Co-financed by the Connecting Europe Facility of the European Union

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

TEN-T Priority Route Improvement Project, Donegal

Chapter 13: Climate

TT_MGT0337-RPS-P3-ZZ-RP-E-EN0001

EIAR

March 2026

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List of Abbreviations

The following is a list of abbreviations used within this chapter of the Environmental Impact Assessment Report (EIAR).

List of Abbreviations	
A5 WTC	A5 Western Transport Corridor (Northern Ireland)
ACP	An Coimisiún Pleanála
AEP	Annual Exceedance Probability
AFIR	Alternative Fuels Infrastructure Regulation
BaU	Business as Usual
BEV	Battery Electric Vehicle
BSI	British Standards Institution
CAF	Common Appraisal Framework
CAP	Climate Action Plan
CAP19	Climate Action Plan 2019
CAP21	Climate Action Plan 2021
CAP23	Climate Action Plan 2023
CAP24	Climate Action Plan 2024
CAP25	Climate Action Plan 2025
CCAC	Climate Change Advisory Council
CCR	Climate Change Risk
CESSM	Civil Engineering Standard Method of Measurement
CFRAM	Catchment-based Flood Risk Assessment and Management
CMIP	Coupled Model Intercomparison Project
CMS	Central Management System
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
CORINE	Coordination of Information on the Environment
DAERA	Department of Agriculture, Environment and Rural Affairs (Northern Ireland)
DCEE	Department of Climate, Energy, and the Environment
DECC	Department of the Environment, Climate and Communications
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
ESM	Earth System Model
ESR	Effort Sharing Regulation
ETS	Emissions Trading Scheme
EU	European Union
GGBS	Ground Granulated Blast Furnace Slag
GHG	Greenhouse Gas
HDPE	High-density Polyethylene
HEV	Hybrid Electric Vehicle
HGV	Heavy Goods Vehicles
ICCA	Ireland's Climate Change Assessment
ICE	Internal Combustion Engine
IEMA	Institute of Environmental Management and Assessment (now ISEP)
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
ISEP	Institute of Sustainability & Environmental Professionals (formerly IEMA)

List of Abbreviations

LGV	Light Goods Vehicle
LULUCF	Land Use, Land Use Change and Forestry
MERL	Monitoring, Evaluation, Research and Learning
MHDV	Medium and Heavy-Duty Vehicles
NAF	National Adaptation Framework
NCCRA	National Climate Change Risk Assessment
NECP	National Energy and Climate Plan
NMU	Non-Motorised User
NTA	National Transport Authority
OPW	Office of Public Works
PAS	Publicly Available Specification
PCMP	Project Carbon Management Plan
PHEV	Plug-in Hybrid Electric Vehicle
PSO	Public Service Obligation
RCP	Representative Concentration Pathway
REM	Road Emissions Model
SEAI	Sustainable Energy Authority of Ireland
SEC	Sectoral Emission Ceilings
TAF	Transport Appraisal Framework
TEN-T	Trans-European Network - Transport
TII	Transport Infrastructure Ireland
T-SAP II	Transport Sectoral Adaptation Plan
UNFCCC	UN Framework Convention on Climate Change
VRS	Vehicle Restraint Systems
WAM	With Additional Measures
WEM	With Existing Measures
WMO	World Meteorological Organisation
ZoI	Zone of Influence

13 CLIMATE

13.1 Introduction

This chapter of the EIAR assesses the potential climate impacts that the proposed TEN-T Priority Route Improvement Project, Donegal (hereafter the Proposed Development or the Project) may have on the receiving environment, during the construction, operational and decommissioning phases. This chapter should be read in conjunction with the following chapters, which present related impacts arising from the Proposed Development:

- Chapter 4: Project Description
- Chapter 6: Traffic & Transportation
- Chapter 10: Land, Soils & Hydrogeology
- Chapter 11: Water (Including Hydrology and Flood Risk)
- Chapter 12: Air Quality
- Chapter 13: Noise and Vibration
- Chapter 16: Material Assets

This chapter also considers the requirements of Regulation (EU) 2024/1679 of the European Parliament and of the Council of 13 June 2024 (i.e. the TEN-T Regulation) on Union guidelines for the development of the trans-European transport network.

In addition to considering and assessing the likely significant effects of the Proposed Development on climate for Environmental Impact Assessment (EIA) purposes, this chapter also addresses in Section 13.3.1 below, the most recent approved Climate Action Plan, namely the Climate Action Plan 2025 (which, as discussed further below, is to be read in conjunction with the Climate Action Plan 2024). It considers how the Proposed Development aligns with the Climate Action Plan 2025 and the Climate Action Plan 2024, and also with the other plans, strategies and objectives specified in section 15 of the Climate Action and Low Carbon Development Act 2015 (as amended) (the '2015 Act').

This report therefore also provides the information necessary for An Coimisiún Pleanála (ACP) to be satisfied that, by granting approval for the Proposed Development, it would be discharging its obligations under section 15 of the 2015 Act and performing its functions, insofar as practicable, in a manner consistent with the Climate Action Plan 2025, the Climate Action Plan 2024, the most recent approved long term climate strategy, and the other plans and objectives specified in section 15.

13.2 Competent Experts

Paul Chadwick is the Director of Sustainability in RPS with over 25 years' experience. Paul specialises in the fields of air quality and climate and risk assessment. He has considerable experience, both academic and professional, in ambient air quality and a wide range of atmospheric pollutants. As a result of two years research in atmospheric chemistry, he has an in-depth knowledge of the chemical and physical transformations associated with local and regional air pollution and climate change. Paul also specialises in risk assessments and the identification and quantification of risks on projects.

Dr Clare Noone is a Senior Scientist in RPS, with over 17 years' experience working in the fields of air quality and climate change and related policy. Clare holds a PhD in Atmospheric Physics from the Centre for Climate and Air Pollution Studies, School of Physics, University of Galway, and a BSc in Physics from the University of Galway. Clare is a lead author of Ireland's first 5-Year Assessment Report (ICCA) Climate Research and is currently a series editor for one of Palgrave's long-established book series Energy, Climate and the Environment. Clare was an expert reviewer of the IPCC AR6 Synthesis Report and AR7 Special report on Climate Change.

13.3 Methodology

Specifically in relation to the climate impact assessment, the methodology adopted is based on the following guidance:

- TII Climate Guidance for National Roads, Light Rail, and Rural Cycleways (Offline and Greenways) – Overarching Technical Document PE-ENV-01104 (December 2022) (TII, 2022a).
- TII Climate Assessment of Proposed National Road Projects – Standard PE-ENV-01105 (December 2022) (TII, 2022b).
- TII Carbon Tool for Road, Greenway and Light Rail Projects: User Guidance Document GE-ENV-01106 (September 2025a) (TII, 2025a).
- TII Road Emissions Model (REM): Model Development Report GE-ENV-01107 (May 2025) (TII, 2025b).
- The Institute of Environmental Management and Assessment (IEMA)[1] Assessing Greenhouse Gas Emissions and Evaluating their significance (2nd Edition) (IEMA, 2022).

The TII Standard Document PE-ENV-01105 (TII, 2022b) requires that the climate impact assessment must report the Project's impact on greenhouse gas emissions and the Project's risk and resilience to climate change through a climate assessment comprising the following separate assessments:

- Greenhouse Gas Emissions (GHG) Assessment: The assessment of GHG emissions identifies the impact of GHGs arising from a project during its lifetime and addresses how the project will affect the ability of the Government to meet its carbon reduction targets.
- Climate Change Risk (CCR) Assessment: The CCR assessment identifies the vulnerability of a project to climate change and considers adaptation measures to increase the resilience of the project.

The GHG assessment has been undertaken for the construction and operational phases by considering the GHG emissions associated with materials (embodied carbon), import and transport of construction materials to site, on site plant and equipment and management of materials. This assessment has been undertaken using the TII Carbon Tool for Road and Light Rail Projects and Publicly Available Specification (PAS) 2080:2023 on Carbon Management in Infrastructure (BSI, 2023). The Carbon Tool identifies and estimates greenhouse gas emissions that may be generated by construction and maintenance of large road and rail infrastructure projects.

Emissions from road transport when the road is operational have been calculated using the TII Road Emissions Model (REM). The REM calculates road transport emissions integrating the traffic volumes/ speeds for light and heavy vehicles on the Proposed Development, as presented in Chapter 6: Traffic & Transportation, with Irish fleet composition information.

The emissions reductions associated with the planned active travel measures which will reduce road traffic emissions have been calculated in a similar manner based on estimated journey times and model of modal shift (refer Section 13.5.2.2).

The combined outputs of the TII Carbon Tool (Version 0.9.0) and the TII REM (Version 1.0.2) have been used to inform the GHG assessment set out in this chapter. The purpose of this assessment is to quantify, and then to identify measures to avoid or reduce, in so far as practicable, any adverse impacts of GHG emissions from the Proposed Development on the climate and to inform the assessment of the likely significant effects of the Proposed Development on climate. This will include an assessment of the extent to which the estimated GHG emissions generated over the life of the Proposed Development aligns with Ireland's GHG trajectory to net zero by 2050.

[1] The Institute of Environmental Management and Assessment (IEMA) is now known as the Institute of Sustainability & Environmental Professionals (ISEP).

Article 5(1)(g) of the TEN-T Regulation mandates that the trans-European transport network shall be planned, developed and operated in a resource-efficient way, and in accordance with the applicable EU and national environmental requirements, through: '[*…]the development of green, sustainable and climate resilient infrastructure […], and the promotion of new technologies that aim to decarbonise the construction of transport infrastructure, including through the use of resource-efficient and climate-proof materials.*'

The Climate Change Risk (CCR) assessment identifies the impact of a changing climate on the Proposed Development. The assessment considers the Proposed Development's vulnerability to climate change and identifies adaptation measures to accommodate climate change impacts, based on the climate change hazards/risks that are relevant to the project type and location.

The CCR methodology is guided by the principles set out in the overarching best practice guidance documents which include:

- EU Technical Guidance on the Climate Proofing of Infrastructure in the period 2021-2027 (EU 2021).
- Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (IEMA, 2020).

The purpose of the CCR assessment is to reduce or manage the adverse impacts of climate change on the Proposed Development and develop the Proposed Development so that it will be resilient to climate change.

Articles 46(2) and 49a of the TEN-T Regulations requires that new infrastructure projects on the trans-European transport network shall be subject to climate proofing taking into account the latest available best practice. Preventive maintenance needs should be taken into account during project planning, including their estimated costs over the lifetime of the infrastructure. Article 46(1)c of Regulation (EU) 2024/1679: to increase the resilience of projects on the trans-European transport network during their planning and implementation, consideration should be given to, among others '*structural infrastructure quality during its whole lifecycle, with particular attention to the environmental conditions and the future projected climate conditions*'.

The following sections first detail the relevant guidelines, policy and legislation which underpin the climate assessment as well as outlining the relevant criteria for assessing impacts to climate. Secondly, the significance criteria for the GHG and CCR assessment are set out.

13.3.1 Legislative Context

The **Paris Agreement** was adopted in December 2015 under the **United Nations Framework Convention on Climate Change (UNFCCC)** and entered into force on 4 November 2016. The Parties to the Paris Agreement have agreed to hold the increase in the global average temperature well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

The **European Green Deal** is the EU's long-term growth strategy which aims to make Europe climate-neutral by 2050 and put renewable energy at the heart of the energy system. As part of the Green Deal, with the European Climate Law, the EU has set itself a binding target of achieving climate neutrality by 2050. As an intermediate step towards climate neutrality, the EU has raised its 2030 climate ambition, committing to cutting emissions by at least 55% by 2030. Further, the EU has revised its climate, energy, and transport-related legislation under the 'Fit for 55' package in order to align with the 2030 and 2050 ambitions.

The **Fit for 55 Package** comprises a set of revisions and updates to EU legislation and includes new initiatives with the overall aim of ensuring that EU policies are in line with the Council and the European Parliament's climate goals of reducing net GHG emissions by at least 55% by 2030.

In May 2018, the European Council adopted the EU **Effort Sharing Regulation** (ESR, Regulation (EU) 2018/842), which sets out 2030 targets for member states to reduce greenhouse gas (GHG) emissions. The starting point is an average of 2016 - 2018 emissions with binding emission reduction targets of 30% compared to 2005 levels. The ESR establishes binding annual greenhouse gas emission targets for Member States for the periods 2013–2020 and 2021–2030. These targets concern emissions from most sectors not included in the EU Emissions Trading System (ETS), such as transport, buildings, agriculture and waste.

The ESR forms part of a set of policies and measures on climate change and energy that will help move Europe towards a low-carbon economy and increase its energy security. Under the current Regulation, the national targets will collectively deliver a reduction of around 10% in total EU emissions from the sectors covered by 2020 and of 30% by 2030, compared with 2005 levels. The ESR, as amended in March 2023 by Regulation (EU) 2023/857, enshrines a GHG emissions reduction target for Ireland of 42% by 2030, relative to 2005 levels. This Amending Regulation has applied since May 2023 and contributes to the long-term target of climate neutrality in the EU at the latest by 2050, with the aim of achieving negative emissions thereafter and contributes to achieving the objectives of the Paris Agreement.

The **European Climate Law**, Regulation (EU) 2021/1119, sets a binding EU target of a net domestic reduction in GHG emissions by at least 55% (compared with 1990 levels) by 2030 and undertakes to set a climate target for 2040 within six months of the first global stocktaking under the Paris Agreement.

A key target for Ireland is the 42% reduction in GHG emissions which is required under the ESR. Table 13-1 compares Ireland's ESR share with the broader EU-wide GHG emissions reduction targets. The latest projections from the EPA (EPA 2025a) indicate that currently implemented measures (With Existing Measures, WEM) will achieve a reduction of 10% on 2005 levels by 2030, significantly short of the 42% reduction target. If measures in the higher ambition (With Additional Measures, WAM) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 22% by 2030, also short of the 42% reduction target.

Table 13-1: Key Targets for GHG Emissions Reductions by 2030

By 2030	Previous Target (pre-Fit for 55 Package)	Current Target	Baseline Year
EU economy-wide target	40%	At least 55%	1990
EU ETS contribution	43%	62%	2005
EU ESR contribution	30%	40%	2005
Ireland's legally binding ESR target	30%	42%	2005

The **Alternative Fuels Infrastructure Regulation** (AFIR, (EU) 2023/1804), establishes mandatory national targets out to 2030 leading to the deployment of sufficient alternative fuels infrastructure in the EU for road vehicles, trains, vessels and stationary aircraft. These measures will directly support the transition of cars, vans and trucks to electric vehicles, and ensure that Irish ports and airports can provide alternatives to using on-board fossil-fuelled engines for vessels at berth or stationary aircraft. The implementation of the AFIR will provide fast recharging stations for cars and vans, as well as for heavy-duty vehicles, along the EU's main transport corridors (i.e. the TEN-T network which includes the Proposed Development).

In relation to national climate legislation, the **Climate Action and Low Carbon Development Act 2015** (as amended) ('the 2015 Act') is the legislation most relevant for this chapter. Section 15 of the 2015 Act defines the duties of certain bodies under the 2015 Act, and provides that:

> *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.*

Each of the matters listed in section 15(1) is described in Section 13.3.2, with specific reference to the transport and other sectors which are relevant to the Proposed Development. As mentioned above, in addition to considering and assessing the likely significant effects of the Proposed Development on climate for EIA purposes, this chapter also considers how the Proposed Development aligns with the matters specified in section 15(1) of the 2015 Act (in section 13.8.6 below) and provides the information necessary

for ACP to be satisfied that, by granting approval for the Proposed Development, it would be performing its functions insofar as practicable in a manner consistent with each of these matters.

The 2015 Act provides for plans to be established on a statutory footing in relation to climate change to aid the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of 2050. In line with this objective, a national mitigation plan and national adaptation framework were required to be produced by the Minister to the Government for approval. Under the 2015 Act, Ireland has:

- Set economy-wide carbon budgets for the periods 2021-2025 and 2026-2030 as shown in Table 13-2.
- Established pathways to deliver the sectoral emission ceilings (SECs) as shown in Table 13-3.

The 2015 Act also sets out the national climate objective of achieving, by no later than 2050, the '*transition to a climate resilient, biodiversity-rich, environmentally sustainable, and climate-neutral economy'* on a statutory footing and requires the preparation of (i) a Climate Action Plan which is to be updated annually, and (ii), not less frequently than once every five years, a national long term climate action strategy.

Table 13-2: 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2035 (Department of the Taoiseach, 2022)

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

Table 13-3: Sectoral Emission Ceilings 2030 (Government of Ireland, 2022)

Sector	Baseline (Mt CO_2e) 2018	Sectoral Emissions Ceilings (Mt CO_2e) 2021-2025	2026-2030	2030 Emissions (Mt CO_2e)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
Transport	12	54	37	6	50
Electricity	10	40	20	3	75
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Agriculture	23	106	96	17.25	25
Land Use, Land-use Change and Forestry (LULUCF)[1]	5	TBC	TBC	TBC	TBC
Industry	7	30	24	4	35
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Unallocated Savings	-	7	5	-5.25	-
Total	68	TBC	TBC	-	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

Note: 1. In the Sectoral Emissions Ceilings Report published by the Government in 2022, the Sectoral Emissions Ceiling for the Land-Use, Land-Use Change and Forestry (LULUCF) sector was not set out, and the report indicated that the finalisation of that sectoral emissions ceiling had been deferred.

In relation to carbon budgets, section 6A(1) of the 2015 Act provides that *'A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Advisory Council, finalised by the Minister and approved by the Government for the period of five years commencing on 1 January 2021 and ending on 31 December 2025 and for each subsequent period of five years (in this Act referred to as a 'budget period')'.*

The carbon budget is to be produced for three sequential budget periods as shown in Table 13-2 for the budgets approved in April 2022. Under section 6D of the 2015 Act, the carbon budget can be revised where new obligations are imposed under the law of the EU or certain international agreements, or where there are significant developments in scientific knowledge in relation to climate change.

In April 2025, the Department of Climate, Energy and the Environment (DCEE) began consultation on aspects of the Climate Change Advisory Council's (CCAC) latest recommendations for the Carbon Budget Period 3 (2031 – 2035, to replace the provisional budget set in 2022 shown in Table 13-2) and Period 4 (2036 – 2040).

The CCAC has published a proposal for the second programme of carbon budgets which is outlined in its Carbon Budget Proposal Report (CACC, 2024). In this report the CCAC recommend that for Carbon Budget 3 (2031–2035) a budget of 160 Mt CO_2e should apply (which is higher than the 152 Mt CO_2e in Table 13-2). In addition, the CCAC recommend a provisional Carbon Budget 4 (2036–2040) of 120 Mt CO_2e.

At the time of drafting this chapter, carbon budgets have not been approved by government for Carbon Budget Period 3 (2031 – 2035) or Period 4 (2036 – 2040). However, for the purposes of this assessment, the budgets proposed by the CCAC have been used as default to assess impact where relevant.

In relation to sectoral emissions ceiling, section 6C of the 2015 Act provides that the Minister for Climate, Energy, and the Environment shall prepare, within the limits of the carbon budget, the maximum amount of greenhouse gas emissions that are permitted in different sectors of the economy during a budget period (in the 2015 Act referred to as a 'sectoral emissions ceiling') and different ceilings may apply to different sectors. The Minister is required, as soon as may be after a carbon budget takes effect, to finalise and submit each sectoral emissions ceiling to the Government for approval. The sectorial emission ceilings for 2030 were agreed by the Government on 18 July 2022 and are shown in Table 13-3.

13.3.2 Policy

The **UN Framework Convention on Climate Change** (UNFCCC, 1992) was adopted with the objective of preventing '*dangerous anthropogenic interference with the climate system'* and the Paris Agreement (2015) established the long-term goals of '*holding the increase in global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels*' and of achieving a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century.

The **Intergovernmental Panel on Climate Change** (IPCC) 6th Assessment Report which was completed in 2023 provides a clear message on the scale and pace of climate action required to avoid the worst impacts of climate change. '*Deep, rapid and sustained mitigation and accelerated implementation of adaptation actions in this decade would reduce projected losses and damages for humans and ecosystems, and deliver many co-benefits, especially for air quality and health'*.

The European Union **Technical Guidance on Climate Proofing of Infrastructure in the period 2021-2027** (2021) provides guidance on the climate proofing of investments in network infrastructure and physical assets covering the programming period 2021-2027. Climate proofing is a process that integrates climate change mitigation and adaptation measures into the development of infrastructure projects. This guidance states that infrastructure investments should be aligned with the goals of the Paris Agreement and a credible pathway of GHG emission reduction consistent with the EU 2030 climate targets and climate neutrality by 2050 and climate resilient development.

The **National Policy Position on Climate Action and Low Carbon Development** (2014) recognises the threat of climate change for humanity; anticipates and supports mobilisation of a comprehensive international response to climate change, and global transition to a low-carbon future; recognises the challenges and opportunities of the broad transition agenda for society; and aims, as a fundamental national objective, to

achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050.

Ireland declared a **climate and biodiversity emergency** in May 2019 and in November 2019 and there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe.

The first **Climate Action Plan 2019** (CAP19) was formulated on a non-statutory basis. It set out many measures, key objectives, and targets to address the climate change agenda. There have since been a number of updates since the 2019 plan – the first was **Climate Action Plan 2021** (CAP21) which set out a wide range of policies aimed at decarbonisation in relation to the particular sectors of the economy.

Climate Action Plan 2023 (CAP23) was launched in December 2022 as the first national climate plan to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021 and following the introduction of carbon budgets and sectoral emissions ceilings in 2022. CAP23 implements the carbon budgets and sectoral emissions ceilings and sets a roadmap for taking decisive action to halve national emissions by 2030 and reach net zero no later than 2050. CAP23 also introduces the Avoid-Shift-Improve approach to transport decarbonisation as a hierarchical framework that prioritises actions to achieve the systemic and behavioural change needed. This approach has been adopted where possible into this project through the inclusion of active travel and modal shift infrastructure (shift) and increasing the efficiency of the road network (improve).

The actions and targets of CAP23 have been continued or supplemented with further actions in **Climate Action Plan 2024** (CAP24) and **Climate Action Plan 2025** (CAP25). CAP25 states on page 20 that *'In contrast to previous iterations of the Climate Action Plan, CAP25 is to be read in conjunction with CAP24 and takes account of key developments in the policy and evidence base in the previous year while setting out a range of new actions in response to the latest data. This is intended to facilitate a focus on the delivery of outstanding actions from CAP24 and high-impact legacy actions from CAP23.'* Therefore, CAP25 should be read in conjunction with CAP24 and CAP23. The relevant actions and targets from these Climate Action Plans are presented in the following paragraphs.

Chapter 12 of CAP25 relates to industry and while not directly applicable to road transport, there are targets of relevance in relation to the construction phase, including the following national targets for reducing embodied carbon in construction materials which are also referenced in CAP24/CAP23:

> *National Target: Decrease embodied carbon in construction materials.*
>
> *2025: Decrease by 10% embodied carbon for materials produced and used in Ireland.*
>
> *2030: Decrease by at least 30% embodied carbon for materials produced and used in Ireland.*

While these indicators are placed on the industrial sector, local authorities such as Donegal County Council, can support delivery through ensuring procurement of these materials on all construction project as per the Public Sector Climate Action Mandate in Appendix 1 of CAP25. This mandate includes a commitment to play a leadership role in driving far-reaching climate action across its buildings, transport, waste, and energy usage as well as wider society. A requirement for the public sector of relevance to this project is listed as follows:

> *3.5.1. Specify low carbon construction methods and low carbon cement material as far as practicable as per guidance issued by Department of Enterprise, Trade and Employment for directly procured or supported construction projects from 2024.*

The Proposed Development herein, if granted, will be constructed as a directly procured or supported construction project by Donegal County Council which gives this commitment to using low carbon construction methods and low carbon cement material as far as practicable. The above policy elements are specifically relevant to the construction phase of the Project and are directly supported by the Project for the reasons discussed in section 13.6.1 below.

Chapter 14 of CAP25 relates to transport and notes that the actions for 2025 reflect the continuation of, and are in line with, the agreed policies set out in CAP23 and CAP24. CAP25 notes that fleet electrification and biofuels are expected to provide the greatest share of emissions abatement in the medium term. This

Project has been designed to, in so far as practicable, contribute to the actions and key performance indicators listed for sustainable transport as listed in these Climate Action Plans through the provision of active travel infrastructure as well as measures to support for modal shift and fleet electrification.

The key transport targets listed in CAP25 include:

20% reduction in total vehicle kilometres travelled relative to business-as-usual.

50% reduction in fuel usage, and significant increases to sustainable transport trips and modal share.

These targets are supplemented with additional key performance indicators for the road transport fleet by 2030 as listed in CAP24:

- *Private Car Fleet*
  - *Battery EV share of total passenger car fleet (30%);*
  - *EV share of new registrations (100%); and*
  - *845,000 Private EVs.*
- *Commercial Fleet*
  - *20% EV share of total LGV fleet;*
  - *95,000 commercial EVs;*
  - *30% ZE share of new heavy duty vehicle registrations; and*
  - *3,500 HGVs.*
- *PT Services*
  - *1,500 EV buses in PSO bus fleet; and*
  - *Expansion of electrified rail services.*
- *Raise the blend proportion of biofuels to B20 in diesel by 2030 and E10 in petrol.*

In terms of actions for sustainable transport in CAP25, the key active travel action is listed as:

Action TR/25/7: Advance roll-out of walking/cycling infrastructure in line with National Cycle Network and CycleConnects plans.

CAP24 provides for greater detail in sustainable transport and includes key performance indicators by 2030 as follows:

- *50% increase in daily active travel journeys.*
- *130% increase in daily public transport journeys.*
- *25% reduction in daily car journeys.*
- *Shift in Daily Mode Share - 2018: 72% (car), 8% (PT), 20% (AT) to 2030: 53% (car), 19% (PT), 28% (AT).*
- *PT Services*
  - *1,500 EV buses in PSO bus fleet; and*
  - *Expansion of electrified rail services.*

These CAP25/CAP24 actions and key performance indicators are also supplemented with the following CAP23 actions:

TR/23/29 Advance roll-out of 1,000 km walking/cycling infrastructure.

TR/23/30 Advance roll-out of National Cycle and Greenway Networks.

CAP25 also includes specific provision for the TEN-T project and notes the following:

The vision set out in these documents, and in the overarching National EV Charging Infrastructure Strategy, envisages a 300% increase in charging capacity by 2025. It will see fast recharging stations established for cars and vans every 60 km along the main transport corridors, as well as dedicated HGV charging facilities on the TEN-T network and at key urban nodes. It will bolster public confidence in transitioning to EVs and is in line with the recent adoption of the EU Alternative Fuels Infrastructure Regulation (AFIR).

Regulation (EU) 2023/1804 (AFIR) on the deployment of alternative fuels infrastructure sets out mandatory minimum levels of alternative fuels infrastructure to be deployed by EU Member States on the TEN-T network, across land transport, maritime and aviation sectors. The Regulation will require a significant programme of infrastructural deployment to support EV charging and hydrogen refuelling station deployment for LDVs and HDVs in our urban nodes and on the TEN-T core network, as well as the provision of onshore electricity supply for large vessels at berth; and electricity supply for stationary aircraft in our TEN-T airports.

As noted, this Project has been designed to align with CAP25 including the provision of EV charging infrastructure as part of the Project.

It is notable that the Business As Usual (BaU) modelling that was carried out by the State to inform the preparation of CAP23, CAP24 and CAP25 included several major infrastructure projects, including the Proposed Development. The modelling exercise carried out to inform the preparation of the CAPs showed that the targets (emission reduction and vehicle kilometre reduction) set out in CAP23, CAP24, and CAP25 (transport sector targets have not changed in these three Climate Action Plans) at a national level could be achieved with the inclusion of the Proposed Development. Therefore, the delivery of the Proposed Development is consistent with CAP and with the achievement of the targets set out in CAP25 and CAP24 at a national level.

It is important to acknowledge that the CAP targets are on a national basis to be delivered through changing behaviours and new infrastructure across the State. The targets do not apply to individual projects as no one project can deliver on each of the range of modal shift, active travel and electrification of the fleet initiatives. In this regard, projects should aim to contribute to as many of the targets as practical and where a project cannot contribute to a target, it should not weaken the State's ability to achieve that target.

Ireland's first **National Energy and Climate Plan 2021-2030** (NECP) was published in 2019 in accordance with the ESR. This NECP incorporated all planned policies and measures that were identified up to the end of 2019 and which collectively deliver a 30% reduction by 2030 in non-ETS greenhouse gas emissions (from 2005 levels). In terms of transport, the NECP reported to the European Commission referenced the measures and targets that were presented in CAP19. The revised **National Energy and Climate Plan 2021-2030** was submitted to the European Commission in July 2024 and outlines the State's energy and climate policies in detail for the period from 2021 to 2030 and looks onwards to 2050. In line with the 2019 NECP, the revised NECP cites the measures and targets included in CAP24 as these relate to key transport policies and measures including:

Finalise and implement a national transport demand management strategy, in line with CAP ambition of reducing total vehicle kilometres (relative to projected 2030 business as usual) by 20%, and draft 'Moving Together' strategy.

Facilitate modal shift from private car usage through continued investment in major public transport infrastructure, including BusConnects in each of our five cities, DART+ rail programme, Cork Commuter Rail, and for delivery beyond 2030, MetroLink.

Facilitate modal shift from private car usage through continued investment in public transport services, such as NTA's Connecting Ireland Rural Mobility Programme, which seeks to ensure that 70% of rural communities have enhanced access to public transport services that provide at least three return trips to the closest large town.

Encourage greater levels of walking, wheeling, and cycling over private car usage through accelerated delivery of e.g. Safe Routes to School programme, Sustainable Mobility Policy Pathfinder schemes, and National Cycle Network and Cycle Connects strategies.

Support the uptake of c. 845,000 private electric vehicles (c.30% of anticipated future fleet share) through implementation of National EV Charging Infrastructure strategy, and in line with EU AFIR Regulation (EU) 2023/1084 requirements.

Support the uptake of c. 95,000 commercial electric vehicles (c. 20% of anticipated future fleet share) and c 3,500 low emission trucks and 1,500 EV buses in the public transport fleet.

In line with the Global Memorandum of Understanding on Zero-Emission Medium and Heavy-Duty Vehicles, target 30% of new MHDV sales to be zero-emission by 2030.

The 2015 Act requires local authorities to prepare Local Authority Climate Action Plans (LA CAPs) and the **Donegal County Council Climate Action Plan 2024 – 2029** was adopted in 2024 and includes the following actions specific to this development:

TR2.4 Design a network of segregated, attractive and safe Active Travel paths as part of the TEN-T Priority Route Improvement Project (Donegal) to encourage a greater uptake of walking and cycling.

NE4.5 Integrate Nature based design solutions in the form of SuDs within the TEN-T Priority Route Improvement Project Donegal.

The **Long-term Strategy on Greenhouse Gas Emissions Reductions** was published by DCEE in 2024 as part of the actions proposed under CAP23 and as a requirement under the 2015 Act. This strategy sets out indicative pathways, beyond 2030, towards achieving carbon neutrality for Ireland by 2050. It covers the following with a perspective of at least 30 years:

- Total GHG emission reductions and enhancements of removals by sinks.
- Emission reductions and enhancements of removals in individual sectors, including electricity, industry, transport, the heating and cooling and buildings sector (residential and tertiary), agriculture, waste and land use, land-use change and forestry (LULUCF).
- Expected progress on transition to a low GHG emission economy, including GHG intensity, CO_2e intensity of gross domestic product, related estimates of long-term investment, and strategies for related research, development and innovation.
- The expected socio-economic effect of the decarbonisation measures, including aspects related to macro-economic and social development, health risks and benefits and environmental protection.
- Links to other national long-term objectives, planning and other policies and measures, and investment.

First published in 2018, the **National Adaptation Framework (NAF)** contained Ireland's strategy for the application of climate adaptation measures to reduce the vulnerability of the State to the negative effects of climate change, and to seek opportunities for any positive effects that may occur. In 2024 an updated NAF was published based on a review of the 2018 NAF and sets out to expand on the guiding principles that promote smarter, faster and transformative adaptation actions. The actions of the NAF foster the development and use of appropriate adaptation/ resilience indicators to create a fit-for-purpose MERL (Monitoring, Evaluation, Research and Learning) system and encourage data sharing for adaptation monitoring.

In 2025, the **Transport Sectoral Adaptation Plan 2025-2030 (T-SAP II)** was published by the Department of Transport. This plan identifies the key vulnerabilities in the transport network and looks to promote greater resilience to safeguard its continued operation. The overarching goal of T-SAP II is building long-term resilience across all transport modes in Ireland by adapting to current and future climate conditions to minimise negative impacts on transport services and infrastructure and reduce their consequences. This will enable the transport sector to continue fulfilling its economic, social and environmental objectives.

This goal is delivered through a framework of three objectives and actions with those relevant to the Proposed Development listed below. This policy framework has informed the CCR for this Project presented in section 13.5.4.

T-SAP II Objectives

Objective 3: Ensure that resilience to weather extremes and longer-term adaptation needs are taken into account in investment programmes for asset management of existing, as well as planned future transport infrastructure.

Actions for Land Transport – Roads

R1: Propose new funding schemes for climate-proofing roads in Ireland.

R2: Improve data collection and sharing on road infrastructure and climate hazards.

R3: Continue to implement the existing climate adaptation strategy for roads.

R4: Streamline the request for financial resources to TII and Local Authorities in the aftermath of extreme weather events.

R5: In addition to existing coordination, develop sectoral response guidelines to coordinate during extreme weather events.

R7: Enhance collaboration between the National Transport Authority, local authorities, bus operators and Transport Infrastructure Ireland on climate-proofing urban roads.

Actions for Land Transport – Active Travel

AT1: Clarify roles and responsibilities for climate adaptation of active travel network.

AT2: Assess the criticality of active travel networks in relation to climate risk.

The **National Climate Change Risk Assessment (NCCRA)** was published by the EPA in 2025 (EPA, 2025c) to provide a comprehensive national overview of the potential risks and opportunities posed by climate change for Ireland. The NCCRA integrates scientific and technical knowledge with input from expert stakeholders, to identify, assess, and prioritise climate change risks to build a comprehensive understanding of risks. Some of the key risks identified in the NCCRA with relevance to the Proposed Development include:

- Coastal areas are at risk from sea level rise, coastal erosion, and coastal flooding, causing damage and requiring relocation of assets.
- Extreme precipitation and flooding pose risks to transport infrastructure, causing delays, diversions, and closures.
- Floodwaters can erode foundations, wash away road surfaces, and cause bridge collapses.
- Extreme heat impacts roads, railways, and airports, causing deformation and requiring frequent maintenance.

These key risks have been considered in the CCR assessment of the Proposed Development in Section 13.5.3 for the construction phase and Section 13.5.4 for the operation phase.

The **TII Climate Adaptation Strategy 2022** sets out how TII will adapt the light rail and national road networks in the face of a changing climate. This Climate Adaptation Strategy is TII's response to CAP21 Action 297 to improve climate resilience and adapt to climate change on the light rail and national road network. The Strategy outlines seven strategic objectives for climate adaptation:

- Observe fewer network disruptions during climate related events.
- Rapidly recover from any climate-related events.
- Have a robust, flexible, and equitable organisation that responds effectively during climate events.

- Enhance the climate resilience of lifeline roads in order to maintain community accessibility.
- Engage with the wider adaptation efforts across Ireland through partnerships and wider research.
- Embed climate adaptation within TII's operations, policies, and procedures in order to ensure a safe and resilient network.
- Adopt a low-carbon approach in TII's designs, standards, and processes when considering climate adaptation, while also considering wider social and environmental benefits.

The **TII 2025 Climate Action Roadmap** sets out TII's plans to reduce emissions and meet decarbonisation and energy efficiency targets. The Roadmap demonstrates how TII will achieve emissions reductions to 2030. As a public sector organisation TII has two targets under CAP24 focused on energy:

- Target 1 Decarbonisation: To reduce GHG emissions associated with energy from TII's operations by 73% to 7,606 tonnes of Carbon Dioxide (tCO_2e) by 2030, compared to a 2016-2018 (average) baseline of 28,533 tCO_2e; and
- Target 2 Energy Efficiency: To improve energy efficiency by 50% by 2030 compared to a 2009 baseline.

Note that these targets only relate to emissions and energy performance within TII's direct control and are not applicable to TII projects such as the Proposed Development.

The TII **Sustainability Implementation Plan 2024** includes a series of six sustainability principles and the one of greatest relevance to this assessment is: *Reduce the carbon impact of construction, operation and use of the transport network through responsible use of resources, reuse and repurposing, as well as driving the net-zero transition and enabling customers to make more sustainable choices*.

From the 1st September 2024, all new public projects in Ireland must adhere to newly introduced **procurement guidance to promote the reduction of embodied carbon in construction.** These guidelines mandate a minimum of 30% clinker substitution in concrete products used in government and public works projects (consistent with IS EN 206). Also public bodies should seek an Environmental Product Declaration, to an EN 15804 standard, or equivalent, when directly procuring cement or concrete products.

Further, while it does not apply in this jurisdiction, the **Climate Change Act (Northern Ireland) 2022** applies in Northern Ireland and is of relevance in this assessment given the potential for transboundary impacts. This Act sets a target of at least a 100% reduction in net zero GHG emissions by 2050 (i.e., net zero emissions by 2050) for Northern Ireland compared to baseline, along with interim targets including at least a 48% reduction in net emissions by 2030. Like the 2015 Act in the Republic of Ireland, there is a legal requirement on all Northern Ireland government departments to exercise their functions, as far as is possible to do so, in a manner consistent with the achievement of the targets of the Climate Change Act (Northern Ireland) Act 2022 and carbon budgets set under the Climate Change Act (Northern Ireland) Act 2022.

Under the Climate Change Act (Northern Ireland) Act 2022, the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland is required to produce five year climate action plans (CAP) to set out the policies and proposals that Northern Ireland departments will implement to meet the corresponding carbon budget as well as set out how the emissions reduction targets will be achieved. Public Consultation on Northern Ireland's draft **Climate Action Plan 2023-2027** commenced in June 2025 and was completed on 8th October 2025. The final CAP will be published shortly thereafter taking into consideration the consultation responses.

Section 3 of the Proposed Development includes the N14/N15 to A5 Link south of Lifford to the border with Northern Ireland on the River Finn where it will connect to a proposed Trunk Road T3 in Northern Ireland, which in-turn connects to the proposed A5 Western Transport Corridor (WTC). In June 2025, the High Court in Northern Ireland made a judgement regarding the A5 WTC whereby the permission granted for sections 2 and 3 of the A5 WTC was quashed. That decision has been appealed to the Court of Appeal in Northern Ireland. The proposed N14/N15 to A5 Link, including the proposed bridge over the River Finn (i.e. the link between the N14/N15 Lifford Junction and a proposed Trunk Road T3) will not be constructed until such time as a proposed Trunk Road T3 / Section 1 of the A5 WTC has been constructed or is under construction.

13.3.3 Zone of Influence

The Zone of Influence (ZoI) for climate includes the national environment (island of Ireland – both the Republic of Ireland and Northern Ireland), where the receptor is the climate and the global atmosphere. Effects arising from the construction phase and operational phase due to changes in traffic flow are considered to impact on a national level. National, regional, and local data has been considered where relevant and available. Carbon dioxide (CO_2e) emissions have a global climate warming effect. This is regardless of their rate of release, location, or the weather when released into the atmosphere. This is unlike pollutants that affect local air quality where the rate of release, location, and prevailing weather, as well as the amount of pollutant, determines the local concentrations and the impact. Any potential transboundary impacts on climate have therefore been considered and assessed part of this chapter, as the ZoI includes both the Republic of Ireland and Northern Ireland.

Local ambient concentrations of CO_2e are not relevant to this assessment as there are no limits or thresholds that can be applied to particular sources of carbon emissions (such as for air quality). Any amount of CO_2e released into the atmosphere will contribute to climate warming, the extent of which is determined by the magnitude of the release. Although CO_2e emissions are typically expressed as kilograms or tonnes per year, there is a cumulative effect of these emissions because CO_2e emissions have a warming effect which lasts for 100 years or more.

13.3.4 Existing Environment

Details of the existing environment in terms of the national emissions profile was derived from Ireland's GHG emissions inventory as published by the EPA. This inventory includes both total GHG emissions as well as sectoral emissions including those from the transport sector. Details of the local baseline was derived from the Donegal County Council Climate Action Plan 2024 – 2029. The GHG emissions associated with baseline levels of road traffic (refer section 6.4 of Chapter 6: Traffic & Transportation) within the area were quantified using the TII Road Emissions Model (REM).

The baseline climate resilience is derived from the Met Éireann Major Weather Event Database coupled with the Global Facility for Disaster Reduction and Recovery 'Think Hazard!' tool. Additional baseline information has been derived from the Translate (Climate Ireland). The threat of climate change has the potential to negatively impact on the environment in Donegal, in particular through rises in sea levels and/or increases in flooding events.

13.3.5 Sources of Information to Inform the Assessment

This analysis was undertaken by means of a desktop assessment based on available relevant guidance and information sources and, the design team and other chapters of this EIAR. The following information sources have been consulted in relation to the assessment:

- Key materials, resources, and cut/fill balance inputs from the description of the Proposed Development; see sections 4.12.3 (Section 1), 4.13.3 (Section 2) and 4.14.3 (Section 3) of Chapter 4: Project Description.
- Traffic data provided by the Transport Team; see section 6.4 of Chapter 6: Traffic and Transport.
- Estimates of likely waste volumes provided by the design team, see section 16.5.1.3 of Chapter 16 Material Assets (Non-Agricultural).
- Climate vulnerability and flood risk as identified in section 11.6 of Chapter 11: Water.
- Global Facility for Disaster Reduction and Recovery 'Think Hazard!' tool (https://thinkhazard.org/en/).
- Met Éireann Major Weather Event Database (https://www.met.ie/climate/major-weather-events).
- Met Éireann TRANSLATE: One Climate Resource for Ireland (https://www.met.ie/science/translate).
- Climate Data Tool from Climate Ireland (https://www.climateireland.ie/#!/tools/climateDataExplorer).

Table 13-4 outlines the existing studies, datasets and information used to inform the assessment on climate that was collected through a detailed desktop review. The baseline climate represents the existing climate GHG emissions from within the zone of influence and data is derived from national or local validated inventory data from Met Éireann, the EPA or the local authority. No site-specific baseline surveys were undertaken as part of the assessment for climate given that local ambient concentrations of CO_2e are not relevant to assessing significance, as noted earlier, and the abundance of validated climate inventory data using standardised measurement protocols. The baseline data presented in this section is derived from EPA inventories and projections, and the Met Éireann monitoring network, and is representative of the existing baseline conditions.

Table 13-4: Summary of Key Desktop Reports

Title	Source	Year
Ireland's Provisional Greenhouse Gas Emissions 1990-2024	EPA	2025
Ireland's Greenhouse Gas Emissions Projections 2025-2055	EPA	2025
30 Year Averages: Malin Head	Met Éireann	2022
Climatological Note No. 14: A Summary of Climate Averages for Ireland 1981-2010	Met Éireann	2012
National Climate Change Risk Assessment (NCCRA).	EPA	2025

13.3.6 Key Parameters for Assessment

13.3.6.1 Greenhouse Gas Assessment: Construction and Maintenance Phase Climate Emissions

PE-ENV-01104 (TII, 2022a) recommends the calculation of the construction stage embodied carbon using the TII Carbon Tool (TII, 2025a). The Carbon Tool has been commissioned by TII specifically to assess GHG emissions associated with road, greenway or rail projects. The Carbon Tool aligns with Section 7 of PAS 2080 - Publicly Available Specification (PAS) 2080:2023 on Carbon Management in Infrastructure (BSI, 2023), which was published by the British Standards Institution (BSI), the Construction Leadership Council and the Green Construction Board in 2023.

Where available, Irish specific factors are employed in the Carbon Tool such as from the Sustainable Energy Authority of Ireland (SEAI) emission and conversion factors for electricity and the most common fuels in Ireland. Where Ireland specific emission factors are not available, the Carbon Tool uses emission factors from recognised UK sources including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013), UK National Highways Carbon Tool v2.7 and UK Government 2025 Greenhouse Gas Reporting Conversion Factors. These UK emission factors are representative of the materials used in the Irish market.

Information on the material quantities employed and waste products generated were provided by the design team (refer section 4.11.3 (Section 1), 4.12.3 (Section 3) and 4.13.3 (Section 3) of Chapter 4 and Section 16.5.1.3 of Chapter 16) and input into the Carbon Tool. This information was used to calculate the GHG emissions associated with the construction phase and the maintenance phase of the Proposed Development.

13.3.6.2 Greenhouse Gas Assessment: Operation Phase Climate Emissions

Emissions associated with operation and maintenance of the Proposed Development are assessed using the Carbon Tool and the procedures outlined above for the construction phase.

The emissions reductions associated with active travel are derived from the modal shift estimates prepared for the Preliminary Business Case 2024 for the project converted into carbon savings using the emission factors published by the UK Department for Energy Security and Net Zero (DESNZ, 2025).

Road traffic data has been supplied (refer section 6.4 of Chapter 6: Traffic and Transport) that has been used to quantify the GHG emissions generated from road traffic arising from the Proposed Development.

Traffic data has been supplied for all road links in the traffic study area (refer Figure 6-1) for all future year scenarios both for Do-Minimum and Do-Something options. The following scenarios are assessed in this analysis:

- Opening Year 2032 Do-Minimum and Do-Something (both including and excluding the N14/N15 to A5 Link to Northern Ireland).
- Design Year 2047 Do-Minimum and Do-Something (both including and excluding the N14/N15 to A5 Link to Northern Ireland).

Traffic data has been compiled from Chapter 6: Traffic & Transportation. GHG emissions arising from changes to traffic patterns are quantified using the TII REM. The REM calculates road transport emissions integrating traffic volumes/speeds for light and heavy goods vehicles on the national road network with Irish fleet composition information in accordance with TII Guidance GE-ENV-01107 (TII 2025b).

Under EU and national policy on electric vehicles and fuel and engine technology, the proportions of the different vehicle classifications (EURO classification) will change over time because it is expected the fleet will move towards increased adoption of newer and relatively lower emission vehicles in the future, including greater uptake of hybrid (HEV), battery-electric (BEV) and alternative fuelled vehicles. As the speed of this transition to lower emissions vehicles may be accelerated depending on policy interventions, the results are generated for separate Fleet Database scenarios within the REM model as follows:

- Business as Usual (BaU) scenario: i.e. excluding strategic policy interventions for reduction of CO_2, etc, and based on existing trends in vehicle purchasing and turnover of vehicles out of the vehicle fleet.
- Climate Action Plan (CAP) based on achieving increases in EVs including 175,000 passenger car EV and PHEVs by 2025 and 840,000 passenger car EV and PHEVs by 2030 (and see section 13.4.1.1 below in relation to Ireland's progress towards these targets).
- An intermediate case calculated by AECOM on behalf of TII using linear extrapolation to a central value between BaU and CAP for each vehicle sub-classification.
- CAP & 2035 Internal Combustion Engine (ICE) Sales ban scenario based on alignment with the EU policy to end the sales of new ICE, including HEV and PHEV, by 2035.

TII Guidance GE-ENV-01107 (TII 2025b) recommends a mix of the above scenarios including the CAP fleet projection for cars, BaU high ambition scenario for LGVs and the EU Target for HGVs. The guidance states that this combination represents a realistic worst case scenario for the purposes of assessing impact from road traffic.

It is noted that in December 2025, the EU signalled that the laws to ban the sale of internal combustion engine (ICE) vehicles by 2035 will be dropped in favour of more flexible rules to achieve a reduction in carbon dioxide emissions from cars. It should be noted that the analysis in this chapter is not impacted by this recent policy change as the scenarios presented are based on levels of CAP implementation and targets (e.g. 30% battery EV share of total passenger car fleet) rather than reliance on an ICE sales ban.

In addition to the realistic worst case scenario described above, this assessment includes a sensitivity analysis to show the scale of impact for each of the following levels of climate policy implementation:

- A high climate ambition scenario whereby CAP targets for the car, LGV and HGV fleet are implemented in full.
- A low climate ambition scenario whereby the strategic policy interventions for reduction of CO_2 from road vehicles are excluded and the BaU low ambition scenario is applied to the car, LGV and HGV fleet.

Results within this assessment for all future scenario years are presented in the assessment for all scenarios to illustrate the impact of this Project versus the corresponding DM under all future climate scenarios.

13.3.6.3 Climate Change Risk Assessment: Vulnerability of the Proposed Development to Climate Change

The TII guidelines for CCR assessment (PE-ENV-01104 (TII, 2022a) and PE-ENV-01105 (TII, 2022b)) outline an approach for undertaking a risk assessment where there is a potentially significant impact on the Proposed Development due to climate change. The risk assessment assesses the sensitivity and exposure of the impact occurring to a receptor, leading to the evaluation of the significance of the impact. The assessment methodology is a two-stage process, with the first stage being a screening assessment. If the results of this first phase indicate the climate hazard is a vulnerability, then the second stage of the assessment is carried out and referred to as a climate change risk assessment.

The screening stage of the assessment is a combination of sensitivity analysis and exposure analysis and is undertaken through the following methodology:

- In undertaking the sensitivity analysis, the asset categories and climate hazards to be considered in the climate vulnerability assessment must be identified and the list of asset categories and climate hazards included.
    - Asset categories include – pavements; drainage; structures; active travel networks; utilities; landscaping; signs; lighting columns; associated auxiliary buildings; fences.
    - Climate hazards include - flooding (coastal); flooding (pluvial); flooding (fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning; hail; fog.
- The sensitivity (low, medium, or high) of each asset category to each of the climate hazards is determined by assigning a sensitivity score of 1 to 3 (refer Table 13-6).
- Using historic and projected for Representative Concentration Pathways (RCP) scenarios RCP4.5 (moderate) and RCP8.5 (high):
    - RCP4.5 – a moderate scenario where global greenhouse gas emissions are significantly reduced over time. This is broadly associated with a +2°C rise in global temperatures by 2100, measured from the beginning of the century.
    - RCP8.5 – a high-emissions scenario representing a ‘business-as-usual’ future with limited climate action in which emissions continue to rise throughout the century. This is associated with a +4°C rise in global temperatures by 2100, measured from the beginning of the century.

  The level of exposure for each climate hazard within the Proposed Development is assessed by assigning a vulnerability score of 1 to 3 (refer Table 13-7)
- The product of sensitivity and exposure for each climate hazard is determined and each asset category is identified. Any climate hazards with vulnerabilities marked as high have been included in the detailed climate change risk assessment.

The second stage climate change risk assessment is a combination of a likelihood analysis and impact analysis:

- The asset categories considered in the climate screening have formed the key project receptors in this assessment as well as any critical connecting infrastructure and significant parts of the surrounding environment.
- The climate baseline (historical extreme climate events) is defined using historical climate conditions and climate change projection data is collated in order to understand future climate conditions. Climate Ireland provides projections of predicted climate change for a variety of time periods up to 2100 under RCP4.5 and RCP8.5, which are appropriate to adopt for this assessment (note that future climate predictions include a level of uncertainty).

- The probability levels of future climate projections are determined for the CCR assessment using relevant resources such as Climate Ireland (2025).

The climate data gathered is used to identify climate-related risks to the Proposed Development to generate a list of risks based on the climate change hazards that have been deemed relevant to the Proposed Development and location.

13.3.7 Assessment Criteria and Significance

13.3.7.1 Assessment Criteria for GHG Assessment

The TII guidelines state that the climate assessment is not solely based on whether a project emits GHG emissions alone but how it makes a relative contribution towards achieving a science based 1.5°C aligned transition towards net zero (as recommended in the 2022 IEMA guidance). The guidelines state that the impact assessment must give regard to two major considerations when assessing the significance of a project's GHG emissions including:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050.

- The level of mitigation taking place.

The criteria set out in the TII guidelines (PE-ENV-01104 (TII, 2022a) and PE-ENV-01105 (TII, 2022b)) for determining the significance of impacts on climate in the context of the GHG assessment are outlined in Table 13-5. The predicted effects of the Proposed Development (both in the construction phase and in the operation/maintenance phase) have been compared against these criteria in Table 13-5 in order to inform the expert's consideration and assessment of the likely significant effects of the Project on climate, as set out in section 13.5 below.

Table 13-5: TII Significance Matrix for the GHG Assessment

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

13.3.7.2 Assessment Criteria for CCR Assessment

The CCR assessment is undertaken in two phases with an initial climate screening phase followed by a more detailed analysis. The detailed analysis is subject to the outcome of the screening phase, which helps ensure that the cost and effort associated with climate proofing is proportional to the benefits. The climate screening is intended to provide an indication of the project's vulnerability to climate change. The screening is broken down into three steps: a sensitivity analysis; an exposure analysis; and when combined make up the vulnerability assessment. To undertake the sensitivity analysis, a score is applied for each asset category (pavements, cycleways bridges, embankments, walls, etc.) against each climate hazard (flooding, extreme temperature, etc.). Table 13-6 provides the definitions and scoring used when assessing sensitivity.

Table 13-6: Sensitivity Definition and Scoring

Level	Definition	Scoring
High sensitivity	The climate hazard will or is likely to have a major impact on the asset category.	3
Medium sensitivity	It is possible or likely the climate hazard will have a moderate impact on the asset category.	2
Low sensitivity	It is possible the climate hazard will have a low or negligible impact on the asset category.	1

The aim of the exposure analysis is to identify which climate hazards are relevant to the Proposed Development location, e.g., flooding could represent a significant hazard for a project located next to a river in a floodplain. Therefore, whilst sensitivity analysis focuses on the type of project, exposure focuses on location. The hazards assessed are the same as those used for the sensitivity analysis. To undertake the exposure analysis, an exposure score is applied for each climate hazard at the project location. The allocation of exposure level is informed by the high-level climate data collected. Table 13-7 shows the exposure definitions and scoring.

Table 13-7: Exposure Definition and Scoring

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

The vulnerability assessment combines the outcomes of the sensitivity and exposure analysis with the aim to identify the key vulnerabilities and the potentially significant climate hazards associated with the Proposed Development. Mitigation can be taken into account when considering vulnerability as it is undertaken to reduce the vulnerability. To complete the vulnerability assessment, the product of sensitivity and exposure for each climate hazard and each asset category identified are determined and mapped as per Table 13-8.

Table 13-8: Vulnerability Matrix

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

Any vulnerabilities with a score >5 are then subjected to the detailed phase - a climate risk assessment using a combination of likelihood analysis and impact analysis. The likelihood analysis looks at how likely the identified climate hazards are to occur within a given timescale. Table 13-9 presents the likelihood analysis key used for this assessment.

Table 13-9: Likelihood Analysis Key

Term	Qualitative	Quantitative
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to occur as not	50%
Likely	Likely to occur	80%
Almost certain	Very likely to occur	95%

The impact analysis investigates the consequences of the climate hazards and also refers to the severity and magnitude. Table 13-10 provides guidance to ranking the risk areas and this table was taken from the European Commission (2021) technical guidance on the climate-proofing of infrastructure in the period 2021-2027.

Table 13-10: Consequence Analysis Key

Risk areas	Magnitude of Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage, engineering, operational	Impact can be absorbed through normal activity	Adverse event that can be absorbed by taking business continuity actions	A serious event that requires additional emergency business continuity actions	A critical event that requires extraordinary / emergency business continuity action	Disaster with the potential to lead to shut down or collapse or loss of the asset / network
Health and safety	First aid case	Minor injury, medical treatment	Serious injury or lost work	Major or multiple injuries, permanent injury, or disability	Single or multiple fatalities
Environment	No impact on baseline environment. Localised in the source area. No recovery required	Localised within site boundaries. Recovery measurable within one month of impact	Moderate harm with possible wider effect Recovery in one year	Significant harm with local effect. Recovery longer than one year. Failure to comply with environmental regulations / consent	Significant harm with widespread effect. Recovery longer than one year. Limited prospect of full recovery
Social	No negative social impact	Localised, temporary social impacts	Localised, long-term social impacts	Failure to protect poor or vulnerable groups. National, long- term social impacts	Loss of social license to operate. Community protests
Financial	x % internal rate of return (IRR) < 2% of turnover	x % IRR 2-10% of turnover	x % IRR 10-25% of turnover	x % IRR 25-50% of turnover	x % IRR > 50% of turnover
Reputational	Localised, temporary impact on public opinion	Localised, short-term impact on public opinion	Local, long-term impact on public opinion with adverse local media coverage	National, short-term impact on public opinion. negative national media coverage	National, long-term impact with potential to affect the stability of the government
Cultural Heritage and cultural premises	Insignificant impact	Short-term impact. Possible recovery or repair	Serious damage with a wider impact to tourism industry	Significant damage with national and international impact	Permanent loss with resulting impact on society

Table 13-11 presents summary outcome of the assessment of likelihood and consequence of each climate hazard in the form of a climate risk matrix.

Table 13-11: Climate Risk Matrix for Detailed Assessment

Likelihood	Magnitude of Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Rare	Low	Low	Medium	High	Extreme
Unlikely	Low	Low	Medium	High	Extreme
Moderate	Low	Medium	High	Extreme	Extreme
Likely	Medium	High	High	Extreme	Extreme
Almost Certain	High	High	Extreme	Extreme	Extreme

The risk framework and the risk ratings allocated in Table 13-11 are used to determine significance where risk rating levels e.g., 'Low', 'Medium', 'High', 'Extreme' are denoted as either 'Significant' or 'Not Significant' as shown in Table 13-12.

Table 13-12: Assessing Significant using the Risk Matrix

Likelihood	Magnitude of Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Rare	Not Significant	Not Significant	Not Significant	Significant	Significant
Unlikely	Not Significant	Not Significant	Not Significant	Significant	Significant
Moderate	Not Significant	Not Significant	Significant	Significant	Significant
Likely	Not Significant	Significant	Significant	Significant	Significant
Almost Certain	Significant	Significant	Significant	Significant	Significant

13.3.8 Data Limitations

Throughout the assessment, the design team has provided the most likely scenario of the materials balance and traffic for the Proposed Development. Where it was required to make assumptions, these assumptions are based on advice from competent project designers and are clearly outlined within the chapter. The traffic projections and the volumes of materials, locations, specifications and other estimates contained in this chapter are robust and represent the likely figures, locations, specifications and volumes which will result from the development herein.

13.3.9 Consultations

No specific agencies were consulted as part of the development of this chapter of the EIAR on climate but all agencies contacted as part of general consultations in relation to the Proposed Development were free to comment and/or make recommendations regarding this climate in their responses and such responses were considered in the preparation of this chapter.

13.4 Description of the Existing Environment

13.4.1 Baseline Environment

13.4.1.1 Baseline National Emissions

GHG in the atmosphere are rising as a result of human activity, largely emanating from the agricultural, transport, energy and residential sectors. The main sources of GHG in the vicinity of the Proposed Development and the ZoI (local, national and transboundary extents) are from existing road traffic, rail, shipping, agriculture, energy, residential space heating, commercial and industrial activity, and waste facilities.

At a national level, according to Ireland's provisional Greenhouse Gas Emissions 1990-2024 report (EPA, 2025b), provisional estimates of emissions in 2024 are estimated to be 53.75 million tonnes carbon dioxide equivalent (Mt CO_2e) which is 2.0% lower (or 1.09 Mt) than the validated emissions in 2023 (54.85 Mt) and follows a 6.8% decrease in emissions reported for 2023. Emissions in 2024 are 3.6% lower than the historical 1990 baseline.

Ireland is not currently in compliance with the EU's Effort Sharing Regulation (ESR) in 2024 or cumulatively from 2021-2024. While, since 2005 ESR emissions have decreased by 10.9% or 5.2 Mt CO_2e, same is considerably short of Ireland's 42% reduction commitment by 2030.

Provisional estimates of national greenhouse gas emissions (including LULUCF) in 2024 are 12.0% below 2018, well off the National Climate objective of a 51% reduction by 2030. The data indicate that from 2021-2024 Ireland has used 82.5% (243.3 Mt) of the 295 Mt Carbon Budget for the five-year period 2021-2025. A reduction of 10.3% in national emissions is now required in 2025 to stay within budget.

The sectoral breakdown of the validated 2023 and provisional 2024 GHG emissions is shown in Table 13-13. The sector with the highest emissions was agriculture followed by transport and energy industries.

Table 13-13: National and Sectoral GHG Emission Changes 2023 to 2024

Sector	2023 (Mt CO_2e)	2024 (Mt CO_2e)	% Change
Agriculture	20.754	20.408	-1.7%
Transport	11.791	11.652	-1.2%
Energy Industries	7.860	7.157	-8.9%
Residential	5.350	5.615	4.9%
Manufacturing Combustion	4.143	4.130	-0.3%
Industrial Processes	2.155	1.880	-12.8%
F-Gases	0.566	0.581	2.7%
Commercial Services	0.713	0.771	8.2%
Public Services	0.669	0.721	7.7%
Waste	0.843	0.837	-0.7%
LULUCF	3.895	3.895	0.0%
Total including LULUCF	**58.740**	**57.646**	**-1.9%**

Figure 13-1 illustrates the total GHG emissions from the transport sector between 1990 and 2024. The graph shows that the sector emissions are dominated by road transport. Emissions have risen sharply from 1990 to a peak in 2007 with strong economic growth followed by a sharp fall through the economic downturn.

Emissions were relatively stable for the period 2015-2019, at an average 11.6 Mt but reduced to 9.8 Mt in 2020. However, with the easing and ending of travel restrictions in 2021 and 2022 (post Covid), road transport emissions rebounded to a relatively stable average of 11.0 Mt for the period 2021-2024.

In 2024, road transport emissions decreased for the first time since 2020 by 1.5% in 2023. While the fleet increased by 4.1% in 2024, the total energy consumption increased by 0.1%, with increases in biofuel and electricity use. With regards to biofuel, bioethanol and biodiesel consumption increased by 48.5% and 11.6%, respectively; whereas petrol consumption increased by 3.0% and diesel consumption decreased by 2.5%. Electricity consumption for transport in 2024 increased by 35.6%.

At the end of 2024, the EPA report that there were just over 82,400 battery electric vehicles (BEVs) and over 66,500 plug-in hybrid electric vehicles (PHEVs) in Ireland, approximately 76% of the CAP target for 2025 of 195,300 or 16% of the 2030 policy target of 941,500 vehicles. As a result, the continued uptake of electric vehicles has meant the annual target in 2024 was exceeded showing the CAP targets on EVs are taking effect.

In October 2025, the Department of Transport announced that Ireland has already met its CAP target of 195,000 electric vehicles on the road by the end of 2025, a key milestone in the nation's transition to cleaner transport.

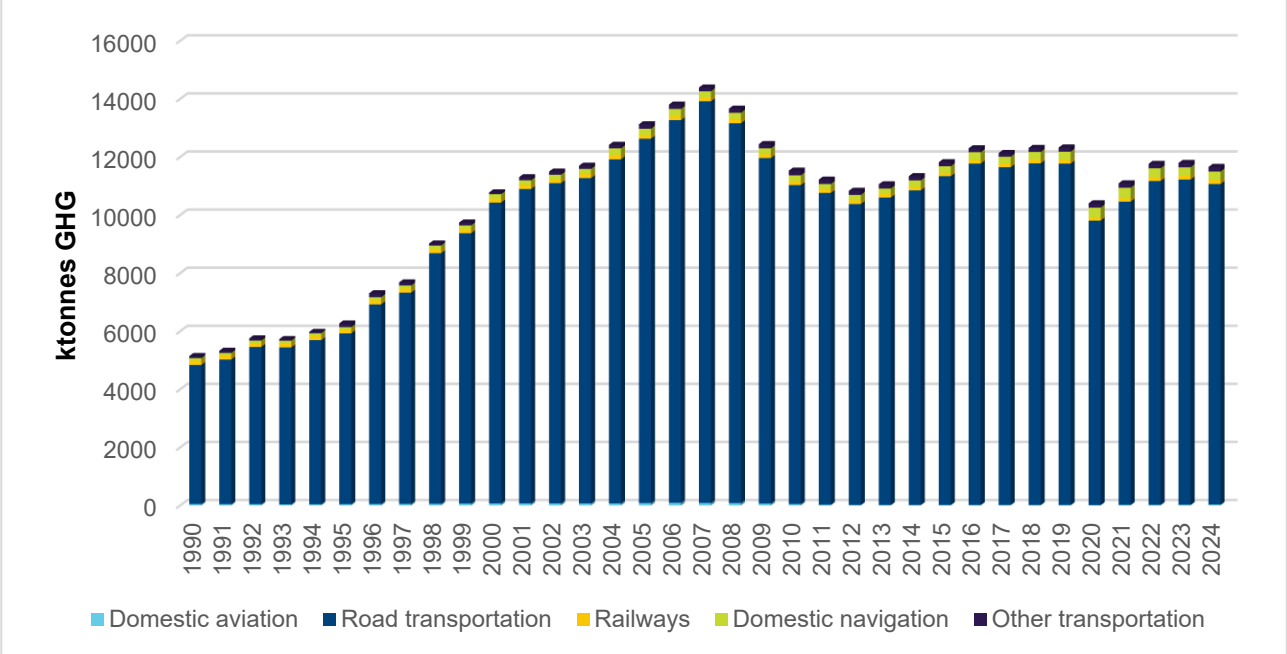

Figure 13-1: Transport Emissions 1990-2024 (source: EPA)

13.4.1.2 Baseline Local Emissions

The Donegal County Council Climate Action Plan 2024 – 2029 reports that GHG emissions for County Donegal in 2019 totalled 1,970 $ktCO_2e$ equating to approximately 3% of the national total in 2019. Total transport emissions for the county in 2019 are reported as 255 $ktCO_2e$ which equates to a 13% share of the county's total emissions.

In terms of transport infrastructure, there is no rail infrastructure within County Donegal. The nearest rail heads are in Sligo and Derry. Nether have freight facilities. Air and sea do not provide a realistic alternative to the established road network for Donegal. Currently, in County Donegal road-based transport is the only

viable option. There are no formal facilities for park and share to carpool or for locations to shift from car to public transport or active travel.

There are currently no significant off-road active travel facilities in Donegal on the primary access routes. Existing pedestrian and cycling facilities are confined to within the urban and semi-urban sections, and in most cases is footpath only, and this is not always continuous. Such areas, while segregated, are shared with strategic, regional and local traffic. Traffic congestion leads to an unattractive and unsafe environment for pedestrians and cyclists.

Currently, except for limited new sections within Letterkenny (Four Lane Road) and Lifford (Northwest Greenway), there are no dedicated cycling facilities within existing town centres. Most of the existing rural road network has no hard shoulder and limited verge. Therefore, pedestrian and cyclist use is generally shared with high-speed vehicular traffic. This unsafe condition has resulted in a poor accident record among non-motorised users including fatalities. The lack of off-road active travel facilities does not provide for a safe and secure environment for non-motorised users, limiting options for sustainable travel and modal choice.

Baseline traffic data in the wider traffic study area (refer Figure 6.1) for the Proposed Development has been compiled from Chapter 6 of the EIAR. The traffic model is a wide area model and covers the wider road network in the county of Donegal and into Northern Ireland. As such, the calculated emissions capture the macro-scale levels of GHG emissions in the north-west of the country.

Using the TII REM the estimated emissions for baseline traffic on the modelled study area is presented in Table 13-14. The total transport related emissions in the traffic study area are estimated at 563,983 tonnes which is double that of the estimate for transport in the Donegal County Council Climate Action Plan 2024 – 2029. This is as a result of the wider area traffic model adopted which also covers the road network outside of the county, including the network in Northern Ireland, and ensures that transboundary impacts on climate area fully taken into account in the assessment presented in this chapter (as the traffic model includes traffic on the road network in Northern Ireland).

Table 13-14: Baseline GHG Emissions from Road Transport

Scenario	Annual Total Emissions (tonnes CO_2e)
Baseline	563,983

13.4.1.3 Current Macro Climate

In Ireland, and in line with global patterns, annual average temperatures are now approximately 0.9°C higher than in the 1900s. In Ireland the last 30 years show an almost 7% increase in annual precipitation. Global sea level increased by approximately 0.20 m between 1901 and 2018, and recent studies have highlighted greater than expected sea level rise in Cork and Dublin. Climate change under early, middle, and late action climate model scenarios show very different futures for Ireland. All model projections show higher temperatures and an increase in annual precipitation, with extreme events becoming more common and more extreme.

Ireland's Climate Change Assessment: Climate Science – Ireland in a Changing World (EPA, 2024) provides the following summary on Ireland's baseline climate:

- There has been a rapid rise in atmospheric greenhouse gas concentrations, measured at numerous sites around the world, including Mace Head, since the Industrial Revolution without precedent in millions of years. Concentrations of methane and nitrous oxide are higher now than in over 800,000 years, and for carbon dioxide, for which longer-term reconstructions are possible, concentrations are higher than for millions of years. The increases in greenhouse gas concentrations since 1850 are due to global human activities, principally through fossil fuel combustion and land use change.

- Changes in the concentrations of these three major greenhouse gases since 1750 exceed those between successive glacial and interglacial cycles of the past 800,000 years for carbon dioxide and methane. For nitrous oxide the changes in concentration are of comparable magnitude to these

successive glacial and interglacial cycles. These past changes in concentrations of all three gases were much slower, occurring over thousands of years.

- Globally, widespread, and rapid changes in the atmosphere, ocean, land, cryosphere, and biosphere have occurred. The scale of recent changes across the climate system as a whole – and the present state of many aspects of the climate system – are unprecedented over many centuries to many thousands of years.

- Global surface temperatures have risen by 1.00-1.25°C between 1850–1900 and the most recent decade, 2013–2022. This most recent decade was likely warmer than any sustained period in at least the past 100,000 years.

- In Ireland annual average temperatures are now approximately 1.0°C higher than in the early 20th century. Sixteen of the top twenty warmest years since 1900 have occurred since 1990, with 2022 being the warmest year to date. Centennial timescale changes in Ireland are broadly consistent with global changes owing to our geographical situation between Europe (which is warming considerably faster than the global mean) and the North Atlantic (which is warming at a slower rate).

- Globally averaged precipitation over land has likely increased since 1950, with a faster rate of increase since the 1980s. The frequency and intensity of extreme precipitation events has increased almost everywhere, particularly so in already wetter regions in the northern hemisphere, and a greater proportion of total precipitation is falling in extreme precipitation events across most of the globe.

- Over Ireland median annual precipitation was 7% higher in the period 1991–2020, compared to the 30-year period 1961–1990. Regions where trends in precipitation since 1950 are significant have generally experienced overall annual increases. Analysis of local observations does not reveal evidence of a clear climate change signal in extreme precipitation indices due to natural variability. Overall, when aggregated, there has been an increase in heavy precipitation extremes across a range of indicators.

- The rate of warming of the global ocean was likely faster in the past century than for any century since the last deglaciation event 11,000 years ago. Global sea level increased by approximately 0.20m between 1901 and 2018, and the rate of global sea level rise is accelerating. Consistent with global open ocean changes, Irish marine waters have experienced long-term acidification due to uptake of anthropogenic atmospheric carbon dioxide.

- Recent studies have highlighted higher rates of sea level rise since the late 20th century in Cork and Dublin than the global average. Reasons for this are unclear and currently under investigation. There are a range of processes that can lead to local sea level changes diverging to a certain extent from global changes over a broad range of timescales.

- Globally, over the last century there have been poleward and upslope movements of many terrestrial species in response to climate changes. There have also been changes in the timing of life cycle events, such as birds migrating and plants flowering in all mid-latitude regions. Changes in the marine biosphere are consistent with large-scale warming and changes in ocean geochemistry. The ranges of many marine organisms are shifting towards the poles and towards greater depths, but a minority of organisms are shifting in the opposite directions.

- The main impacts of climate change on Irish terrestrial species and habitats observed to date have been changes in species abundance and distribution, lifecycle events, community composition, and habitat structure and ecosystem processes. These changes are in addition to much larger changes arising from other human interventions. In Irish waters, there have been substantial changes in marine ecosystems, including changes in seasonality and abundance of many species, including phytoplankton and zooplankton at the base of the food web. Many of these changes are consistent with a changing climate.

- Global climate changes have been modified over Ireland by proximity to the North Atlantic and by internal climate system variability, mainly, but not exclusively, related to variations driven by the North Atlantic. Most notably, the Atlantic Multi-decadal Variability explains successive multi-decadal periods when Ireland has warmed or cooled relative to global trends.

The EPA has noted a number of observed climate change impacts nationally including the observation that the last five-year and ten-year average temperatures are the warmest on record and 2023 was the warmest year on record.

13.4.1.4 Current Micro Climate

The World Meteorological Organisation (WMO) defines climate as the average weather over an extended period of 30 years. This period is used as it is considered long enough to account for year-to-year variations. Therefore, the existing climate for the environs around Malin Head is estimated using 30-year (1991-2020) average meteorological data from Met Éireann which is shown in Table 13-15 which is compared to the national trends below.

- Annual Mean Air Temperature - The annual mean air temperature for Ireland over the period 1991-2020 is 9.8°C. Annual mean air temperature ranges from approximately 8.5°C to 10.8°C. Due to the moderating influence of the sea, areas closest to the coast are generally the warmest whilst areas at higher elevations are the coolest.

- Seasonal Mean Air Temperature - Summer is the warmest season with a mean air temperature for Ireland of 14.6°C, autumn is the second warmest season at 10.3°C, followed by spring at 8.8°C. Winter is the coldest season at 5.4°C. In summer months, the highest temperatures are largely observed in inland areas. The reverse is true in winter with regions close to the coast experiencing the warmest temperatures.

- Annual Mean Rainfall 1991-2020 - Nationally, annual average rainfall over the period 1991-2020 is approximately 1,288 mm. The 30-year annual average distribution shows a typical west to east decline. Highest rainfall amounts are observed in the west of the country, particularly on higher ground. Annual average rainfall ranges from 878 mm along the east coast to 2,045 mm in southwest mountainous regions.

- Seasonal Rainfall - Winter and autumn are the wettest seasons in the 1991-2020 period, with average rainfall of 380 mm and 369 mm, respectively. The driest season is spring with 256 mm of rainfall, followed by summer with an average of 282 mm of rainfall observed over the 30-year period.

Table 13-15: 30-year Average Meteorological Data from Malin Head 1991-2020

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
mean daily max	8.2	8.4	9.4	11.1	13.3	15.3	17	17.1	15.8	13.1	10.5	8.8	12.3
mean daily min	3.7	3.7	4.6	6	8	10.4	12.1	12.4	11.1	8.8	6.2	4.3	7.6
mean temperature	6	6	7	8.6	10.7	12.8	14.5	14.8	13.4	11	8.4	6.6	10
absolute max.	14.5	14.6	19.9	21.4	25.1	25.2	25.9	25.9	23.4	20.4	17.4	16	25.9
min. maximum	2.1	0.8	2.2	4.5	6.7	10.3	10.2	11.8	10.8	6.4	4.3	0.3	0.3
max. minimum	13	11.6	10.6	12.9	14.2	15.1	18.5	17.4	16.4	15.7	13.6	12.5	18.5
absolute min.	-3.9	-3.6	-2.7	-1.5	0.7	2.7	7.1	6.9	3.6	0.4	-1.2	-5.2	-5.2
mean num. of days with air frost	2	1.7	1.1	0.2	0	0	0	0	0	0	0.3	1.7	7
mean num. of days with ground frost	6.9	5.8	5.4	2.5	0.6	0.1	0	0	0	0.4	2.3	5.1	29
mean 5cm soil	4.5	4.5	5.7	8.5	12.1	14.7	15.8	15.2	12.9	9.8	7.1	5.2	9.7
mean 10cm soil	5	4.9	5.9	8.2	11.4	14	15.2	14.8	12.8	10.1	7.5	5.7	9.6
mean 20cm soil	5.6	5.6	6.5	8.6	11.3	13.8	15.2	15.1	13.4	10.9	8.4	6.5	10.1
RELATIVE HUMIDITY (%)													

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
mean at 0900UTC	83.4	82.8	81.5	79.1	79.3	81.6	83.2	83	82.5	82.6	83	82.8	82.1
mean at 1500UTC	80.7	77.7	76.1	74.7	75.5	78.6	79.9	79	77.5	77.4	79.9	81	78.2
SUNSHINE (hours)													
mean daily duration	1.3	2.4	3.4	5.3	6.5	5.5	4.7	4.7	3.8	2.6	1.6	1.1	3.6
greatest daily duration	7.6	9.1	11.6	14.2	16	16.8	16.4	14.6	12.2	10.4	8	6.7	16.8
mean num. of days with no sun	9.9	5	4.9	2.9	2.3	2	2	3	3.1	5.6	8	10.4	59.1
RAINFALL (mm)													
mean monthly total	118.9	95.2	80.7	63.4	65	73.8	86	97.8	94.8	110.3	121.6	130.5	1138.1
greatest daily total	28.4	34.3	31.4	26.3	35	42.2	27.7	73	34.9	38.7	39.4	66	73
mean num. of days with >= 0.2mm	23.2	20.1	20.9	17.2	17.4	17.7	20.1	20.8	19.9	21.5	23.7	23	245.5
mean num. of days with >= 1.0mm	18.8	15.8	15.2	12.6	12.2	12.4	15.7	15.7	14.9	17.5	19.8	19.5	190.1
mean num. of days with >= 5.0mm	9.1	7.2	5.9	4.3	4.2	5.2	6	6.6	6.9	7.5	9	9.2	81.1
WIND (knots)													
mean monthly speed	9.4	9.2	8.5	7.5	6.9	6.4	6.1	6.5	7.3	8.3	8.8	9	7.8
max. gust	91	80	73	71	73	62	57	58	71	78	92	96	96
max. mean 10-minute speed	68	56	52	52	55	47	42	43	49	56	61	67	68
mean num. of days with gales	10.5	8.7	7.4	3.4	1.8	0.8	0.6	0.7	2.3	5.1	7.2	8.6	57.2

13.4.1.5 Climate Vulnerability

Details of current climate vulnerability in the area have been derived from the Global Facility for Disaster Reduction and Recovery 'Think Hazard!' tool with data specific to County Donegal extracted from the tool. Note that the data is for the county of Donegal as a whole rather than the specific areas of this Project.

This data is supplemented as required with information from the Office of Public Works (OPW) FloodInfo.ie Section 11.4 of Chapter 11: Water details all available historical flood information and any flood maps prepared for the study area under previous flood studies from the OPW. This site specific flooding data has been used to inform this assessment. More general data from the 'Think Hazard!' tool is summarised in Table 13-16 to illustrate the current climate hazard threat to the area of the Proposed Development.

Table 13-16: Observed Hazard Level in Donegal County

Hazard Type	Hazard Level
Coastal Flood	High
Pluvial Flood	Low
Fluvial Flood	Low
Extreme Heat	Low
Wildfire	Medium
Drought	Very Low

In addition to the hazard types listed in Table 13-16, this analysis also has due regard for past major weather events which are used to inform future potential hazards and adaptation. Table 13-17 presents a list of historically recorded extreme weather events nationally which have been derived from the Met Éireann Major Weather Events database.

Table 13-17: National Major Weather Events

Year	Event	Climate Hazard
2025	Storm Eowyn	Storm Éowyn was a powerful and record-breaking extratropical cyclone which hit Ireland, the Isle of Man and the United Kingdom on 24 January 2025
2023	Storm Babet	Extreme Flooding
2023	Winter Storms	Strong Wind/Extreme Rainfall
2022	Highest Temperature Recorded in Ireland since 1887 (July 2022)	High Temperature
2022	Storm Eunice	Strong Wind
2021	Storm Barra	Strong Wind
2020	Storm Ellen	Strong Wind
2018	Heatwaves and Drought	High Temperature
2018	Snowstorm Emma & Beast from the East	Snowfall
2018	Storm Doris	Strong Wind
2018	Storm Eleanor	Strong Wind
2017	Storm Dylan	Strong Wind
2017	Storm Ophelia	Strong Wind
2017	Heavy Rain	Extreme Rainfall
2016	Storm Jake	Strong Winds
2015	Storm Frank	Strong Winds
2015	Storm Eva	Strong Winds
2015	Storm Desmond	Flooding
2015	Storm Darwin	High Temperature
2013/14	Winter Storms	Cold snaps
2011	Tropical Storm Katia	Strong winds
2010	Winter Cold Spell	Cold snaps
2009/10	Winter Cold Spell	Cold snaps/ Frost
2009	Severe Flooding	Flooding
2008	Heavy Rain and Flooding	Extreme Rainfall
2006	High Temperature/ Heatwave	High Temperature
2003	Heavy Rainfall/ Cloud Burst	Extreme Rainfall
2002	Severe Flooding in Eastern Areas	Flooding
2002	Coastal flooding along the eastern and southern coasts	Flooding
2000	Severe flooding in east and southern coasts	Flooding
1998	Hurricane-force winds over north and northeast	Strong Wind
1997	Windstorm	Strong Wind
1986	Hurricane Charley	Strong Wind

Source: Met Éireann, Major Weather events. Available at: https://www.met.ie/climate/major-weather-events

13.4.2 Evolution of the Environment in the Absence of the Proposed Development

13.4.2.1 Climate Mitigation

Achieving Net Zero Carbon by 2050 is set out as the national climate objective in Section 3 of the 2015 Act which states:

'The State shall, so as to reduce the extent of further global warming, pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy (in this Act referred to as the 'national climate objective').'

In line with TII (TII, 2022a) and IEMA Guidance (IEMA, 2022) the future baseline is a trajectory towards net zero by 2050, '*whether the Proposed Development contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*'.

The EPA report on Ireland's Greenhouse Gas Emissions Projections annually and the latest dataset for 2024 to 2055 was published in May 2025 (EPA, 2025a) and the key findings are summarised as follows:

- Ireland is not on track to meet the 51% national climate objective emissions reduction target (by 2030 compared to 2018) which includes the assumption that the CAP24 measures are implemented.
- Greenhouse gas emissions are projected to be 9% to 23% lower by 2030 (compared to 2018) which places Ireland further from the 2030 national climate target compared to previous assessments.
- Carbon Budgets Budget period 1 (2021-2025) of 295 Mt is projected to be exceeded by between 8 Mt to 12 Mt.
- Budget period 2 (2026-2030) of 200 Mt is also expected to be exceeded by a significant margin of 77 Mt to 114 Mt (with carryover from Budget period 1).
- Sectoral emissions ceilings for 2030 are projected to be exceeded by the Buildings, Electricity, Industry and Transport sectors; and met by the sector 'Other'.
- Ireland is not projected to meet its EU target, set under the ESR, of a 42% emissions reduction by 2030 (compared to 2005) even with flexibilities applied.
- The EPA assessment shows that greenhouse gas emissions will be reduced by 10% to 22% by 2030 (compared to 2005).

In terms of projections for transport emissions under the 'with existing measures' (WEM) scenario, emissions are projected to decrease by 9% from 12.3 Mt to 11.2 Mt over the period 2018-2030. Measures included in the WEM scenario are:

- A 10% blend for petrol and a 20% blend for diesel at the pumps by 2030 is assumed. The diesel blend rate of 20% by 2030 has moved from planned (WAM) to implemented (WEM) measures since the last projections report.
- For uptake of electric vehicles, the WEM scenario assumes approximately 564,000 electric vehicles on the road by 2030. This includes approximately 270,000 passenger BEV (or 11% of total car stock in 2030) and almost 280,000 passenger PHEV.

Under the 'with additional measures' (WAM) scenario, transport emissions are projected to decrease by 21% from 12.3 Mt to 9.7 Mt over the period 2018-2030. Measures in the WAM scenario include:

- Uptake of electric vehicles of 640,750 by 2030.

- Reduction in total vehicle kilometres travelled to be achieved by behavioural and sustainable transport measures outlined in the Climate Action Plan 2024, such as a 50% increase in daily active travel journeys and a 130% increase in daily public transport journeys.

The measured baseline of transport emissions (in green) as well as the EPA projected WEM (light blue) and WAM (dark blue) scenarios are shown in Figure 13-2. The figure shows that traffic emissions in Ireland are projected to decrease in the medium to long term with current interventions such as the electrification of the fleet. The figure also shows key SEC targets in 2025 and 2030 (in red) and illustrate that even with the projected decreases, the State is not on track to meet these ceilings in 2025 and 2030, as reported by the EPA.

In line with the national trend, the baseline traffic emissions for the road network (as presented in Table 13-14) will decrease in future years without the Proposed Development as a result of the above interventions. In the absence of the Proposed Development, the existing road network will continue to function as it does at present, with the significant issues in relation to congestion and lack of alternatives to car transport as set out in section 13.4.1.2 continuing, and with the further issues identified immediately below in terms of lost opportunities for future climate positive measures. Projected emissions on the road network are presented as the 'Do-Minimum' scenarios for 2032 and 2047 in Table 13-31.

However, as the Proposed Development forms part of overall regional and national sustainable mobility strategies, should the Proposed Development not go ahead, opportunities will be lost in terms of improving road safety, removing existing levels of congestion and the associated high emissions associated with congestion as well as the delivery of sustainable mobility (support for active travel, modal shift, support for electric vehicles, etc.) and the predicted benefits of this mobility in terms of climate.

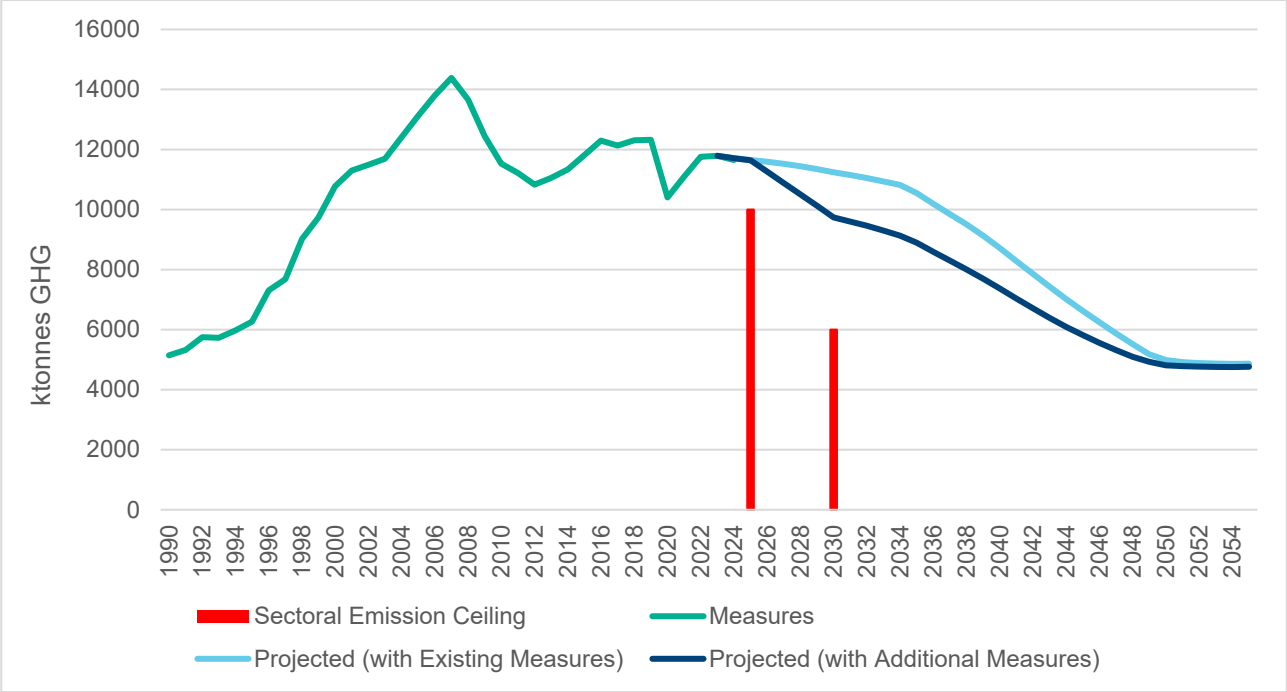

Figure 13-2: Transport Emissions Measured (1990-2024) and Projected (2024-2055) (source: EPA)

13.4.2.2 Climate Adaptation

Ireland's Climate Change Assessment: Climate Science – Ireland in a Changing World (EPA, 2024) and the National Climate Change Risk Assessment Technical Report (EPA, 2025c) provide the following summary on the future for Ireland's climate regardless of the status of the Proposed Development:

- Projections of Irish temperature changes consistently show warming, with the magnitude of this warming increasing with delays in global mitigation action. Under Early action, the temperature increase averaged across the island of Ireland relative to the recent past (1976–2005) would reach 0.91°C [0.44–1.10°C] by mid-century before falling back to 0.80°C [0.34–1.07°C] at the end of the century. Whereas under Late action, by the end of the century it is projected that the temperature increases could be 2.77°C [2.02–3.49°C]. Warming also generally increases with the climate sensitivity of the Earth System Model (ESM) used for a given mitigation pathway. Heat extremes will become more frequent and more severe and cold extremes will become less frequent and less severe with further warming.

- In Ireland, intense precipitation extremes are projected to become more frequent and extreme with further warming in most locations. Projected changes in precipitation accumulations are more uncertain than those for temperature. While winters tend to get wetter and summers tend to get drier, this signal is not consistently found across all global ESMs. There is also substantial sensitivity to the choice of ESM used to drive the national simulations. Changes averaged across the island of Ireland show a slight increase of < 10% in annual mean accumulated precipitation amounts.

- Global sea level increases will be modified locally around the island of Ireland by ongoing isostatic rebound – the north-east of the island is slowly rising and the south-west slowly sinking (<0.2mm per year in most regions); multi-decadal ocean basin variability (order of several centimetres in a decade); and the relative contributions to sea level change arising from the Greenland and Antarctic Ice Sheets over time. Larger relative contributions from Greenland would result in smaller increases for Ireland and vice versa due to the gravitational effects of the two ice sheets.

- Storm surges and extreme waves pose an ever-increasing threat to Ireland as sea levels continue to rise, including for many coastal cities such as Cork, Dublin, Galway, and Limerick, and to critical infrastructure. Particularly at risk are soft sediment shorelines. Projections of changes in storminess are highly uncertain and translate into large uncertainties in future frequency and intensity of extreme waves.

- Compound events are combinations of multiple climate impact drivers that occur at the same time, in the same area or both. The likelihood of both concurrent heatwave and drought conditions and storm surges with heavy precipitation have been observed to increase to date in Europe and are projected to further increase with additional warming.

- Ireland will continue to experience seasonal to multi-decadal variability arising from natural internal variations in the climate system. These will serve to modulate aspects such as temperature, precipitation, and storminess on seasonal to multi-decadal scales and, in doing so, periodically may reduce or enhance long-term global climate trends arising from human activities.

- Current atmospheric carbon dioxide levels are higher than at any time since the Middle Miocene (14 to 16 million years ago), according to the latest consensus atmospheric carbon dioxide record from a global consortium of scientists who study past atmospheric composition using proxies. Paleo-temperature estimates for the North Atlantic Ocean off Ireland indicate sea surface temperatures 10 to 13°C warmer than present-day during the Middle Miocene. Early action would keep global mean surface temperature rise within the bounds of our and our ancestors' past experience.

The Donegal County Council Climate Action Plan 2024 – 2029 lists the projected changes in the frequency and intensity of climate hazards (acute and chronic) for the county as follows:

- Projections indicate an overall increase in average temperature of between 1.1°C and 1.5°C for County Donegal relative to the 1981-2000 period.

- Under a high emission scenario, projections indicate that heatwaves will become more frequent by mid-century.

- Summer rainfall is expected to reduce in the future when compared with the baseline period of 1981 to 2000, in both the RCP4.5 and RCP8.5 scenario contributing to potential drought conditions.
- Because of the increasing temperatures, a decrease in the number of frost days and ice days is projected for the 2041-2060 period when compared with the baseline period of 1981 to 2000, for both the RCP4.5 and RCP8.5 scenario.
- The annual snowfall in the region is projected to decrease substantially by the middle of the century for the RCP4.5 and RCP8.5 scenarios.
- Projections of storms are subject to a high level of uncertainty. By mid-century, projections indicate that average wind speed will remain similar to those currently experienced. There is limited evidence of a potential increase in the frequency of more intense storms. However, more research is needed to confirm this increase.
- Rising sea levels projections under a high emissions scenario indicate an increase of up to 0.20m by 2050 which will increase the frequency of coastal inundation.
- A rising sea level is strongly linked with coastal erosion and an increase in erosion rates and extent.
- Projections indicate an increase in the frequency of heavy rainfall days (days with precipitation >30mm) for County Donegal with some areas projected to see increases of up to 80%. This will likely result in an increased frequency of associated fluvial and pluvial flooding.

These national and county specific projections will be used to inform the CCR assessment in this chapter and will supplement project specific data (e.g. the flood risk assessment).

13.5 Description of the Likely Significant Effects

13.5.1 Construction Phase Greenhouse Gas Emissions

There is the potential for a number of GHG emissions to atmosphere during the construction of the Proposed Development. As part of the Proposed Development, construction stage GHG emissions have been calculated under the following headings within the TII Carbon Tool:

- Pre-construction Works (e.g. site clearance);
- Embodied Carbon of Materials;
- Construction Activities; and
- Construction Waste.

Transport GHG emissions associated with delivery of materials to site and construction worker travel to site were also included in the calculator. The GHG assessment has quantified the overall GHG emissions arising from the construction of the Proposed Development, as well as investigating the individual impacts arising from each section of the Proposed Development.

13.5.1.1 Pre-Construction Phase

Pre-construction phase impacts account for emissions accrued before construction of the infrastructure commences and includes land use impacts and emissions associated with plant and machinery required to clear the site. The carbon tool has a range of assigned land use categories for calculating site clearance impacts. Different land use types have higher or lower carbon intensity for site clearance, which is linked to the energy required to clear the site.

Emissions associated with land use change are determined by whether the existing land use is a carbon sink. Certain land types, such as agricultural land, are not deemed to be carbon sinks, as these land uses do

not sequester carbon dioxide from the atmosphere. Therefore, when agricultural land is required for the land take in a development, this is not deemed to have a significant impact on the development's carbon footprint (i.e. no carbon is being lost to the atmosphere through disruption of the soil). However, other natural land use types (such as peat, forestry, etc.) are carbon sinks. Each of the remaining land use categories are capable of sequestering carbon. When these land use types are needed for a development, any carbon sequestered is lost when the land is disturbed. Peat bogs (only in good condition and undrained) are deemed to be the most valuable carbon sink in the carbon tool, down to natural grassland, which sequesters the least amount of carbon.

To calculate the loss of carbon sinks (forests and woodland) through the Proposed Development's pre-construction, CORINE data and land cover drawings provided in Figures 10.11-10.13 in Volume D: Book of Drawings were referenced. Impacts associated with site clearance are set out in Table 13-18.

Table 13-18: Emissions Associated with Site Clearance

Source	Emissions (t CO_2e)			
	Section 1	**Section 2**	**Section 3**	**Proposed Development as a whole**
General site clearance	25	5	1	**31**
Clearance of Mixed forest	21	6	-	**27**
Land use change and vegetation loss	1,574	465	-	**2,039**
Total	**1,620**	**476**	**1**	**2,097**

13.5.1.2 Embodied Carbon

Embodied carbon is the carbon contained within a material or product. It is the sum of all carbon emissions that have been generated during the extraction, processing and manufacturing of a particular product. The impact of transporting materials from factory/ source to site to facilitate construction is reported separately in Table 13-24.

Earthworks – Imported Fill

Earthworks schedules for each section are provided by the geotechnical design teams (sections 4.11.3 (Section 1), 4.12.3 (Section 2) and 4.13.3 (Section 3) of Chapter 4). The schedules contain the estimated cut/ fill balances and a breakdown of the material type to be excavated. In terms of embodied carbon, only imported fill (if required) is captured in this section.

Where material is site won, the embodied carbon does not need to be included in the calculations, as the material has been sourced from within the Project boundary and will be reused within the Proposed Development (circular economy for dealing with material surplus). There is the impact of excavations emissions, but these have been captured elsewhere in the carbon tool (refer Table 13-25).

On all three sections of the Proposed Development, the designers have integrated material extraction and deposition areas into the designs in order to achieve an earthworks balance through acceptable site-won material (refer to sections 4.11.3 (Section 1), 4.12.3 (Section 2) and 4.13.3 (Section 3) of Chapter 4).

Therefore, the total volume of fill material for Section 1, Section 2 and Section 3 is site won, and therefore there is no embodied carbon footprint or transport emissions for imported fill material.

Road Pavement – Base, Binder and Surface Layers

Details of the pavement design for the Proposed Development are provided in the project description (refer to section 4.5.5 and sections 4.6 to 4.8 of Chapter 4 for details of the pavement design and dimensions). This design, coupled with total road lengths have been used to calculate the embodied carbon emissions from road pavement materials. As per these pavement areas, Table 13-19 sets out the embodied carbon emissions of road pavement materials.

It should be noted that due to the significant wear that pavement materials undergo during their lifespan, surfacing will require maintenance and replacement. These maintenance emissions can be significant, due to the carbon-intensive process around removing old materials and reinstating the surface as new and these maintenance emissions are presented in Table 13-29.

Table 13-19: Embodied Carbon Emissions of Pavement

Material Type	Emissions (t CO_2e)			
	Section 1	Section 2	Section 3	Proposed Development as a whole
Hot rolled asphalt concrete	515	485	622	1,622
Surface dressing	172	162	240	574
Granular Material	838	788	1006	2,632
Total	**1,525**	**1,435**	**1,868**	**4,828**

Road Markings

Road markings have been included in the carbon assessment based on the design as provided in the drawings in Volume D: Book of Drawings. A summary of the impacts is presented in Table 13-20.

Table 13-20: Embodied Carbon Emissions of Road Markings

Section	Embodied Carbon (tCO_2e)
Section 1	173
Section 2	119
Section 3	104
Proposed Development as a whole	**396**

Drainage – Culverts and Pipes

The drainage elements include culverts and cross-drain pipes. The total volume of concrete required for culverts has been calculated from the dimensions provided by the design team (provided in the drawings in Volume D: Book of Drawings). All culvert sizes (diameters, width and depth measurements) are internal open dimensions. Cross-drain pipes are high-density polyethylene (HDPE). The results of the assessment are included in Table 13-21.

Table 13-21: Embodied Carbon Emissions of Culverts, Pipes and Cross-Drain Pipes

Section	Embodied Carbon (tCO_2e)
Section 1	567
Section 2	316
Section 3	888
Proposed Development as a whole	**1,771**

Kerbing

Total lengths of precast kerbing have been provided by the design team. The embodied carbon and transport emissions are summarised in Table 13-22. Section 2 has a notably higher carbon footprint from kerbing than the other two sections as it is within a more urban environment than the other two sections, which increases the need for extra kerbing for footways and pedestrian areas.

Table 13-22: Embodied Carbon of Kerbs

Section	Embodied Carbon (tCO_2e)
Section 1	142
Section 2	425
Section 3	82
Proposed Development as a whole	**649**

Structures

There are major rivers and waterways which must be crossed in each section and link roads which must be connected to the mainline via under/overbridges. There are four major river crossings in this project (refer to section 4.5.6 of Chapter 4), the River Finn at a location north-west of Ballybofey/ Stranorlar, the River Swilly crossing east of Letterkenny and two major structures in Section 3, one crossing of the River Finn facilitating the proposed N14/N15 to A5 Link and one over the River Deele.

Major and minor river crossings (i.e. bridges) require significant load-bearing materials such as steel and concrete and these materials may be high in embodied GHG emissions. The embodied carbon associated with these structures is shown in Table 13-23.

Table 13-23: Carbon Impact of Structures

Name	Embodied Carbon (t CO_2e)		
	Concrete	**Steel**	**Waterproofing Resin**
Section 1	14,197	5,772	95
Section 2	10,181	3,490	66
Section 3	7,789	8,964	-
Proposed Development as a whole		**50,555**	

Transport of Materials

In calculating the associated transport emissions, it is assumed that all structural steel and rebar will be transported to the site from Dublin via heavy goods vehicles (HGV), due to the steel being imported through Dublin Port. The transport emissions are presented in Table 13-24. All other materials are assumed to be sourced within 100 km.

Table 13-24: Carbon Impact of Transport of Materials

Section	Transport Emissions (tCO_2e)
Section 1	1,324
Section 2	1,150
Section 3	1,486
Proposed Development as a whole	**3,960**

13.5.1.3 Construction Activities

Excavation Activities

Emissions arising from excavation activities capture the energy used by mobile plant engaged in the excavation and movement of materials. Energy expenditure varies depending on the type of ground to be excavated, e.g., rock excavation is much more energy intensive than topsoil excavation. The geotechnical design team have provided a breakdown of material required for excavation for each section (refer to section 4.11.3 (Section 1), 4.12.3 (Section 2) and 4.13.3 (Section 3) of Chapter 4) and the impact of these construction works are presented in Table 13-25 based on the levels of energy required to excavate each of the listed materials.

Table 13-25: Carbon Impact of Excavation Activities

Excavation Type	Emissions (t CO_2e)			
	Section 1	Section 2	Section 3	Proposed Development as a whole
Topsoil	266	156	197	619
Other acceptable material	182	700	-	882
Rock	8,756	6,883	5,524	21,163
Peat	130	35	104	269
Other unsuitable material	1,354	131	1,533	3,018
Total	**10,688**	**7,905**	**7,358**	**25,951**

Construction Activities

The construction activities section of the tool captures carbon emissions generated during the construction of the Proposed Development excluding excavation which is addressed above. Types of activities include fuel use of mobile and fixed plant operating during the construction phases along with electricity and water use. The durations of each of the phases of work are derived from section 4.10 in Chapter 4 which notes that if the three sections of the Proposed Development are constructed at the same time, then this will require a 60-month construction period. However, a phased approach may also be taken to the construction of the Proposed Development. In such circumstances, each section of the Proposed Development is estimated to take 36 months to construct. This assessment assumes a robust worst case scenario assessment whereby all three sections of the Proposed Development are constructed at the same time.

The total estimated plant employed for each phase of construction is aligned with that assessed in Chapter 14: Noise and Vibration. Industry standards for fuel type and consumption for each item of mobile and fixed plant were applied to determine fuel use and durations were derived from the programme to determine total fuel us per phase. Table 13-26 presents the GHG emissions associated with fuel, electricity and water use of mobile and fixed plant operating during the construction phase.

Table 13-26: Carbon Impact of Construction Activities (excluding Excavation)

Task	Emissions tCO_2e
Site Enabling Works - Site Compounds	52
Operation of Site Compounds (x 6)	1,369
Demolition of Structures	104
Material Processing	261
Construction of Structures	730

Task	Emissions tCO_2e
Bridge Construction	834
Culverts	156
Road Formation and Paving	573
Park and Share	573
Signage and Lighting	130
Landscaping	261
Proposed Development as a whole	**5,043**

13.5.1.4 Construction Waste

The generation of waste during the construction phase has potential for climate impact and the nature and scale of this impact depends on the type and volume of waste generated coupled with the nature of the waste treatment (reuse, recycling, recovery, or disposal). The largest waste streams generated are surplus aggregates which is unsuitable for reuse on site, demolition wastes from the planned demolition of structures, bitumen waste as well as soil arisings generated from pile bores to be used for bridge structures (refer to section 16.5.1.3 of Chapter 16 Material Assets (Non-Agricultural)). This assessment assumes that all wastes will be available for recycling with the exception of the demolition waste which will undergo a disposal operation to landfill.

Table 13-27 summarises the emissions from waste management during the construction phase coupled with the emissions associated with transporting this waste (based on an assumed 100 km round trip for this waste transport).

Table 13-27: Emissions from the Management of Waste

Section	Waste processing (tCO_2e)	Total emissions for Waste Transport ($t\ CO_2e$)	Total emissions ($t\ CO_2e$)
Section 1	1,297	4,866	6,163
Section 2	1,739	3,105	4,844
Section 3	1,110	5,736	6,846
Proposed Development as a whole	**4,146**	**13,707**	**17,853**

13.5.1.5 Summary of Construction Phase GHG Impacts in the absence of Mitigation

Table 13-28 summarises the generation of GHG emissions at the construction phase of the Project. Overall, the results indicate that the primary source of GHG emissions from the construction phase of the Proposed Development is the embodied carbon (55%) from the materials used in the construction and from emissions associated with construction (27%).

The total estimated carbon generated during the construction phase is **113,103 tCO_2e** as set out in Table 13-28. This equates to an average 3,133 tonnes of CO_2e per km of road development constructed over the 36.1km of proposed road prior to mitigation.

Table 13-28: Estimated GHG Emissions associated with the Construction Phase of the Proposed Development

Source	Total emissions (t CO_2e)	Fraction (%)
Pre-Construction	2,097	2%
Embodied Carbon	62,159	55%
Construction Activities	30,994	27%
Construction Waste	17,853	16%
Total	**113,103**	**100%**
Total Emission per km of Road	**3,133**	

TII have published a Carbon Benchmarking and Analysis for the N22 road development in May 2025 to develop a benchmark for total carbon per km of road construction and examine the fraction of sources that make up the total carbon impact. The report identified 3,673 tonnes of CO_2e per km as the benchmark for construction (including earthworks).

The report also identifies a set of benchmarks for share of the carbon impact. Both embodied carbon and construction activities are reported at 39% each. The embodied carbon reported for the Proposed Development, at 55% of the share, is high relative to that baseline and requires mitigation (refer to section 13.6.1).

With regard to the significance of this impact, the criteria presented in Table 13-5 is referenced as follows:

- The Project's GHG construction phase impacts are partially mitigated through the commitment to use site won material to eliminate the need for imported fill reducing embodied carbon of virgin materials and material transport.
- The Project has not fully complied with existing and emerging policy requirements such as the commitments to employ low carbon construction materials set out in CAP24 and CAP25 and in the Public Sector Climate Action Mandate.
- At a total emission of 113,103 tCO_2e for construction over 5 years, the impact falls short of full contribution to Ireland's trajectory towards net zero.

In terms of Sectoral Emissions Ceilings (SECs), the following emission levels are compared to the relevant SEC aggregated over the construction period:

- The Industry emissions ceiling for the 2026-2030 carbon budget period is 24 $MtCO_2e$. The construction phase embodied carbon emissions of the Project (62,159 tonnes) will be circa 0.26% of this emissions ceiling.
- The Transport emissions ceiling for the 2026-2030 carbon budget period is 37 $MtCO_2e$. The construction phase transport emissions (including waste transport) of the Project (17,667 tonnes) will be circa 0.05% of this emissions ceiling.
- The Other (F-gases, waste, petroleum refining) emissions ceiling for the 2026-2030 carbon budget period is 8 $MtCO_2e$. The construction phase waste emissions of the Project (4,146 tonnes) will be circa 0.05% of this emissions ceiling.

Therefore, on the basis of the criteria set out in Table 13-5 and in the absence of further mitigation to reduce these direct and indirect emissions, the construction of the Proposed Development will have a **moderate adverse** impact on climate which is considered significant.

It is noted that in the scenario where the N14/N15 to A5 Link does not proceed at the time of construction of Section 3, the remainder of Section 3 will be constructed as described in Chapter 4: Project Description

(Sections 4.8.1.1 and 4.13.10). The roundabout at the N14/N15 Lifford Junction including the active travel elements and the part of the N14/N15 to A5 Link up to approximately chainage CH 0+080 will be constructed. This small section of road will be blocked-off from the roundabout to prevent vehicular traffic from entering. This small section of the N14/N15 to A5 Link is necessary to facilitate the construction of the active travel infrastructure and for any potential future construction of the remainder of the N14/N15 to A5 Link to Northern Ireland. The structure for the River Finn Crossing and associated roads will not be constructed in this scenario.

In this scenario the construction phase emissions outlined in Table 13-28 will be reduced including the embodied emissions from the reduced requirement for materials as well as the emissions from excavation and construction activities and material transport.

13.5.1.6 Transboundary Construction Phase GHG Emissions

For construction materials sourced outside of the Republic of Ireland and used on this Project there is potential for transboundary impact in the embodied emissions associated with the mining or manufacture of these materials. For example, if aggregates, bitumen, poured concrete, pre-cast concrete, etc. are supplied by manufacturers in Northern Ireland, the embodied emissions presented in section 13.5.1.2 will be transboundary.

Similarly, the transport of these materials to the site will be through the Northern Ireland road network resulting in transboundary traffic emissions which will be a subset of those quantified in Table 13-24. This is also true in relation to the transport of waste as quantified in Table 13-27 where this waste is transported for disposal or recovery in authorised facilities in Northen Ireland.

There will also be direct transboundary greenhouse gas impact from the construction activities related to the River Finn Crossing (N14/N15 to A5 Link) where works are undertaken on the southern (Co. Tyrone) side. Direct emissions from plant and machinery during all phases of work will be generated and these emissions have been included in the analysis presented in section 13.5.1.

13.5.2 Operational Phase Greenhouse Gas Emissions

Operation phase impacts are predominately related to traffic on the road network but also other sources such as road maintenance (including lighting, road markings, etc.) as described in the following sections. In addition, the potential benefits of the active travel network and other sustainable transport initiatives are addressed.

13.5.2.1 Road Maintenance

The asphalt and other surface treatments for the road pavement will require periodic maintenance through the 60-year operation phase through standard maintenance regimes (refer section 4.15.1). This maintenance regime will require additional materials that, like construction, will result in embodied carbon impacts and these impacts are summarised in Table 13-29. These emissions are predicted to have a **minor adverse** impact on climate which is not considered significant.

Table 13-29: Emissions Associated with Maintenance of the Road Pavement

Section	Total emissions (t CO_2e)
Section 1	5,900
Section 2	5,108
Section 3	6,459
Proposed Development as a whole	**17,467**

13.5.2.2 Active Travel and Modal Shift Emissions

As outlined in section 4.5.6 of Chapter 4, the Proposed Development includes and promotes active travel and responds to the need to promote physical and mental health benefits, and to encourage a modal shift towards cycling and walking modes of transport in the area. To achieve this promotion of health benefits, dedicated shared pedestrian/cycling facilities are provided as part of the Proposed Development.

The active travel networks included throughout Section 1 include 21 km of shared pedestrian / cycle facilities. These facilities include pedestrian / cycle paths located adjacent to and remote from the proposed mainlines, connections to the local road network and connections to local amenity areas and areas of interest, including park and share / cycle facilities.

The active travel network has been designed to provide an amenity facility for leisure use, enhance local access to other amenities (such as football pitches, woodland walks) through active travel and maintain local connectivity through use of active travel.

In addition to the mainline shared cycleway/footway, Section 1 also includes active travel facilities in the following locations:

- Connection to existing active travel network at existing N15 (Dooish) at Ch 0+000 m.
- Connection to existing active travel network at existing N15 (Cappry) at Ch 0+225 m.
- Connection to existing Cappry Rovers Football Club at Ch 1+000 m.
- Connection to existing active travel network at Ballybofey at Ch 1+900 m.
- Connection into existing and proposed woodland facilities at Holywell and Drumboe Woods at Ch 3+275.
- Connection to existing active travel network at Drumboe lower at Ch 3+900 m.
- Connection to existing active travel network at Dunwiley at Ch 4+500 m.
- Connection to facilitate access to Dunwiley ring Fort at Ch 4+900 m.
- Park and Share / Cycle facilities at Ch 1+100 m, 1+750 m and 8+550 m.
- Connection to existing community along the existing N13 (downgraded) at Meenavoy at Ch 8+550 m.

Active travel networks included throughout Section 2 include 16 km of shared pedestrian / cycle facilities. In addition to the mainline shared cycleway/footway, Section 2 also includes active travel facilities in the following locations:

- Connection to St. Patrick's National School at Ch 0+850.
- Connection to existing community at Cullion Road at Ch. 0+550 m.
- Connection to the existing community along the existing N13 Lurgybrack section, also includes a second connection to St Patrick's School.
- Connection to existing Donegal cycle route at Dromore at Ch 2+300 m.
- Connection to an old inactive rail bed and potential future greenway at Dromore.
- Connection to the existing active travel segregated facilities along the N56 Four Lane Road at Dry Arch roundabout.
- Connection to the existing active travel segregated facilities at Ballyraine junction.

- Connection with a proposed Park and Share / Cycle facility and proposed bus stop adjacent to the Dry Arch Roundabout at Ch 0+200 m.

- Connection from Dromore to N13/N14 Pluck Roundabout along the local road network linking communities from Ch 0+000m to 3+650 m.

The active travel networks included throughout Section 3 include 26 km of shared pedestrian / cycle facilities. In addition to the mainline shared cycleway/footway, Section 3 also includes Non-Motorised User (NMU) facilities as part of the cross section in the following locations:

- Ballindrait Link Road Type 2 single carriageway cross-section, which connects the R264 to the existing N14 at Rossgeir.

- A connection from the mainline at Croaghan Hill to Murlough, connecting to the existing R264 near Murlough Chapel and the termination point for the Northwest Greenway Route 3.

- Park and share / cycle facilities at Ch 0+100, 7+600, 14+000 and 17+500.

- Connection to the existing local road network at approximate Ch 2+200 which will facilitate any future greenway project along the disused railway line. An underpass is also being provided where the mainline crosses the disused railway line.

- Numerous connections to the local road network.

In addition, the Proposed Development includes for park and share/ cycle facilities at designated locations to form hubs at which motorists can park their own car and car-share with other motorists to complete an ongoing journey or park their car while drivers utilise the active travel facilities for commuting, exercise or amenity usage.

An assessment of active mode impacts associated with physical cycling and pedestrian om the proposed Project infrastructure was undertaken to support the Preliminary Business Case published in July 2024. An estimated 688 daily cycling trips and an estimated 7,236 pedestrian daily trips have been forecasted based on the analysis undertaken.

Table 13-30 shows the estimated daily cycling and pedestrian trips across each of the journey purposes and illustrate that leisure and tourism account for a significant number.

On the basis that the commuting and education trips may arise as a result of modal shift, these journeys will lead to a total annual number of trips of 45,050 for cycling and 518,660 trips for pedestrian trips (based on a 180 day education calendar and a 250 day work calendar).

Based on the assumption that each of these journeys will replace an average 10 km round trip in a private vehicle (average car emission per kilometre of 0.16725kgCO_2e, DESNZ 2025), the calculated emissions saving per annum from this model shift is estimated at 1,798 tonnes CO_2e per annum.

Table 13-30: Future Daily Cycling and Pedestrian Trips by Journey Purpose and associated Emission Reductions

Journey Purpose	Daily Cycling Trips	Daily Pedestrian Trips
Commuting	137	1,112
Education	60	1,337
Domestic Leisure	304	2,468
Tourism (including domestic and overseas)	183	2,236
Total Daily Trips	**688**	**7,153**
Total Annual Trips (Commuting and Education)	**45,050**	**518,660**
Total Transport Emissions Reduction (tonnes CO_2e)	**75**	**1,723**

The Proposed Development is also designed to integrate with the public transport network to support to modal shift away from private cars to public transport. For example, the proposed bus stop adjacent to the Dry Arch Roundabout at Ch 0+200m in Section 2. The other rural mobility proposals for Donegal, which would be supported by the Proposed Development, include the following:

- Enhanced interurban bus services between Letterkenny, Derry and Strabane along a portion of the N13/N14.
- Improved interurban bus services from Donegal, Letterkenny, and Derry to Dublin, Galway and the south.
- New local bus services from Greencastle to Letterkenny along a portion of the N13.

With regard to the significance of this impact, the criteria presented in Table 13-5 is referenced as follows:

- The active travel and modal shift aspects of the Proposed Development's net GHG impacts are below zero and these will lead to a net reduction in atmospheric GHG concentration through the reduction in private car journeys;
- The project has gone well beyond existing and emerging policy requirements to ensure that these active travel and modal shift elements of the design are fully integrated; and
- The delivery of 63 km of shared pedestrian / cycle facilities aligns the Proposed Development with Ireland's trajectory towards net zero, providing a positive climate impact.

As such, the active travel and modal shift aspects of the Proposed Development are predicted to have a **negligible to beneficial** impact on climate which is not considered significant.

13.5.2.3 Road Traffic Emissions

The current road infrastructure is considered deficient requiring revised alignment to improve safety but also to support a more efficient transport network. For example, Section 1 accommodates strategic and local traffic through the town centres of Ballybofey and Stranorlar, resulting in queuing and delays as the existing infrastructure is insufficient to accommodate current traffic flows. The section of the N56 in Section 2 is a key route into Letterkenny town from the east and south and suffers from particularly heavy congestion during peak hours. Designing out congestion with the new alignment can increase vehicle efficiency and reduce GHG emissions where vehicles are operating at moderate speeds.

TII Guidance (TII 2025a) recommends a future traffic fleet scenario for the REM model that includes the CAP fleet projection for cars, BaU high ambition scenario for LGVs and the EU Target for HGVs. TII advise that this scenario represents a realistic worst case scenario for the purposes of assessing climate impact from road traffic. In addition to the realistic worst case scenario recommended by TII, this assessment also includes a sensitivity analysis to show the scale of impact for each of the following levels of climate policy implementation:

- A high climate ambition scenario whereby all CAP targets for the car, LGV and HGV fleet are implemented in full in compliance with CAP;
- A low climate ambition scenario whereby the strategic policy interventions for reduction of CO_2 from road vehicles are excluded and the BaU low ambition scenario is applied to the car, LGV and HGV fleet.

Predicted changes in traffic (section 6.4 of Chapter 6: Traffic and Transport) have been used to estimate the future generation of transport related GHG. The predicted emissions for operational traffic have been predicted for the following scenarios:

- Opening Year 2032 Do-Minimum and Do-Something (both including and excluding the A5 WTC and the N14/ N15 to A5 Link road in Northern Ireland).
- Design Year 2047 Do-Minimum and Do-Something (both including and excluding the A5 WTC and the N14/ N15 to A5 Link road in Northern Ireland).

Table 13-31 presents the total kilometres travelled for each of the traffic model scenarios above. The results show that the predicted increase in total kilometres travelled under the Do-Something scenario with the Proposed Development in operation is minimal (less than 1%) relative to the Do-Minimum current network. These results indicate that the Proposed Development will not lead to any significant increase or decrease in traffic on the road network but will redistribute traffic around the network through reducing congestion (such as in the town centres of Ballybofey, Stranorlar and the roads into Letterkenny) on a more efficient system with no net change in impact over the Do-Minimum impact.

For the Realistic Worst Case Scenario, the predicted emissions for operational traffic under the above scenarios are presented in Table 13-31. It is noted that the total emissions per annum set out in Table 13-31 do not represent the likely emissions arising from traffic using the Proposed Development, but rather the total emissions from road traffic using all roads across the traffic study area (as defined in Figure 6.1). The likely increase in annual emissions from road traffic that arises from the operation of the Proposed Development is indicated by the difference between the 'Do Minimum' and 'Do Something' scenario, in each of the years set out in the table.

The results for the Realistic Worst Case Scenario indicate that the total traffic emissions decrease in 2032 for all scenarios by circa 12% relative to the baseline (refer Table 13-14) and in 2047 all scenarios decrease by circa 43% relative to the baseline. This reduction is due to the planned and progressive implementation of CAP measures such as the electrification of the fleet and the increased use of biofuels which will reduce the average emissions per vehicle resulting in these decreases.

As such, regardless of the development of the Proposed Development and the A5 WTC, including the N14/ N15 to A5 Link road in Northern Ireland, traffic emissions in the area will decrease in future years as a result of traffic decarbonisation measures included in the Climate Action Plans. This reduction aligns with the projected decreases in national traffic emissions as shown in Figure 13-2 and these decreases are as expected given that these measures represent an increased ambition for EV infiltration and biofuels to the national fleet.

When comparing the Do-Minimum to the Do-Something scenarios in 2032 and 2047 for the Realistic Worst Case Future Fleet Scenario (both with and without the A5 WTC and the N14/N15 to A5 Link), the results show negligible change in total annual emissions (of the order of 1% equating to circa 3,500 tonnes CO_2e without the A5 and circa 1,800 tonnes CO_2e with the A5). As noted above, these results indicate that the Proposed Development will not lead to any significant increase or decrease in traffic on the road network but will redistribute traffic around the network through reducing congestion on a more efficient system with no net change in impact over the Do-Minimum impact. As a consequence, there is no net significant change in total traffic emissions with the Proposed Development in operation relative to the emissions associated with the current road network.

A similar pattern is observed for the High and Low Climate Ambition Scenarios whereby comparing the results of the Do-Minimum to the Do-Something scenarios show negligible change in total annual emissions (of the order of 1%). This sensitivity analysis indicates that regardless of the future realisation of the climate ambition within the State on EVs and biofuels, the Project will have no net significant change in total traffic emissions over the current road network.

In terms of Sectoral Emissions Ceilings (SECs), the 2030 transport emissions ceiling for the final year of 2026-2030 carbon budget period is 6 $MtCO_2e$. The 2032 scenarios illustrate that the additional road transport emissions associated with the Project in 2032 will be at worst without the A5 WTC (at circa 3,500 tonnes CO_2e) and will be circa 0.06% of the 2030 transport SEC. Furthermore, not all of these additional emissions will be in the Republic of Ireland and the transboundary impacts will not be counted in the emissions ceiling.

It is also noted that the beneficial impact associated with active travel, as noted in Table 13-30 at an estimated 1,798 tCO_2e reduction per annum, will further reduce the projected Do-Something road traffic impact presented in Table 13-31.

Table 13-31: Predicted Annual Road Traffic GHG Emissions across the entire of the Traffic Study Area

Year and Scenario	Total Emissions (tonnes CO_2e) per annum		% Change from Do-Something over Do-Minimum
	Do-Minimum	Do-Something	
Total Kilometres (km) Travelled			
2032 (without the A5 WTC)	10,222,720	10,274,989	+0.51%
2032 (with the A5 WTC)	10,195,086	10,212,433	+0.17%
2047 (without the A5 WTC)	11,263,909	11,317,618	+0.48%
2047 (with the A5 WTC)	11,248,040	11,251,509	+0.03%
Realistic Worst Case Scenario			
2032 (without the A5 WTC)	496,764	500,284	+0.7%
2032 (with the A5 WTC)	496,795	498,384	+0.3%
2047 (without the A5 WTC)	318,079	321,459	+1.1%
2047 (with the A5 WTC)	319,507	321,394	+0.6%
High Climate Ambition Scenario			
2032 (without the A5 WTC)	450,894	454,021	+0.7%
2032 (with the A5 WTC)	450,873	452,232	+0.3%
2047 (without the A5 WTC)	273,578	276,717	+1.1%
2047 (with the A5 WTC)	274,989	276,873	+0.7%
Low Climate Ambition Scenario			
2032 (without the A5 WTC)	634,077	638,061	+0.6%
2032 (with the A5 WTC)	633,659	635,132	+0.2%
2047 (without the A5 WTC)	585,819	589,451	+0.6%
2047 (with the A5 WTC)	586,207	586,916	+0.1%

Having regard to the criteria set out in the TII Guidelines (PE-ENV-01104 (TII, 2022a) and PE-ENV-01105 (TII, 2022b)) as set out in Table 13-5, the following considerations apply to the operational road traffic emissions for the Do Something Scenario relative to the Do-Minimum Scenario:

- The Project's GHG impacts have been mitigated through 'good practice' measures – such as the inclusion of active travel infrastructure, supports for modal shift and EV charging infrastructure. TEN-T policy imposes the responsibility to adhere to EU policy standards and requirements, including the AFIR which carries specific requirements for EV charge point coverage on the TEN-T road network for light-duty vehicles, including passenger cars, and heavy-duty vehicles. In the case of the modelled emissions, national measures such as the electrification of the fleet and the biofuels blend as per CAP and these national measures are inherent in the scenario calculations.

- The Project complies with existing and emerging policy requirements, again through the implementation of CAP policy measures such as the inclusion of active travel infrastructure, supports for modal shift and EV charging infrastructure.

- The predictions using the REM model suggest that all future scenarios (Do-Minimum and Do-Something) will decrease relative to the current baseline in line with a trajectory to net zero. This aligns with the EPA national projections showing a net decrease in traffic emissions with CAP implementation (of the order of

21% by 2030 relative to baseline). The results indicate that the Proposed Development will not lead to any significant change in traffic emissions on the road network with no net change in impact over the Do-Minimum impact. The analysis shows that Do-Something scenario results in an equivalent decrease in future years to that presented for the Do-Minimum scenario and does not in any way inhibit the projected trajectory towards net zero.

With these factors considered, the net impact on climate of the operational phase traffic emissions is classed as **minor adverse** in the long term which is not considered significant. While projected emissions are negligible relative to the Do-Minimum scenario, any emissions of GHG represents an adverse impact, albeit a minor adverse impact.

13.5.2.4 Transboundary Operation Phase Greenhous Gas Emissions

Details of the traffic modelling is presented in section 6.2.2 of Chapter 6: Traffic and Transportation Assessment and it is noted that the traffic model includes the road network in Northern Ireland. As such, the total emissions from road transport presented in section 13.5.2.3 includes the transboundary emissions that will be generated on the Northern Ireland road network. This includes the traffic emissions both with and without the N14/N15 to A5 link. As shown, the impact of the Project on traffic generated emissions is minimal with limited impact over the projected Do-Minimum scenario so these transboundary impacts are not considered significant.

13.5.3 Construction Phase Climate Change Risk

13.5.3.1 Sensitivity Analysis

As per TII Guidance, a sensitivity analysis was carried out on all construction elements (construction compounds, processing areas, material storage areas, etc.) to identify which climate hazards are relevant to the construction phase of the Proposed Development. The sensitivity of the Proposed Development to the climate hazards is assessed irrespective of the project location or section. Table 13-32 presents the sensitivity analysis and the rationale for the sensitivity score for the construction of the project, based on Table 13-6.

Table 13-32: Sensitivity Analysis of Climate Hazards to the Construction Phase

Climate Hazard	Sensitivity	Sensitivity Score
Flooding (Coastal)	Medium sensitivity to all types of flooding. Excavations, foundations, and fresh-cut earthworks can become unstable when saturated and are exposed to erosion, wash-out and settlement. Large, deep excavations will be required for the larger structures and bridges. Being at a low level these excavations are vulnerable to flood events as well as any partially completed structures, materials and plant working in the excavation. Inundation of pipeline trenches can channel water over long lengths, wash in materials, destabilise the trench and cause floatation of the pipe. Large areas can be exposed and may be difficult to protect. Water damaged mechanical and electrical plant and equipment may become non-compliant with quality specifications and warranties making it difficult to repair.	2
Flooding (Pluvial)		2
Flooding (Fluvial)		2
Extreme Heat	Medium sensitivity to extreme heat. Extreme heat can cause concrete to crack, difficulties in managing bitumen or other materials, and can delay works through cessation of works to protect outdoor workers.	2
Extreme Cold	Generally medium sensitivity to the assets under construction. Extreme cold can cause concrete to crack, pipes to burst impacting the integrity of pavements and structures. Extreme cold can result in cessation or delay in construction works such as for pouring concrete.	2
Wildfire	All assets are considered to have a medium sensitivity to wildfires. Such fires can cause significant asset damage, cease construction and impact on the health of workers and the community. Drainage assets have a medium direct sensitivity to wildfires but may be impacted by firefighting water.	2

Climate Hazard	Sensitivity	Sensitivity Score
Extreme Wind	Low sensitivity to extreme wind on most assets with the exceptions of cranes or other elevated operations which have a medium sensitivity to extreme winds or storms but such plant is designed to work in such conditions.	2
Drought	Low sensitivity to drought on all assets with the exceptions of landscaping works which has a high sensitivity to drought.	1
Lightning and Hail	Low sensitivity to lightning and hail for all assets. Potential for short term interruptions to works.	1
Fog	Low sensitivity to fog for all assets. May have short term impacts on cranes or other elevated operations but not significant.	1

13.5.3.2 Exposure Analysis

In relation to the short term construction phase, the greatest vulnerability relates to flood risk and a separate flood risk assessment of the Project has been undertaken (refer to Section 11.6 of Chapter 11: Water) and is used to inform this assessment. Flooding risks to the lands and properties during the construction stage may result from the following construction stage activities:

- Temporary paved surfaces or roofed areas of site compounds may increase the rate of runoff.
- Temporary bunding or material stockpiles may alter runoff from upstream areas.
- Large areas stripped of vegetation can discharge runoff at a much higher rate than if grassed.
- Inadequate sizing of temporary flow diversion channels could cause flooding to the adjacent lands and properties.

The flood risk assessment concluded that with the prescribed mitigation there are no significant construction phase effects on flooding and no flooding effects on construction. At all crossings, encroachments within floodplains to existing watercourses have been minimised such that any increase in flood levels in the upstream or downstream vicinity due to flood volume storage loss would be minimal. At all culvert and bridge crossings adequate freeboard is available (refer Chapter 11: Water).

At some locations the construction of the Proposed Development and its associated road drainage system will lead to the interception of overland flow by the road drainage system, with subsequent discharge to nearby watercourses. This may lead in some cases to a very small degree of diversion and concentration of overland flow that would otherwise have discharged to a different watercourse.

The design for the Proposed Development has taken this into account and includes for materials to reduce the risk of loss of fines which could impact on the sensitive ecology in the area and also includes platforms with the minimum thickness required to provide stability for machinery and plant to operate safely. This flood risk assessment is further described in Chapter 11: Water.

With these controls in place the climate vulnerability of the construction phase of the Project is considered to have a low likelihood coupled with a potential moderately adverse severity which, when combined is not considered significant. Table 13-33 presents the rationale for the exposure scoring for the construction phase, based on Table 13-7.

Table 13-33: Exposure Analysis based on Past and Predicted Climate Events during the Construction Phase

Climate Event	Detail	Exposure Score
Flooding (Coastal)	Low exposure for Section 1 given the distance of the alignment to the coast. In Section 2, the River Swilly Estuary is tidally impacted and was modelled under the Irish Coastal Wave and Water Level Modelling Study in 2018 and determined that both the River Swilly and Isle Burn floodplains and much of the Bonagee Junction are liable to flooding from the 0.5% AEP tidal event. In Section 3, there is known tidal and coastal flooding risk at Manorcunningham, Swilly Burn to the east of Raphoe, the River Deele to West of Lifford and the River Finn at Lifford. Medium exposure at Sections 2 and 3.	2
Flooding (Pluvial)	Medium - for Section 1 and Section 2, the flood risk assessment predicts a slight increase in flood level in the upstream vicinity of the proposed bridge and culvert crossings. This is very localised and will not cause flooding to the adjacent lands and properties. Any increases in flood levels due to flood volume storage loss likely to be caused by any encroachments of road embankments in the existing floodplains or from any increased road runoff volume, are predicted to be imperceptible. For Section 3, the assessment predicts the flood impact of the Proposed Development ranging from negligible to moderate adverse, depending on the area of the receiving watercourse catchment (magnitude of impact increases with decreasing catchment area).	2
Flooding (Fluvial)	Medium exposure, the CFRAM mapping at project locations indicates that there is a moderate probability of localised river flooding, i.e. approximately a 1-in-a-10 chance of occurring or being exceeded in any given year. The alignment of Section 1 and its associated link roads cross several fluvial floodplain areas as a result of the nature of transport infrastructure which in some cases it is unavoidable. Fluvial flooding risk is from the River Finn, Backlees Stream, Cloghroe River (a tributary of River Deele), Mullaghgarry River and other smaller tributary drains. The N13 alignment of Section 2 (between Ch.3+350 & Ch. 3+450) encroaches on the 1% AEP flood extents of the Isle Burn (Leslie Hill) stream. Section 3 is subject to fluvial flooding from the Leslie Hill Stream, Swilly Burn, River Deele, River Finn and smaller tributary drains.	2
Extreme Heat	Extreme heat is rated as medium exposure for these project locations as per Table 13-7. According to the 1991–2020 climate data, the absolute maximum temperature recorded was 25.9 °C, occurring in both July and August. A medium exposure rating is appropriate despite the historically lower absolute temperatures at the project locations.	2
Extreme Cold	Extreme cold is rated as medium exposure. The absolute minimum temperature recorded between 1991–2020 was –5.2 °C in December (Table 13-15). The mean number of days with air frost per year is 7, and ground frost occurs on average 29 days annually, indicating occasional but not extreme cold events. These figures support a medium exposure classification due to infrequent but potentially disruptive cold spells at the project locations.	2
Wildfire	Wildfire is rated as medium exposure. While no wildfires have been recorded at the project locations, summer conditions can include prolonged dry spells. The data in Table 13-15 shows July and August receive 86.0 mm and 97.8 mm of rain respectively, with moderate sunshine (average 4.7 hours/day) and mean daily max temperatures up to 17.1 °C. Though not highly conducive to wildfire ignition, drier summers and climate change trends justify a precautionary medium exposure rating. Sections 1 and 2 have some adjacent forestry so risk is higher than in Section 3.	2

Climate Event	Detail	Exposure Score
Extreme Wind	Extreme wind is rated as high exposure. The project locations experience an annual mean wind speed of 7.8 knots, with maximum gusts reaching 96 knots and a maximum 10-minute mean wind speed of 68 knots (Table 13-15). The station records an average of 57.2 gale days per year, confirming frequent and potentially damaging wind events, especially during winter months, which supports the high exposure classification.	3
Drought	Drought is rated as medium exposure. Despite generally high rainfall with mean annual total 1,138.1 mm, there are seasonal variations, with May receiving only 65.0 mm on average—the driest month (Table 13-15). However, the relatively consistent number of rain days (mean of 245.5 days/year with ≥0.2 mm) indicates that prolonged dry periods are infrequent.	2
Lightning and Hail	Lightning and hail are rated as high exposure. According to the dataset, the mean number of days with hail is 9.7, and mean thunder days is 5.5, representing around 3% of the year. These events, while not daily occurrences, are regular enough to justify a high exposure rating due to their potential to disrupt infrastructure and pose safety risks.	3
Fog	Fog is rated as high exposure. The Malin Head station recorded an average of 41.5 fog days per year between 1981 and 2010, equating to over 11% of the year.	3

Based on the estimated sensitivity and exposure the vulnerability of the construction phase may be assessed and is summarised in Table 13-34. The analysis indicates that extreme wind represents the highest vulnerability and this element is considered in more detail under the climate risk assessment.

Table 13-34: Vulnerability Analysis for the Construction Phase

		Exposure		
		Low	**Medium**	**High**
Sensitivity	**Low**		Drought	Lightning and Hail, Fog
	Medium		Flooding (Coastal), Flooding (Pluvial), Flooding (Fluvial), Extreme Heat, Extreme Cold, Wildfire	Extreme Wind
	High			

13.5.3.3 Climate Risk Assessment

The TII guidance presents a sample risk framework to assess climate risks based on the framework detailed in the EU Technical Guidance on Climate Proofing (2021). This sample framework has been adopted for the Proposed Development to evaluate the risk associated with the high risk hazards on the construction phase of the Proposed Development. This risk register is presented in Table 13-35 based on the RCP4.5 moderate emissions scenario.

The register shows that with the planned controls in place (as listed in Table 13-35) with regard to the construction of the Proposed Development, the risk to the construction phase from extreme wind has been mitigated to reduce the likelihood of such an event having a significant adverse impact. As such, the risk of high winds has been suitably managed through the planned controls to reduce the risk from climate change to not significant. These planned controls will form part of the Environmental Operating Plan (EOP) for the construction phase.

In short, the vulnerability of the construction phase of the Proposed Development to climate change has been suitably mitigated and the potential impact is considered to be **minor adverse**, which is not considered significant in EIA terms.

Table 13-35: Climate Risk Register for the Construction Phase

Risk Identification					Risk Assessment				Significance
Risk ID	Climate Variable	Risk Statement	Project Receptors	Impact Type	Planned Controls	Initial Risk Rating (RCP4.5)			
						Likelihood	Consequence	Risk Rating	
1a	Extreme Wind during Construction	Cranes or other elevated operations which have a high sensitivity to extreme winds.	Cranes, jibs, masts or other elevated working operations.	Asset damage, human health and financial (project delays).	Lifting operations will be programmed in advance of a favourable weather window of sufficient duration to complete the works. This will form part of the Environmental Operating Plan (EOP) for the construction phase.	Unlikely	Moderate	Medium	Not Significant
1b	Extreme Wind during Construction	Construction of bridges or elevated structures	All elevated working operations on plant or in elevated or exposed areas.	Asset damage, human health and financial (project delays).	The safety team will monitor weather forecasts and warnings and will devise a set of clear restrictions on works in these elevated or exposed areas during weather warnings for the country or at winds speeds above a safe threshold (e.g. 10m/s). This will form part of the Environmental Operating Plan (EOP) for the construction phase.	Unlikely	Moderate	Medium	Not Significant

13.5.3.4 Transboundary Construction Phase Climate Change Risk

There is a known risk of fluvial, tidal and coastal flooding at the River Finn at Lifford and this risk equally applies on the Northern Ireland side of the border around Strabane. This range of flooding risks have been considered in this assessment and are considered not significant during construction with planned controls in place.

13.5.4 Operation Phase Climate Change Risk

The approach to assessing the climate risk associated with the operation phase is the same as that presented for the construction phase in section 13.5.3.

13.5.4.1 Sensitivity Analysis

The climate sensitivity of the operation phase is different to that of the construction phase given the change in nature of a construction operation versus that of a transport asset. Table 13-36 presents the sensitivity analysis and the rationale for the sensitivity score for the operation phase of the Proposed Development. The key risks identified in the NCCRA (EPA, 2025c) for transport infrastructure have been used to inform this analysis. These include the risk of disruption, damage, and loss of transport infrastructure due to sea level rise, coastal erosion, and coastal flooding.

Table 13-36: Sensitivity Analysis of Climate Hazards to the Operation Phase

Climate Hazard	Sensitivity	Sensitivity Score
Flooding (Coastal)	Risk of disruption, damage and loss of transport and infrastructure due to sea level rise, coastal erosion and coastal flooding. Low sensitivity at Section 1 given the distance of the alignment to the coast. Medium sensitivity at Sections 2 and 3 given the known risks identified in the flood risk assessment but these risks have been resolved through the design of the infrastructure to result in a managed residual coastal flood risk.	2
Flooding (Pluvial)	Risk of disruption and damage to transport infrastructure due to extreme precipitation and flooding (fluvial, surface water, and groundwater).	2
Flooding (Fluvial)	The additional hard standing over existing greenfield areas due to the construction of the mainline and active travel routes have the potential to increase peak run-off rates, which could further exacerbate flood risk in the area. This is mitigated by the proposed drainage design described in Chapter 4: Project Description. For all sections there is a slight increase in flood level predicted in the upstream vicinity of some culvert crossings. This is very localised and within the OPW Section 50 guidelines specified head loss of 300 mm. This is very localised and will not cause flooding to the adjacent lands and properties. Any increases in flood levels due to flood volume storage loss likely to be caused by any encroachments of road embankments in the existing floodplains or from any increased road runoff volume, are predicted to be imperceptible. Section 2 – similar to above and there is one long term direct significant effect at the River Swilly crossing with an increase in inundated flood areas from the existing to proposed scenarios under the design flood condition. The predicted increases in fluvial flood flows of 20% is considered and catered for in the design which aligns to what climate scenario RCP4.5. Overall sensitivity is classed as Medium.	2
Extreme Heat	Medium sensitivity to extreme heat. Risk of disruption and damage to transport infrastructure due to extreme heat. Potential to cause some deterioration in pavement surfaces (roads and cycleways) over time but readily resolved with a scheduled maintenance programme.	2

Climate Hazard	Sensitivity	Sensitivity Score
Extreme Cold	Medium sensitivity to extreme cold whereby the asset suffers short term and limited impact such as disruption and damage to transport infrastructure but prolonged or severe ice or snow may result in more significant road closures or other economic or social impacts (such as the closure or reduced uptake of active travel infrastructure).	2
Wildfire	All assets are considered to have a medium sensitivity to wildfires. Can cause some surface damage to the transport corridor and may lead to road closures impacting with economic or social impacts. Sensitivity for fires in the active travel routes as a result of higher population exposure in this area.	2
Extreme Wind	Low sensitivity to extreme wind on most assets with the exceptions of lighting or signposts which have a medium sensitivity to extreme winds. May reduce the attractiveness of the active travel measures reducing the community uptake of this modal route in winter months.	2
Drought	Low sensitivity to drought on all assets with the exceptions of landscaping works which has a high sensitivity to drought.	1
Lightning and Hail	Low sensitivity to lightning and hail for all assets.	1
Fog	Low sensitivity to fog for all assets. Potential to affect road safety.	1

13.5.4.2 Exposure Analysis

In relation to the longer term operation phase the levels of exposure are similar to those for the construction phase (Table 13-37) but the longer term climate projections are more relevant for the lifetime of the Project. Table 13-37 presents the rationale for the exposure scoring for the construction phase, based on Table 13-7.

Table 13-37: Exposure Analysis based on Past and Predicted Climate Events during the Construction Phase

Climate Event	Detail	Exposure Score
Flooding (Coastal)	Rising sea levels projections under a high emissions scenario indicate an increase of up to 0.20 m by 2050 which will increase the frequency of coastal inundation in coastal areas (CFRAMS). As per the construction phase: • Low exposure for Section 1 given the distance of the alignment to the coast. • Medium sensitivity in Section 2 given that both the River Swilly and Isle Burn are liable to flooding. • Medium sensitivity in Section 3, where there is known tidal and coastal flooding risk at Manorcunningham, Swilly Burn, the River Deele and the River Finn.	2
Flooding (Pluvial)	Pluvial flooding is rated as medium exposure. Climate projections indicate an increase in the frequency of heavy rainfall days (days with precipitation >30mm) for County Donegal with some areas projected to see increase of up to 80%. This will likely result in an increased frequency of associated fluvial and pluvial flooding. As per the construction phase: • Medium sensitivity for Section 1 and Section 2 where the flood risk assessment predicts a slight increase in flood level. • Low sensitivity for Section 3 where the flood impact of the Proposed Development range from negligible to moderate adverse.	2
Flooding (Fluvial)	As per the construction phase, medium exposure at all sections based on CFRAM mapping.	2
Extreme Heat	Given Ireland's changing climate and the increasing likelihood of future heatwaves, a medium exposure rating is appropriate despite the historically lower absolute temperatures at the project locations. The Donegal Climate Action Plan predicts that under a high emission scenario, projections indicate that heatwaves will become more frequent by mid-century.	2

Climate Event	Detail	Exposure Score
Extreme Cold	As per the construction phase. extreme cold is rated as medium exposure. Because of the increasing temperatures, a decrease in the number of frost days and ice days is projected for the 2041-2060 period when compared with the baseline period of 1981 to 2000. The annual snowfall in the region is projected to decrease substantially by the middle of the century.	2
Wildfire	As per the construction phase, wildfire is rated as medium exposure.	2
Extreme Wind	Extreme wind is rated as high exposure. Projections for Donegal indicate that by mid-century, average wind speed will remain similar to those currently experienced. There is limited evidence of a potential increase in the frequency of more intense storms.	3
Drought	Drought is rated as medium exposure. Summer rainfall is expected to reduce in the future when compared with the baseline period of 1981 to 2000, in both the RCP4.5 and RCP8.5 scenario contributing to potential increased frequency of drought conditions in the county.	2
Lightning and Hail	Lightning and hail are rated as high exposure. These events, while not daily occurrences, are regular enough to justify a high exposure rating due to their potential to disrupt infrastructure and pose safety risks.	3
Fog	Fog is rated as high exposure. Persistent fog conditions, particularly in autumn and winter, can impact visibility and transport, supporting a high exposure score.	3

13.5.4.3 Climate Risk Assessment

Based on the estimated sensitivity and exposure, the vulnerability of the operation phase may be assessed and is summarised in Table 13-38. The analysis indicates that extreme wind represents the highest vulnerability. This element is considered in more detail under the climate risk assessment.

Table 13-38: Vulnerability Analysis for the Operation Phase

		Exposure		
		Low	**Medium**	**High**
Sensitivity	**Low**		Drought	Lightning and Hail, Fog
	Medium		Flooding (Coastal), Flooding (Pluvial), Flooding (Fluvial), Extreme Heat, Extreme Cold, Wildfire,	Extreme Wind
	High			

The risk framework to evaluate the risk associated with the high risk hazards on the operation phase of the Project is presented in Table 13-39 based on the RCP4.5 moderate emissions scenario. The register shows that with the planned controls in place (as listed in Table 13-39) with regard to the operation of the Proposed Development, the risk to the Project from extreme wind has been mitigated to reduce the likelihood of such an event having a significant adverse impact. As such, the risk of high winds has been suitably managed with planned controls to reduce the risk of climate change to not significant.

In short, the vulnerability of the Proposed Development to climate change has been suitably mitigated and the potential impact is considered to be **minor adverse** when considering the criteria in section 13.3.7.2, which is not considered significant in EIA terms.

Table 13-39: Climate Risk Register for the Operation Phase

Risk Identification					Risk Assessment				Significance
Risk ID	Climate Variable	Risk Statement	Project Receptors	Impact Type	Planned Controls	Initial Risk Rating (RCP4.5)			
						Likelihood	Consequence	Risk Rating	
7a	Extreme Wind during Operation	Damage to utilities or landscaping	Lighting masts and or elevated road signs.	Asset damage.	Road lighting will be mounted on galvanised steel lighting columns up to a maximum of 12 m high above finished road level. The lighting will be designed to the appropriate Lighting Class in compliance with BS 5489-1: Code of Practice for the Design of Road Lighting.	Unlikely	Minor	Medium	Not Significant
7b	Extreme Wind during Operation	Damage to road infrastructure	Overbridges and other elevated road structures.	Asset damage.	All bridges and structures have been designed to account for the wind loading in County Donegal and wind forces are suitably distributed across the structure to ensure the stability and safety of all bridges and structures.	Rare	Moderate	Medium	Not Significant
7c	Extreme Wind during Operation	Damage to cycle/pedestrian infrastructure	Active travel infrastructure overbridges and other elevated structures.	Asset damage.	As above	Rare	Moderate	Medium	Not Significant

13.5.4.4 Transboundary Construction Phase Climate Change Risk

As noted, there is a known risks of fluvial, tidal and coastal flooding at the River Finn at Lifford and this risk equally applies on the Northern Ireland side of the border around Strabane. This range of flooding risks has been considered in this assessment and is considered not significant during operation based on the Project design.

13.5.5 Indirect Impacts

There are no significant indirect climate impacts associated with the Proposed Development. While the CAP ambition to a national electrification of the fleet will reduce tailpipe emissions on all roads but increase emissions from electricity generation, these emissions will arise regardless of the Proposed Development.

13.6 Mitigation Measures

The mitigation measures devised for this Project are based on the mitigation hierarchy published by IEMA in the Implementing the Mitigation Hierarchy from Concept to Construction (IEMA, 2024). The priority in this guidance is to Avoid, Prevent, Reduce and then Offset carbon impacts.

13.6.1 Construction Stage Mitigation Measures

As noted earlier in this chapter, CAP25 sets out the following key targets for embodied carbon in materials: *Decrease embodied carbon in construction materials produced and used in Ireland by at least 30% by 2030.*

Furthermore, the implementation of the Public Sector Climate Action Mandate is an action identified in Chapter 9 (Public Sector Leading by Example) of CAP25. The Public Sector Climate Action Mandate is included at Appendix 1 to CAP25 and includes Action 3.5.1 which is:

> *Specify low carbon construction methods and low carbon cement material as far as practicable as per guidance issued by Department of Enterprise, Trade and Employment for directly procured or supported construction projects from 2024.*

To support this action, government guidelines mandate a minimum of 30% clinker substitution in concrete products used in government and public works projects (consistent with IS EN 206).

To comply with these actions and targets of CAP25, and to reduce the GHG emissions arising from the Proposed Development and thereby reduce the likely significant effects of the Proposed Development on Climate, the following mitigation measures have been embedded in the design of the Project:

- As a replacement for traditional precast concrete materials made with CEM1 cement mixes, the Proposed Development will use a minimum of 50% ground granulated blast-furnace slag (GGBS) cement for all structural and non-structural precast structures, kerbs, drains, etc. The carbon intensity of 50% GGBS replacement is the mitigated baseline value and any concrete or the same functional properties and equivalent, or lower, carbon is suitable.

- Similarly, all concrete poured *in-situ* for the Proposed Development will consist of a minimum of 50% GGBS (or alternative clinker replacement) cement.

Donegal County Council will revisit this mix during detailed design to achieve greater embodied reductions, if possible, based on industry practices available at the time.

The impact of the use of this low carbon cement material is presented in Table 13-40 which shows the baseline levels of embodied carbon in concrete relative to the mitigated levels of embodied carbon in concrete. The total embodied carbon saved by this measure equates to 11,561 tonnes CO_2e. This saving is equivalent to 19% of the total embodied carbon in concrete and cement estimated for the Proposed Development in the baseline. This reduction is aligned with the CAP25 target to decrease embodied carbon in construction materials produced and used in Ireland by at least 30% by 2030.

Table 13-40: Mitigation of Embodied GHG in Construction Materials

Material	Total Baseline GHG (tonnes CO_2e)	Total GHG after Mitigation (tonnes CO_2e)
Precast concrete structures, kerbs, drains, etc. and poured concrete	32,168	20,607

In terms of the SEC for Industry for the 2026-2030 carbon budget period at 4 $MtCO_2e$, the total mitigated embodied carbon emissions of the Project (50,598 tonnes) will be circa 0.21% of this emissions ceiling.

Other mitigation aspects of the construction phase that have been designed in and committed to in the development include:

- The Proposed Development will employ Warm Mix Asphalt (WMA) in line with TII standards. WMA are produced at lower temperatures, typically 20-40°C lower, compared to equivalent Hot Mix Asphalts (HMA) reducing energy consumption and embodied GHG emissions.
- Optimisation of the sizes of key structures and concrete needs to design out any excess carbon needs.
- Optimisation of the cut/fill balance to ensure that the transport of material to and from the site is minimised thereby minimising transport emissions.
- Material disposal areas are located close to the project site and within the redline boundary of the Proposed Development. As above this reduces transport emissions from material haulage.
- Within the Project detailed design, concrete need is minimised by specifying non-concrete assets where possible such as gravel footpaths, grassed drains, etc.
- Reduction in the need for barriers or vehicle restraint systems through passive design to reduce the overall steel requirement on the Proposed Development.
- Use of sustainable timber post fencing over steel in boundary treatments.

In addition to the commitment to use low carbon construction materials, the additional climate mitigation measures that will be implemented during the construction phase are:

- Regular maintenance of construction plant machinery to maintain operational efficiency.
- Turning off machinery engines when not in use.
- Enacting measures to reduce the use of private vehicles to get to site (e.g., public transport and car sharing and maximising the amount of local labour).
- For electricity generation at site compounds, an electric grid connection will be employed as default or the use of hydrogen generators or electrified plant will be used instead of traditional diesel generators.
- Where feasible, electric powered mobile plant should be used on site in favour of diesel powered plant.

The committed mitigation measures will be tracked through a Project Carbon Management Plan (PCMP) which will be developed in accordance with PAS 2080 (Carbon Management in Infrastructure). The PCMP is used to monitor and report on the above committed carbon management measures and all other climate measures adopted during the design, procurement and construction phases. Contractors will be obliged to provide a PCMP as part of the tendering for the project and will be evaluated on the commitments for further carbon reductions.

13.6.2 Operational Stage Mitigation Measures

Regarding road maintenance, the mitigation measures specified for construction in relation to the use of material with low embodied carbon (such as 50% clinker replacement cement/concrete) will continue to apply.

There are a number of operational measures included in the design of the Proposed Development to promote active travel and to mitigate emissions from road traffic:

- The combined active travel networks in the Proposed Development equate to 63 km of shared pedestrian/ cycle facilities. This equates to 7% of the national target for the advance roll-out of 1,000 km walking/cycling infrastructure (CAP23 Action TR/23/29).
- These facilities include pedestrian/ cycle paths located adjacent to and remote from the proposed mainlines, connections to the local road network and connections to local amenity areas and areas of interest, including park and share/ cycle facilities.
- The park and share/ cycle facilities are provided at designated locations across all three sections of the Proposed Development and form hubs at which motorists can park and car share with other motorists or avail of public transport (public bus) to complete an ongoing journey or park their car while drivers utilise the active travel facilities for commuting, exercise or amenity. Immediate access to the wider active travel network is provided at each park and share/ cycle facility.
- The park and share/ cycle facilities are equipped with car parking spaces; cycles stands and landscape picnic areas. While it is not proposed to provide toilet facilities with this project, each park and share/ cycle area will have service connections to utilities to enable the expansion of the facility in the future. Charging facilities for electric vehicles will also be provided. Immediate access to the wider active travel network is provided at each park and share/ cycle facility.
- Access to local amenities and the local active travel network (existing footways, cycleways) will be provided at interface points with the proposed active travel network for the project to ensure connectivity between proposed and existing networks.

Separate to the active travel mitigation listed above, the following mitigation will also be implemented during the operation phase:

- Public lighting has been incorporated into the design of the Proposed Development. These public lighting installations will use a photocell to only be on when required. These lighting fixtures will include a Central Management System, to communicate what is required with lighting (e.g., dimming).
- Removal of traffic congestion and idle traffic with an increase to efficiency (this is particularly the case for Section 1 in the town centres of Ballybofey and Stranorlar and in Section 2 within the town of Letterkenny).
- In terms of carbon sequestration, there is a potential for tree planting in the surrounding areas.

Regarding climate resilience, sustainable drainage systems (SuDS) has been employed in the design of the surface water collection systems for the main infrastructure including the road alignment, the park and share facility, etc. (refer section 11.2.7 of Chapter 11: Water).

13.7 Cumulative Effects

With respect to the requirement for a cumulative assessment PE-ENV-01104 (TII, 2022a) states that *'as the identified receptor for GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable*.'

A cumulative impact assessment has been undertaken to consider potential for cumulative impact of the Proposed Development with other relevant plans and projects. The climate assessment for cumulative impact is presented in Chapter 19: Interactions and Cumulative Effects.

13.8 Summary

The climate impacts of the Proposed Development have been considered and assessed during the construction and operational phases.

13.8.1 Construction Phase Greenhouse Gas Emissions

The TII criteria for defining magnitude in this chapter for the GHG Assessment are outlined in Table 13-5. With regard to the significance of this impact, the criteria presented in Table 13-5 is referenced as follows:

- The project's GHG construction phase impacts are mitigated through good practice measures such as the commitment to use site won material to eliminate the need for imported fill and the use of low carbon materials such as GGBS (or alternative clinker replacement) cement to reduce embodied carbon by circa 19%. The 50% commitment goes well beyond the government's procurement guidelines of 30% clinker replacement for public projects.

- The project has complied with (or exceeded in respect to the clinker replacement above) existing policy requirements (CAP23, CAP24 and CAP25) such as the commitment to employ low carbon construction materials in the Public Sector Climate Action Mandate which is:

  Specify low carbon construction methods and low carbon cement material as far as practicable as per guidance issued by Department of Enterprise, Trade and Employment for directly procured or supported construction projects from 2024.

  Furthermore, the commitment to reduce embodied carbon in construction materials on the project by 19% will contribute to the targets for reduced embodied carbon in such materials as set out in CAP24 and CAP25.

  As such, Donegal County Council has designed the construction aspects of the Proposed Development to be fully consistent with the relevant policies and actions contained within the climate policies.

- By specifying these low carbon materials from material suppliers in Ireland, the Proposed Development will contribute to Ireland's trajectory towards net zero through supporting the Industry Sector response to the CAP commitments to reduce embodied carbon in materials manufactured and used in Ireland.

In terms of Sectoral Emissions Ceilings (SECs), the following emission levels are compared to the relevant SEC aggregated over the construction period:

- The Industry emissions ceiling for the 2026-2030 carbon budget period is 24 $MtCO_2e$. The mitigated construction phase embodied carbon emissions of the Project (50,598 tonnes) will be circa 0.21% of this emissions ceiling.

- The Transport emissions ceiling for the 2026-2030 carbon budget period is 37 $MtCO_2e$. The construction phase transport emissions (including waste transport) of the Project (17,667 tonnes) will be circa 0.05% of this emissions ceiling.

- The Other (F-gases, waste, petroleum refining) emissions ceiling for the 2026-2030 carbon budget period is 8 $MtCO_2e$. The construction phase waste emissions of the Project (4,146 tonnes) will be circa 0.05% of this emissions ceiling.

As such, the construction of the Proposed Development is predicted to have a direct and indirect (in the case of embodied carbon) **minor adverse** short term impact on climate which is not considered significant.

13.8.2 Operational Phase Greenhouse Gas Emissions

The asphalt and other surface treatments for the road pavement will require periodic maintenance through the operation phase. This maintenance regime will require additional materials that, like construction, will result in embodied carbon impacts but these emissions are predicted to have a direct and long term **minor adverse** impact on climate which is not considered significant. Where low carbon materials are employed, such as the GGBS or alternative clinker replacement cement committed to for construction, these will also be employed in maintenance.

With regard to the significance of this impact, the criteria presented in Table 13-5 is referenced as follows:

- The active travel and modal shift aspects of the Proposed Development's net GHG impacts are below zero and these will lead to a net reduction in atmospheric GHG concentration through the reduction in private car journeys.

- The project has gone well beyond existing and emerging policy requirements to ensure that these active travel and modal shift elements of the design are fully integrated.

- The delivery of 63 km of shared pedestrian/ cycle facilities aligns the Proposed Development with Ireland's trajectory towards net zero, provides a positive climate impact and equates to 7% of the national target for the advance roll-out of 1,000 km walking/cycling infrastructure (CAP23 Action TR/23/29).

As such, the active travel and modal shift aspects of the Proposed Development are predicted to have a **negligible to beneficial** impact on climate which is not considered significant.

With regard to significance of the operational road traffic emissions relative to the assessment criteria in Table 13-5:

- The Project's GHG impacts have been mitigated through 'good practice' measures – such as the inclusion of active travel infrastructure, supports for modal shift and EV charging infrastructure. In the case of the modelled emissions, national measures such as the electrification of the fleet and the biofuels blend as per CAP and these national measures are inherent in the scenario calculations.

- The Project complies with existing and emerging policy requirements, again through the implementation of CAP policy measures such as the inclusion of active travel infrastructure, supports for modal shift and EV charging infrastructure.

- The predictions using the REM model suggest that all future scenarios (Do-Minimum and Do-Something) will decrease relative to the current baseline in line with a trajectory to net zero. This aligns with the EPA national projections showing a net decrease in traffic emissions with CAP implementation (of the order of 21% by 2030 relative to baseline). The results indicate that the Proposed Development will not lead to any significant change in traffic emissions on the road network with no net change in impact over the Do-Minimum impact. The analysis shows that Do-Something scenario results in an equivalent decrease in future years to that presented for the Do-Minimum scenario and does not in any way inhibit the projected trajectory towards net zero.

In terms of SEC, the 2030 transport emissions ceiling for the final year of 2026-2030 carbon budget period is 6 $MtCO_2e$. The 2032 Do-Something scenario illustrate that the additional road transport emissions associated with the Project in 2032 without the A5 WTC (circa 3,500 tonnes CO_2e) will be circa 0.06% of the 2030 transport emissions ceiling.

With these factors considered, the net impact on climate of the operational phase traffic emissions is classed as a direct and long term **minor adverse** with a potential transboundary impact given the wider road network modelled into Northern Ireland, which is not considered significant. While projected emissions are negligible relative to the Do-Minimum scenario, any emissions of GHG represents an adverse impact.

13.8.3 Construction Phase Climate Change Risk

With regard to significance of the Construction Phase CCR relative to the assessment criteria in Table 13-11, the vulnerability of the works to climate change will be suitably mitigated and the potential impact is considered to be low with a short term direct **minor adverse** impact to climate adaption given the control measures to be implemented during construction.

13.8.4 Operation Phase Climate Change Risk

With regard to significance of the Operation Phase CCR relative to the assessment criteria in Table 13-11, the vulnerability of the infrastructure to climate change will be suitably mitigated and the potential impact is considered to be low with a long term direct **minor adverse** impact to climate adaption with the flood control measures adopted in design and the wider design for resilience.

13.8.5 Project Residual Impact

IEMA guidance (IEMA, 2020) requires an assessment of the climate impact of the project as a whole through construction and operation. Based on the above analysis, the project's GHG impacts are mitigated through 'good practice' measures, the project has complied with existing and emerging policy requirements and is in line to achieve Ireland's trajectory towards net zero. Based on the listed residual impacts above, the project scale impact of both the GHG and CCR assessment through construction and operation are considered as a combined **minor adverse** effect which is not significant.

13.8.6 Obligations under section 15 of the 2015 Act

Section 13.5 considers and assesses the likely significant effects of the Proposed Development on climate for the purposes of informing the EIA that will be carried out by the Competent Authority, ACP.

Separately, as noted in section 13.3.1 and as ACP will be aware, ACP is also required under section 15 of the 2015 Act to perform its functions, insofar as practicable, in a manner consistent with the matters specified in section 15(1) of the 2015 Act, which are:

- The most recent approved climate action plan, which is currently CAP25 and is to be read in conjunction with CAP24.
- The most recent approved national long term climate action strategy, which is Ireland's Long-term Strategy on Greenhouse Gas Emissions Reduction 2024.
- The most recent approved national adaptation framework (National Adaptation Framework 2024) and approved sectoral adaptation plans, which is the Transport Sectoral Adaptation Plan 2025-2030 (T-SAP II).
- The furtherance of the national climate objective which is set out in section 3 of the 2015 Act, namely to 'pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy'.
- The objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State.

These policy measures have been described in section 13.3.2 and have been referenced as appropriate throughout this chapter where relevant to the assessment of the likely significant effects of the Proposed Development on climate in the EIA context. The following sections go on to note the key actions, targets and policies arising in relation to each of these matters and sets out how the Proposed Development aligns with and supports the CAP25 and CAP24, and also the other plans, strategies and objectives specified in section 15 of the 2015 Act.

These sections therefore provide the information necessary for ACP to be satisfied that, by granting approval for the Proposed Development, it would be discharging its obligations under section 15 of the 2015 Act and

performing its functions, insofar as practicable, in a manner consistent with CAP25 and CAP24, the most recent approved long term climate strategy, and the other plans and objectives specified in section 15.

13.8.6.1 Most Recent Approved Climate Action Plan

The most recent approved climate action plan, which is currently CAP25 and is to be read in conjunction with CAP24 and the key policies and actions of relevance the opposed Development are presented in section 13.3.2 and reproduced Table 13-41 along with an analysis of how the Proposed Development is consistent with and supports the delivery of the CAPs. The analysis indicates the following key aspects of the Proposed Development:

- The design of the construction phase of the Proposed Development is consistent with all requirements for low carbon materials as committed to in the mitigation in section 13.6.1. The procurement of these materials by the public sector will increase demand and stimulate production in the low carbon materials market. Chapter 13, Industry, of CAP24 states that '*The public sector is the State's largest purchaser of construction products and should act as an influential market player regarding the adoption of lower carbon concrete and cements. Through specification of lower carbon cements in public procurement, the State will aid market development and the supply of lower carbon concrete and/or cement products*' Chapter 10, Public Sector, of CAP 24 states that '*GPP [Green Public Procurement] is acknowledged as a vital policy lever in meeting environmental policy objectives. In Ireland public bodies spend an estimated €18.5 billion a year on goods, services and works. This provides Ireland's public sector with significant influence to stimulate and actively encourage the provision of more resource-efficient, low carbon, less polluting goods, services and works across the public sector*'. Through the low carbon materials commitments on this Project, Donegal County Council can support the market for such materials.

- The inclusion of 63 km of shared pedestrian / cycle facilities as an integral part of the Proposed Development provides a positive climate impact and is consistent with all active travel measures in the CAPs. Indeed, as set out above, the provision of this cycle infrastructure represents, as part of one individual Project, approximately 7% of the total national target for the roll out of walking and cycling infrastructure as set out in CAP which is a significant contribution to the delivery of CAP targets.

- There is no significant increase in traffic emissions associated with the Proposed Development as the proposed alignments will reduce congestion and allow for an increased efficiency and redistribution of traffic on the road network.

In summary, the Proposed Development has been designed to ensure consistency with the key provisions of the CAPs on sustainable material choices, active travel and reducing transport impacts.

Table 13-41: Consistency with the most recent Approved Climate Action Plan

Reference	Policy Requirement	Consistency of the Proposed Development
Chapter 10 of CAP23	By 2025 Public Bodies shall specify low carbon construction methods and low carbon cement material as far as practicable for directly procured or supported construction projects from 2023.	As noted in section 13.6.1, as a replacement for traditional precast concrete materials made with CEM1 cement mixes, the Proposed Development will use 50% ground granulated blast-furnace slag (GGBS, or alternate clinker replacement) cement for all structural and non-structural precast structures, kerbs, drains, etc. Similarly, all concrete poured in-situ for the Proposed Development will consist of 50% GGBS or alternate clinker replacement cement. This 50% clinker replacement commitment goes well beyond the government's procurement guidelines of 30% clinker replacement for public projects and illustrates the climate ambition in the design. As such, the mitigation presented in this chapter is consistent with (or exceeds) the requirement to specify low carbon construction methods and low carbon cement material in this directly procured infrastructure project.
Chapter 13 of CAP23	Decrease embodied carbon in construction materials produced and used in Ireland by 10% by 2025; and Decrease embodied carbon in construction materials produced and used in Ireland by at least 30% by 2030.	The impact of the use of the low carbon cement material is presented in Table 13-40 and shows that the total embodied carbon saved by this measure equates to 11,561 tonnes of CO_2e. This saving is equivalent to 19% of the total embodied carbon estimated for the Proposed Development in the baseline. This reduction is consistent with the industry target to decrease embodied carbon in construction materials produced and used in Ireland by at least 30% by 2030.
Chapter 13 of CAP23	Action EN/23/12: Specify low carbon construction methods and low carbon cement material as far as practicable for directly procured or supported construction projects from 2023.	As noted above, the commitment for low carbon cement material presented in this chapter is fully consistent with the requirement to specify low carbon construction methods and low carbon cement material as far as practicable for directly procured or supported construction projects from 2023. As above this commitment exceeds the government's procurement guidelines of 30% clinker replacement for public projects. As noted, through the low carbon materials commitments on this Project, Donegal County Council can support the market for such materials through GPP to stimulate the need for the industry to supply these materials.
Chapter 15 of CAP23	TR/23/29 Advance roll-out of 1,000 km walking/cycling infrastructure. TR/23/30 Advance roll-out of National Cycle and Greenway Networks.	The delivery of 63 km of shared pedestrian/ cycle facilities as an integral part of the Proposed Development provides a positive climate impact and equates to 7% of the national target for the advance roll-out of 1,000 km walking/ cycling infrastructure as well as connectivity to National Cycle and Greenway Networks. The Proposed Development is therefore fully consistent with this aspect of CAP25 and indeed makes a direct significant contribution to delivering on this national target for roll out of active travel infrastructure.

Reference	Policy Requirement	Consistency of the Proposed Development
Chapter 15 of CAP24	**Road Traffic** 20% reduction in total vehicle kms relative to the 2030 BAU Scenario 50% reduction in fuel usage compared to 2018 levels	Table 13-31 compares the Do-Minimum existing road network to the Do-Something proposed network in both 2032 and 2047. The results show negligible change in total emissions and negligible change in the total vehicle kilometres travelled between the two scenarios. These results indicate that the Proposed Development will not increase or decrease traffic on the road network but will redistribute traffic around the network through reducing congestion on a more efficient system with no net change in vehicle kilometres travelled or fuel use. As such, while the Proposed Development does not in and of itself contribute directly to achieving a reduction in total vehicle kms, the Proposed Development will not impact on the State's ability to deliver this target through other active travel and modal shift projects and indeed…. The Project will contribute indirectly to the reduction in fuel usage in the area through the provision of charging infrastructure.
	Sustainable Transport 50% increase in daily active travel journeys. 130% increase in daily public transport journeys 25% reduction in daily car journeys Shift in Daily Mode Share - 2018: 72% (car), 8% (PT), 20% (AT) to 2030: 53% (car), 19% (PT), 28% (AT).	The Proposed Development will result in an estimated 688 daily cycling trips and an estimated 7,236 pedestrian daily trips. The commuting and education aspects of these journeys will result in an emissions saving from this modal shift of 1,723 tonnes CO_2e per annum. As such, the active travel infrastructure in the Proposed Development is fully consistent with and directly contributes to the State delivering on this target.

	Fleet Electrification
	• Private Vehicles
	  ○ Battery EV share of total passenger car fleet (30%)
	  ○ EV share of new registrations (100%)
	  ○ 845,000 Private EVs
	• Commercial Vehicles
	  ○ 20% EV share of total LGV fleet;
	  ○ 95,000 commercial EVs;
	  ○ 30% ZE share of new heavy duty vehicle registrations;
	  ○ 3,500 HGVs.
	• PT Services
	  ○ 1,500 EV buses in PSO bus fleet;
	  ○ Expansion of electrified rail services.
		The projected infiltration of electric vehicles into the Irish fleet as mandated by CAP has been factored into this assessment. The future emissions scenarios for 2032 and 2047 in Table 13-31 show a marked decrease in the baseline emissions in Table 13-14 as a result of these policy changes. While the growth in the fraction of electric vehicles is outside the remit of the Project, the Project supports, and is consistent with, the policy by providing charging facilities for electric vehicles at the park and share/ cycle facilities to support the national electrification of the fleet. The analysis shows that Do-Something scenario results in an equivalent decrease in future years to that presented for the Do-Minimum scenario and does not in any way inhibit the projected trajectory towards net zero.

Reference	Policy Requirement	Consistency of the Proposed Development
	Raise the blend proportion of biofuels to B20 in diesel by 2030 (B12 by 2025) and E10 in petrol.	The increased share of biofuels in petrol and diesel sold in the Irish market for use in the national fleet is outside the remit of this Project. The assessment of future climate from road transport, both with and without the Project, has factored this policy change through the REM model.
Chapter 14 of CAP25	20% reduction in total vehicle kilometres travelled relative to business-as-usual 50% reduction in fuel usage	As noted above, while the Project does not contribute to achieving a reduction in total vehicle kms or fuel usage, the Project will not impact on the State's ability to deliver this target through other active travel and modal shift projects.
	Significant increases to sustainable transport trips and modal share.	As above, the delivery of 63 km of shared pedestrian / cycle facilities as an integral part of the Project is consistent with the target to increase sustainable transport trips and modal share.
	Action TR/25/7: Advance roll-out of walking/cycling infrastructure in line with National Cycle Network and CycleConnects plans.	As above, the delivery of 63 km of shared pedestrian / cycle facilities as an integral part of the Project is consistent with the roll-out of walking/cycling infrastructure in line with National Cycle Network and CycleConnects plans.

13.8.6.2 Ireland's Long-term Strategy on Greenhouse Gas Emissions Reduction

Ireland's Long-term Strategy on Greenhouse Gas Emissions Reduction (DCEE, 2024b) sets out indicative pathways, beyond 2030, towards achieving carbon neutrality for Ireland by 2050. Table 13-42 outlines the key provisions of the Strategy and how the Proposed Development has been designed to ensure consistency with this.

Table 13-42: Consistency with Ireland's Long-term Strategy on Greenhouse Gas Emissions Reduction

Policy Reference	Policy Requirement	Consistency of the Proposed Development
Pathway to Climate Neutrality by 2050	Modal shift will play a key role in decarbonisation by 2050. Our cities will be leaders in transport innovation due to the predominance of short-distance journeys, existing availability of public transport alternatives, air quality considerations and due to the requirement to provide for greater urban density in residential development.	The Proposed Development will result in an estimated 688 daily cycling trips and an estimated 7,236 pedestrian daily trips. The commuting and education aspects of these journeys will result in an emissions saving from this model shift of 1,723 tonnes CO_2e per annum. As such, the active travel infrastructure in the Proposed Development is fully consistent with and contributes to the State delivering this modal shift in the area.
	Mobility in rural areas will see significant changes over the decades, driven by investment to provide greater accessibility of public transport alternatives to private cars as well as by digitalisation.	There are a number of modal shift enhancements included in the Proposed Development (e.g. Park and Share and proposed bus stop adjacent to the Dry Arch Roundabout in Section 2) that will contribute locally to this measure.
	For passenger cars, an environment fostering the replacement of ICE cars after 2035 will be supported by various EV policy pathways relating to vehicles and charging infrastructure.	The Proposed Development includes for a series of proposed electric vehicle charging points at all park and share/ cycle facilities. This infrastructure will support delivery of this measure.
	Heavy-duty freight and long-distance vehicles will begin to convert to zero emissions from mid-decade and throughout 2030s and 2040s.	The revised alignments of the Proposed Development will result in a safer and more efficient road network for freight in an area where the alternatives such as rail are not available. Charging facilities are included in the Proposed Development to support the transition to EV for all vehicle types.

13.8.6.3 Most Recent Approved National Adaptation Framework and Approved Sectoral Adaptation Plan

The most recent approved National Adaptation Framework (NAF) was published in 2024 based on a review of the 2018 NAF and sets out to expand on the guiding principles that promote smarter, faster and transformative adaptation actions. Action 2 of the NAF required government to request Ministers to submit new sectoral adaptation plans aligning with the NAF within a specified period which are to be delivered as Action 3.

In 2025, the revised Transport Sectoral Adaptation Plan 2025-2030 (T-SAP II) was published by the Department of Transport. This plan identifies the key vulnerabilities in the transport network and looks to promote greater resilience to safeguard its continued operation. The overarching goal of T-SAP II is building long-term resilience across all transport modes in Ireland by adapting to current and future climate conditions to minimise negative impacts on transport services and infrastructure and reduce their consequences. This is achieved through a series of objectives and actions with those relevant to the Proposed Development listed in Table 13-43 with analysis of how the Proposed Development is aligned with these measures.

Table 13-43: Consistency with the most recent Approved National Adaptation Framework and Approved Sectoral Adaptation Plan

Policy Reference	Policy Requirement	Consistency of the Proposed Development
National Adaptation Framework 2018/2024	Action 11: Develop iterative NCCRA process and associated guidance to underpin sectoral risk assessment and adaptation planning.	Note that all three information sources listed in these Actions have been referenced in the assessment of climate vulnerability for the Proposed Development.
	Action 12: Continue to develop Climate Ireland as the National Adaptation Platform, providing services as per its ToR.	
	Action 13: Met Éireann to develop additional standardised climate information through the TRANSLATE project.	
Transport Sectoral Adaptation Plan 2025-2030 (T-SAP II)	Objective 3: Ensure that resilience to weather extremes and longer-term adaptation needs are 1` in investment programmes for asset management of existing, as well as planned future transport infrastructure.	TII guidance that has informed this assessment requires that a Climate Change Risk Assessment is undertaken at planning stage to identify the vulnerability of the development to climate change and to consider adaptation measures to increase the resilience of the Project. This has been fully documented within this chapter to ensure a climate resilient Project (refer section 13.5.3 for the Construction Phase and section 13.5.4 for the Operation Phase).
	Actions for Land Transport – Roads *R1: Propose new funding schemes for climate-proofing roads in Ireland.* *R2: Improve data collection and sharing on road infrastructure and climate hazards.* *R3: Continue to implement the existing climate adaptation strategy for roads.* *R4: Streamline the request for financial resources to TII and Local Authorities in the aftermath of extreme weather events.* *R5: In addition to existing coordination, develop sectoral response guidelines to coordinate during extreme weather events.* *R7: Enhance collaboration between the National Transport Authority, local authorities, bus operators*	This Project has been designed and will be funded to a standard that ensures that the proposed road and supporting infrastructure is suitably resilient to the identified climate risks and complies with the relevant EU and TII guidelines in terms of adaptation assessment.
	Actions for Land Transport - Roads *AT1: Clarify roles and responsibilities for climate adaptation of active travel network.* *AT2: Assess the criticality of active travel networks in relation to climate risk.*	The active travel elements of the Project have been assessed in terms of vulnerability and resilience to climate change to ensure that the critical risks to this infrastructure have been suitable mitigated.

13.8.6.4 Furtherance of the National Climate Objective

The Climate Action and Low Carbon Development (Amendment) Act 2021 introduced the national climate objective into the 2015 Act which states:

> *The State shall, so as to reduce the extent of further global warming, pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy.*

For the purpose of enabling the State to pursue and achieve the national climate objective the 2015 Act commits the development of budgets/ceilings, the CAP, the NAF and the long terms strategies as outlined in this report.

In terms of sectoral emissions ceilings, the EPA national data presented in Figure 13-2 illustrate that the transport sector is not on target to achieve the sectoral emissions ceilings for 2025 and 2030 but transport related emissions are predicted to decrease in the medium to long term with current interventions such as the electrification of the fleet. Projected levels in 2050 are less than 50% of the measures levels in 2024 which will support the transition to a climate resilient economy.

In line with the national trend, the baseline traffic emissions for the road network will decrease in future years with the Proposed Development as a result of the above interventions as well as the active travel measures included in the design. This analysis indicates that the Proposed Development will not lead to any significant change in traffic on the road network but will redistribute traffic around the network through reducing congestion on a more efficient system with no net change in impact over the Do-Minimum impact.

With this significant reduction in road traffic emissions and the delivery of significant active travel infrastructure, the Proposed Development is consistent with the furtherance of the National Climate Objective.

13.8.6.5 Objective of Mitigating GHG Emissions and Adapting to Climate Change

While not a specific policy document, this objective reflects the wider policy base addressing both climate mitigation and adaption as mandated through the policy documents listed in this section.

In terms of mitigating GHG emissions, the Proposed Development includes the following:

- The Project's construction phase impacts are mitigated through good practice measures such as the commitment to use site won material to eliminate the need for imported fill and the use of low carbon materials such as GGBS cement to reduce embodied carbon for concrete products by circa 19% in line with national targets.

- The delivery of 63 km of shared pedestrian / cycle facilities provides a positive climate impact and equates to 7% of the national target for the advance roll-out of 1,000 km walking/ cycling infrastructure. The calculated emissions saving per annum from this modal shift is estimated at 1,723 tonnes CO_2e per annum.

- When comparing the Do-Minimum to the Do-Something scenarios, the results show negligible change in total annual emissions. These results indicate that the Proposed Development will not lead to any significant increase or decrease in traffic on the road network but will redistribute traffic around the network through reducing congestion on a more efficient system with no net change in impact over the Do-Minimum impact. As a consequence, there is no net significant change in total traffic emissions with the Proposed Development in operation relative to the emissions associated with the current road network.

- Regarding Adapting to climate change, the vulnerability of the construction works and the operational infrastructure to climate change has been suitably mitigated through the design process to ensure that the Project aligns with the National Adaptation Framework and the Transport Sectoral Adaptation Plan.

13.8.6.6 Summary

In short, the analysis shows that the Proposed Development is consistent with all of the plans, strategies and objectives set out in section 15(1) of the 2015 Climate Action and Low Carbon Development Act, 2015 as amended. For policies relating to the construction phase, the Proposed Development is aligned with the requirements, while the active travel enhancements in the operation phase will all contribute to the national targets and measures for active travel in CAP. In addition, the national and sectoral climate adaptation requirements of the Proposed Development and this assessment are consistent with the required policy base.

It is notable that the Business As Usual modelling that was carried out to inform the preparation of CAP23, CAP24, and CAP25 included several major infrastructure projects, including the Proposed Development. The modelling exercise carried out to inform the preparation of the CAPs showed that the targets (emission reduction and vehicle kilometre reduction) set out in CAP23, CAP24, and CAP25 (transport sector targets have not changed in these three Climate Action Plans) at a national level could be achieved with the inclusion of the Proposed Development. Therefore, the delivery of the Proposed Development is consistent with CAP and with the achievement of the targets set out in CAP25 and CAP24 at a national level.

In summary, the Proposed Development is consistent with CAP24 and CAP25 and with the achievement of the targets set out in CAP24 and CAP25 at a national level, and An Coimisiún Pleanála, in granting approval for the Proposed Development, would be performing its functions, in so far as practicable, in a manner consistent with CAP24, CAP25, and the other matters specified in section 15 of the 2015 Act.

An Coimisiún Pleanála can be satisfied that, by granting approval for the Proposed Development, it would be it would be discharging its obligations under section 15 of the 2015 Act and performing its functions, insofar as practicable, in a manner consistent with the Climate Action Plan 2025, the Climate Action Plan 2024, the most recent approved long term climate strategy, and the other plans and objectives specified in section 15.

13.9 References

BSI, 2023, Publicly Available Specification (PAS) 2080:2023 on Carbon Management in Infrastructure.

CACC, 2024. Climate Change Advisory Council Carbon Budget Proposal Report.

CESSM, 2013. Carbon and Price Book Database, S.I.: Civil Engineering Standard Method of Measurement.

Climate Action and Low Carbon Development Act 2015.

Climate Action and Low Carbon Development (Amendment) Act 2021.

Climate Change Act (Northern Ireland) 2022.

Climate Ireland (2025) Climate Data Tool from Climate Ireland. Available at: https://www.climateireland.ie/#!/tools/climateDataExplorer.

DESNZ (2025) UK Department for Energy Security and Net Zero - Greenhouse gas reporting: conversion factors 2025. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2025

Department of Agriculture, Environment and Rural Affairs (DAERA) Northern Ireland's draft Climate Action Plan 2023-2027.

DECC (2013) National Policy Position on Climate Action and Low Carbon Development.

DECC (2019) Climate Action Plan 2019.

DECC (2021) Climate Action Plan 2021.

DECC (2023a) Climate Action Plan 2023.

DECC (2023b) Climate Action Plan 2024.

DCEE (2024a) National Adaptation Framework.

DCEE (2024b) Ireland's Long-term Strategy on Greenhouse Gas Emissions Reductions.

DCEE (2024c) National Energy and Climate Plan (NECP) 2021-2030.

DCEE (2025) Climate Action Plan 2025.

Department of the Taoiseach (2022) Carbon Budgets. [Online] Available at: www.gov.ie/en/publication/9sf1b-carbon-budgets/.

Department of Transport (2025) Transport Sectoral Adaptation Plan 2025-2030 (T-SAP II).

Donegal County Council (2024) Climate Action Plan 2024 – 2029.

EPA (2024) Ireland's Climate Change Assessment: Climate Science – Ireland in a Changing World 2024.

EPA (2025a) Ireland's Greenhouse Gas Emissions Projections 2025-2055.

EPA (2025b) Ireland's Greenhouse Gas Emissions 1990-2024.

EPA (2025c) National Climate Change Risk Assessment (NCCRA).

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

EU Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999.

EU (2021) Technical guidance on the climate proofing of Infrastructure in the Period 2021-2027.

EU Regulation (EU) 2023/857 of the European Parliament and of the Council of 19 April 2023 amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement, and Regulation (EU) 2018/1999.

EU Regulation (EU) 2024/1679 of the European Parliament and of the Council of 13 June 2024 on Union guidelines for the development of the trans-European transport network.

IEMA (2020) Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition).

IEMA (2022) Guidance on 'Assessing Greenhouse Gas Emissions and Evaluating their Significance', 2nd Edition as noted in the TII GHG methodology guidance.

IEMA (2024) Implementing the Mitigation Hierarchy from Concept to Construction.

IPCC (2023) Intergovernmental Panel on Climate Change Sixth Assessment Report.

Met Éireann (2012) Climatological Note No. 14: A Summary of Climate Averages for Ireland 1981-2010.

Met Éireann (2025) Major Weather Event Database. Available at: https://www.met.ie/climate/major-weather-events.

Met Éireann TRANSLATE: One Climate Resource for Ireland. Available at: https://www.met.ie/science/translate.

Think Hazard! (2026) Global Facility for Disaster Reduction and Recovery 'Think Hazard!' tool. Available at: https://thinkhazard.org/en/.

TII (2022a) TII Climate Guidance for National Roads, Light Rail, and Rural Cycleways (Offline and Greenways) – Overarching Technical Document PE-ENV-01104 (December 2022).

TII (2022b) Transport Infrastructure Ireland (TII) Climate Assessment of Proposed National Road Projects – Standard PE-ENV-01105 (December 2022).

TII (2022c) Climate Adaptation Strategy 2022.

TII (2024) TII Climate Action Roadmap 2024.

TII (2025a) Transport Infrastructure Ireland (TII) Carbon Tool for Road, Greenway and Light Rail Projects: User Guidance Document GE-ENV-01106 (September 2025).

TII (2025b) TII Road Emissions Model (REM): Model Development Report GE-ENV-01107 (May 2025).

TII (2025c) N22 Carbon Benchmarking and Analysis RE-ENV-01109 (May 2025).