storms and hail (Acute)	There is low confidence that climate change will affect ice and snow-related episodic hazards (limited evidence).	*No atlas data available for heavy snowfall, ice storms and hail.*	
Coastal and Oceanic	Sea level rise (Acute)	Relative sea level rise is extremely likely to continue in the oceans around Europe.	**Increase in sea level (metres) in Medium Term (2041-2060):** Median: 0.2 P25-P75: 0.1 to 0.3 **Increase in sea level (metres) in Long Term (2081-2100):** Median: 0.4 P25-P75: 0.2 to 0.5	**Increase in sea level (metres) in Medium Term (2041-2060):** Median: 0.2 P25-P75: 0.1 to 0.3 **Increase in sea level (metres) in Long Term (2081-2100):** Median: 0.5 P25-P75: 0.3 to 0.7
	Coastal flooding (Chronic)	Relative sea level rise is extremely likely to continue around Europe, contributing to increased coastal flooding in low-lying areas. The present-day 1-in-100-year extreme total water level (ETWL) is between 2.5 and 5.0 m around the UK. There is high confidence that extreme total water level (ETWL) magnitude and occurrence frequency will increase throughout Europe. Under RCP4.5, the present day 1-in-100-year ETWL is projected to have median return periods of between 1-in-20-years and	*No atlas data available for coastal flooding.*	

IPCC Climate Impact Driver Category	IPCC Climate Impact Driver (CID) / Climate-related hazard	IPCC AR6 Summary Findings[7]	IPCC WGI Interactive Atlas Data[8] (SSP2-4.5 Scenario)[9]	IPCC WGI Interactive Atlas Data[10] (SSP5-8.5 Scenario)[11]
		1-in-50-years by 2050 and between 1-in-5-years and 1-in-20-years by 2100.		
Other	Compound events	One typical compound event that is observed in the European area is compound flooding due to the combination of extreme sea level events and extreme precipitation events associated with high levels of runoff. Under RCP8.5, the probability of these events is projected to increase along northern European coasts, with the percentage of coastline now experiencing such events at least once every 6 years increasing by between 3% and 11% by the end of the 21st century. Compound events of dry and hot summers have increased in Europe. The probability of such compound events has increased across much of Europe between 1950–1979 and 1984–2013. Compound hot and dry extremes are projected to increase in Europe by mid-century for the Special Report on Emission Scenarios (SRES) A1B and RCP8.5 scenarios.	*No atlas data available for compound events.*	

2.3 Other Relevant Scientific Based Climate Predictions

2.3.1 TRANSLATE: One Climate Resource for Ireland

The TRANSLATE project is a Met Éireann lead initiative to standardise future climate projections for Ireland and develop climate services that meet the climate information needs of decision makers. It is a collaborative effort 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 focuses on reviewing existing climate models to produce a national set of standardised climate projections. Climate services are then developed from these standardised climate projections to aid climate risk decision making across multiple sectors (for example, transport, energy, water). Climate services can be described as a set of services that communicate climate science data/information into products (for example, indices, risk assessments, uncertainty estimates) tailored to meet climate sensitive decision makers.

TRANSLATE's outputs are produced using a selection of internationally reviewed and accepted models from both CORDEX and high-resolution regional projections produced by ICHEC. Together they demonstrate a range of possible futures for Ireland based on assumptions of global human activity resulting in "least", "more" or "most" climate change. Historical climate data is evaluated against the observational record and corrected to remove any model bias. This correction is then applied to all future data. This allows information to be presented on how the variables change (difference) as well as actual values (absolute).

2.3.1.1 Climate Ireland – Climate Change Projection Maps

Climate Ireland is Ireland’s national adaptation platform and is provided by the Environmental Protection Agency as part of the EPA's climate adaptation work.

The Climate Change Projection Maps viewer has been developed to understand current and projected future climate conditions for Ireland. Observed Climate Information is based on TRANSLATE and Climate Change Projections are based on TRANSLATE along with EPA Research Report No. 339[16] for some variables.

The Climate Data Explorer provides three types of climate information:

- Observed Climate Information: average historical climate data on variables including temperature and precipitation for the period 1976-2005.
- Climate Change Projections (standardised and bias-corrected): future projections of changes for variables such as temperature and precipitation for a selection of time periods, scenarios and global warming levels (from Met Éireann's TRANSLATE project - O'Brien and Nolan (2023)).

[16] P. Nolan and J. Flanagan (2020) High-Resolution Climate Projections for Ireland – a Multi-model Ensemble Approach. EPA Research Report No. 339.

- Climate Change Projections (non-standardised): future projections of changes for variables such as snowfall, driving rain and wind energy for the period 2041-2060 (these projections come from Nolan and Flanagan (2020) and are compared to 1981-2000, rather than the TRANSLATE parameters). As further results come from standardised projects these maps will be replaced.

2.3.1.2 EPA Climate Projections

The EPA's Research Report on Climate Projections for Ireland (Research Report No. 339)[17] employs regional climate modelling to assess the impacts of a warming climate on the 21st-century climate of Ireland. Regional climate models (RCMs) take the outputs from global climate models (GCMs) to produce more refined projections of the potential local and regional impacts of climate change. The RCM simulations were run at high spatial resolution (3.8km and 4km) which allowed for a more realistic representation of important physical processes and enabling a more accurate evaluation of the local impacts of climate change across Ireland.

A multi-model ensemble approach was employed in the study to address the issue of uncertainty. Through the ensemble approach, the uncertainty in the projections can be partly quantified, thus providing a measure of confidence in the projections. Different RCMs were used to downscale outputs from a number of different CMIP5 (Coupled Model Intercomparison Project – Phase 5) GCMs.

Simulations were run for the reference period 1981–2000 and the future period 2041–2060. Differences between the two periods provide a measure of climate change. To account for the uncertainty in future greenhouse gas emissions and changing land use, and how the world will come together to respond to the challenge of climate change, the future climate was simulated under both the Representative Concentration Pathway 4.5 (RCP4.5) and RCP8.5 scenarios. The climate projections of EPA Research Report No. 339 are in broad agreement with previous research, which adds a measure of confidence to the projections.

2.3.2 Ireland's Changing Climate

Ireland's climate is changing in line with global trends, with a temperature increase of, on average, 0.8°C compared with 1900. By the middle of this century (2041 – 2060) the average annual temperatures are projected to increase by between 1–1.2℃ and 1.3–1.6℃ depending on the emissions trajectory. The number of warm days is expected to increase and heat waves are expected to occur more frequently.

The mean annual temperature for Ireland has experienced an overall increase of 0.9°C over the last 120 years with fifteen of the top 20 warmest years on record having occurred since 1990.

There has been a decrease in the number of frost days (temperatures below 0°C) and a shortening of the frost season duration. In contrast, there has been an increase in the number

[17] P. Nolan and J. Flanagan (2020) High-Resolution Climate Projections for Ireland – a Multi-model Ensemble Approach. EPA Research Report No. 339.

of warm days (temperature > 20°C). This is in line with trends evident for the rest of Western Europe.

For Ireland, satellite observations indicate that sea levels around Ireland have increased by approximately 2-3 mm per year since the 1990s.

When compared with an annual average rainfall of 1186mm in the period 1961-1990, the thirty-year period 1990-2019 shows a 70mm or almost 7% increase in rainfall. The last decade from 2006 - 2015 has been the wettest period in the period 1711- 2016 and there is evidence of an increasing trend in winter rainfall and a decreasing trend in summer rainfall. This information is derived from the latest 30-year averages from Met Eireann (1991-2019). 30-years is the standard reference period as established by the world meteorological organisation, and data is only required to be updated every 10-years.

Other climate change indicators, as detailed in Met Eireann's Annual Climate Statement (2024) include:

- The average annual air temperature for Ireland in 2024 *(using the Island of Ireland dataset*)* was 10.72 °C, which is 1.17°C above the 1961-1990 long-term average (LTA) or 0.55°C above the most recent 1991-2020 LTA.
- This makes 2024 the fourth warmest year on record, 0.49 °C cooler than 2023, the warmest year on record.
- The five warmest years on record are 2023, 2022, 2007, 2024 and 1945. Seven of the top ten warmest years have occurred since 2005.
- The coldest year on record was in 1919 with 8.73 °C, of the top ten coldest years – none have occurred since 2000.
- Provisionally, 2024 rainfall was the 41st driest or 44th wettest since 1941.

The climate projections for the next century indicate that observed climate trends will continue and intensify over the coming decades. Predicted impacts include:

- Changes in wind speeds and storm tracks;
- Increased likelihood of river and coastal flooding;
- Changes in distribution of plant and animal species and in the phenology (the timing of lifecycle events) of native species;
- Water stress for crops, pressure on water supply and adverse impacts on water quality;
- Negative impacts on human health and wellbeing.

Adaptation refers to actions taken to reduce vulnerability and exposure to climate change impacts. The more we reduce global emissions, the less adaptation to the consequences of climate change will be required. However, some impacts are already unavoidable.

The following Table 2-2 provides a summary of climate projections for Ireland and specific climate model simulations for Meath County Council using a combination of the *Climate Ireland* Climate Change Projection Maps[18] and EPA Research Report No. 339[19]. For the purposes of this report, the climate variables observed have been determined as "climate-related hazards" and have been grouped according to the IPCC CID Categories.

Climate projections were obtained for the future periods 2041-2060 and 2041-2070. The reference periods have been set at 1976-2005 and 1980-2000. Differences between the reference periods and future periods provide a measure of climate change. The climate scenarios utilised in the assessment are RCP4.5 and RCP8.5.

[18] Climate Ireland - Climate Change Projection Maps.

[19] P. Nolan and J. Flanagan (2020) High-Resolution Climate Projections for Ireland – a Multi-model Ensemble Approach. EPA Research Report No. 339.

Table 2-2: Climate Projections for Ireland and Meath (Data Source: Climate Ireland Climate Change Projection Maps)

IPCC Climate Impact Driver Category	Climate-related Hazard	Summary of Projections for Ireland[20]	Climate Model Simulations for Meath[21] (RCP4.5 Scenario)	Climate Model Simulations for Meath[22] (RCP8.5 Scenario)
Heat and Cold	Temperature Projections (Chronic) (Reference period 1976-2005; Future period: 2041-2070)	Mid-century mean annual temperatures are projected to increase by 0.6–1.7°C and 1.1–1.9°C for the RCP4.5 and RCP8.5 scenarios, respectively. Temperature projections show a clear west-to-east gradient, with the largest increases in the east.	Mean annual temperature change: +1.3°C Greatest seasonal change in Autumn with an expected increase of +1.6°C	Mean annual temperature change: +1.7°C Greatest seasonal change in Autumn with an expected increase of +2.2°C
	Surface Humidity (Chronic) (Reference Period 1981-2000; Future period: 2041-2060)	Specific humidity [22] is projected to increase substantially (≈10%) for all seasons by the middle of the century. Relative humidity [23] is projected to increase slightly (or show ≈0% change) for all seasons except summer. For summer, relative humidity is expected to decrease in the south-east and increase in the north-west (both RCP scenarios).	Annual mean change in specific humidity: +8.5% Relative humidity is projected to decrease slightly or show ≈0% change.	Annual mean change in specific humidity: +11.5% Relative humidity is projected to increase slightly (0.3%) or show ≈0% change.
	Heatwave[24] (Acute) (Reference period 1976-2005; Future period: 2041-2070)	The large projected increase in high summer temperatures suggests an increase in the number of heatwave events by the middle of the century. The changes range from -0.05 to 0.21 for the RCP4.5 scenario and from 0.04 to 0.28	Change in daily max temperature: +1.2°C Change in the number of heatwave events: +0.2	Change in daily max temperature: +1.7°C Change in the number of heatwave events: +0.4

[20] P. Nolan and J. Flanagan (2020) High-Resolution Climate Projections for Ireland – a Multi-model Ensemble Approach. EPA Research Report No. 339.
[21] Simulations were run for the reference period 1981–2000 and the future period 2041–2060.
[22] Specific humidity is the amount of water vapour in the atmosphere calculated as the ratio of the mass of water vapour to the total mass of the air parcel.
[23] Relative humidity is the ratio of the amount of water vapour present in the air to the greatest amount possible at the same temperature.

IPCC Climate Impact Driver Category	Climate-related Hazard	Summary of Projections for Ireland[20]	Climate Model Simulations for Meath[21] (RCP4.5 Scenario)	Climate Model Simulations for Meath[22] (RCP8.5 Scenario)
		for the RCP8.5 scenario. A sustained increase in the daily maximum temperature is associated with heatwaves.		
	Frost and Ice days (Acute) (Reference period 1976-2005; Future period: 2041-2070)	The large projected decrease in cold nights implies a decrease in the number of frost and ice days by the middle of the century. The number of frost days (days when the minimum temperature is <0°C) is projected to decrease by 22.09 to 8.84 under the RCP 4.5 scenario and 27.75 to 15.50 under the RCP 8.5 scenario. The number of ice days (days when the maximum temperature is <0°C) is projected to decrease by 0.36 to 0.10 in the RCP 4.5 scenario and 0.36 to 0.20 in the RCP 8.5 scenario.	The number of frost days is projected to decrease by -25. No projected change in the number of ice days.	The number of frost days is projected to decrease by -30. No projected change in the number of ice days.
Wet and Dry	Precipitation (Chronic) (Reference period 1976-2005; Future period: 2041-2070)	Substantial decreases in precipitation are projected for the summer months, with reductions up to -8.68% for the majority of the country (90th percentile) for the RCP 4.5 scenario and -15.62% for the RCP 8.5 scenario. Meath, however, indicates a change of 0% to -2% and 0% to -4% in the RCP 4.5 and RCP 8.5 scenarios, respectively. Other seasons, and over the full year, show small projected changes in precipitation with an average 2.86% and 4.81% increase over the whole country in the RCP4.5 and RCP8.5 scenarios, respectively. However, the mid-	Percentage increase in annual mean rainfall: +3% to +5% Percentage increase in spring rainfall: +2% to +5% Percentage change in summer rainfall: 0% to -2% Percentage increase in autumn rainfall: +3% Percentage increase in winter rainfall: +5% to +8%	Percentage increase in annual mean rainfall: +4% to +7% Percentage increase in spring rainfall: +4% to +5% Percentage decrease in summer rainfall: 0% to -4% Percentage increase in autumn rainfall: +7% Percentage increase in winter rainfall: +12% to +18%

IPCC Climate Impact Driver Category	Climate-related Hazard	Summary of Projections for Ireland[20]	Climate Model Simulations for Meath[21] (RCP4.5 Scenario)	Climate Model Simulations for Meath[22] (RCP8.5 Scenario)
		century precipitation climate is expected to become more variable with substantial projected increases in both dry periods and heavy precipitation events. The uncertainty of the mean precipitation projections may be partly attributed to the projected increase in the variability of the future Irish precipitation climate, resulting in an increase in both dry periods and heavy rainfall events.		
	Heavy Precipitation Events (Acute) (Reference period 1976-2005; Future period: 2041-2070)	Changes in the occurrence of heavy rainfall events are of particular importance because of the link with flooding. The projections indicate a decrease in the annual number of wet days[25] for the RCP4.5 (mean value -2.42%) and RCP8.5 (mean value -2.61%) scenarios. There is a projected increase in the annual number of very wet days[26], with mean values of 0.54% and 0.74% for the RCP4.5 and RCP8.5 scenarios, respectively.	Projected (percentage) decrease in the annual number of wet days: -1% to -2.5% *(It is noted that regional details are not reliable because of a large variability in the ensembles).*	Projected (percentage) decrease in the annual number of wet days: -1% to -2% *(It is noted that regional details are not reliable because of a large variability in the ensembles).*
			Projected increase in the annual number of very wet days: +1 *(It is noted that regional details are not reliable because of a large variability in the ensembles).*	Projected increase in the annual number of very wet days: +1.5 *(It is noted that regional details are not reliable because of a large variability in the ensembles).*

[25] A “wet day” is defined as one on which the daily precipitation amount is greater than 20mm.
[26] A “very wet day” is defined as one on which the daily precipitation is greater than 30mm.

IPCC Climate Impact Driver Category	Climate-related Hazard	Summary of Projections for Ireland[20]	Climate Model Simulations for Meath[21] (RCP4.5 Scenario)	Climate Model Simulations for Meath[22] (RCP8.5 Scenario)
	Dry Periods (Acute) (Reference Period 1981-2000; Future period: 2041-2060)	To quantify the potential impact of climate change on future drought events, the change in the number of dry periods[27] was analysed. The projections indicate an increase in the annual number of dry periods for the RCP4.5 and RCP8.5 scenarios (mean value ≈16% for both RCPs). The projected increases in dry periods are largest for summer, with "likely" values of +11% and +48% for the RCP4.5 and RCP8.5 scenarios, respectively.	Percentage increase in the number of annual dry periods: 15% to 20% Percentage increase in the number of summer dry periods: 15% to 30%	Percentage increase in the number of annual dry periods: 12% to 18% Percentage increase in the number of annual dry periods: 20% to 30%
Wind	Wind Speed and Sea Level Pressure (Chronic) (Reference Period 1981-2000; Future period: 2041-2060)	Mid-century mean 10-m wind speeds are projected to decrease for all seasons. The decreases are largest for summer months under the RCP8.5 scenario. The summer reductions in 10-m wind speed range from 0.3% to 3.4% for the RCP4.5 scenario and from 2% to 5.4% for the RCP8.5 scenario. Annual average mean sea level pressure (MSLP) is projected to increase by the middle of the century for both the RCP4.5 (mean value 1.4hPa) and RCP8.5 scenarios (mean value 1.2hPa). There exists a clear south-east to north-west gradient in the projections, with the largest increases in the north. The projected increases in MSLP are some of many possible factors that could contribute to the projections of	Percentage change in annual mean 10-m wind speed: -2% Change in annual average mean sea level pressure: +1.38 to +1.4 hPa	Percentage change in annual mean 10-m wind speed: -2% to -2.5% Change in annual average mean sea level pressure: +1.2 hPa

[27] A dry period is defined as at least 5 consecutive days on which the daily precipitation is less than 1mm.

IPCC Climate Impact Driver Category	Climate-related Hazard	Summary of Projections for Ireland[20]	Climate Model Simulations for Meath[21] (RCP4.5 Scenario)	Climate Model Simulations for Meath[22] (RCP8.5 Scenario)
		decreases in wind speed and wind power and increases in dry periods and heatwave events.		
	Storm Track Projections[28] (Acute) (Reference Period 1981-2000; Future period: 2041-2060)	Projections show a reduction of ≈10% in the numbers of less intense storms affecting Ireland and suggest an eastward extension of the more severe windstorms over Ireland and the UK from the middle of the century. It should be noted that because extreme storms are rare events, the storm projections should be considered with a level of caution.		
Snow and Ice	Snowfall (Chronic) (Reference Period 1981-2000; Future period: 2041-2060)	Annual snowfall is projected to decrease substantially by the middle of the century for the RCP4.5 (mean value 52%) and RCP8.5 scenarios (mean value 63%). The largest decreases are noted over low-lying regions. Averaged over the whole country, the "likely" decreases in mid-century snowfall are 51% and 60% for the RCP4.5 and RCP8.5 scenarios, respectively.	Percentage decrease in mean annual snowfall: -55%	Percentage decrease in mean annual snowfall: -65% to -70%

[28] Given the large societal impacts of extreme storms, there is considerable interest in the potential impact of climate change on extreme cyclonic activity in the North Atlantic. Windstorms and associated high wind speeds are a major source of natural hazard risk for Ireland and many countries across Europe.

IPCC Climate Impact Driver Category	Climate-related Hazard	Summary of Projections for Ireland[20]	Climate Model Simulations for Meath[21] (RCP4.5 Scenario)	Climate Model Simulations for Meath[22] (RCP8.5 Scenario)
Other (Energy Impacts)	Heating degree days[29] (Reference period 1976-2005; Future period: 2041-2070)	The projected change in heating degree days (HDDs) shows that by the middle of the century there will be a greatly reduced requirement for heating in Ireland, with HDDs projected to decrease by 12–17% and 15–21% for the RCP4.5 and RCP8.5 scenarios, respectively. A clear north-to-south gradient is evident for both RCP scenarios, with the largest decreases in the south. Averaged over the whole country, the expected decreases in HDDs are 14% and 18% for the RCP4.5 and RCP8.5 scenarios, respectively.	Percentage decrease in mean annual in HDD: -15% to -20%	Percentage decrease in mean annual in HDD: -20% to -23%
	Cooling degree days[30] (Reference Period 1981-2000; Future period: 2041-2060)	The projections show that cooling degree days (CDDs) are expected to slightly increase, particularly over the east and midlands, suggesting a small increase in air conditioning requirements by the middle of the century. However, the amounts are small compared with HDDs and therefore have a negligible effect on the projected changes in the total energy demand		

[29] A degree day, an estimate of accumulated heat, is defined as the deviation (°C) from a base temperature value. Heating degree days (HDDs) are used by power companies and consumers to estimate the amount of energy required for residential or commercial space heating during the cold season.
[30] Cooling degree days (CDDs) are used to estimate the amount of air conditioning usage during the warm season.

IPCC Climate Impact Driver Category	Climate-related Hazard	Summary of Projections for Ireland[20]	Climate Model Simulations for Meath[21] (RCP4.5 Scenario)	Climate Model Simulations for Meath[22] (RCP8.5 Scenario)
	Solar photovoltaic (PV) power (Reference Period 1981-2000; Future period: 2041-2060)	To assess the impacts of climate change on solar power in Ireland, projections of solar photovoltaic (PV) power were analysed. Results show an expected small decrease in PV by the middle of the century ranging from ≈0 to 4%. The largest decreases are noted in the north of the country and for the RCP8.5 scenario.	Percentage decrease in mean annual in PV: -1% to -2%	Percentage decrease in mean annual in PV: -2% to -3%

3 CLIMATE RISK SCREENING

3.1 Technical Screening Criteria Requirements

For the purposes of the assessment, the methodology outlined in Regulation (EU) 2020/852 of the European Parliament and of the Council (the 'Taxonomy Regulation') and Commission Delegated Regulation (EU) 2021/2139[31] (the 'Supplementing Regulation') for a Climate Risk and Vulnerability Assessment has been adopted.

The 'Supplementing Regulation' establishes the Technical Screening Criteria for '*Substantial contribution to climate change adaptation'* specific to certain economic activities. Annex II, Section 7.1 (2) of the Supplementing Regulation sets out the following criteria for assessing risk on the 'Construction of new buildings' (the Proposed Development at Rathmullan Road, Oldbridge, Drogheda, Co. Meath consists of the construction of a large-scale residential development):

2. *The physical climate risks that are material to the activity have been identified from those listed in Appendix A to this Annex by performing a robust climate risk and vulnerability assessment with the following steps:*

    a. *screening of the activity to identify which physical climate risks from the list in Appendix A to this Annex may affect the performance of the economic activity during its expected lifetime;*

    b. *where the activity is assessed to be at risk from one or more of the physical climate risks listed in Appendix A to this Annex, a climate risk and vulnerability assessment to assess the materiality of the physical climate risks on the economic activity;*

    c. *an assessment of adaptation solutions that can reduce the identified physical climate risk.*

The first step of the climate risk and vulnerability assessment, as set out in Annex II, Section 7.1 (2) (a) of the Supplementing Regulation (and provided above), is the screening of the activity to identify which physical climate risks from the list in Appendix A of Annex II of the Supplementing Regulation may affect the performance of the economic activity during its expected lifetime. These physical climate risks are provided in Table 3-1.

[31] Commission Delegated Regulation (EU) of 4.6.2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives.

Table 3-1: Classification of climate related hazards (Source: Appendix A of Annex II of the Commission Delegated Regulation 2021/2139[32])

	Temperature-related	Wind-related	Water-related	Solid mass-related
Chronic	Changing temperature (air, freshwater, marine water)	Changing wind patterns	Changing precipitation patterns and types (rain, hail, snow/ice)	Coastal erosion
	Heat stress		Precipitation or hydrological variability	Soil degradation
	Temperature variability		Ocean acidification	Soil erosion
	Permafrost thawing		Saline intrusion	Solifluction
			Sea level rise	
			Water stress	
Acute	Heat wave	Cyclone, hurricane, typhoon	Drought	Avalanche
	Cold wave/frost	Storm (including blizzards, dust and sandstorms)	Heavy precipitation (rain, hail, snow/ice)	Landslide
	Wildfire	Tornado	Flood (coastal, fluvial, pluvial, ground water)	Subsidence
			Glacial lake outburst	

The climate risk screening primarily considers the location of the Proposed Development; this allows certain climate-related hazards to be initially excluded from the screening assessment based on location. Climate projections for the area of the Proposed Development along with risk levels as determined by the IPCC AR6 WGI and MCC CCAP are then utilised to determine the climate risks which are material to the Proposed Development. Climate risks that are material to the Proposed Development are then subsequently identified from those listed in Table 3-1.

3.2 Risk Identification

3.2.1 Project Site Location

The site covers an area of 9.20 hectares and is located adjacent to the Meath-Louth County border approximately 1.7Km west of Drogheda Town Centre. The site is accessed by the Rathmullan Road along the eastern boundary and is 50m south of the Boyne Estuary and 0.2km east of the M1 motorway.

The site generally slopes from the southwest to the northeast towards the Boyne Estuary, with existing ground levels ranging from 30m above Ordnance Datum (mOD) to 6mOD within the site boundary.

[32] Appendix 2 of this report contains a copy of Appendix A of Annex II of the Supplementing Regulation.

The Site is located approximately 9.5km west of the Irish Sea at Bettystown where the highest tide level is ca. 4.5m above ordnance datum (AOD) (Malin).

A Site Investigation Report[33] was carried out for the Site which investigated subsurface conditions utilising a variety of investigative methods in accordance with the project specification.

The full details of the strata encountered during the ground investigation are provided in the Ground Investigation Report.

Due to the use of appropriate foundations, as recommended within the Site Investigation Report, the Site will not be prone to subsidence. The topography of the Site and surrounding area would not be prone to landslide risk.

A Flood Risk Assessment (FRA)[34] has been carried out for the Proposed Development which considers the potential flood mechanisms at the Site. This Report has been considered for the purposes of the CCIA in order to determine overall flood risk at the site, and the adequacy of proposed measures.

Tidal Flooding is caused by elevated sea levels or overtopping by wave action. The site is located 9.5km inland from the Irish Sea and the site levels exceed the highest ever recorded or projected tide in the area. The site has a fall in excess of 10m across the site, with the lowest proposed Finished Floor Level on the northern boundary adjacent to the River Boyne at 19.60mOD, well above any potential coastal flood levels. Tidal flood sources have therefore been screened out of the FRA.

Historic CFRAM mottled outlines across the southern boundary assumed a continuous upstream catchment crossing the M1; however, the M1 motorway cutting and associated drainage now intercepts former overland flows, discontinuing the pre-existing Sheephouse drain and leaving a dry, non-functional ditch along the site's eastern boundary. This condition was confirmed by a site visit on 05 August 2025 and by review of Northern Motorway drainage drawings, which show culverted interceptions discharging directly to the River Boyne. Accordingly, the CFRAM fluvial mapping does not reflect current conditions and fluvial flood risk to the site is screened out (FRA, JBA Consulting, 2025).

According to the FRA, groundwater flooding has not been recorded in OPW PFRA for the area, and no groundwater strikes were encountered during SI (trial pits and boreholes to ~8 m bgl, Nov 2018). On this basis groundwater flood risk is screened out.

Pluvial flooding occurs due to insufficient capacity in the local drainage network system which results in overland flows as well as the ponding of water in topographically low points. It is usually associated with high intensity rainfall. Due to the predicted increase in the frequency and intensity of extreme rainfall events, it is prudent that site specific drainage and management measures aimed at mitigating the effects of pluvial flooding are incorporated into the development design. Careful consideration has been given to the overall site design to manage the potential generation of surface water run-off by the Proposed Development.

[33] Refer to Site Investigation Report (Construction Environmental Management Plan) Waterman Moylan, 2025.
[34] Refer to Flood Risk Assessment, JBA Consulting, 2025.

Proposed mitigation measures to reduce risk of pluvial flooding will be implemented and are discussed in detail in Table 4-1 of this Report.

There are flood risks associated with misuse, neglect, damage, intervention or lack of intervention attributable to mechanical failure or human error. Such a risk can be caused by blockages in piped systems or lack of maintenance of mechanical devices. The correct operation and maintenance of the drainage system is necessary to reduce the risk of human or mechanical error causing pluvial flood risk from blockage. The storm water network will be maintained regularly as part of the Proposed Development's operational plan and procedure and a number of maintenance measures have been outlined within the Engineering Assessment Report[35]. These measures have also been considered in Table 4-1 of this report.

To prevent the risk of pluvial flooding due to overland flow in extreme rainfall events, the drainage network is to be designed in accordance with the applicable regulations e.g., Greater Dublin Strategic Drainage Study (GDSDS) and to take account of flood exceedance for storms with return periods exceeding 1% AEP (Annual Exceedance Probability). This is detailed in Table 4-1 of this report.

Based on a review of the Proposed Development Site location, the following potential climate-related hazards, as listed in Table 3-1, can be excluded from the screening assessment:

- **Sea level rise:**

  - Due to the elevation of the Site and its position above sea level, it is not expected to be affected by sea level rise.[36]

- **Temperature-related:** permafrost thawing; wildfire.

  - The Site is located close to an urban setting; therefore, highly unlikely to be affected by wildfires. Permafrost is not relevant to the Irish climate.

- **Wind-related:** tornado.

  - It is possible that thunderstorms with conditions favourable for tornado events and warmer, unstable weather attributed to climate change may be linked. On average, Ireland experiences ten tornadoes per year although many of these are weak and often occur without being noticed. There have been more reports of tornadoes in Ireland in recent years, some of which have caused considerable damage to buildings and local infrastructure. This may indicate that the risk of more powerful tornadoes in Ireland is rising, however there currently lacks tangible evidence on this subject. Therefore, tornado is currently excluded as a material risk.

- **Solid mass-related:** soil degradation; soil erosion; solifluction; avalanche; landslide; subsidence.

[35] Refer to Engineering Assessment Report, Waterman Moylan Consulting Engineers, 2025.
[36] Climate Central - Coastal Risk Screening Tool

- In relation to soil degradation and soil erosion, there will be unavoidable loss of in—situ soil and subsoil from the Proposed Development Site to achieve the required formation levels for the Proposed Development including building foundations, roads, drainage, and other infrastructure. All excavated soil and subsoil material will be reused on Site for engineering fill and landscaping, subject to suitability testing, as much as practicable.

- Due to the use of appropriate foundations, as recommended within the Site Investigation Report[37], the Site will not be prone to subsidence.

- Due to the location and topography of the Site, solifluction has been excluded in the long-term.

- According to the Landslide Susceptibility Map developed by Geological Survey Ireland (GSI), the Proposed Development Site is considered Low in terms of landslide susceptibility.[38]

- Avalanches are not considered relevant based on Ireland's historical and future projected climate.

3.2.2 IPCC AR6 WGI Climate Impact Drivers and Confidence in Future Changes for Northern Europe and Ireland

The IPCC WGI has developed an Interactive Atlas to demonstrate Climatic impact-drivers (CIDs) predictions across the globe. CIDs are physical climate system conditions (e.g., means, events, extremes) that affect an element of society or ecosystems. Depending on system tolerance, CIDs and their changes can be detrimental, beneficial, neutral, or a mixture of each across interacting system elements and regions. CID types include heat and cold, wet and dry, wind, snow and ice, coastal and open ocean.

Chapter 12 of IPCC AR6 WGI surveys the links between CIDs and affected sectors and provides a matrix of CIDs for regional sectors that are rated based on their potential impact and risk relevance. Impacts, risks, and opportunities are rarely attributable to a single CID index or threshold, but climate shifts that push conditions outside of expected conditions and beyond tolerance levels are indicative of impact, risk or benefit given vulnerability and exposure. Focus is on direct sectoral connections of a CID rather than cascading or secondary effects. Within each sector there is a multitude of specific sectoral systems that may be affected by CID increases and decreases, with consequences further distinguished by region, background climate and socio-economic or ecological context of the affected asset.

The Proposed Development falls within the sector of the "Built Environment" as per IPCC AR6 WGI. Therefore, CIDs and their associated impact/risk relevance for the Built Environment have been provided in Table 3-2:

[37] Refer to Site Investigation Report (Construction Environmental Management Plan) Waterman Moylan, 2025.
[38] Geological Survey Ireland - Landslide Susceptibility Map

Table 3-2: Impacts and Risk Relevance for the "Built Environment".

Category	CIDs	Impacts and Risk Relevance
HEAT AND COLD	Mean air temperature	High
	Extreme heat	High
	Cold spell	Low/moderate
	Frost	None/low confidence
WET AND DRY	Mean precipitation	None/low confidence
	River flood	High
	Heavy precipitation and pluvial flood	High
	Landslide	Low/moderate
	Aridity	None/low confidence
	Hydrological drought	None/low confidence
	Agricultural and ecological drought	Low/moderate
	Fire weather	Low/moderate
WIND	Mean wind speed	None/low confidence
	Severe windstorm	High
	Tropical cyclone	High
	Sand and dust storm	Low/moderate
SNOW AND ICE	Snow, glacier and ice sheet	None/low confidence
	Permafrost	Low/moderate
	Lake, river and sea ice	None/low confidence
	Heavy snowfall and ice storm	Low/moderate
	Hail	Low/moderate
	Snow avalanche	Low/moderate
COASTAL AND OCEANIC	Relative sea level	High
	Coastal flood	High
	Coastal erosion	High
	Marine heatwave	None/low confidence
	Ocean acidity	None/low confidence
OTHER	Air pollution weather	None/low confidence
	Atmospheric CO_2 at surface	None/low confidence
	Radiation at surface	Low/moderate

The CIDs, and confidence in future changes of climate for Northern Europe are demonstrated in Table 3-3:

Table 3-3: IPCC WGI Interactive Atlas: Regional synthesis Climate Change Predictions for Northern Europe

Category	CIDs	Future Changes	
HEAT AND COLD	Mean surface temperature	High confidence of increase	△
	Extreme heat	High confidence of increase	△
	Cold spell	High confidence of decrease	▽
	Frost	High confidence of decrease	▽
WET AND DRY	Mean precipitation	High confidence of increase	△
	River flood	Medium confidence of decrease	▽
	Heavy precipitation and pluvial flood	High confidence of increase	△
	Landslide	Low confidence in direction of change	—
	Aridity	High confidence of decrease	▽
	Hydrological drought	Low confidence in direction of change	—
			—
			—

Category	CIDs	Future Changes	
	Agricultural and ecological drought	Low confidence in direction of change	
	Fire weather	Low confidence in direction of change	
WIND	Mean wind speed	Medium confidence of decrease	▽
	Severe windstorm	Medium confidence of increase	△
	Tropical cyclone	Not relevant	⊠
	Sand and dust storm	Not relevant	⊠
SNOW AND ICE	Snow, glacier and ice sheet	High confidence of decrease	▽
	Permafrost	High confidence of decrease	▽
	Lake, river and sea ice	High confidence of decrease	▽
	Heavy snowfall and ice storm	Low confidence in direction of change	—
	Hail	Low confidence in direction of change	—
	Snow avalanche	Low confidence in direction of change	—
COASTAL AND OCEANIC	Relative sea level	High confidence of increase	△
	Coastal flood	High confidence of increase	△
	Coastal erosion	High confidence of increase	△
	Marine heatwave	High confidence of increase	△
	Ocean acidity	High confidence of increase	△
OTHER	Air pollution weather	Low confidence in direction of change	—
	Atmospheric CO_2 at surface	High confidence of increase	△
	Radiation at surface	Medium confidence of decrease	▽

The Proposed Development is located in Rathmullan, Co. Meath. The CIDs and predicted changes in future climate for Meath are presented in Table 3-4 below, as adapted from the findings in Table 2-2 of this Report:

*Table 3-4: Climate Change Predictions for **Meath** (based on Climate Ireland Climate Change Projection Maps)*

Category	CIDs	Future Changes
HEAT AND COLD	Mean surface temperature	Predicted increase
	Extreme heat	Predicted increase
	Cold spell	Predicted decrease
	Frost	Predicted decrease
WET AND DRY	Mean precipitation	Predicted increase
	River flood	Predicted increase
	Heavy precipitation and pluvial flood	Predicted increase
	Hydrological drought	Predicted increase
	Agricultural and ecological drought	Predicted increase
WIND	Mean wind speed	Predicted decrease
	Severe windstorm	Predicted increase

Category	CIDs	Future Changes
SNOW AND ICE	Snow, glacier and ice sheet	Predicted decrease
	Heavy snowfall and ice storm	Predicted decrease
COASTAL AND OCEANIC	Relative sea level	Predicted increase
ENERGY IMPACTS (OTHER)	Heating degree days	Predicted decrease
	Cooling degree days	Predicted increase
	Solar photovoltaic (PV) power	Predicted decrease

3.2.3 Meath County Council Climate Action Plan (2024-2029) Risk Statement

Meath County Council undertook a climate change risk assessment as part of the MCC CAP 2024-2029. The purpose of the climate change risk assessment is to better understand the current risks that County Meath faces and provide a view on the potential frequency and impact of future climate events.

Climate hazards include extreme weather events and periods of climate variability. Figure 3-1 provides an illustration of extreme weather events in County Meath (1986 – 2022).

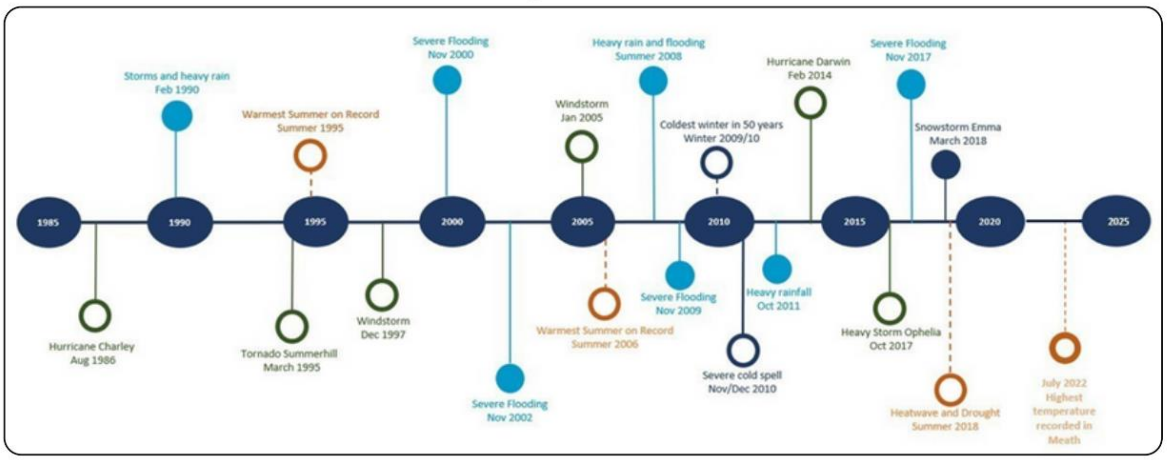

Figure 3-1: Illustration of Extreme Weather Events in County Meath (1986-2022) (Source: MCC CAP)

The assessment identified windstorms as posing the highest level of climate change risk for County Meath. Key impacts from windstorms include damage to buildings and infrastructure such as roads, powerlines, and communications systems. Coastal locations like Laytown and Bettystown will be more exposed to wind as there are no land barriers to slow the wind.

Flooding has been identified as posing a relatively high risk for County Meath with impacts experienced on a localised scale including damage to assets and infrastructure and potential for isolation of communities and reduced business activities. Inland locations through which rivers run are exposed to fluvial flooding. There are many small rivers intertwining throughout County Meath, such as the Inny, Delvin, and Broadmeadow. One of the principal rivers in Meath is the Boyne which flows through a number of large urban centres.

Laytown and Bettystown will also be exposed to sea level rise in a high warming scenario. Coastal flooding in Laytown and Bettystown is considered to be a potential risk in a four-degree

temperature increase scenario to 2050. The impact of heavy snowfall and cold spells on County Meath will likely decrease due to the decrease in intensity and duration of these events.

The whole of County Meath will be exposed to drought as the frequency and duration of drought events are projected to increase. Projected increases in drought frequency and duration may reduce grass and forage crop yields, which could affect feed availability for livestock.

Assessing the major recent climate events in County Meath shows the impacts and risks associated with climate change. It has become clear that the frequency and intensity of weather events are having a more profound impact on not only the County of Meath, but also Meath County Council's services and operations. This analysis helps Meath County Council better understand the potential climate risk to County Meath, its citizens, and how the County operates. This process aids the development of mitigation and adaptation initiatives that will be undertaken across the County.

The following Table 3-5 describes the future projected changes to climate hazard risk for County Meath, as set out within the MCC CAP.

Table 3-5: Future Projected Changes to Climate Hazard Risk for County Meath (Source: MCC CAP)

Climate Hazard	Change Projections	Summary	Future Frequency
Droughts **Heatwaves** **Flooding**	The climate risks associated with droughts, heatwaves and floods are expected to increase significantly for County Meath as a result of projected increases in the frequency of hazard events and also due to an increase in the areas, assets and populations exposed to these hazards. The risk is exacerbated by not only projected changes in the frequency occurrence of drought and heatwaves but also as a result of projected increases in population and the proportion of population considered vulnerable (those aged 65 years and over). Meath County Council's services are likely to be impacted by these changes with increased pressure on services before, during and after extreme weather events. There will likely be a significant financial impact to Meath County Council due to the likely need to allocate more financial resources towards climate related mitigation and adaptation measures.	These are emerging and increasing risks	
Windstorms	The impact of severe windstorms will likely increase marginally in County Meath. There will be an increase in the intensity of storms but not necessarily the frequency. There will be an increase in the cost of the actions that Meath County Council takes before, during, and after an event e.g., removal of fallen trees, repair of public infrastructure.	This is an increasing risk	
Extreme Cold Heavy Snowfall	The impact of heavy snowfall and cold spells on County Meath will likely decrease due to the decreased intensity and duration of these events., The overall risk of these hazards is projected to reduce in the future, resulting in less risk. These are decreasing risks.	These are decreasing risks	

3.2.4 Identified Climate Risks

The CIDs, and confidence in future changes of climate for Northern Europe, as presented in IPCC AR6 WGI, have been taken into consideration along with the location of the Proposed Development, projected changes in climate for Ireland, and future climate risk levels as determined within the MCC CAP, in order to determine what risks are material to the Proposed Development.

Based on these findings, as presented in Table 3-2 to Table 3-5, the following Table 3-6 indicates the CIDs of relevance to the Proposed Development. Only CIDs which have been assigned as low/moderate or high in IPCC AR6 WGI findings for the “Built Environment” have been included here; anything that has been assigned none/low confidence has been omitted (aside from hydrological drought which is considered relevant to the site location). This approach ensures that the assessment is based on reliable and robust data. Many of these CIDs that have been omitted due to ‘none/low confidence’ risk relevance are not applicable to the subject site location (as can be seen in table 3-2). The only potentially relevant CIDs which have been omitted are mean precipitation and mean wind speed. Impacts from these will be captured in the assessment of acute hazards such as heavy rainfall or storm winds.

Table 3-6: Climate Risk Screening

Category	CIDs	IPCC Impacts and Risk Relevance to the Built Environment	Predicted Change in CID for Northern Europe and Ireland (Meath)	Included in MCC CAP	Material Risk
HEAT AND COLD	Mean air temperature (chronic)	High	High confidence of increase in Northern Europe. Projections for Meath indicate an increase in mean air temperature.	Yes	**Yes**
	Extreme heat (acute)	High	High confidence of increase in Northern Europe. Projections for Meath indicate an increase in heatwaves.	Yes	**Yes**
	Cold spell (acute)	Low/moderate	High confidence of decrease in Northern Europe. Projections for Meath indicate a decrease in cold spells.	Yes	**No**
WET AND DRY	River flood (acute)	High	Medium confidence of decrease for Northern Europe. Very wet days predicted to increase in Meath.	Yes	**Yes**
	Heavy precipitation and pluvial flood (acute)	High	High confidence of increase for Northern Europe. Very wet days predicted to increase in Meath.	Yes	**Yes**
	Landslide (acute)	Low/moderate	Low confidence in direction of change. The Proposed Development Site is considered Low in terms of landslide susceptibility.	No	**No**
	Hydrological Drought [39] (acute)	None/low confidence	Low confidence in direction of change for Northern Europe. Number of dry periods expected to increase in Meath.	Yes	**Yes**

[39] Though this has been assigned as none/low confidence by the IPCC in terms of impacts and risk relevance to the built environment, climate predictions for Ireland indicate an increase in the frequency and duration of droughts. Therefore, this CID has not been omitted from the current risk screening.

Category	CIDs	IPCC Impacts and Risk Relevance to the Built Environment	Predicted Change in CID for Northern Europe and Ireland (Meath)	Included in MCC CAP	Material Risk
	Agricultural and ecological drought (acute)	Low/moderate	Low confidence in direction of change.	No	**No**
	Fire weather (acute)	Low/moderate	Low confidence in direction of change.	No	**No**
WIND	Severe windstorm (acute)	High	Medium confidence of increase in Northern Europe. Increase in windstorms projected for Ireland with level of caution for uncertainty.	Yes	**Yes**
	Tropical cyclone (acute)	High	Not relevant for location.	No	**No**
	Sand and dust storm (acute)	Low/moderate	Not relevant for location.	No	**No**
SNOW AND ICE	Permafrost thawing (chronic)	Low/moderate	Not relevant for location.	No	**No**
	Heavy snowfall and ice storm (acute)	Low/moderate	Low confidence in direction of change for Northern Europe. Projections for Meath predict a decrease in snowfall.	Yes	**No**
	Hail (acute)	Low/moderate	Low confidence in direction of change.	No	**No**
	Snow avalanche (acute)	Low/moderate	Not relevant for location.	No	**No**
COASTAL & OCEANIC	Relative sea level (chronic)	High	High confidence of increase in Northern Europe. Laytown and Bettystown will also be exposed to sea level rise.	Yes	**No**
	Coastal flood (acute)	High	High confidence of increase in Northern Europe. Due to the location of the site and proximity to the coast, the FRA does not consider coastal flooding to be a risk to the Proposed Development.	Yes	**No**

Category	CIDs	IPCC Impacts and Risk Relevance to the Built Environment	Predicted Change in CID for Northern Europe and Ireland (Meath)	Included in MCC CAP	Material Risk
	Coastal erosion (chronic)	High	High confidence of increase in Northern Europe. Due to the location of the site and proximity to the coast, coastal erosion is not considered to be a risk to the Proposed Development.	Yes	**No**
OTHER	Compound flooding	High	The probability of these events is projected to increase along northern European coasts	No	**Yes**

Taking account of the findings presented in Table 3-2 to Table 3-6, the physical climate risks from the list in Appendix A of Annex II of the Supplementing Regulation (as provided in Table 3-1) which may affect the performance of the economic activity during its expected lifetime have been revised in terms of relevancy to the Proposed Development. Table 3-7 presents the physical climate risks which have been deemed relevant to the Proposed Development (highlighted) and those which have been excluded (strikethrough):

Table 3-7: Classification of climate related hazards which are relevant to the Proposed Development

	Temperature-related	Wind-related	Water-related	Solid mass-related
Chronic	Changing temperature (air, freshwater, marine water)	~~Changing wind patterns~~	~~Changing precipitation patterns and types (rain, hail, snow/ice)~~	~~Coastal erosion~~
	~~Heat stress~~		~~Precipitation or hydro-logical variability~~	~~Soil degradation~~
	~~Temperature variability~~		~~Ocean acidification~~	~~Soil erosion~~
	~~Permafrost thawing~~		~~Saline intrusion~~	~~Solifluction~~
			~~Sea level rise~~	
			~~Water stress~~	
Acute	Heat wave	~~Cyclone, hurricane, typhoon~~	Drought	~~Avalanche~~
	~~Cold wave/frost~~	Storm (including blizzards, dust and sandstorms)	Heavy precipitation (rain, hail, snow/ice)	~~Landslide~~
	~~Wildfire~~	~~Tornado~~	Flood (coastal, fluvial, pluvial, ground water)	~~Subsidence~~
			~~Glacial lake outburst~~	

4 CLIMATE RISK AND VULNERABILITY ASSESSMENT

4.1 Technical Screening Criteria Requirements

In accordance with the methodology as outlined in Annex II, Section 7.1 (2) (a) of the Supplementing Regulation, Section 3 of this Report has screened the activity to identify which physical climate risks from the list in Appendix A of Annex II of the Supplementing Regulation may affect the performance of the economic activity during its expected lifetime.

The remaining steps, as set out in Annex II, Section 7.1 (2) of the Supplementing Regulation (and provided above), are to conduct a climate risk and vulnerability assessment to assess the materiality of the physical climate risks on the economic activity and assess the adaptation solutions that can reduce the identified physical climate risk. This has been completed using the IPCC framework on the assessment of risk and is detailed in the following sections.

4.2 Climate Risk and Vulnerability Assessment Framework

The IPCC provides a framework to assess risk. This framework evaluates risks which may emerge due to the overlap of Climate Hazards, Vulnerability, and Exposure[40].

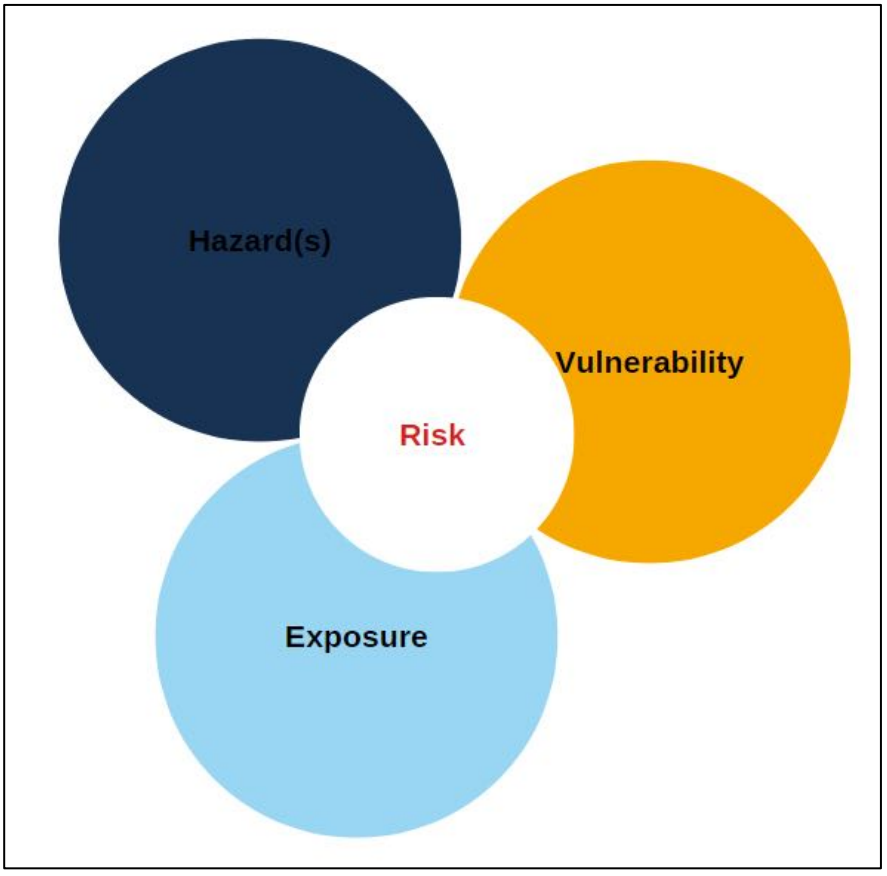

Figure 4-1: IPCC (AR6) Risk Assessment Propeller

[40] IPCC (2022) Working Group II Contribution to the Sixth Assessment Report (AR6), Climate Change 2022: Impacts, Adaptation and Vulnerability.

Section 3 (Climate Risk Screening) identified the following Climate Hazards as posing a potential risk to the Proposed Development:

- Temperature (chronic)
- Temperature (acute)
- Precipitation (acute)
- Drought (acute)
- Wind (acute)
- Compound events (acute)

Table 4-1 below evaluates these Climate Hazards, the risk factors (Exposure), the current sensitivity and adaptive capacity of the development (Vulnerability), and the subsequent risk level. Adaptation solutions that can reduce the identified physical climate risk have been assessed and any further recommendations for additional adaptation and mitigation measures which may improve the Proposed Development's resilience to climate change impacts are also noted and will be applied.

Table 4-1: Risk and Vulnerability Assessment

IPCC CID Category	Climate Hazard	Risk Factor (Exposure)	Current Sensitivity and Adaptive Capacity of Development (Vulnerability)	Risk with Existing Adaptation Measures	Proposed Additional Adaptation/Mitigation Measures
WET AND DRY	**Temperature (chronic)** *Increase in mean annual air temperature* **Temperature** **(acute)** *Increase in frequency and duration of heatwave events*	Increased cooling days for the buildings, extra power usage.	Due to factors such as climate change, population increase, and construction of high-rise buildings there has been an increase in high internal temperatures Landscaping and the use of trees and plants will shade and contribute to the cooling of the air through evapotranspiration[41]. The building services strategy for the development has been considered in terms of Part L Compliance (NZEB)[42]. A number of low energy technologies are being considered for the development. The Heating Ventilation Air Conditioning (HVAC) system design has been considered to ensure minimal energy requirements in the development. The proposed HVAC systems will be selected based upon their efficiency performance, which has been assessed	Low Risk once existing proposed measures are implemented.	Inspection and maintenance of the PV solar panels and HVAC systems (if implemented) will be carried out periodically and completed in accordance with good practice.

[41] Evapotranspiration is a term used to refer to the combined processes by which water moves from the earth's surface into the atmosphere.

[42] Refer to Energy Statement, McElligott Consulting Engineers, 2025.

IPCC CID Category	Climate Hazard	Risk Factor (Exposure)	Current Sensitivity and Adaptive Capacity of Development (Vulnerability)	Risk with Existing Adaptation Measures	Proposed Additional Adaptation/Mitigation Measures
			to ascertain their coefficient performance in terms of heating, cooling, and hot water generation. The passive measures included in the design, such as minimising solar gain (glazing selection), reducing the fabric heat loss through the building envelope by improving the airtightness significantly contributes towards reducing the loads on the active systems within the building. The active measures have been designed to reduce the primary energy consumption through intelligent control and highly efficient plant and equipment. The following passive and active measures are being considered for the development: **1. Building Fabric and Passive Design** **High Insulation Standards**: External walls, roofs, floors, and windows are designed with low U-values (e.g. walls at 0.18 W/m²K), reducing heat transfer and helping maintain indoor comfort during hot spells. **Airtightness and Thermal Bridging**: The dwellings are designed to achieve 3 air changes per hour or better, with minimal thermal bridging (0.08), limiting unwanted heat gain or loss. **Passive Solar Consideration**: The layout maximises daylight while managing solar gain to prevent overheating. Glazing is selected to balance light, insulation, and solar control. **2. Lighting and Internal Heat Management** **LED Lighting**: LED fittings are used throughout, which emit less heat than traditional bulbs, reducing internal heat load and the risk of overheating in summer. **3. Ventilation and Indoor Air Quality** **Heat Recovery Ventilation (HRV)**: Each unit includes HRV systems that provide fresh air while recovering		

IPCC CID Category	Climate Hazard	Risk Factor (Exposure)	Current Sensitivity and Adaptive Capacity of Development (Vulnerability)	Risk with Existing Adaptation Measures	Proposed Additional Adaptation/Mitigation Measures
			heat from exhaust air. This ensures good air quality and reduces humidity, which is important during warmer periods. **4. Renewable and Low-Carbon Energy Systems** **Heat Pumps**: Air-to-water heat pumps are proposed for hot water and space heating. These are efficient in warm weather and can operate on night-rate electricity, reducing peak demand and supporting grid stability. **5. Electric Vehicle (EV) Infrastructure** **EV Charging Strategy**: 20% of communal parking spaces will be fitted with EV chargers from the outset, with ducting to all other spaces to allow future expansion. This supports sustainable transport and reduces urban heat and air pollution. **6. Material Choices and Thermal Comfort** **Window Frames**: uPVC frames are preferred over aluminium due to better insulation and lower embodied energy. They also reduce sound transmission and require less maintenance, which is beneficial in coastal environments.		
	Precipitation (acute) *Increase in heavy precipitation and pluvial flood*	Pressure on drainage systems.	The lowest FFL is set at 19.60mOD, well above any potential coastal or fluvial flood levels. Refer to Flood Risk Assessment, JBA Consulting.[43] **Surface Water Drainage Design**	Low Risk once existing proposed measures are implemented.	No additional measures proposed. A programme of maintenance measures has been detailed

[43] Refer to Flood Risk Assessment, JBA Consulting, 2025.

IPCC CID Category	Climate Hazard	Risk Factor (Exposure)	Current Sensitivity and Adaptive Capacity of Development (Vulnerability)	Risk with Existing Adaptation Measures	Proposed Additional Adaptation/Mitigation Measures
			Catchment Division: The site is divided into two primary surface water catchments, Northern and Southern, which operate in series. Runoff from the Southern Catchment flows into the Northern Catchment before discharging into the existing 1200mm culvert adjacent to Rathmullan Road. The existing 1.2m culvert located along the eastern section of the development has sufficient capacity to convey the estimated 1% AEP peak flows (0.72m³/s) with a peak capacity of approximately 3m³/s. In the event of blockage, floodwaters will overtop onto Rathmullan Road and flow northward without impacting the site. **Greenfield Runoff Rate**: Outflows are restricted to greenfield runoff rates (Qbar), calculated using the Institute of Hydrology Report No. 124. This ensures that the development does not increase downstream flood risk. **Attenuation Storage**: Southern Catchment: Total storage of 1,110.4 m³ (896 m³ underground + 214.4 m³ overground). Northern Catchment: Total storage of 1,311.35 m³ (1,000 m³ underground + 311.35 m³ overground). Combined: 2,368.89 m³, designed to accommodate a 1-in-100-year storm event with a 20% climate change allowance. **Flow Control**: Hydro-Brake® or similar flow control devices are installed at each outfall to restrict discharge rates and manage stormwater volumes. **Sustainable Urban Drainage Systems (SuDS)** The SuDS strategy is comprehensive and layered, following the GDSDS (Greater Dublin Strategic Drainage Study) guidance:		in the Engineering Assessment Report. It will be the responsibility of the site management team to ensure the drainage system is maintained. Maintenance and cleaning of gullies, manholes (including catch pits) and all other SuDS features will ensure adequate performance.

IPCC CID Category	Climate Hazard	Risk Factor (Exposure)	Current Sensitivity and Adaptive Capacity of Development (Vulnerability)	Risk with Existing Adaptation Measures	Proposed Additional Adaptation/Mitigation Measures
			Water Butts: Installed at each residential unit to intercept roof runoff for reuse in gardening and washing. **Permeable Pavement**: Used in on-curtilage parking areas to allow infiltration and temporary storage. **Swales**: Grass swales with infiltration trenches are integrated along internal roads to promote infiltration and conveyance. **Detention Basins**: Aboveground grass basins with underground storage tanks provide attenuation and slow discharge to the receiving watercourse. **Petrol Interceptors**: Installed downstream of flow control devices to treat runoff before discharge. The incorporation of SuDS elements will provide a sustainable manner in which to disperse surface water from the site, encourage groundwater recharge and provide treatment of run-off and subsequent improvement of discharge quality. Refer to the Engineering Assessment Report for more detail on the drainage design and each of the above-listed SuDS measures which have been taken into account in the preparation of this document[44]. **Design for Climate Resilience** **Stormwater Calculations**: Designed for 1-in-100-year storm events with an additional 20% allowance for climate change **Soil Classification**: Site soils classified as Type 3 (moderate infiltration), ensuring conservative design assumptions		

[44] Refer to Engineering Assessment Report, Waterman Moylan Consulting Engineers, 2025.

IPCC CID Category	Climate Hazard	Risk Factor (Exposure)	Current Sensitivity and Adaptive Capacity of Development (Vulnerability)	Risk with Existing Adaptation Measures	Proposed Additional Adaptation/Mitigation Measures
			Simulation and Modelling: Extensive hydraulic modelling using FSR methodology and Colebrook-White formula to size pipes and storage **<u>Emergency Access and Flood Management Plan</u>** The site has three access routes via Rathmullan Road, providing alternative access in the event of a disruption to any single route. An Emergency Management Plan (EMP) will be implemented to manage potential access disruption during extreme flood events along the River Boyne. • Includes a communication system (e.g., text alerts) triggered by weather warnings or water level gauges. • Residents will be notified of road closures and alternative access routes.		
	Drought (acute) *Increase in the number of dry periods*	Potential disruption to residential water supply. Increase use of water for the irrigation of the landscaping.	Water supply is on the public water mains, so disruptions should be minimised and mitigated by Irish Water.	Low risk to building. Moderate risk to irrigation of landscaping.	Consider installation of rainwater harvesting.
WIND	**Wind (acute)** Potential increase in the number of windstorms	Potential for damage to infrastructure and telecommunications, and a risk to human health	Suitable exterior materials are proposed for the development, and a Planned Preventative Maintenance (PPM) programme will be implemented to ensure all external elements remain safe and fit for purpose. Materials have been selected for their durability and long service life, with consideration given to their performance under environmental stressors such as wind-driven rain and weathering. The report outlines that pitched roofs with concrete tiles, metal cladding, uPVC rainwater systems, and precast concrete elements have been chosen for their	Low Risk once existing proposed measures are implemented, and landscaping is maintained in place as designed.	No additional measures proposed.

IPCC CID Category	Climate Hazard	Risk Factor (Exposure)	Current Sensitivity and Adaptive Capacity of Development (Vulnerability)	Risk with Existing Adaptation Measures	Proposed Additional Adaptation/Mitigation Measures
			resilience, low maintenance requirements, and long lifespans—ranging from 40 to over 80 years. The design and specification of these components are informed by best practice principles, including regular inspection regimes and maintenance schedules to extend material longevity. While the report does not explicitly reference BS 7543:2015 or its annexes, it aligns with its principles by detailing lifecycle expectations, maintenance strategies, and material performance under climatic conditions.[45] Bins are stored in a secure Bin storage area, which will prevent the risk of causing harm in high winds[46].		
OTHER	**Compound events (acute)** *Increase in the number of compound flooding events*	Increased water runoff and pressure on drainage system	Drainage systems have been designed with ample capacity to store any excess storm water, with separate foul and surface water drainage systems to reduce the rate of run-off to the sewer and further reducing the risk of the sewer surcharging[47]. As detailed in the Engineering Assessment Report, the proposed surface water drainage system for this development has been designed as a SuDS system to treat run-off and remove pollutants to improve quality, restrict outflow and control quantity of run-off.	Low Risk once existing proposed measures are implemented.	No additional measures proposed. A programme of maintenance measures has been detailed in the Engineering Assessment Report. It will be the responsibility of the site management team to ensure the drainage system is maintained. Maintenance and cleaning of gullies, manholes (including catch pits) and all other SuDS features will ensure adequate performance.

[45] Refer to Building Lifecycle Report, Aramark, 2025.
[46] Refer to Operational Waste Management Plan, DNV, 2025.
[47] Refer to Engineering Assessment Report, Waterman Moylan Consulting Engineers, 2025.

4.3 Mitigation and Adaptation Measures

4.3.1 Mitigation Measures

The Proposed Development shall seek to achieve the greatest standards of sustainable construction and design and has incorporated sustainable building design criteria from the outset which support overall climate change mitigation, including the requirement that the Development does not exceed the threshold set for the nearly zero-energy building (NZEB) requirements in national regulation implementing Directive 2010/31/EU.

A number of low energy technologies are being considered for the development, as described within the Energy Statement[48] and Building Lifecycle Report[49]:

Building Fabric and Passive Design

- **High-Performance Envelope**: Walls (0.18 W/m²K), roofs (0.16 W/m²K), floors (0.16 W/m²K), and windows (1.3 W/m²K) are designed to minimize heat loss
- **Air Tightness**: Target of 3 air changes per hour or better, reducing uncontrolled ventilation losses
- **Thermal Bridging**: Minimal bridging factor of 0.08, enhancing overall thermal performance
- **Passive Solar Design**: Optimized window placement for daylighting and solar gain, balanced against overheating risk

Energy Efficiency and NZEB Compliance

- **NZEB Standards**: All units comply with 2021 Part L Regulations, achieving A2/A3 BER ratings
- **DEAP Software v4.2**: Used to demonstrate compliance, showing a 70% reduction in energy use compared to 2005 standards
- **LED Lighting**: Full LED deployment with low energy demand and reduced internal heat gain

Renewable Energy Integration

- **Heat Pumps**: Air-to-water and exhaust air heat pumps proposed for space heating and hot water, leveraging grid decarbonization
- **Photovoltaic (PV) Panels**: Roof-mounted PV arrays to support Part L/NZEB compliance, reducing grid dependency
- **CHP (Combined Heat and Power)**: Considered for district heating, though not viable at current scale; would otherwise reduce grid load and utilize gas efficiently

[48] Refer to Energy Statement, McElligott Consulting, 2025.
[49] Refer to Building Lifecycle Report, Aramark, 2025.

Ventilation and Indoor Air Quality

- **Heat Recovery Ventilation (HRV)**: Mechanical systems to recover heat from exhaust air while ensuring fresh air supply, improving energy efficiency and occupant health

- **Demand-Controlled Ventilation**: Systems with CO_2 sensors and heat recovery to optimize air quality and reduce energy use

Electric Vehicle (EV) Infrastructure

EV Charging Strategy:

- 20% of communal spaces equipped with chargers from the outset.
- Ducting provided to 100% of spaces for future scalability.
- In-curtilage houses pre-wired for future EV charger installation

Sustainable Materials and Lifecycle Planning

- **Durable, Low-Maintenance Materials**: uPVC windows, concrete sills, and metal cladding selected for longevity and reduced embodied carbon

- **Lifecycle Costing**: Building Lifecycle Report includes a Planned Preventative Maintenance (PPM) schedule to ensure long-term sustainability and cost control

Waste Management

The principles of waste management and the circular economy have been incorporated into both the Construction Phase and Operational Phase to ensure that maximum recycling, reuse, and recovery of waste with diversion from landfill, wherever possible, is being achieved. [50]

4.3.2 Adaptation Measures

In relation to climate change adaption, overall, the climate risks for the Proposed Development are low based on the Site location and the incorporated design measures. Nevertheless, the following actions are recommended to ensure that these adaptive design measures, particularly in relation to drainage, are capable of operating as intended:

- Inspection and maintenance of HVAC systems is carried out periodically and completed in accordance with good practice.

- The correct operation and maintenance of the drainage system is necessary to reduce the risk of human or mechanical error causing pluvial flood risk from blockage. Inspection and maintenance of the drainage systems is carried out periodically and completed in accordance with good practice (particularly after every major storm event, the end of winter (to collect winter debris), mid-summer (to collect dust, flowers and grass-type deposits), and after autumn leaf fall). This will ensure that the drainage

[50] Refer to Operational Waste Management Plan, DNV, 2025; and Resource & Waste Management Plan, DNV, 2025.

systems are capable of managing storm runoff during periods of exceptionally high rainfall. A programme of maintenance measures has been detailed in the Engineering Assessment Report. It will be the responsibility of the site management team to ensure the drainage system is maintained. Maintenance and cleaning of gullies, manholes (including catch pits) and all other SuDS features will ensure adequate performance.

- It is expected that regular inspection and maintenance of drainage systems will be an effective measure to ensure that the Proposed Development is not at risk of flooding in the future. A regularly maintained drainage system will ensure that it remains effective and in good working order should a large pluvial storm occur. For storms greater than 100-year level, the development has been designed to provide an overland flood route. Additionally, the floor levels of the buildings are set above the 100-year flood levels. However, to account for a worst-case scenario, it is recommended to conduct a risk assessment, as necessary, when deciding the future location and placement of critical infrastructure.

- Risk relating to all changing climate hazards should be revisited and assessed periodically and in line with emerging studies to ensure that proper mitigation and adaptation measures are in place.

These recommended additional measures have been presented to Earlsfort Developments Drogheda Limited who have accepted them and committed to implementing them.

5 MEATH COUNTY DEVELOPMENT PLAN 2021-2027: RELEVANT POLICY OBJECTIVES

In accordance with MCC planning requirements, the preceding sections of this Report have assessed the impact of climate change on the Proposed Development.

The Meath County Development Plan 2021-2027 (MCDP) sets out the Council's proposed policies and objectives for the development of the County over the Plan period; including policies and associated objectives which contribute towards mitigating and adapting to climate change. The format of the Plan aims to facilitate a holistic approach to ensuring Climate Action is at the forefront of all future development within the County, with a selection of policy objectives across a number of chapters all contributing to aid in the transition of the County to a climate resilient low carbon society.

The following Table 5-1 demonstrates that the relevant policies and objectives produced and implemented by MCC in relation to climate change protection measures, particularly in relation to Transport and Built Environment, as set out within the MCDP, have been incorporated into the Proposed Development design. The key risks and associated objectives which are deemed relevant to the Proposed Development have been included here:

These initiatives not only address local environmental challenges but also advance broader sustainability targets set by the UN. Therefore, each relevant policy objective has also been carefully considered in the context of the UN Sustainable Development Goals (SDGs) as outlined within Table 1-3 of this Report, demonstrating that the relevant mitigative or adaptive action to be included in the Proposed Development also aligns with and contributes to the relevant SDG.

Table 5-1: Relevant Policies of the Meath County Development Plan 2021-2027 and associated SDGs

Key Risks	Associated Objectives	Proposed Development Considerations	Relevant SDGs
Built Environment			
• Existing drainage capacity may be exceeded with more extreme rainfall occurrences. • An increase in the prevalence of storm surges puts coastal infrastructure at risk. • Severe flooding may cause road damage and closures.	**INF OBJ 14** To require the use of SuDS within Local Authority Developments and other infrastructural projects in accordance with the Greater Dublin Regional Code of Practice for Drainage Works.	In accordance with the GDSDS it is proposed to use Sustainable Urban Drainage systems (SuDS) for managing stormwater for the Proposed Development. Refer to the Engineering Assessment Report for details on SuDs measures and attenuation design.[51]	  

[51] Refer to Engineering Assessment Report, Waterman Moylan Consulting Engineers, 2025.

Key Risks	Associated Objectives	Proposed Development Considerations	Relevant SDGs
	INF OBJ 15 To require the use of SuDS in accordance with the Greater Dublin Regional Code of Practice for Drainage Works for new developments (including extensions).	In accordance with the GDSDS it is proposed to use Sustainable Urban Drainage systems (SUDS) for managing stormwater for the Proposed Development. The aim of the SUDS strategy for the site will be to: • Attenuate storm-water runoff. • Reduce storm-water runoff. • Reduce pollution impact. • Replicate the natural characteristics of rainfall runoff for the site. The drainage network has been designed in accordance with GDSDS and to take account of flood exceedance for storms return periods exceeding 1% AEP (Annual Exceedance Probability). Refer to the Engineering Assessment Report for details on SuDs measures and attenuation design[52].	  
	INF POL 20 To require that a Flood Risk Assessment is carried out for any development proposal, where flood risk may be an issue in accordance with the "Planning System and Flood Risk Management – Guidelines for Planning Authorities" (DoECLG/OPW, 2009). This assessment shall be appropriate to the scale and nature of risk to and from the potential development and shall consider the impact of climate change.	A Flood Risk Assessment (FRA)[53] has been carried out for the Proposed Development in accordance with the "Planning System and Flood Risk Management – Guidelines for Planning Authorities" (DoECLG/OPW, 2009) which considers the potential flood mechanisms at the Site and considers the impact of climate change.	 

[52] Refer to Engineering Assessment Report, Waterman Moylan Consulting Engineers, 2025.
[53] Refer to Flood Risk Assessment, JBA Consulting, 2025.

Key Risks	Associated Objectives	Proposed Development Considerations	Relevant SDGs
			
	INF OBJ 21 To restrict new development within floodplains other than development which satisfies the justification test, as outlined in the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).	The Proposed Development is not located within a flood plain.	  
	INF OBJ 30 To ensure the County's natural coastal defences, such as beaches, sand dunes, salt marshes and estuary lands, are protected and are not compromised by inappropriate works or forms of development.	The proposed residential development at Rathmullan Road, Oldbridge, Drogheda, Co. Meath has been designed with a strong emphasis on environmental protection and compliance with Meath County Council's objective to safeguard natural coastal defences, particularly estuarine lands. Although the site is located inland, it is hydrologically connected to the River Boyne, which is tidal at the point of discharge and ultimately flows into the Boyne Estuary and the Boyne Coast and Estuary Special Area of Conservation (SAC). Recognising	

Key Risks	Associated Objectives	Proposed Development Considerations	Relevant SDGs
		this connection, the project incorporates a comprehensive surface water management strategy that includes Sustainable Urban Drainage Systems (SuDS). These systems feature water butts, permeable pavements, swales, grass detention basins, hydrobrakes, and petrol interceptors. Collectively, these measures ensure that surface water runoff is treated and attenuated before being discharged at a restricted rate equivalent to greenfield runoff conditions, thereby preventing downstream impacts on estuarine environments.[54] The development's surface water infrastructure is designed to prevent any increase in runoff volume or pollutant load to the River Boyne. The attenuation systems are sized to accommodate storm events, and the use of hydrobrakes and petrol interceptors ensures that water quality is maintained. This approach aligns with the Greater Dublin Strategic Drainage Strategy and Meath County Council's drainage requirements.[55] The Natura Impact Statement (NIS) and Ecological Impact Assessment (EcIA) confirm that the development site does not contain or directly impact any coastal or estuarine habitats such as salt marshes or dunes. Impacts to several Natura 2000 sites including River Boyne and River Blackwater SAC/SPA, Boyne Estuary SPA, River Nanny Estuary and Shore SPA, and North-West Irish Sea SPA were ruled out in the NIS based on field surveys confirming the project site is not used as ex-situ habitat by relevant bird species. However, the assessments acknowledge the hydrological connectivity to the four River Boyne and European Estuaries Sites and have evaluated	 

[54] Refer to Natura Impact Statement, Verde, 2025.
[55] Refer to Ecological Impact Assessment, Verde, 2025.

Key Risks	Associated Objectives	Proposed Development Considerations	Relevant SDGs
		potential impacts accordingly. The NIS concludes that, with the proposed mitigation measures in place, the development will not adversely affect the integrity of any designated European sites, including those with estuarine features. Refer to the NIS for details on these mitigation measures.[56] Additional safeguards include a landscape masterplan that enhances existing woodland and meadow habitats, and lighting design that avoids spill into sensitive areas. Construction-phase controls such as bunded fuel storage, designated washout areas, and spill kits further reduce the risk of environmental harm.[57]	

[56] Refer to Natura Impact Statement, Verde, 2025; and Ecological Impact Assessment, Verde, 2025.
[57] Refer to Ecological Impact Assessment, Verde, 2025.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

To conclude, this Report has demonstrated the potential impacts of climate change on the Proposed Residential Development at Rathmullan Road, Oldbridge, Drogheda, Co. Meath through the preparation of a Climate Risk and Vulnerability Assessment, which has incorporated the following:

- Climate projections (EPA and IPCC) across a conservative range of future scenarios have been examined, along with the Proposed Development location, to gain an understanding of the future risks that climate change may have on the Proposed Development;

- Screening of potential climate hazards relevant to the location of the Proposed Development and the projected changes in future climate for this location to determine what hazards pose a material risk;

- Assessment of identified material risks, taking account of relevant adaptation and mitigation measures which have been incorporated into the Development design, in accordance with the IPCC's Climate Risk Framework;

- Provision of recommended additional actions to further reduce the potential risks of identified climate hazards.

This report addresses the requirements for a Climate Change Impact Assessment by evaluating the impact of climate change on the Proposed Development and demonstrating how relevant policies and objectives from the Meath County Development Plan 2021–2027 have been incorporated into the design. These policies have been considered alongside the UN Sustainable Development Goals (SDGs), and the Report demonstrates that adaptive measures proposed for the development contribute to achieving the relevant SDGs.

Furthermore, this Report has provided information to support the relevant public body in carrying out its functions in a manner which is consistent with national climate plans and strategies and furthering the achievement of the national climate objective as set out under Section 15 of the Climate Action and Low Carbon Development Act 2015, as amended in 2021. The current CCIA report should be reviewed alongside the National Climate Action Plan (CAP25) and Meath County Council Climate Action Plan (2024-2029) to ensure alignment with relevant objectives and targets.

6.2 Recommendations

6.2.1 Climate Risk and Vulnerability

In relation to climate change adaption, overall, the climate risks for the Proposed Development are low based on the Site location and the incorporated design measures. Nevertheless, the following actions are recommended to ensure that these adaptive design measures, particularly in relation to drainage, are capable of operating as intended:

- Inspection and maintenance of HVAC systems is carried out periodically and completed in accordance with good practice.

- The correct operation and maintenance of the drainage system is necessary to reduce the risk of human or mechanical error causing pluvial flood risk from blockage. Inspection and maintenance of the drainage systems is carried out periodically and completed in accordance with good practice (particularly after every major storm event, the end of winter (to collect winter debris), mid-summer (to collect dust, flowers and grass-type deposits), and after autumn leaf fall). This will ensure that the drainage systems are capable of managing storm runoff during periods of exceptionally high rainfall. A programme of maintenance measures has been detailed in the Engineering Assessment Report. It will be the responsibility of the site management team to ensure the drainage system is maintained. Maintenance and cleaning of gullies, manholes (including catch pits) and all other SuDS features will ensure adequate performance.

- It is expected that regular inspection and maintenance of drainage systems will be an effective measure to ensure that the Proposed Development is not at risk of flooding in the future. A regularly maintained drainage system will ensure that it remains effective and in good working order should a large pluvial storm occur. For storms greater than 100-year level, the development has been designed to provide an overland flood route. Additionally, the floor levels of the buildings are set above the 100-year flood levels. However, to account for a worst-case scenario, it is recommended to conduct a risk assessment, as necessary, when deciding the future location and placement of critical infrastructure.

- Risk relating to all changing climate hazards should be revisited and assessed periodically and in line with emerging studies to ensure that proper mitigation and adaptation measures are in place.

These recommended additional measures have been presented to Earlsfort Developments Drogheda Limited who have accepted them and committed to implementing them.

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Head Office

3D, Core C, Block 71, The Plaza, Park West, Dublin 12, D12F9TN, Ireland.
Tel: +353 1 565 4730
Email: bes.info@dnv.com

South West Regional Office

19 Henry Street, Kenmare, County Kerry, V93 CVH0, Ireland.
Tel: +353 646 641932
Email: bes.info@dnv.com

South East Regional Office

M10 Wexford Enterprise Centre, Strandfield Business Park, Rosslare Rd, Strandfield,. Wexford, Y35 W5RD, Ireland.
Tel: +353 1 565 4730
Email: bes.info@dnv.com

Appendix 1

Site Location and Site Layout

Site Plan Layout

1:500

HOUSE SCHEDULE				
Type		ROOM / PERSON	House Type	Quantity
2.1		2 BED/4P	2 Bed Mid Terrace	23
2.4		2 BED/4P	2 Bed Semi-Detached	8
2.5		2 BED/4P	2 Bed Semi-Detached	6
3.2		3 BED/5P	3 Bed Mid Terrace	16
3.4		3 BED/5P	3 Bed Mid Terrace	22
3.5		3 BED/4P	3 Bed Semi-Detached	4
3.6		3 BED/4P	3 Bed Semi-Detached	14
3.7		3 BED/5P	3 Bed Semi-Detached	46
3.8		3 BED/5P	3 Bed Semi-Detached	9
4.1		4 BED/6P	4 Bed Semi-Detached	22
				170

DUPLEX UNIT SCHEDULE				
Type		ROOM / PERSON		Quantity
D.1		1 BED/2P	1 Bed Unit (GFP)	16
D.2		2 BED/4P	2 Bed Unit (1st/2nd)	16
				32

APARTMENT BUILDING SCHEDULE						
Type		Quantity	ROOM / PERSON	UNIT PER BUILDING	Total Number	Quantity
AP1		4	1 BED/2P	2	8	16
			2 BED/4P	2	8	
AP2		4	1 BED/2P	2	8	16
			2 BED/4P	2	8	
AP3		3	1 BED/2P	2	6	15
			2 BED/4P	3	9	
						47

COMMERCIAL BUILDING SCHEDULE			
Type		Name	Quantity
COM		Creche	1

UNIT MIX			
Type	Quantity	[%]	
1 BED	38	15.3%	**249**
2 BED	78	31.3%	
3 BED	111	44.6%	
4 BED	22	8.8%	

PROPOSED DEVELOPMENT SUMMARY
- 170 Houses
- 32 Duplex Units
- 47Apartment Units

Total Number of Units: 249

	MAIN ROAD SURFACE
	NEIGHBORHOOD STREET SURFACE
	PEDESTRIAN SURFACE
	PUBLIC OPEN SPACE
	PRIVATE OPEN SPACE

APPLICATION SITE
AREA CALCULATED IN DENSITY
AREA CALCULATED IN PUBLIC OPEN SPACE
PROPOSED SITE ENTRANCE

APPLICATION SITE within Red line	**9.2 ha**
PROPOSED DEVELOPMENT SITE: (residentially zoned part of site)	**6.92 ha**
PROPOSED RESIDENTIAL UNITS:	**249**
DENSITY:	**(35.9 / ha)**
PROPOSED PUBLIC OPEN SPACE: (residentially zoned part of site)	**1.17ha (16.90%)**
PROPOSED PUBLIC OPEN SPACE: (parkland area within red line)	**1.68ha**
TOTAL PUBLIC OPEN SPACE: (within red line)	**2.85 ha (30.98%)**

NOTES

1. Copyright Reserved.
2. Work to figured dimensions only. Do not scale drawing.
3. The contractor is responsible for checking all levels and dimension on site and shall refer all discrepancies to the Architect.
4. Where appropriate, for details of R.C. structure, or mechanical and electrical details, see Engineers drawings.
5. Proprietary items shall be fixed in strict accordance with manufacturers instructions.
6. Sizes of proprietary items shall be checked with manufacturer.
7. The contractor shall be responsible for the co-ordination of structure, finishes and services.

NOTES

PROGRESS	
INFORMATION ONLY	
PLANNING APPLICATION	
TENDER	
FIRE CERT	
CONSTRUCTION	
DAC	
COMPLIANCE	

REV.	DATE	DR	CKD.	COMMENT

REV.	DATE	DR	CKD.	COMMENT

REV.	DATE	DR	CKD.	COMMENT

REV.	DATE	DR	CKD.	COMMENT

Project : LARGE-SCALE RESIDENTIAL DEVELOPMENT - BOYNE RIDGE
Client: Earlsfort Developments Ltd
NDBA JOB NO. 23/004
DrawingTitle: Proposed Site Plan -House Types
Drawing No.: PL-SP-04
REVISION NO. 0
Date : 03/09/2025 | Scale : 1:500@A0 | Drawn by: BW | Checked by: JO'L | Format: A0

ndba architects
Niall D. Brennan Associates
Niall D. Brennan Associates, Grand Canal Wharf, Unit 5, S Dock Rd, Dublin 4
TEL (353 1) 478 90 09 FAX (353 1) 478 90 10 E-MAIL info@ndba.ie WEB www.ndba.ie

Appendix 2

Appendix A (Classification of climate-related hazards) from Annex II of the Commission Delegated Regulation (EU) 2021/2139.

APPENDIX A: CLASSIFICATION OF CLIMATE-RELATED HAZARDS[669]

	Temperature-related	**Wind-related**	**Water-related**	**Solid mass-related**
Chronic	Changing temperature (air, freshwater, marine water)	Changing wind patterns	Changing precipitation patterns and types (rain, hail, snow/ice)	Coastal erosion
	Heat stress		Precipitation or hydrological variability	Soil degradation
	Temperature variability		Ocean acidification	Soil erosion
	Permafrost thawing		Saline intrusion	Solifluction
			Sea level rise	
			Water stress	
Acute	Heat wave	Cyclone, hurricane, typhoon	Drought	Avalanche
	Cold wave/frost	Storm (including blizzards, dust and sandstorms)	Heavy precipitation (rain, hail, snow/ice)	Landslide
	Wildfire	Tornado	Flood (coastal, fluvial, pluvial, ground water)	Subsidence
			Glacial lake outburst	

669 The list of climate-related hazards in this table is non-exhaustive, and constitutes only an indicative list of most widespread hazards that are to be taken into account as a minimum in the climate risk and vulnerability assessment.