

13 Climate

13.1 Introduction

The impact of the proposed development on climate was considered for both macro-climate and micro-climate. The climate of a large geographic area, for example Ireland, is defined as macro-climate. The climate in the immediate area is known as the micro-climate.

The macro-climatic impact of the proposed development was considered in relation to Ireland's future obligations under the EU Climate Change and Renewable Energy Package, 2008.

The potential micro-climatic impacts of the proposed development were assessed in relation to existing micro-climatic conditions, the size of the proposed development and the nature of use of the surrounding environment.

The chapter initially sets out the methodology used (Section 13.2), describes the receiving environment (Section 13.3), discusses the predicted impacts (Section 13.4), details the mitigation measures proposed (Section 13.5) and discusses any residual impacts anticipated (Section 13.6).

13.2 Methodology

13.2.1 Legislative Background

In December 2008, the EU Climate Change and Renewable Energy Package set out a number of commitments. This package commits to reduce the EU's GHG emissions from non- Emission Trading Scheme (ETS) sectors (such as transport, agriculture, residential and waste) by 20% on 2005 levels by 2020 or by a more ambitious 30% in the event of a comprehensive global agreement. As part of the effort-sharing proposal of this package, Ireland is one of the countries facing the highest target of a 20% reduction on 2005 levels for non- ETS sectors. This will result in a limit of approximately 38 Mt CO₂ eq for Ireland's non-ETS emissions in 2020, together with annual binding limits for each year from 2013 to 2020. The full extent of this target for individual sectors cannot be determined until the broader national targets under a revised National Climate Change Strategy are finalised.

There is also a commitment to achieve a mandatory EU target of 20% renewable energy by 2020, including a 10% bio fuel target.

In February 2013, the Climate Change Bill 2013 was published. The document is currently under consideration of the Oireachtas Joint Committee on the Environment, Culture and the Gaeltacht and all stakeholders. The final climate policy analysis report from the National Economic and Social Council (NESC), which sets out a carbon-neutral vision for Ireland by 2050, was also issued.

The Bill requires the Minister for the Environment, Community and Local Government to make, and submit to Government, a National Low Carbon Roadmap, incorporating sectoral roadmaps prepared by the relevant Ministers and approved by Government. The National Low Carbon Roadmap will:

- Contain a national vision for the transition to a low-carbon, climate resilient and environmentally sustainable economy.
- Address and specify policy measures required to ensure compliance with, any relevant, climate related, existing obligation of the State under EU law or any international agreement (this would include, for example, Ireland's target to achieve a 20% reduction in emissions in the non-ETS sectors of the economy by 2020, under the 2009 Effort-Sharing Decision).

When preparing both the National Low Carbon Roadmap and the sectoral roadmaps, the relevant Ministers are required to take a long term view having regard to any relevant, climate related, and existing obligation of the State under EU law or any international agreement and any likely future mitigation commitments.

The document Smarter Travel - A Sustainable Transport Future, A New Transport Policy for Ireland 2009 – 2020 includes a number of targets to reduce carbon emissions:

- Work-related commuting by car will be reduced from a current modal share of 65% to 45%, which will mean that between 500,000 and 600,000 commuters will be encouraged to take means of transport other than car driver (of these 200,000 would be existing car drivers).
- Car drivers will be accommodated on other modes such as walking, cycling, public transport and car sharing (to the extent that commuting by these modes will rise to 55% by 2020) or through other measures such as e-working.
- The total kilometres travelled by the car fleet in 2020 will not increase significantly from current total car kilometres.
- The road freight sector will become more energy efficient, with a subsequent reduction in emissions.
- Transport will make a meaningful contribution to Ireland's commitment under the proposed EU effort-sharing arrangement in relation to climate change and real reductions on current levels of emissions will be achieved.

Policies to reduce transport emissions include the reduction of travel demand, increase use of alternatives to the private car and improve the efficiency of motorised transport.

13.2.2 Macro-climatic Methodology

The NRA's Environmental Impact Assessment of National Road Schemes – A Practical Guide (National Roads Authority, 2005) notes that climate change issues are largely outside the scope of an EIS for individual road schemes as the issues and mitigation measures are the subject of specific policies and strategies set out in the Government's National Climate Change Strategy (NCCS). However, the EIS should indicate whether the scheme would impact positively or negatively on carbon dioxide.

The DMRB Screening Method (Version 1.03c) spreadsheet was used to calculate the total CO₂ produced as a result of vehicles travelling on the proposed M7 Osberstown Interchange and R407 Sallins Bypass Scheme.

The spreadsheet calculates total emissions of carbon (C, tonnes/year). This was converted to CO₂ using a factor of 44/12 (the ratio of the molecular weight of CO₂ to C).

DMRB requires the following input data to assess the regional impact of the proposed scheme:

- Length of each link.
- Annual average daily traffic flow (AADT).
- Average speeds.
- Traffic composition.
- Road type.

The UK Environment Agency (EA) has developed a carbon calculator to estimate the greenhouse gas impacts of construction activities. It does this by calculating the embodied CO₂ of materials plus the CO₂ associated with their transportation. It also considers personnel travel, site energy use and waste management. This calculator was used to estimate the greenhouse gas emissions from the construction phase of the proposed scheme.

13.2.3 Micro-Climatic Methodology

The potential micro-climatic impacts of the proposed development were assessed in relation to existing micro-climatic conditions, the size of the proposed road development and the nature of use of the surrounding environment.

13.3 Receiving Environment

13.3.1 Macro-climatic

In April 2013, the EPA published “Ireland’s Greenhouse Gas Emission Projections 2012-2030” in which it outlines the likelihood of Ireland achieving its climatic commitments.

The EPA states that there continues to be a significant risk that Ireland will not meet its 2020 EU targets, even under the most ambitious emission reduction scenario. There is projected to be an exceedance of the target of 7 between – 24 Mtonnes for the period 2013-2020 with Ireland breaching its annual limits in 2015-2016. Strong projected growth in emissions from transport and agriculture are the key contributors to this trend.

For traffic, under the “With Measures” scenario (assumes that no additional policies and measures, beyond those already in place by December 2011), transport emissions are projected to increase by 22% over the period 2011 – 2020 to 14 Mtonnes of CO₂ eq. The “With Measures” scenario includes:

- The impact of VRT and motor tax changes (introduced in 2008).
- Improvements to the fuel economy of private cars, supported by the EU.
- Regulation which mandates maximum levels of CO₂ for new cars to 120g/km in 2015 and 95g/km in 2020.

- Renewable energy penetration of 3% out to 2020 which is supported by the Biofuel Obligation Scheme 2010.

Transport sector emissions are projected to be 1.2 Mtonnes of CO₂ eq higher in 2020 compared with last year's projection. This is attributed to forecasted increases in petrol and diesel use for road transport. In addition, revisions to historical data and changes in the underlying methodology have had an impact on the energy forecast for this sector relative to last year's projections.

Under the "With Additional Measures" scenario (assumes that Government targets for 2020, for example renewables targets, will be fully achieved), transport emissions are projected to increase by 12% over the period 2011 – 2020 to 13 Mtonnes of CO₂ eq returning transport emission to 2009 levels by 2020. In this scenario, it is assumed that:

- Renewable energy penetration is 10% by 2020 – this is the RES-T target which is a binding target under the Renewable Energy Directive. The Biofuels Obligation Scheme 2017 and the rollout of Electric Vehicles (EVs) underpin the achievement of this target. Electric vehicles account for only 1.5% of the RES-T target by 2020, with biofuels contributing the remaining 8.5%.
- More efficient road traffic movements and public transport efficiencies will deliver savings.

13.3.2 Micro-climatic

The nearest representative Met Éireann synoptic meteorological station is at Casement Aerodrome, Baldonnel which is located approximately 20 km northeast of the proposed site at 94 m above mean sea level. All climate data cited below are taken from the 30 year averages (1981-2010) reported for Casement meteorological station.

13.3.2.1 Temperature

The annual mean temperature is 9.7°C. The annual mean of daily maxima is 13.4°C and of daily minima is 6.1°C.

13.3.2.2 Sunshine

The mean daily duration of sunshine is 3.7 hours.

13.3.2.3 Rainfall

The mean annual rainfall is 754.2 mm, and the annual mean number of days with more than 1 mm of rainfall is 130 days.

13.3.2.4 Wind

The annual mean wind speed is 5.5 m/s (10.7 knots).

13.4 Predicted Impacts on Climate

13.4.1 Macroclimate

13.4.1.1 Construction Phase

Based on expected construction activities and methods, CO₂ values have been estimated during the construction phase, refer to Table 13.1.

Table 13.1: Total Estimated CO₂ Produced as a result of the Construction of the Proposed Scheme

	tonnes/year
Ireland's non-ETS CO ₂ Commitment for 2020	38,000,000
Total CO ₂ during construction phase per year	55,880
Increase relative to CO ₂ commitment	0.14%

During the construction phase of the development, 55,880 tonnes per year of CO₂ are estimated to be generated, assuming an 18 month construction programme. This constitutes 0.14% of Ireland's 2020 obligation under the EU Climate Change and Renewable Energy Package. However, this impact will be temporary as it is only associated with the construction phase of the development.

13.4.1.2 Operational Phase

Table 13.2 describes the predicted CO₂ produced as a result of the proposed scheme. The results include CO₂ levels based on Do-Minimum (DM) and Do-Something for both 2015 and 2030. Results are based on traffic data for the various scenarios, refer to Chapter 5 - *Transportation*. Predicted changes in level of CO₂ due to the proposed development are compared to Ireland's non-ETS commitments under the EU Climate Change and Renewable Energy Package.

Table 13.2: Total Estimated CO₂ Produced as a result of the Operation of the Proposed Scheme

Scenario	Tonnes/year
Ireland's non-ETS CO ₂ Commitment for 2020	38,000,000
Total CO ₂ as a result of scheme 2015 (DM-DS) ¹	3,270
Change relative to CO ₂ commitment	0.008%
Total CO ₂ as a result of scheme 2030 (DM-DS) ¹	2,963
Change relative to CO ₂ commitment	0.0078%

¹ Total C converted to total CO₂ using a factor of 44/12

Table 13.2 shows that a maximum of 0.008% increase of CO₂ relative to Ireland's commitments under the EU Climate Change and Renewable Energy Package is predicted to occur due to the proposed scheme. This is not deemed to be significant.

13.4.2 Microclimate

The proposed scheme will result in changes to the shape of the existing terrain. Such changes may modify airflow and temperature profiles in the area. These modifications will not be significant and are unlikely to result in any adverse impact on local flora and fauna and residential populations.

13.4.2.1 Modification of the Existing Heat Balance

Mesoscale meteorological modelling results indicate that heat islands in US cities may lead to 1.5 – 3°C increase in temperature relative to the suburbs in the afternoon in summer (Lawrence Berkley Laboratory 1995). Relative to the size and nature of the proposed road development an imperceptible heat island effect is envisaged.

13.4.2.2 Moisture

The proposed road development will have no significant impact on the microclimate due to a decrease in evaporation, as the length of new road is relatively short.

13.4.2.3 Airflow

The proposed road development will increase the macro-roughness in the area, which will increase air turbulence. There is the potential for some sheltering in the lee of the major structures, however, this is not likely to be significant.

13.5 Mitigation Measures

13.5.1 Microclimate

There will be no effect on microclimate as a result of the proposed scheme, therefore no mitigation measures are proposed.

13.5.2 Macroclimate

As outlined above, the NRA's Environmental Impact Assessment of National Road Schemes – A Practical Guide notes that climate change issues are largely outside the scope of an EIS for individual road schemes as the issues and mitigation measures are the subject of specific policies and strategies set out by government. The Climate Change Bill, 2013 requires the Minister for the Environment, Community and Local Government to make, and submit to Government, a National Low Carbon Roadmap, incorporating sectoral roadmaps prepared by the relevant Ministers and approved by Government. This Roadmap will specify policy measures required to ensure compliance with climate related obligations.

It should also be noted that the provision of cycling paths and improved access to existing park and ride facilities at Sallins Rail Station as part of the proposed scheme will encourage a modal shift in line with Smarter Travel - A Sustainable Transport Future, A New Transport Policy for Ireland 2009 – 2020.

This shift has the potential to reduce greenhouse gas emissions associated with the proposed road development in the future.

13.6 Residual Impacts

13.6.1 Microclimate

There will be no residual impact on microclimate.

13.6.2 Macroclimate

In general, the generation of CO₂ due to increases in construction and operational traffic volume is not considered significant in terms of Ireland's commitment under the EU Climate Change and Renewable Energy Package. Future measures implemented by government as part of the Climate Change Bill 2013 will ensure compliance with climatic obligations.

13.7 References

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