SEA Environmental Report
Appendix II: Non-Technical Summary

FOR THE

Integrated Implementation Plan
2019-2024

for: **National Transport Authority**
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Section 1 Introduction and Terms of Reference

This is the Non-Technical Summary of the Strategic Environmental Assessment (SEA) Environmental Report for the Integrated Implementation Plan 2019-2024. The purpose of the Environmental Report is to comply with SEA legislation and provide a clear understanding of the likely environmental consequences of decisions regarding the adoption and implementation of the Plan.

What is an SEA?

SEA is a systematic process of predicting and evaluating the likely environmental effects of implementing a proposed plan, or other strategic action, in order to ensure that these effects are appropriately addressed at the earliest appropriate stage of decision-making on a par with economic, social and other considerations.

Why is it needed?

The SEA was carried out in order to comply with the provisions of the SEA Regulations, as amended, and in order to contribute towards environmental management and sustainable development. The output of the process is an Environmental Report and an SEA Statement, both of which should be read in conjunction with the Plan.

How does it work?

Relevant aspects of the current state of the environment were assembled and presented to the team who prepared the Plan. This helped them to devise a Plan that protects whatever is sensitive in the environment. To decide how best to make a Plan that helps to protect the environment as much as possible, the National Transport Authority (NTA) examined different alternatives for the Plan. This helped to highlight where conflicts could occur and facilitated the development of mitigation measures which will help to avoid/reduce adverse environmental effects.

What is included in the Environmental Report that accompanies the Plan?

The Environmental Report contains the following information:

- A description of the relevant aspects of the current state of the environment;
- A description and assessment of alternatives;
- An assessment of the Plan's provisions; and,
- Mitigation measures which set out to aid compliance with important environmental protection legislation - e.g. the Water Framework Directive, the Habitats Directive - and which will help to avoid/reduce the adverse environmental effects of implementing the Plan.

What happens at the end of the process?

On finalisation of the Plan, an SEA Statement is prepared and made available. The SEA Statement includes information on how environmental considerations were integrated into the Plan and why the preferred alternative was chosen for the Plan.

Section 2 The Plan

2.1 Introduction

The Minister for Transport, Tourism and Sport approved the Greater Dublin Area Transport Strategy 2016-2035 on 24th February 2016.

Under Section 13 of the Dublin Transport Authority Act 2008, the Authority is required, within nine months of that approval date, to make an Integrated Implementation Plan ("Plan") covering the first six year period of the Transport Strategy. However, because the Government decided to undertake a review of capital spending in 2016, and because the legislation does not permit any amendments to an adopted Plan until a new Transport Strategy is approved by the Minister, it was agreed to postpone the development of the Plan until the Government's review concluded.

Earlier this year the Government published its National Development Plan 2018-2027. This publication has enabled the Integrated Implementation Plan to be prepared.

While the initial legislation governing the Plan was more clearly limited to the delivery of the Transport Strategy for the Greater Dublin Area, subsequent amendments have somewhat diluted this position. While the bulk of the Plan relates solely to the Greater Dublin Area, certain areas such as public transport services and activities related to small public service vehicles will be dealt with on a national basis.

2.2 Plan Informants for and Content of the Integrated Implementation Plan

The emergence of increasing road congestion in recent years has underlined the need to provide an enhanced level of public transport provision to provide an alternative to car-based commuting. Congestion is a challenge that must be addressed by the transport system in a context where significant population growth, and associated economic, social, cultural and recreational activity is being planned for.

The significance of the need for action to reduce the use of fossil fuels and diminish the generation of greenhouse gases is recognised and required by legislation.

The National Transport Authority is required to adhere to the National Climate Change Adaptation Framework, which was published by the Minister for Communications, Climate Action and Environment in 2018, and the Department of Transport, Tourism and Sport's Sectoral Adaptation Plan, published in 2017.

The Transport Strategy for the Greater Dublin Area 2016-2035, which established an overall framework for transport investment over the next two decades and was subject to full SEA and Stage 2 AA, is a key policy shaping the six-year Integrated Infrastructure Plan. The priorities in the Integrated Infrastructure Plan align with the objectives and priorities set out in the Transport Strategy, focused on improving public and sustainable transport across the Greater Dublin Area.

Taking all of the above into account, the Authority has focused on improving public and sustainable transport across the Greater Dublin Area while seeking to ensure primacy for transport options that provide for unit reductions in carbon emissions. This can most effectively be done by promoting public transport, walking and cycling, and by actively seeking to reduce car use in circumstances where alternative options are available. In addition, transitioning to lower emission vehicles for transport use is also fundamental to reducing transport related carbon emissions.

To date the Authority has focused significant levels of investment in these sustainable modes, including the reopening of the Phoenix Park Tunnel and the delivery of Luas Cross City. It is intended that this will continue under the Implementation Plan.

The Implementation Plan identifies investment proposals for a number of areas including:

- Bus;
- Light Rail;
- Heavy Rai;
- Integration Measures and Sustainable Transport Investment;
- Integrated Service Plan; and
- Integration and Accessibility.

Most proposals included within the Plan have been already included within plans that have already been subject to SEA including the Transportation Strategy for the Greater Dublin Area 2016-2035, Project Ireland 2040 (including the National Planning Framework 2018) and the Greater Dublin Area Cycle Network Plan 2016.

2.3 Relationship with other relevant Plans and Programmes

The Plan sits within a hierarchy of strategic actions such as plans and programmes, including those listed and detailed in Appendix I of main Environmental Report.

The Plan must comply with relevant higher level strategic actions and may, in turn, guide lower level strategic actions.

The Plan is subject to a number of high level environmental protection policies and objectives with which they must comply, including those which have been identified as Strategic Environmental Objectives (please refer to Section 3.14 of this Non-Technical Summary).

Examples of Environmental Protection Objectives include the aim of the EU Habitats Directive - which is to contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora in the European territory of Member States - and the purpose of the Water Framework Directive - which is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which, among other things, prevents deterioration in the status of all water bodies and protects, enhances and restores all waters with the aim of achieving good status.

Section 3 Relevant aspects of the current state of the environment

3.1 Introduction

Reflecting the specifications in the SEA Directive, the relevant aspects of the current state of the environment for the following environmental components are identified in this section: biodiversity and flora and fauna, population and human health, soil, water, air and climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors.

Information which is relevant to lower tier planning and project development and associated environmental assessments is identified (note that Article 5 of the SEA Directive, in accordance with the established European principle of subsidiarity, requires that the Environmental Report includes the information that may reasonably be required taking into account, inter alia, the extent to which certain matters are more appropriately assessed at different levels in that process in order to avoid duplication of the assessment).

3.2 National Reporting on the Environment

The EPA's *"Ireland's Environment - An Assessment 2016"* provides an integrated assessment of the overall quality of Ireland's environment, the pressures being placed on it and the societal responses to current and emerging environmental issues. This report has informed various parts of the environmental baseline provided below. The key environmental challenges or messages identified by the report relate to the following topics:

- Environment and Health and Wellbeing;
- Climate Change;
- Implementation of Legislation;
- Restore and Protect Water Quality;
- Sustainable Economic Activities;
- Nature and Wild Places; and
- Community Engagement.

3.3 Likely Evolution of the Environment in the Absence of a New Plan

The implementation of the Plan is likely to give rise to the following residual adverse environmental effects:

- An extent of travel related greenhouse gas and other emissions to air. This has been mitigated by provisions which have been integrated into the Plan, including those relating to sustainable mobility;
- An extent of travel related greenhouse gas and other emissions to air. This has been mitigated by provisions which have been integrated into the Plan, including those relating to sustainable mobility;
- Loss of an extent of non-protected habitats as a result of new or widened transport infrastructure that involves the replacement of semi-natural land covers with artificial surfaces;
- Losses or damage to ecology (these would be in compliance with relevant legislation);
- Residual wastes (these would be disposed of in line with higher level waste management policies);
- Potential residual losses to built/amenity assets and infrastructure including as a result of new or widened transport infrastructure;
- Flood related risks remain due to uncertainty with regard to extreme weather events;
- Residual visual effects (these would be in compliance with landscape designation provisions);
- Potential alteration to the context and setting of designated cultural heritage however these will occur in compliance with legislation. Potential loss of unknown archaeology however this loss will be mitigated by measures integrated into the Plan; and
- Loss of an extent of soil function arising from the replacement of semi-natural land covers with artificial surfaces and from sea level rise/coastal erosion.

In the absence of a new Plan, none of the adverse effects detailed above would result due to the implementation of the Plan. However, lower-tier Plans would continue to be reviewed and implemented and applications for permission for new projects would continue to be made. Compliance with the mitigation measures outlined under Section 6 of this report would be necessary in order to help ensure that the following significant adverse environmental effects do not occur:

- Emissions to air and associated issues;
- Potential interactions if effects upon environmental vectors such as air are not mitigated;
- Arising from both construction and operation of transport infrastructure and services and associated facilities/ infrastructure: loss of/damage to biodiversity in designated sites, ecological connectivity and non-designated habitats; and disturbance to biodiversity and flora and fauna;
- Habitat loss, fragmentation and deterioration, including patch size and edge effects;
- Disturbance (e.g. due to noise and lighting along transport corridors) and displacement of protected species and coastal squeeze;
- Effects in riparian zones where new crossings of waters, if any, are progressed;
- Potential effects on vegetation from transport emissions;
- Generation of construction waste;
- Loss or damage to built/amenity assets and infrastructure including as a result of new or widened transport infrastructure;
- Adverse impacts upon the status of water bodies and entries to the WFD Register of Protected Areas, arising from changes in quality, flow and/or morphology;
- Increase in the risk of flooding;
- Occurrence of adverse visual impacts and conflicts with the appropriate protection of statutory designations relating to the landscape;
- Potential effects on protected and unknown archaeology and protected architecture arising from construction and operation activities, including as a result of increasing traffic flows;
- Adverse impacts on the hydrogeological and ecological function of the soil resource as a result of construction of transport and associated transport facilities/ infrastructure;
- Adverse impacts on features or areas of geological / geomorphological interest as a result of construction of transport and associated transport facilities/ infrastructure; and
- Potential for increase in coastal erosion.

In the absence of the Plan, it would be less certain as to which public transport, cycling and walking projects would be progressed or prioritised. Lower-tier plans and projects would be less coordinated. It would be less certain as to whether the positive effects (that would be facilitated by implementation of the Plan), such as the following, would be achieved:

- A shift from car to more sustainable and non-motorised transport modes;
- Management of traffic flows and associated effects on air quality;
- Reductions in travel related greenhouse gas and other emissions to air and energy usage;
- The development of transport infrastructure and services in locations which will facilitate use by those living and working in urban/suburban areas;
- Reuse and regeneration of brownfield lands thereby contributing towards a higher efficiency of land utilisation, sustainable mobility and a reduction in the need to develop greenfield lands; and
- Enhancement of the public realm (including cultural heritage and its context) in urban areas by facilitating the replacement of motorised modes of transport with more sustainable and non-motorised modes such as walking, cycling and light rail/metro.

3.4 Air and Climatic Factors

Introduction

The Plan facilitates a mode shift away from the private car to public transport, walking and cycling and associated positive effects, including those relating to:

- Contributions towards reductions in greenhouse gas emissions and associated achievement of legally binding targets – directly and as a result of facilitating development within urban and suburban areas;
- Contributions towards reductions in consumption of non-renewable energy sources and achievement of legally binding renewable energy targets;
- Energy security; and
- Contributions towards reductions in emissions to air (including noise) and associated achievement of air quality objectives, thereby contributing towards improvement of air quality and protection of human health.

The key issue involving the assessment of the effects of implementing the Plan on climatic factors relates to greenhouse gas emissions arising from transport. Interactions are also present with flooding (see Section 3.8).

Greenhouse Gas Emissions
The EPA 2018 publication Ireland's Greenhouse Gas Emission Projections 2017-2035 provides an assessment of Ireland's progress towards achieving its emission reduction targets.

Latest EPA greenhouse gas emissions projections indicate an overall increase in greenhouse gas emissions from most sectors. The positive impact on emissions of existing and planned policies and measures is tempered by the strong economic outlook and associated increase in energy demand. Ireland is not projected to meet 2020 emissions reduction targets and is not on the right trajectory to meet longer term EU and national emission reduction commitments.

The contribution by the transport sector to Ireland's greenhouse gas emissions highlights the need for a concerted effort to reduce transport emissions. In the transport sector, emissions are projected to increase from current levels by 14-15% by 2020, peaking at 24-26% in 2025, and falling to by 18-21% by 2030. The projected decline in emissions from 2025 to 2030 is due to the assumption of an acceleration in the number of electric vehicles on Irish roads. After 2030, emissions from transport are projected to start increasing again.

Alternative Fuels and Renewable Electricity Generation Targets
The use of alternative fuels, including electricity, forms a significant part of government policy to reduce transport emissions. The Plan facilitates a mode shift away from the private car to public transport, walking and cycling and provisions relating to electric vehicles. This will contribute towards reductions in the consumption of non-renewable energy sources and achievement of legally binding renewable energy targets.

The Draft Bio Energy Plan commitment to continuation of the Bio Fuels Obligation Scheme is relevant to the Plan and will remain a key means by which Ireland's 2020 10% renewable transport target is likely to be met.

Journeys in the Greater Dublin Area
Operating under a contract with the Authority, Dublin Bus currently operates a network catering for c.136 million passengers in 2017. When combined with Bus Éireann commuter services in the Dublin region, 143 million passengers were carried on State operated bus services in the Dublin area, compared with 38 million on Luas and 33 million passengers on the DART and rail commuter services.

In percentage terms, the bus system accounts for over 67% of public transport passenger journeys in the Greater Dublin Area. That means that whilst the bus carries two thirds of all public transport passengers, Luas carries 18% and DART plus commuter rail services deliver the remaining 15%.

Ambient Air Quality
In order to protect human health, vegetation and ecosystems, EU Directives set down air quality standards in Ireland and the other Member States for a wide variety of pollutants. These pollutants are generated through fuel combustion, in space heating, traffic, electricity generation and industry and, in sufficient amounts, could affect the well-being of the areas inhabitants. The EU Directives include details regarding how ambient air quality should be monitored, assessed and managed.

In order to comply with the directives mentioned above, the EPA measures the levels of a number of atmospheric pollutants. For the purposes of monitoring in Ireland, four zones are defined in the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).

The EPA's (2018) *Air Quality in Ireland 2017* identifies that:

- No levels above the EU limit value were recorded at any of the ambient air quality network monitoring sites in Ireland in 2017;
- The tighter World Health Organisation (WHO) guideline values were exceeded at a number of monitoring sites for particulate matter (PM_{10} and $PM_{2.5}$), ozone and NO_2; and

- 2017 dioxin survey shows that concentrations of dioxins and similar pollutants remain at a consistently low level in the Irish environment.

The Plan facilitates improvements in sustainable mobility, thereby facilitating reductions in and limiting increases of emissions to air. Such emissions would occur otherwise with higher levels of motorised transport and associated traffic.

The most recent air quality report for Northern Ireland "Air Pollution in Northern Ireland 2017" (Department of Agriculture, Environment and Rural Affairs, 2019) identifies that EU limit values, target values and corresponding Air Quality Strategy objectives, have been met by the due dates for the following pollutants in Northern Ireland: particulate matter as PM_{10} and $PM_{2.5}$, carbon monoxide, benzene, sulphur dioxide and elements lead, arsenic, cadmium and nickel. However, two monitoring sites with sufficient data for a valid annual mean did not meet the limit values and objectives for nitrogen dioxide in 2017; Belfast Stockman's Lane and Downpatrick Roadside. All are traffic-related sites.

Noise
Noise is unwanted sound. The Noise Directive - Directive 2002/49/EC relating to the assessment and management of environmental noise - is part of an EU strategy setting out to reduce the number of people affected by noise in the longer term and to provide a framework for developing existing EU policy on noise reduction from source.

In compliance with the Directive and transposing Environmental Noise Regulations (S.I. No. 140 of 2006), Noise Action Plans have been prepared for each local authority area within the country. These action plans address the agglomeration of Dublin and major roads, railways and airports. The Action Plans include noise mapping and are required to include measures to manage noise issues and effects, including noise reduction if necessary.

Existing problems
Legislative objectives governing air and climatic factors were not identified as being conflicted with.

However, the Climate Change Advisory Council's Annual Review 2018 has identified that Ireland will miss 2020 and 2030 emissions reduction targets unless urgent action that leads to tangible and substantial reductions in greenhouse gas emissions is taken. The Integrated Implementation Plan will, in combination with various plans and programmes from the transport sector and from other sectors, contribute towards reducing greenhouse gas emissions and moving in the direction of these targets.

With regard to air quality, it is the transport sector which has the greatest impact on NO_2 concentrations, particularly in urban areas where the WHO guideline value, approaching the EU limit value and could face exceedances of this EU limit in the future if vehicle numbers continue to rise. The Transport Plan will help to facilitate reductions in emissions and a transition from dependence on fossil fuel combustion powered transport.

3.5 Population and Human Health

Population
Most users of transport infrastructure and services will reside in and commute to and from urban/suburban areas. Figure 3.1 shows population density per Electoral Division across the Greater Dublin Area. Population for each division has been classified into ten categories with an equal number of units in each category.

A spread of settlement areas occurs throughout the country with a generally higher concentration of settlement areas in the eastern half of the country. The biggest settlements comprise Dublin, Galway, Cork, Limerick and Belfast in Northern Ireland.

The most populous divisions are generally concentrated within and surrounding the M50 motorway, along the coast (as far south as Wicklow), in areas of Meath closest to Dublin and within North-East

Kildare and along the M7 corridor. The uplands in County Wicklow, North-West and South Kildare and North County Meath are among the least populous divisions.

Locating transport infrastructure and services closer to urban/suburban areas (which have higher populations and densities) will allow for a greater number of journeys via sustainable transport modes and associated positive environmental effects on energy usage and air and noise emissions.

Human Health
With regard to human health, impacts relevant to the SEA are those which arise as a result of interactions with environmental vectors (i.e. environmental components such as air, water or soil through which contaminants or pollutants, which have the potential to cause harm, can be transported so that they come into contact with human beings). Hazards or nuisances to human health can arise as a result of exposure to these vectors e.g. interactions with human health that could occur in urban locations that experience high levels of traffic congestion and associated particulate matter and noise emissions to air.

Transport issues that present potential interactions with human health include emissions to air including noise and other emissions. These issues are identified under the relevant environmental component and potential interactions have been taken into account by the provisions contained within the Integrated Implementation Plan.

Emission limits for discharges to air, soil and water are set with regards to internationally recognised exposure limit values. These are generally set to be many times the safe exposure limit - in order to provide protection. In the event that a plan or programme began to have adverse health effects on surrounding populations it is likely that it would have been identified as being in breach of such emission standards at a very early stage - and long before the manifestation of any adverse health effects in the population.

Existing Problems
There is historic and predictive evidence of flooding across the country.

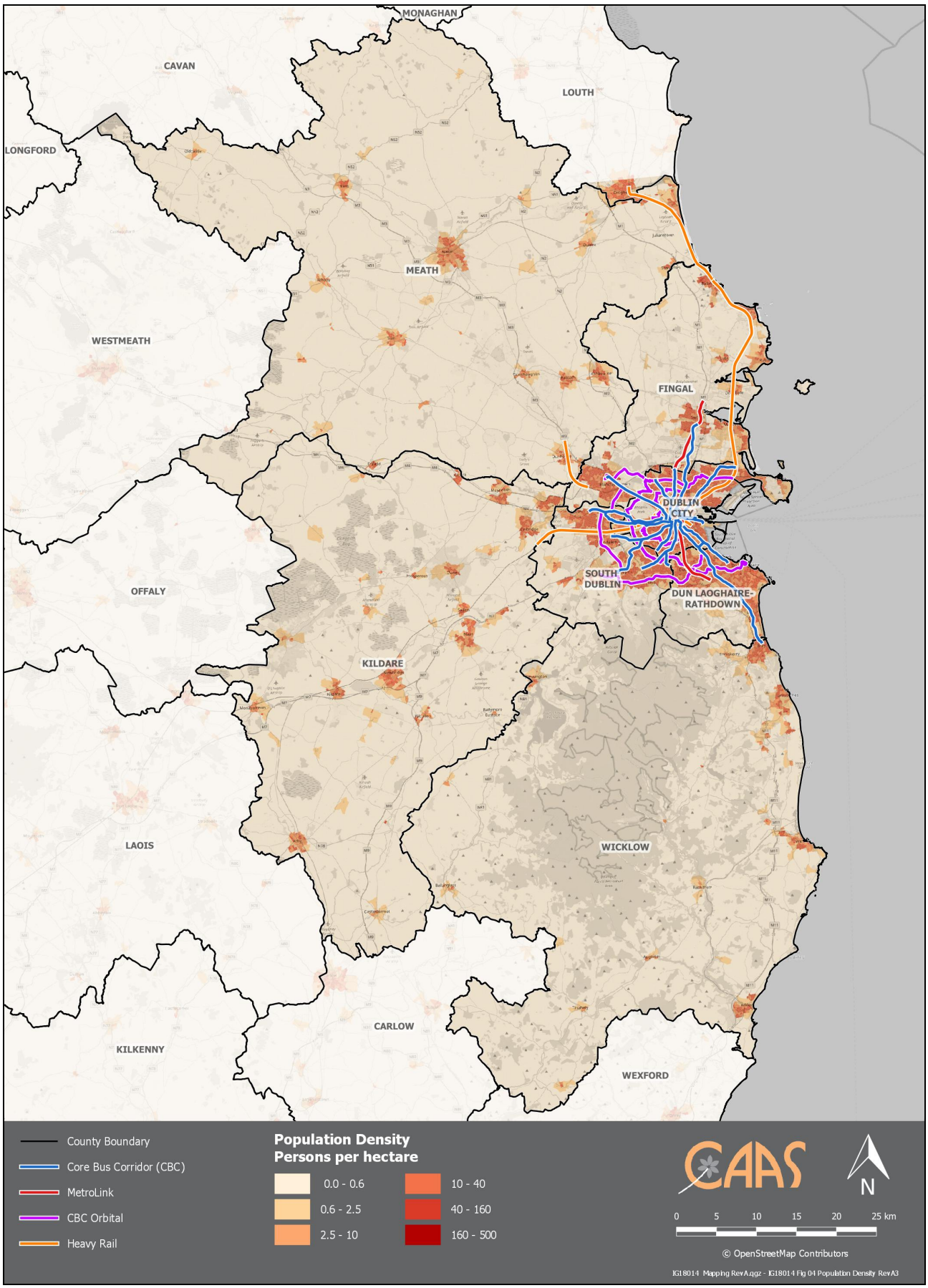

Figure 3.1 Population Density

3.6 Biodiversity and Flora and Fauna

Information on biodiversity and flora and fauna which is relevant to the Plan and lower tier assessments and decision making by local authorities and others includes available information on designated ecological sites and protected species, ecological connectivity (including stepping stones and corridors) and non-designated habitats.

Habitats occurring in Ireland include:

- Coastal habitats including sand and machair systems and sea inlets;
- Upland habitats including blanket bogs, heaths and forests;
- Lowland habitats including raised bogs and agricultural lands;
- Surface waters including rivers, lakes and estuaries;
- Limestone pavements, calcareous springs and turloughs, including those concentrated in the Burren (an example of geological heritage); and
- Ancient and semi-natural woodlands of oaks, yew and pine.

Ecological designations include:

- Special Areas of Conservation[1] (SACs), including candidate SACs;
- Special Protection Areas[2] (SPAs);
- UNESCO World Heritage and UNESCO Biosphere sites[3];
- Ramsar Sites[4];
- Salmonid Waters[5];
- Shellfish Waters[6];
- Freshwater Pearl Mussel catchments[7];
- Flora Protection Order[8] sites;
- Wildlife Sites (including Nature Reserves[9]);

[1] cSACs have been selected for protection under the European Council Directive on the conservation of natural habitats and of wild fauna and flora (92/43/EEC) due to their conservation value for habitats and species of importance in the European Union. The Habitats Directive seeks to establish Natura 2000, a network of protected areas throughout the EU. It is the responsibility of each member state to designate SACs to protect habitats and species, which, together with the SPAs designated under the 1979 Birds Directive, form Natura 2000. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010. The Regulations have been prepared to address several judgments of the Court of Justice of the European Union (CJEU) against Ireland, notably cases C-418/04 and C-183/05, in respect of failure to transpose elements of the Birds Directive and the Habitats Directive into Irish law. European Sites are mapped on Figure 3.2.

[2] SPAs have been selected for protection under the 1979 European Council Directive on the Conservation of Wild Birds (79/409/EEC) - referred to as the Birds Directive - due to their conservation value for birds of importance in the European Union. European Sites are mapped on Figure 3.2.

[3] United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List comprises sites of outstanding universal value: cultural, natural or mixed. The UNESCO Biosphere Reserves List comprises areas of terrestrial and coastal ecosystems promoting solutions to reconcile the conservation of biodiversity with its sustainable use.

[4] Ramsar sites are designated and protected under the Convention of Wetlands of International Importance, especially as Water Fowl Habitat, which was established at Ramsar in 1971 and ratified by Ireland in 1984. Ireland presently has 45 sites designated as Wetlands of International Importance, with surface areas of 66,994 hectares. The objective of a Ramsar site is the conservation of wetlands for wildfowl. While Ireland ratified the Ramsar Convention in 1984 there is no legal backing for Ramsar sites unless they are also Nature Reserves or SPAs and as such are protected by the Wildlife Acts 1976-2012 or the Birds or Habitats Directives.

[5] Salmonid waters are designated and protected as under the European Communities (Quality of Salmonid Waters) Regulations 1988 (SI No. 293 of 1988). Designated Salmonid Waters are capable of supporting salmon (Salmo salar), trout (Salmo trutta), char (Salvelinus) and whitefish (Coregonus).

[6] In order to protect existing shellfish waters and to ensure the future protection of these areas, the European Union introduced the Shellfish Waters Directive (2006/113/EC). The purpose of this Directive is to put in place concrete measures to protect waters, including shellfish waters, against pollution and to safeguard certain shellfish populations from various harmful consequences, resulting from the discharge of pollutant substances into the sea. The Directive applies to the aquatic habitat of bivalve and gastropod molluscs only (includes oysters, mussels, cockles, scallops and clams). It does not include crustaceans such as lobsters, crabs and crayfish.

[7] Freshwater pearl mussel is a globally threatened, long-lived and extremely sensitive species that can be impacted by many forms of pollution, particularly sediment and nutrient pollution and by hydrological and morphological changes, which may arise from developments, activities or changes in any part of the catchment.

[8] The current list of plant species protected by Section 21 of the Wildlife Act, 1976 is set out in the Flora (Protection) Order, 1999.

[9] A Nature Reserve is an area of importance to wildlife, which is protected under Ministerial order. There are currently 78 Statutory Nature Reserves. Most are owned by the State but some are owned by organisations or private landowners.

- Certain entries to the Water Framework Directive Register of Protected Areas[10];
- Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs)[11];
- Wildfowl Sanctuaries (see S.I. 192 of 1979)[12];
- National Parks[13];
- Refuges for Flora and Fauna[14];
- Biogenic Reserves[15]; and
- Tree Preservation Orders (TPOs)[16].

Ecological designations in Northern Ireland include:

- European Sites (see description above);
- Areas of Special Scientific Interest (ASSIs)[17];
- Nature Reserves[18]; and
- Ramsar Sites (see description above).

Protected Species include:

- Annex IV (Habitats Directive) species of flora and fauna, and their key habitats (i.e. breeding sites and resting places), which are strictly protected wherever they occur, whether inside or outside the above sites, e.g. Otter and bats;
- Other species of flora and fauna and their key habitats which are protected under the Wildlife Acts, 1976-2012, wherever they occur; and
- 'Protected species and natural habitats' as defined in the European Liability Directive (2004/35/EC) and European Communities (Environmental Liability) Regulations, 2008, including: Birds Directive – Annex I species and other regularly occurring migratory species, and their habitats (wherever they occur) and Habitats Directive – Annex I habitats, Annex II species and their habitats, and Annex IV species and their breeding sites and resting places (wherever they occur).

The following information is relevant to ecological networks and connectivity and non-designated habitats:

- CORINE land cover mapping (including areas likely to contain a habitat listed in Annex 1 of the Habitats Directive)[19];
- Watercourses, wetlands and peatlands;
- Other relevant County Development Plan designations;
- The EPA's Framework National Ecological Network for Ireland[20];

[10] In response to the requirements of the Water Framework Directive a number of water bodies or parts of water bodies which must have extra controls on their quality by virtue of how their waters are used by wildlife have been listed on Registers of Protected Areas (RPAs). RPAs include those for Protected Habitats or Species, Shellfish, Salmonid, Nutrient Sensitive Areas, Recreational Waters and Drinking Water.

[11] NHAs are designated due to their national conservation value for ecological and/or geological/geomorphological heritage. They cover nationally important semi-natural and natural habitats, landforms or geomorphological features, wildlife plant and animal species or a diversity of these natural attributes. NHAs are designated under the Wildlife (Amendment) Act 2000. pNHAs were published on a non-statutory basis in 1995, but have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats.

[12] Wildfowl Sanctuaries are areas that have been excluded from the 'Open Season Order' so that game birds can rest and feed undisturbed. There are 68 sanctuaries in the State. Shooting of game birds is not allowed in these sanctuaries.

[13] Designated as per criteria of the International Union for the Conservation of Nature 1969.

[14] As provided for by the Wildlife Acts 1976-2012.

[15] The objective of this designation is conservation of representative examples of natural European heritage, scientific research and exchange of information. The Council of Europe launched the concept of a European Network of Biogenetic Reserves in 1973, the programme was started in 1976.

[16] TPOs are a planning mechanism whereby individual trees or groups of trees can be identified as important and protected by a TPO.

[17] ASSIs are protected areas that represent the best of Northern Ireland's wildlife and geological sites that make a considerable contribution to the conservation of Northern Ireland's most valuable natural places.

[18] Nature reserves are chosen from among the very best examples of Northern Ireland's wildlife, habitats and geology. They contain a wide range of species, communities and geology and their designation is a public recognition of their importance.

[19] The CORINE land cover mapping classifies land cover under various headings. This dataset allows for the identification of lands that are likely to be most valuable to biodiversity including those which are likely to contain a habitat listed in Annex 1 of the Habitats Directive e.g. natural grasslands, peat bogs, salt marshes. CORINE Land Cover (CLC) is a map of the European environmental landscape based on interpretation of satellite images. Land cover is the observed physical cover, as seen from the ground or through remote sensing, including for example natural or planted vegetation, water and human constructions which cover the earth's surface.

[20] The EPA's Framework National Ecological Network provides a classification of the relative importance of areas by virtue of the biodiversity and flora that they contain and the connectivity they provide. Many of the areas identified are corridors.

- Areas that are recognised as locally important for biodiversity or nature (e.g. in County Biodiversity and/or Development Plans, semi-natural habitats including wetlands and woodlands); and
- Other sites of high biodiversity value or ecological importance as identified by, for example, the Department of Agriculture, Food and the Marine (badger sets), relevant datasets from the National Biodiversity Data Centre and BirdWatch Ireland's 'Important Bird Areas' (Crowe et al., 2009).

Ecological networks are important in connecting areas of local biodiversity with each other and with nearby designated sites so as to prevent islands of habitat from being isolated entities. They are composed of linear features, such as treelines, hedgerows and rivers/streams, which provide corridors or stepping stones for wildlife species moving within their normal range. They are important for the migration, dispersal and genetic exchange of species of flora and fauna particularly for mammals, especially for bats and small birds and facilitate linkages both between and within designated ecological sites, the non-designated surrounding countryside and urban areas. Article 10 of the Habitats Directive recognises the importance of ecological networks as corridors and stepping stones for wildlife, including for migration, dispersal and genetic exchange of species of flora and fauna. The Directive requires that ecological connectivity and areas of ecological value outside the Natura 2000 network of designated ecological sites are maintained.

Ecological islands or areas of habitat that are not connected to surrounding ecologically valuable habitats can also be important.

In general, and on a national level, ecological sensitivities occur in greatest concentrations in the western half of the country and in particular along the western seaboard (including north-western and south-western coasts). Designated inland areas are generally concentrated around water bodies, bogs and upland areas. Other areas of significant extent designated include estuaries, islands and mountain areas, including those at the Wicklow Mountains to the south of Dublin.

Within the Greater Dublin Area, areas containing the greatest extent of sensitive ecological features include coastal habitats (including intertidal flats, islands, sand and dunes) and those in the uplands of County Wicklow (including peat bogs and forests). In addition to coastal waters there are a number of rivers and lakes draining the area which provide habitats for sensitive species. Dublin has the least concentration of sensitive habitats, although Dublin Bay is heavily designated. Wicklow's sensitivities include peat bogs and forest areas, including those found in the uplands, and coastal areas. Kildare's sensitivities include peat bogs in the North-West of the County. Dispersed areas of marginal agricultural lands that may include ecological sensitivities generally occur in Counties Meath, Kildare and Wicklow.

Potential Habitat Sensitivity

Potential Habitat Sensitivity is mapped on Figure 3.3 and includes Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs) and Areas likely to contain Annex I Habitats. Areas likely to contain Annex I Habitats comprise areas such as: broad-leaved forest, peat bog, natural grassland, water bodies, coastal lagoons, mixed forests, moors and heaths, intertidal flats, beaches dunes sand, inland marshes, stream courses, estuaries, sparsely vegetated areas, burnt areas, salt marshes, bare rocks, transitional woodland scrub and land principally occupied by agriculture with areas of natural vegetation. Where they occur, NHA and pNHA designations often overlap with European Sites boundaries. On national level greater concentrations of these sites occur in the western half of Ireland (including counties of Kerry, Clare, Galway, Mayo, Sligo and Donegal) and elsewhere in the country around lakes, bog areas, the Grand and Royal Canals, Shannon Estuary, Wicklow uplands, and coastal areas including islands and marine waters. Within the Greater Dublin Area they include lakes, bog areas, the Grand and Royal Canals and coastal areas including islands and waters.

Existing Problems

Previous changes in land uses arising from human development have resulted in a loss of biodiversity and flora and fauna however legislative objectives governing biodiversity and fauna were not identified as being conflicted with. The Plan includes robust measures to contribute towards the protection of biodiversity and flora and fauna.

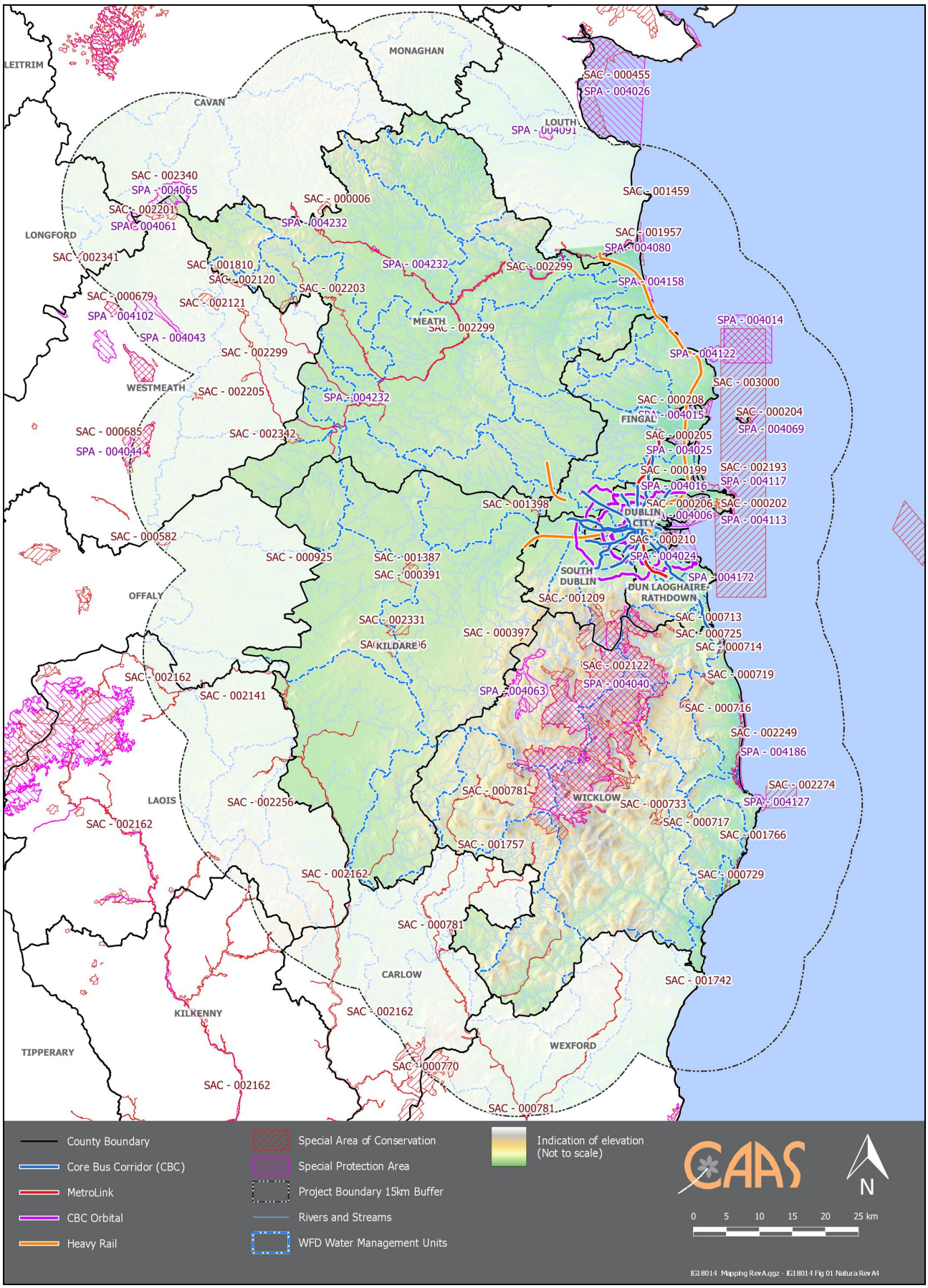

Figure 3.2 European Sites

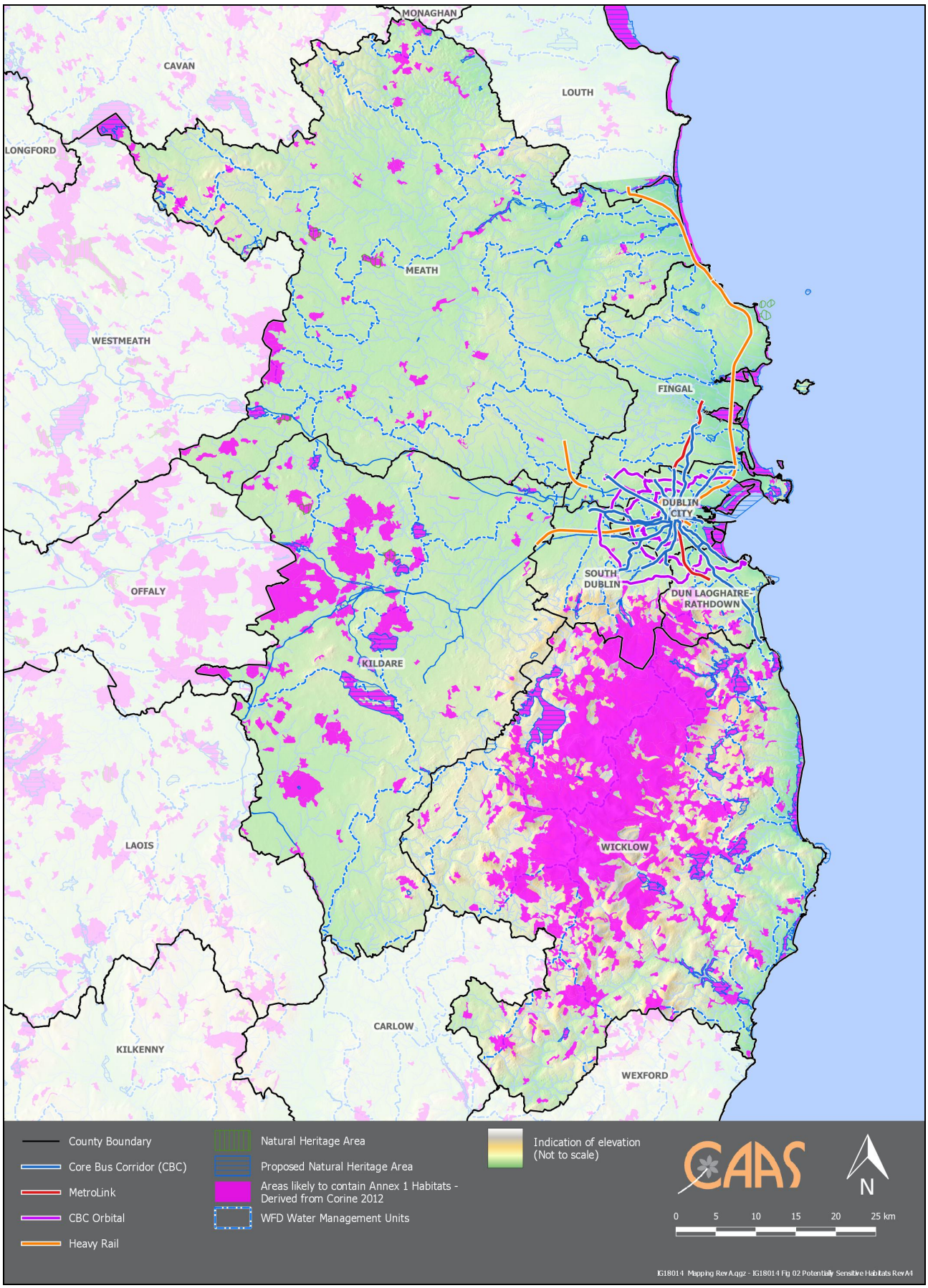

Figure 3.3 Potential Habitat Sensitivity

3.7 Material Assets

Introduction
Resources that are valued and that are intrinsic to specific places are called 'material assets'.

Material Assets relevant to this SEA include:

- Built/amenity assets and infrastructure;
- Land; and
- Waste management.

Material assets other than those detailed below that are covered by this SEA include archaeological and architectural heritage (see Section 3.10) natural resources of economic value, such as water and air (see Sections 3.8 and 3.4)

Built/Amenity Assets and Infrastructure
Built/amenity assets and infrastructure which have the potential to be impacted upon by the development of transport infrastructure, if unmitigated, include public open spaces, parks and recreational areas, public buildings and services, housing and utility infrastructure (electricity, gas, telecommunications, water supply, wastewater infrastructure etc.). These resources are generally located within the immediate outskirts of urban/suburban areas.

Land
The development of transport infrastructure and services has the potential to enable the reuse and regeneration of brownfield sites thereby contributing towards sustainable mobility and reducing the need to develop greenfield lands and associated adverse environmental effects. Brownfield lands are generally located within urban/suburban areas.

Waste Management
Any construction waste arising from the development of infrastructure is required to be dealt with in compliance with relevant EU and National waste management policy, including that relating to the waste hierarchy of prevention, recycling, energy recovery and disposal.

For the purposes of waste management planning, Ireland is divided into three regions: Southern, Eastern-Midlands and Connacht-Ulster. Waste management plans for each waste management region were published in 2015.

The 2016 EPA Report *"Irelands Environment - An Assessment 2016"* identifies that 11.91 Mt of waste was generated in Ireland during 2014. Of this total, 23% was generated by municipal sources, 28% by construction and demolition sources and 49% by other sources such as industry and agriculture. The bulk of construction and demolition waste is made up of uncontaminated soil and stones, with the remainder segregated wastes such as rubble, concrete, bricks, glass, plastic, wood, metals and mixed construction and demolition waste.

Existing Problems
No existing problems relevant to the SEA relating to material assets were identified by the assessment.

3.8 Water

Water Framework Directive
Since 2000, Water Management in the EU has been directed by the Water Framework Directive 2000/60/EC (WFD). The WFD requires that all Member States implement the necessary measures to prevent deterioration of the status of all waters - surface, ground, estuarine and coastal - and protect, enhance and restore all waters with the aim of achieving *good status*.

For the purpose of assessment, reporting and management, water is divided into groundwater, rivers, lakes, estuarine waters and coastal waters which are in turn divided into specific, clearly defined water bodies.

Status of surface and ground waters
WFD Monitoring Programmes are undertaken in Ireland by the Environmental Protection Agency and in Northern Ireland by the Department of the Environment's Northern Ireland Environmental Agency. Overviews of the status for monitored waterbodies are published and made available online. The WFD defines surface water status as the general expression of the status of a body of surface water, determined by the poorer of its ecological status and its chemical status.

The most recent EPA assessment of water quality monitoring data in Ireland was undertaken for 2013-2015[21]. The 2013-15 status information shows 57% of river water bodies, 46% of lakes, 31% of transitional waters and 79% of coastal waters achieving "good" or "high" status. For groundwater, 91% of water bodies are at "good" status. Nationally the number of monitored river water bodies and lakes at "good" or "high" status appears to have declined by 4% since 2007-2009. However, this decline also masks an underlying trend of improvement and dis-improvement across monitored river water bodies and lakes since 2009[22].

For groundwater bodies, the approach to classification is different from that for surface water. For each body of groundwater, both the chemical status and the quantitative status must be determined. Both have to be classed as either *good* or *poor*. The WFD sets out a series of criteria that must be met for a body to be classed as good chemical and quantitative status. Nationally, for groundwater, 91% of water bodies are at *good* status.

Groundwater within the Greater Dublin Area is generally identified as being of *good* status however there are some areas which are identified as being of *poor* status as a result of, for example, historical mining or industrial activities.

Groundwater productivity and vulnerability
The Geological Survey of Ireland (GSI) rates groundwaters according to both their vulnerability to pollution and their productivity.

Groundwater is most at risk where the subsoils are absent or thin and, in areas of karstic limestone, where surface streams sink underground at swallow holes[23]. Groundwater vulnerability varies across the Greater Dublin Area. The most of County Kildare and north-west/south-west of County Meath are underlain by "High" and "Moderate" groundwater vulnerability. The south-east parts of County Meath, northern parts of County Fingal, coastal areas of County Wicklow and some pocket areas in County Kildare and surrounding Dublin City are having "Low" groundwater vulnerability. The Wicklow Mountains and upland areas within the Greater Dublin Area are generally identified as having either "Extreme" or "Extreme (Rock near surface)" vulnerability.

The GSI also rates aquifers based on the hydrogeological characteristics and on the value of the groundwater resource. This is referred to as aquifer productivity. Ireland's entire land surface is divided into nine aquifer productivity classifications that encompass various types of regionally, locally important and poor aquifers. The aquifer underlying parts of north/north-east part of County Meath and west/south-west parts of County Kildare is classified as "regionally important aquifer (karstified bedrock)" with "regionally" and "locally important gravel aquifer" overlying in places.

WFD Registers of Protected Areas
The WFD requires that Registers of Protected Areas (RPAs) are compiled for a number of water bodies or part of water bodies which must have extra controls on their quality by virtue of how their waters are used by people and by wildlife. The WFD requires that these RPAs contain: areas from which waters are taken for public or private water supply schemes; designated shellfish production

[21] Other sources of information from the EPA that are available for use in lower tier assessments include the Geoportal and Envision websites and reports including Water Quality in Ireland (various), Integrated Water Quality Reports (various) and Quality of Estuarine and Coastal Waters (various).
[22] Department of Housing, Planning and Local Government (2018) River Basin Management Plan for Ireland 2018 - 2021
[23] Source: Geological Survey of Ireland (2014) Metadata

areas; bathing waters; areas which are affected by high levels of substances most commonly found in fertilizers, animal and human wastes - these areas are considered nutrient sensitive; areas designated for the protection of habitats or species e.g. Salmonid areas; Special Areas of Conservation (SACs); and, Special Protection Areas (SPAs). Entries to the RPAs in Ireland include:

- Drinking Water Rivers and Lakes;
- Nutrient Sensitive Rivers, Lakes and Estuaries;
- Shellfish Areas;
- Salmonid Rivers;
- Bathing Areas; and
- Groundwater for Drinking Water.

Bathing Waters

For bathing waters, Mandatory and Guide Values are set out for bathing waters in the 2006 EU Bathing Water Directive and transposing Regulations. Mandatory Values are values which must be observed if the bathing area is to be deemed compliant with the Directive. Compliance with Guide Values exceeds guidance with Mandatory Values and can be regarded as quality objectives which bathing sites should endeavour to achieve.

Potential Water Sensitivity

A potential water sensitivity map has been prepared as part of the SEA process. The purpose of the map is to indicate at a regional level where the main concentrations of water sensitivities might occur within and surrounding the Greater Dublin Area. Figure 3.4 shows areas with higher water sensitivities (indicated by darker orange colours), areas with moderate water sensitivities (indicated by yellow colours) and areas with lower water sensitivities (indicated with green colours). Sensitive rivers are generally found away from upland areas, draining lowland areas of settlement and agriculture. Heightened sensitivities arising from groundwater vulnerability and poor status data are found in much of County Wicklow, North-West and East Meath, Dublin County and central Kildare. Areas of sensitivity are also found in coastal areas.

Flooding

Flooding is an environmental phenomenon which, as well as causing economic and social impacts, could in certain circumstances pose a risk to human health. The existence of flood risk across the country is illustrated by various sources of information on historical flooding events – including those available from the Office of Public Works, the lead Authority on flooding in the country, National Flood Hazard Mapping website. In addition to this historic mapping there is predictive, modelled Preliminary Flood Risk Assessment and Flood Risk and Hazard mapping available from the OPW including through the National Catchment Flood Risk Management Programme (CFRAM). These mapping sources identify flood risk from various sources, including fluvial, pluvial, coastal and groundwater.

Existing Problems

Subject to exemptions provided for by Article 4 of the WFD, based on available water data, certain surface and groundwater bodies will need improvement in order to comply with the objectives of the WFD.

There are various bathing water locations across the country that do not meet mandatory bathing water values.

There is historic and predictive evidence of flooding in locations across the country.

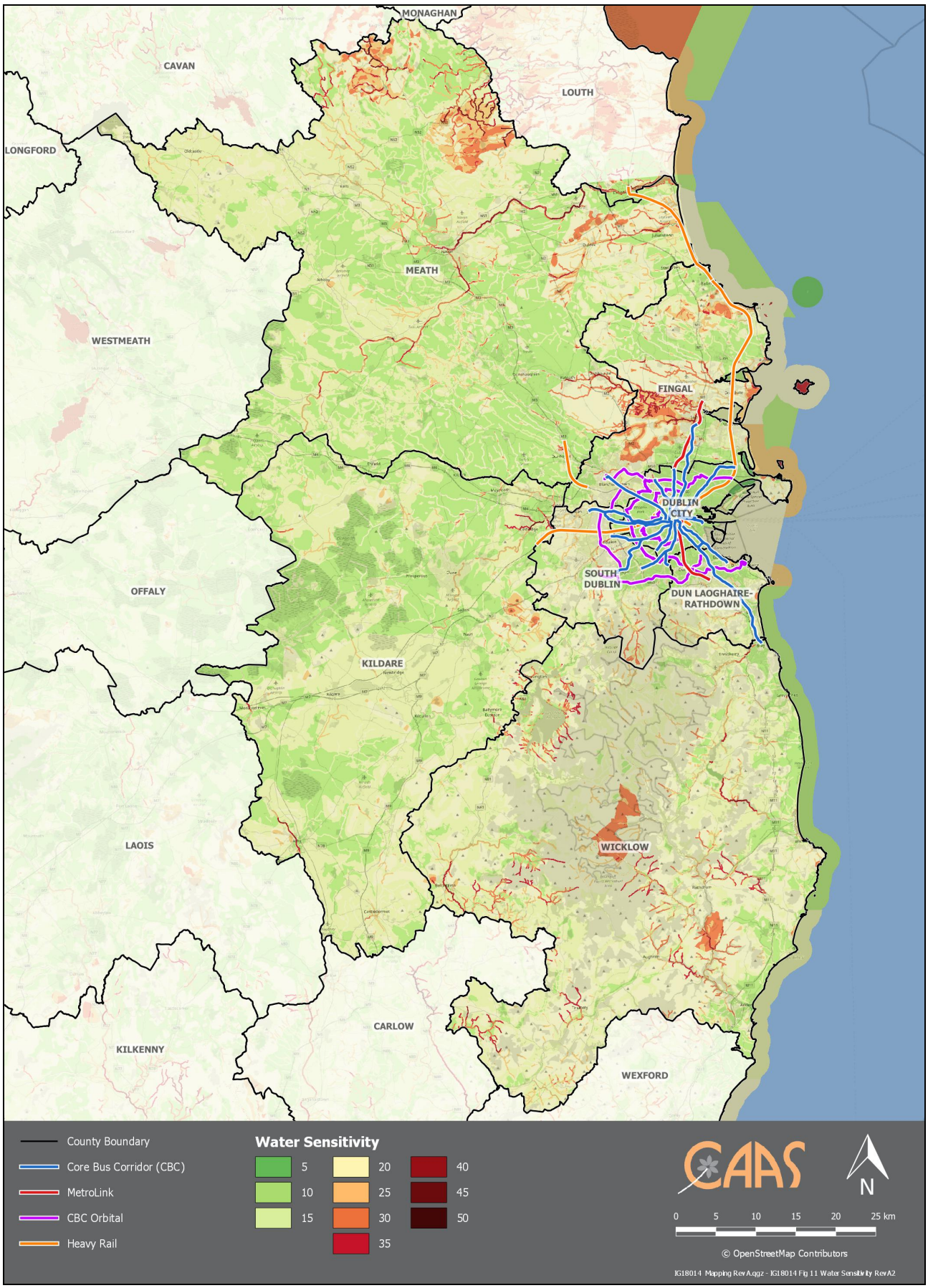

Figure 3.4 Overlay of Potential Water Sensitivity

3.9 Landscape

Landscapes are areas which are perceived by people and are made up of a number of layers: landform, which results from geological and geomorphological history; land cover, which includes vegetation, water, human settlements, and; human values which are a result of historical, cultural, religious and other understandings and interactions with landform and land cover.

Land cover is the observed physical cover, as seen from the ground or through remote sensing, including for example natural or planted vegetation, water and human constructions which cover the earth's surface.

Artificial surfaces in Ireland account for just under 2.46% of the land surface, significantly below the European Union average of 4.2% (European Environment Agency 2012 CORINE mapping).

The CORINE Land Cover map is based on interpretation of satellite images. Three categories of potential land cover sensitivity (normal, robust and sensitive) have been identified on Figure 3.5.

In the Greater Dublin Area, normal land cover is the predominant land cover type and is generally found throughout much of County Meath, County Kildare, County Wicklow and Dublin County. Robust land cover is found within and surrounding the M50 motorway and in pockets throughout the Greater Dublin Area. Sensitive land cover are most common in the Wicklow Mountain uplands/foothills, in bog areas in North-West Kildare and in coastal areas and parklands.

Existing Problems
New developments have resulted in changes to the visual appearance of lands over time however legislative objectives governing landscape and visual appearance were not identified as being conflicted with.

3.10 Cultural Heritage

Archaeological Heritage
Archaeology is the study of past societies through the material remains left by those societies and the evidence of their environment. Archaeological sites and monuments vary greatly in form and date; examples include earthworks of different types and periods, (e.g. early historic ringforts and prehistoric burial mounds), megalithic tombs from the Prehistoric period, medieval buildings, urban archaeological deposits and underwater features. Archaeological heritage is protected under the National Monuments Acts (1930-2004), Natural Cultural Institutions Act 1997 and the Planning Acts. There are thousands of known Recorded Monuments in Ireland.

Archaeological heritage designations in Northern Ireland include entries to the Northern Ireland Sites and Monuments Record and Areas of Significant Archaeological Interest and Archaeological Potential.

Clusters of monuments are indicated within already developed urban and suburban areas and in other locations.

A buffer of 250m (radius) has been applied to make these designations noticeable at the regional scale of the mapping produced. Where zones associated with the monuments have been provided by the National Monuments Service these have been used instead. National Monuments that are in State care are differentiated on the map. Monuments are concentrated within urban/suburban areas and are less common in areas which are not settled, most noticeably much of the Wicklow Mountains.

Architectural Heritage
The term architectural heritage is defined in the Architectural Heritage (National Inventory) and Historic Monuments Act 1999 as meaning all: structures and buildings together with their settings and attendant grounds, fixtures and fittings; groups of structures and buildings; and, sites which are of technical, historical, archaeological, artistic, cultural, scientific, social, or technical interest. Records of

Protected Structures are legislated for under Section 12 and Section 51 of the Planning and Development Act 2000 as amended. In addition to Protected Structures, the Planning and Development Act, 2000 provides the legislative basis for the protection of Architectural Conservation Areas (ACAs). An ACA is a place, area or group of structures or townscape which is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or value, or contributes to the appreciation of protected structures, whose character it is an objective to preserve in a development plan.

The National Inventory of Architectural Heritage (NIAH) is a State initiative under the administration of the Department of Arts, Heritage and the Gaeltacht and was established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. The purpose of the NIAH is to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for the Environment, Heritage and Local Government to the local authorities for the inclusion of particular structures in their Record of Protected Structures (RPS). The NIAH encompasses a survey of Historic Gardens and Designed Landscapes. Similar to the general spatial spread of archaeological heritage, clusters of architectural heritage are indicated within already developed urban and suburban areas.

3.11 Soil

Information sources relevant to the environmental component of soil which may be used in lower tier assessments and decision making by local authorities and others includes:

- Soil types (2006) published by Teagasc, Geological Survey of Ireland (GSI), Forest Service & EPA;
- Soils and Subsoils Class (2006) published by Teagasc, GSI, Forest Service & EPA (2006);
- Sites of Geological Interest which have been published for some counties and provisional information on same for other counties (both available from GSI);
- Other datasets published by and available from GSI including those relating to Bedrock Geology, Quaternary Geology, Mineral deposits, Groundwater Resources and Landslides; and
- Datasets on contaminated soils which may be kept by local authorities (these occur most often in urban areas).

Land Take and Soil Sealing
Land take results from the expansion of cities and spread of urban areas, including development of transport infrastructure, and involves the replacement of formerly open soil with impermeable layers – this process is known as soil sealing.

Soil sealing can place pressure on water resources, increase the risk of flooding, affect the carbon cycle, reduce agricultural and extractive industry potential and adversely affect biodiversity.

County Geological Sites
Sites that are appraised, but which are not selected for NHA designation, are classified as 'County Geological Sites' (CGS), as recognised in the National Heritage Plan (2002). This enables their integration into County Development Plans. All sites of geological heritage importance are currently classified as CGS until such time that the most significant sites can be designated as geological NHAs. Nationally, audits of geological sites in 19 counties have been completed to date. There are 170 County Geological Sites located within the Greater Dublin Area.

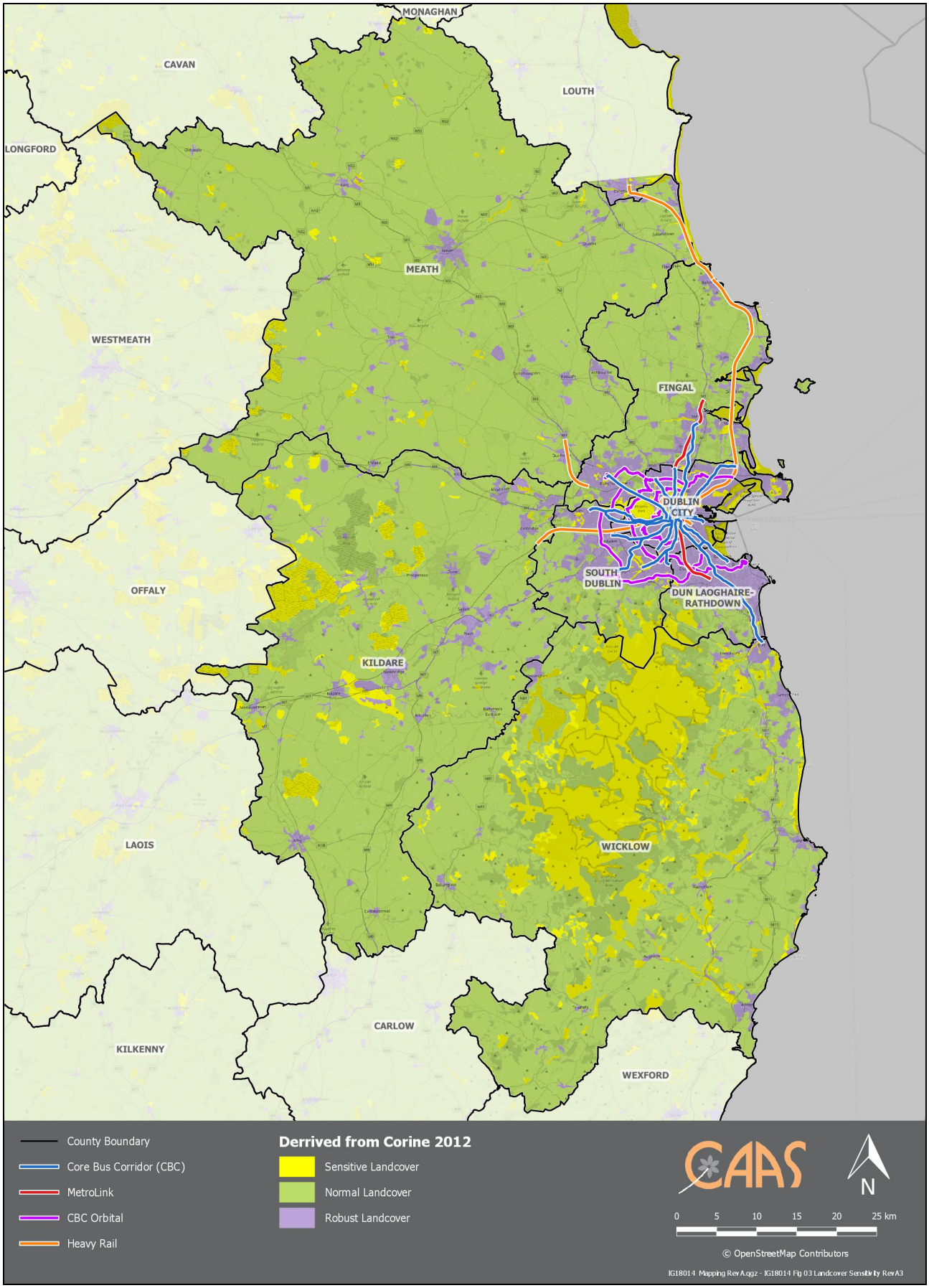

Figure 3.5 Potentially Sensitive Land Covers

3.12 Overall Environmental Sensitivities and Opportunities/Robustness

Some of the environmental information for the Greater Dublin Area detailed under previous subsections has been weighted and mapped to show overall environmental sensitivity (see Figure 3.6) and overall environmental opportunities/robustness (see Figure 3.7) with regard to the development of transport projects. The purpose of the mapping is to indicate at a regional level where the main concentrations of sensitivities might occur.

The maps are prepared at the regional scale and different layers or weightings would produce different map outputs. Where the sensitivity mapping shows a concentration of environmental sensitivities there is an increased likelihood that development will conflict with these sensitivities and cause environmental deterioration, if mitigation is not applied. It is emphasised that the occurrence of environmental sensitivities does not preclude development; rather it flags at a strategic level that the mitigation measures - which have already been integrated into the Plan - will need to be adhered to at lower tiers of decision making in order to ensure that the implementation of the Plan contributes towards environmental protection.

Where the robustness mapping shows a concentration of environmental opportunities there is a decreased likelihood that development will conflict with the environment.

Heightened areas of sensitivity include those in the uplands and foothills of the Wicklow Mountains, in the bog areas of west Kildare, in river valleys (e.g. the River Boyne in central and North Meath, the River Barrow in West and South Kildare and Slaney in South Wicklow) and at lakes. Lands at the coastal margins and coastal waters are also sensitive, especially within and to the north of Dublin Bay. Lower levels of sensitivity occur elsewhere.

Heightened areas of opportunities/robustness include those within and surrounding the M50 motorway, in much of County Meath, especially south and south-east Meath, in much of County Kildare, especially north-east Kildare, and in County Wicklow, between the Mountains and the coast. Lower levels of opportunities/robustness occur elsewhere.

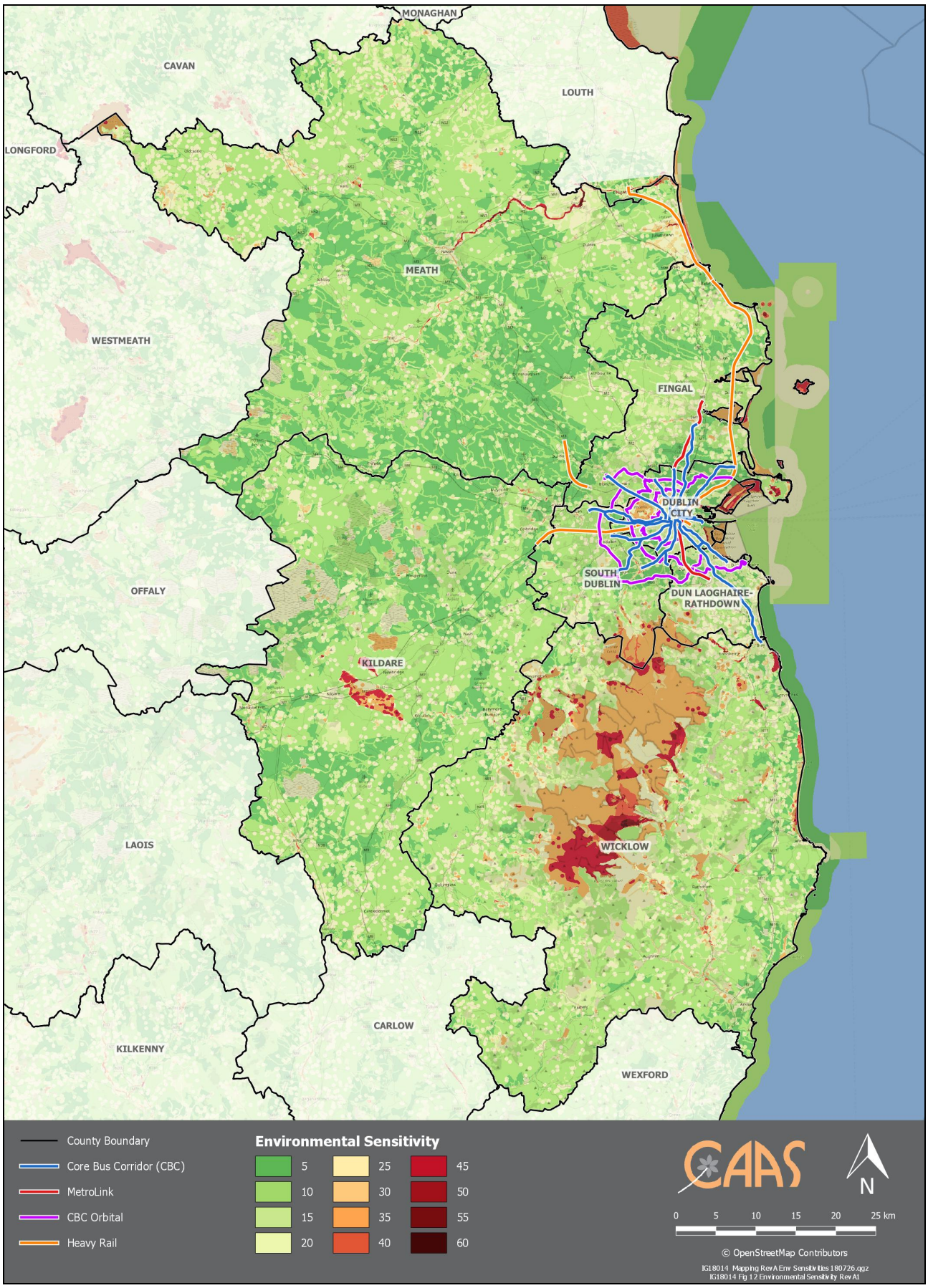

Figure 3.6 Overall Potential Environmental Sensitivity

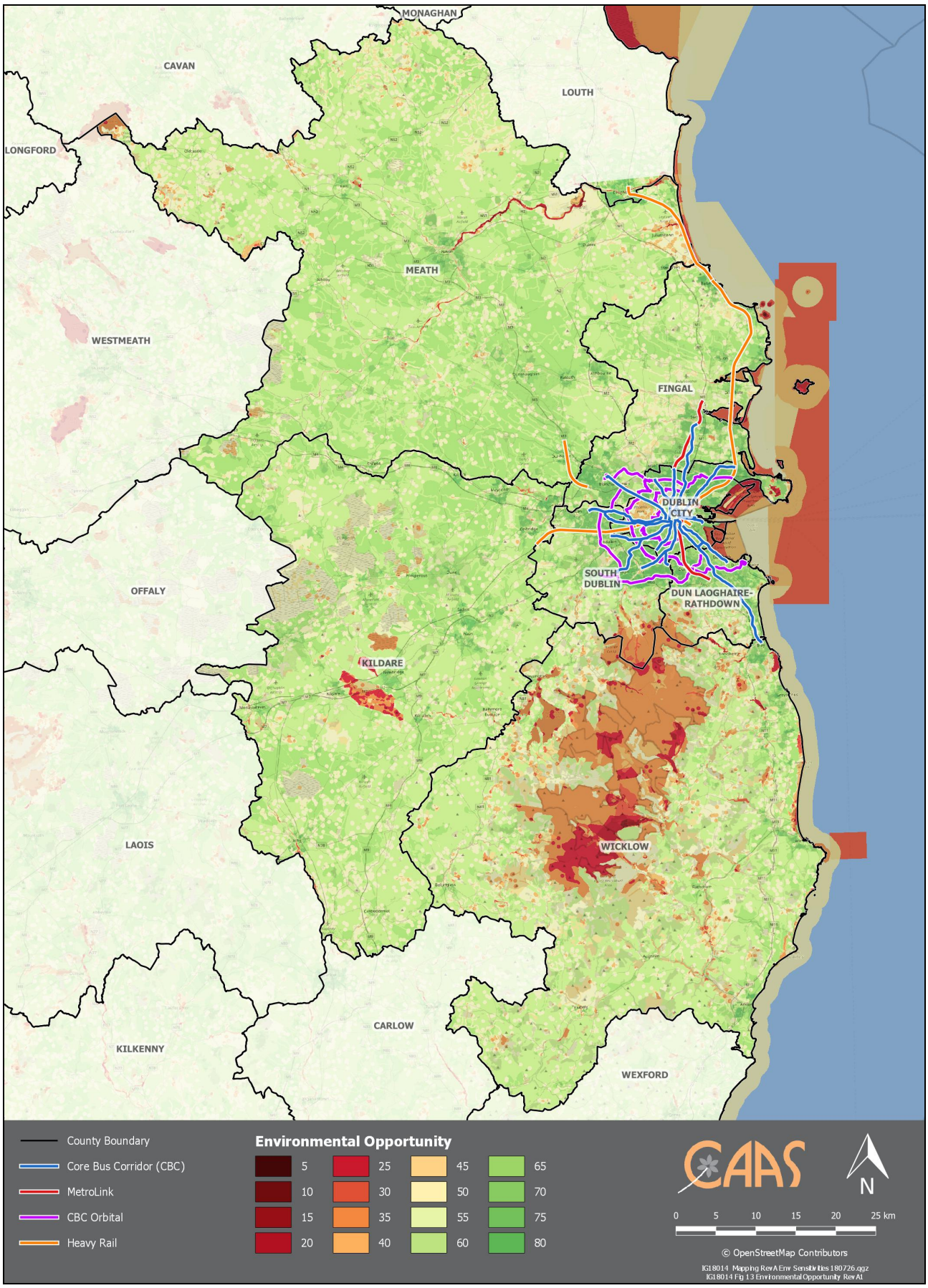

Figure 3.7 Overall Potential Environmental Opportunities/Robustness

3.13 Appropriate Assessment

Stage 2 Appropriate Assessment (AA) has been undertaken alongside the preparation of the Plan. The requirement for AA is provided under the EU Habitats Directive (Directive 1992/43/EEC). The emerging conclusion of the AA is that it will not affect the integrity of the Natura 2000 network[24].

3.14 Strategic Environmental Objectives

Strategic Environmental Objectives (SEOs) are methodological measures developed from policies which generally govern environmental protection objectives established at international, Community or Member State level and are used as standards against which the provisions of the Plan and the alternatives can be evaluated in order to help identify significant environmental effects. SEOs are shown on the table below.

Table 3.1 Strategic Environmental Objectives

Environmental Component	SEO Code	SEO
Air and Climatic Factors	**SEO AC1**	To contribute towards reductions in travel related emissions (including pollutants, noise and greenhouse gas emissions) to air
	SEO AC2	To encourage modal change from car to more sustainable forms of transport
	SEO AC3	To facilitate a reduction in energy use by the transport sector and an increase in the proportion of energy from renewable sources by the transport sector
Population and Human Health	**SEO PHH1**	To develop transport infrastructure and services closer to urban/suburban areas thereby facilitating consolidation of growth and limiting urban sprawl
	SEO PHH2	To contribute towards the protection of populations and human health from exposure to incompatible land uses
Biodiversity, Flora and Fauna	**SEO B1**	To contribute towards compliance with the Habitats and Birds Directives with regard to the protection of European Sites and Annexed habitats and species[25]
	SEO B2	To contribute towards compliance with Article 10 of the Habitats Directive with regard to the management of features of the landscape which - by virtue of their linear and continuous structure or their function as stepping stones (designated or not) - are of major importance for wild fauna and flora and essential for the migration, dispersal and genetic exchange of wild species
	SEO B3	To contribute towards avoidance of significant impacts on relevant habitats, species, environmental features or other sustaining resources in designated sites including Wildlife Sites and to contribute towards compliance with the Wildlife Acts 1976-2012 with regard to the protection of listed species
Material Assets	**SEO MA1**	To contribute towards the protection of built/amenity assets and infrastructure
	SEO MA2	To assist with the reuse and regeneration of brownfield sites
	SEO MA3	To reduce waste volumes, minimise waste to landfill and increase recycling and reuse
Water	**SEO W1**	To contribute towards the maintenance and improvement, where possible, of the quality and status of surface waters
	SEO W2	To contribute towards maintaining and improving, where possible, the chemical and quantitative status of groundwaters
	SEO W3	To comply as appropriate with the provisions of the Flood Risk Management Guidelines
Landscape	**SEO L1**	To contribute towards avoidance or, where infeasible, minimisation of conflicts with the appropriate protection of statutory designations relating to the landscape, including those included in the land use plans of planning authorities
Cultural Heritage	**SEO CH1**	To contribute towards the protection of archaeological heritage (including entries to the Record of Monuments and Places) and its context
	SEO CH2	To contribute towards the protection of architectural heritage (including entries to the Record of Protected Structures, entries to the National Inventory of Architectural Heritage and Architectural Conservation Areas) and its context
Soil	**SEO S1**	To minimise land take and loss to extent of soil resource

[24] Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be:
(a) no alternative solution available;
(b) imperative reasons of overriding public interest for the plan/programme/project to proceed; and
(c) adequate compensatory measures in place.

[25] 'Annexed habitats and species' refer to those listed under Annex I, II & IV of the EU Habitats Directive and Annex I of the EU Birds Directive.

Section 4 Consideration of Alternatives

4.1 Need for the Plan

The emergence of increasing road congestion in recent years has underlined the need to provide an enhanced level of public transport provision to provide an alternative to car-based commuting. Congestion is a challenge that must be addressed by the transport system in a context where significant population growth, and associated economic activity and social, cultural and recreational activity is being planned for.

Furthermore, the significance of the need for action to reduce the use of fossil fuels and diminish the generation of greenhouse gases is recognised and required by legislation. The National Transport Authority is required to adhere to the National Climate Change Adaptation Framework, which was published by the Minister for Communications, Climate Action and Environment in 2018, and the Department of Transport, Tourism and Sport's Sectoral Adaptation Plan, published in 2017.

The National Transport Authority is required by the Dublin Transport Authority Act 2008 to prepare a six year Integrated Implementation Plan to, inter alia, facilitate the implementation of the Transport Strategy for the Greater Dublin Area 2016-2025. The Transport Strategy, which was subject to full SEA and Stage 2 AA, is therefore a key in shaping the six-year Integrated Infrastructure Plan.

4.2 Existing provisions already in place

The Transport Strategy for the Greater Dublin Area 2016-2035 establishes an overall framework for transport investment in Counties Dublin, Meath, Kildare and Wicklow over the next two decades.

The Transport Strategy (and consequently the Implementation Plan) focuses on improving public and sustainable transport across the Greater Dublin Area while seeking to ensure primacy for transport options that provide for unit reductions in carbon emissions. This involves: promoting public transport, walking and cycling; seeking to reduce car use in circumstances where alternative options are available; and transitioning to lower emission vehicles for transport use. Transport Strategy provisions include those relating to: light rail; including the development of the MetroLink project; heavy rail (inclusive of expanded electrification on the suburban rail lines); cycling facilities; pedestrian movement; interchange facilities; information provision; and park and ride developments. To date the Authority has focused significant levels of investment in these sustainable modes, including the reopening of the Phoenix Park Tunnel and the delivery of Luas Cross City. The continuation of this focus is facilitated by the Transport Strategy and it is intended that it will continue under the Implementation Plan.

Most proposals included within the Plan have been already included within plans that have already been subject to SEA including the Transportation Strategy for the Greater Dublin Area 2016-2035, Project Ireland 2040 (including the National Planning Framework 2018) and the Greater Dublin Area Cycle Network Plan 2016.

In addition to aligning with the Transportation Strategy, the Implementation Plan aligns with other existing provisions including those included within the Project Ireland 2040 (including the National Planning Framework 2018) and the Greater Dublin Area Cycle Network Plan 2016. These existing provisions have been subject to SEA.

4.3 Alternative Scenarios

The various elements of the Plan are at different stages in the planning/environmental process. Furthermore, different elements of the Plan will be developed by different agencies, at different

times, according to different funding allocations. For these reasons the alternatives are expressed as alternative scenarios about the sequence and degree of implementation of key elements that make up the Plan.

Transportation is highly integrated with both land-use planning and the provision of other public infrastructure, such as water services. Different alternative scenarios will give rise to different land-use patterns, resulting in different environmental effects.

The following three alternative scenarios are examined:

- Scenario A: Balanced Bus and Rail;
- Scenario B: MetroLink Prioritisation of Funding; and
- Scenario C: MetroLink Reduced Funding.

Each scenario has been developed in line with government priorities in investment and taking into account the overarching provisions of the Transport Strategy for the Greater Dublin Area 2016-2035.

4.3.1 Scenario A: Balanced Bus and Rail

This scenario will advance the implementation of the National Transport Authority's Transport Strategy in a manner which balances investment into rail and bus projects (including both the Core Bus Network and the new MetroLink urban light rail metro service project), along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

This scenario will give rise to orderly development with balanced patterns of land use allocation – resulting in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). Growth will be balanced as a result of this scenario.

4.3.2 Scenario B: MetroLink Prioritisation of Funding

This scenario will advance the implementation of the National Transport Authority's Transport Strategy in a manner which prioritises investment into rail projects (specifically the new MetroLink) along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

In established urban nodes served by the MetroLink project and its associated feeder routes, this scenario will give rise to orderly development with very concentrated patterns of land use allocation within the immediate catchment of new stations. This will result in a in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). However, elsewhere in the Greater Dublin Area, growth will be uneven as a result of this scenario.

4.3.3 Scenario C: MetroLink Reduced Funding

This scenario will advance the implementation of the National Transport Authority's Transport Strategy in a manner which prioritises investment into bus projects (including the Core Bus network), along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

This scenario will give rise to orderly development with very dispersed patterns of land use allocation within the Greater Dublin Area. This will result in a significantly reduced and/or deferred likelihood of financially viable supporting utilities and amenities – as well as much later attainment of income generation goals (through loss of fares from orderly provision of new housing concentrations at scale). Growth will be very uneven as a result of this scenario.

4.4 Summary of Evaluation of Alternatives

4.4.1 Scenario A: Balanced Bus and Rail

This scenario will advance the implementation of the Transport Strategy for the Greater Dublin Area 2016-2035 in a manner which balances investment into rail and bus projects (including both the Core Bus Network and the new MetroLink urban light rail metro service project), along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

This scenario will give rise to orderly development with balanced patterns of land use allocation – resulting in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). Growth will be balanced as a result of this scenario.

This scenario will give rise to the least adverse environmental effects as it would facilitate the concentration of development around planned nodes – which will have appropriate social, environmental and mobility resources – because development will occur on lands that have been zoned and subject to SEA, AA and SFRA. Orderly development of this kind will give rise to the least adverse effects on populations, biodiversity and environmental components including air and water. The orderly and timely provision of services will help to anticipate and avoid effects on water and associated interactions with ecology and human health.

This scenario will:

- Facilitate the greatest improvement in sustainable mobility of all alternatives (reducing and limiting increases in the number of journeys by car taken as a percentage of all journeys taken), thereby facilitating the greatest reduction and limit of increases in greenhouse gas emissions, noise emissions and other emissions to air (with associated effects on human health). Such emissions would occur otherwise with higher levels of motorised transport and associated traffic. By significantly increasing the potential for plan-led, integrated development, greater usage of public transportation and less movement within denser settlements, this alternative would also be likely to result in a higher efficiency of energy resource utilisation.
- Provide for the development of transport infrastructure and services in locations which will facilitate use by those living and working in urban/suburban areas.
- Facilitate lower overall effects on ecology (including designated sites, ecological connectivity, habitats) – due to increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites.
- Facilitate the reuse and regeneration of brownfield lands thereby contributing towards a higher efficiency of land utilisation, sustainable mobility and a reduction in the need to develop greenfield lands. By facilitating increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites there will be lower adverse effects upon ecology, landscape designations, architectural and archaeological heritage and land take/ soil.
- Facilitate lower effects on ground and surface waters due to higher levels of development within established and serviced settlement centres that have installed/upgraded water services capable of delivering Water Framework Directive targets (and associated effects on the protection of ecology and human health).
- Facilitate the enhancement of cultural heritage and its context in urban areas and their surrounds as a result of replacing motorised transport modes with more sustainable and non-motorised modes such as walking, cycling and the new MetroLink.
- The higher levels of certainty under this alternative is likely to increase spatial concentrations of market-led development – residential, commercial and industrial – in areas that are consistent with regional and local land-use planning objectives. These planning objectives are required to be subject to SEA, AA and SFRA that facilitate the integration of environmental considerations. Also, the timely availability of transportation infrastructure will significantly increase the likelihood of co-location of other services – especially water services – in areas that are consistent with the principles of proper planning and sustainable development.

4.4.2 Scenario B: MetroLink Prioritisation of Funding

This scenario will advance the implementation of the Transport Strategy for the Greater Dublin Area 2016-2035 in a manner which prioritises investment into rail projects (specifically the new MetroLink) along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

In established urban nodes served by the MetroLink project and its associated feeder routes, this scenario will give rise to orderly development with very concentrated patterns of land use allocation within the immediate catchment of new stations. This will result in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). However, elsewhere in the Greater Dublin Area, growth will be uneven as a result of this scenario.

In established urban nodes served by the MetroLink project and its associated feeder routes, this scenario will give rise to a low amount and extent of adverse environmental effects as it would facilitate the concentration of development around planned nodes – which will have appropriate social, environmental and mobility resources, because development will occur on lands that have been zoned and subject to SEA, AA and SFRA. Orderly development of this kind will give rise to least adverse effects on – and therefore would contribute towards the protection of – populations, biodiversity and environmental components including air and water. The orderly and timely provision of services will help to anticipate and avoid effects on water and associated interactions with ecology and human health.

In established urban nodes served by the MetroLink project and its associated feeder routes, Scenario B will give rise to the effects described under Section 4.4.1.

However, elsewhere in the Greater Dublin Area, under this scenario:

- There will be uneven growth which would mean that unsustainable patterns of mobility and land-use will persist – with unchanged trend levels of effects on populations, biodiversity and environmental components including air and water.
- There would be an increased likelihood of congestion and delay issues at critical locations including major junctions, especially along the M50 in the near term; and over-crowding on key public transport routes, especially within the M50. Congestion will mean that there will be significant delays in reaching targets for lower emissions to air – including noise and pollutants – and this will be compounded by lower utilisation of public transportation. There would be a failure to maximise contributions towards improving sustainable mobility (there would be increases in the number of journeys by car taken as a percentage of all journeys taken) and a failure to contribute towards managing traffic flows. Uneven growth would also be likely to result in a reduced efficiency of energy resource utilisation.
- There would not be enough transport infrastructure and services to maximise use by those living and working in urban/suburban areas.

4.4.3 Scenario C: MetroLink Reduced Funding

This scenario will advance the implementation of the Transport Strategy for the Greater Dublin Area 2016-2035 in a manner which prioritises investment into bus projects (including the Core Bus network), along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

This scenario will give rise to orderly development with very dispersed patterns of land use allocation within the Greater Dublin Area. This will result in a significantly reduced and/or deferred likelihood of financially viable supporting utilities and amenities, as well as much later attainment of income generation goals (through loss of fares from orderly provision of new housing concentrations at scale). Growth will be very uneven as a result of this scenario.

This scenario would:

- Through the progression of bus projects, facilitate the improvements in sustainable mobility (reducing and limiting increases in the number of journeys by car taken as a percentage of all journeys taken), thereby facilitating the greatest reduction and limit of increases in greenhouse gas emissions, noise emissions and other emissions to air (with associated effects on human health). Such emissions would occur otherwise with higher levels of car transport and associated traffic. By increasing the potential for plan-led, integrated development in some areas and greater usage of bus transportation, this alternative would also be likely to contribute towards a higher efficiency of energy resource utilisation.
- Facilitate orderly development in some (dispersed) locations, including lands that have been zoned and subject to SEA, AA and SFRA; this would contribute towards sustainable development and environmental protection and management locally.

This scenario gives rise to the most potential adverse environmental effects as:

- Development will not concentrate solely around planned nodes – which will have appropriate social, environmental and mobility resources. Very uneven growth means that unsustainable patterns of mobility and land-use will persist throughout the Greater Dublin Area on both zoned and unzoned lands as well as in areas with poor public transport.
- There would be an increased likelihood of congestion and delay issues at critical locations including major junctions, especially along the M50 in the near term; and over-crowding on key public transport routes, especially within the M50. Congestion will mean that there will be significant delays in reaching targets for lower emissions to air – including noise and pollutants – and this will be compounded by lower utilisation of public transportation. There would be a failure to maximise contributions towards improving sustainable mobility (there would be increases in the number of journeys by car taken as a percentage of all journeys taken) and a failure to contribute towards managing traffic flows. Uneven growth would also be likely to result in a reduced efficiency of energy resource utilisation.
- There would not be enough transport infrastructure and services to maximise use by those living and working in urban/suburban areas.
- Very uneven development will give rise to adverse effects on populations, biodiversity and environmental components including air and water.
- The lack of orderly and timely provision of services will generally not avoid effects on water and associated interactions with ecology and human health.

4.5 Selected Alternative

The most preferable outcome from the environmental assessment of alternatives is identified as being Alternative Scenario A and the approach outlined by this alternative is the one that is followed by the Plan.

This alternative will give rise to orderly development with balanced patterns of land use allocation – resulting in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). Growth will be balanced as a result of this alternative.

This alternative will also facilitate the greatest improvement in sustainable mobility of all alternatives (reducing and limiting increases in the number of journeys by car taken as a percentage of all journeys taken), thereby facilitating the greatest reduction and limit of increases in greenhouse gas emissions, noise emissions and other emissions to air (with associated effects on human health).

Potentially significant adverse environmental effects will be mitigated by the various provisions that have been integrated into the Plan (see Section 6 of this report).

Section 5 Evaluation of Plan Provisions

5.1 Overall Findings

The overall findings of the SEA are that:

- **Compliance with Legislation and Guidelines – Environmental Protection and Sustainable Development**

  The National Transport Authority have integrated all recommendations arising from the SEA and AA processes into the Integrated Implementation Plan, facilitating compliance of the Plan with various European and National legislation and Guidelines relating to the protection of the environment and the achievement of sustainable development.

  Implementation of the Plan will contribute towards efforts to achieve a number of the 17 Sustainable Development Goals[26] of the 2030 Agenda for Sustainable Development, which were adopted by world leaders in 2015 at a United Nations Summit and came into force in 2016.

- **Improvements in Sustainable Mobility and Associated Effects (emissions, noise and energy usage)**

  The Plan facilitates improvements in sustainable mobility, including a shift from car to more sustainable and non-motorised transport modes, through the development of transport infrastructure and services and transitioning to lower emission vehicles. Improvements in sustainable mobility will result in the following positive effects:
  - Reductions in/limits in increases of greenhouse gas emissions and associated achievement of legally binding greenhouse gas emissions targets;
  - Reductions in/limits in increases of all emissions to air and associated achievement of air quality objectives, thereby contributing towards improvement of air quality and protection of human health;
  - Reductions in/limits in increases of consumption of non-renewable energy sources and achievement of legally binding renewable energy targets; and
  - Energy security.

- **Positive Effects in Urban Areas**

  In combination with other plans and programmes, including those from the land use sector, the Plan facilitates more consolidated urban areas, reuse and regeneration of brownfield lands and reductions in sprawl. In this way the Plan would facilitate a higher efficiency of land utilisation, increases in sustainable mobility and a reduction in the need to develop greenfield lands. The reduced need to develop greenfield lands further away from existing urban areas would result in lower adverse effects upon ecology, landscape designations, architectural and archaeological heritage and soil.

  Among other positive environmental effects, the Plan facilitates the enhancement of the public realm (including cultural heritage and its context) in urban areas by facilitating the

[26] Including:
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

replacement of motorised transport modes with more sustainable and non-motorised modes such as light rail/metro, cycling and walking.

- **Potentially Significant Adverse Effects to be mitigated**

  Potentially significant adverse environmental effects arising from the Plan are detailed on Table 5.1. These effects will be mitigated by the various provisions which have been integrated into the Plan including those which have arisen through the SEA and AA processes (see Section 6). These mitigating provisions together with the contribution that the Plan will make to sustainable mobility means that the Plan facilitates various significant positive effects upon the protection and management of environmental components.

Table 5.1 overleaf details the various types of environmental effects likely to arise with respect to the Integrated Implementation Plan as a direct result of development and activities under the Plan and in combination with the wider planning framework (see also Section 6). Environmental impacts which occur will be determined by the nature and extent of multiple or individual projects and site specific environmental factors. By complying with appropriate mitigation measures - including those which have been integrated into the Plan - potentially significant adverse environmental effects which could arise as a result of implementing the Plan would be likely to be avoided, reduced or offset.

5.2 Transboundary Effects (Northern Ireland)

Taking into account the geographical scope of Plan provisions (including the limited provisions contained in the Integrated Implementation Plan that apply outside of the Greater Dublin Area) and the detailed Plan provisions relating to environmental protection and management (please refer to Table 5.1 overleaf and Section 6 of this SEA Environmental Report), it is determined that significant environmental effects will not occur in Northern Ireland.

5.3 Alignment with the Transport Strategy for the Greater Dublin Area and Associated Issues/Assessment

The National Transport Authority is required by the Dublin Transport Authority Act 2008 to prepare a six year Integrated Implementation Plan to, inter alia, facilitate the implementation of the Transport Strategy for the Greater Dublin Area 2016-2025. The Transport Strategy, which was subject to full SEA and Stage 2 AA, is therefore a key in shaping the six-year Integrated Infrastructure Plan.

The Transport Strategy for the Greater Dublin Area 2016-2035 establishes an overall framework for transport investment in Counties Dublin, Meath, Kildare and Wicklow over the next two decades.

The Transport Strategy (and consequently the Implementation Plan) focuses on improving public and sustainable transport across the Greater Dublin Area while seeking to ensure primacy for transport options that provide for unit reductions in carbon emissions. This involves: promoting public transport, walking and cycling; seeking to reduce car use in circumstances where alternative options are available; and transitioning to lower emission vehicles for transport use.

Transport Strategy provisions include those relating to: light rail, including the development of the MetroLink project; the development of a Core Bus Network, inclusive of Bus Rapid Transit routes; heavy rail (inclusive of expanded electrification on the suburban rail lines); cycling facilities; pedestrian movement; interchange facilities; information provision; and park and ride developments.

To date the Authority has focused significant levels of investment in these sustainable modes, including the reopening of the Phoenix Park Tunnel and the delivery of Luas Cross City. The continuation of this focus is facilitated by the Transport Strategy and it is intended that it will continue under the Implementation Plan.

The Plan will further contribute towards the following effects identified by the SEA of the Transport Strategy for the Greater Dublin Area 2016-2025:

- **Mode Share**

  The implementation of the Strategy will have a significant positive impact on the objective of reducing the proportion of all trips undertaken by private car from 59.9%, in 2011, to 52.2% in 2035[27], with a corresponding positive impact on the proportions using public transport, walking and cycling.

- **Journey Time**

  The area within 1 hour's travel time to the city centre is far more extensive in the future and accordingly, the areas within shorter journey times are correspondingly greater. Of particular note, is the impact of the MetroLink on the northern corridor, including Dublin Airport, which facilitates significantly shorter journey times within this area.

- **Land Use Benefits**

  The implementation of the Strategy will facilitate a more efficient use of land within the GDA and will improve the accessibility of central areas, which will potentially lead to the greater consolidation of trip intensive developments such as employment and retail into locations served by public transport.

- **Modelled Emissions**

  All types of vehicle emissions (Carbon Monoxide, Carbon Dioxide, Nitrous Oxides and Hydrocarbons) reduce under the Transport Strategy, in comparison with a do minimum scenario. This highlights the air quality improvements associated with the introduction of the Strategy's provisions.

- **Modelled Noise**

  There is significant improvements to noise levels within the Core City Centre network, where the Dublin City Centre Transport Plan measures are implemented.

- **Modelled Severance**

  There is significant improvements to severance within the Core City Centre Network, where the Dublin City Centre Transport Plan measures are implemented. Substantial improvements to severance are noted on the quays, and at the Westmoreland Street / D'Olier Street public transport interchange area.

[27] Transport model output for all trip purposes, AM peak (2011 & 2035)

Table 5.1 Overall Effects Arising from the Integrated Implementation Plan

Environmental Component	Likely Environmental Effects, as a direct result of development and activities under the Plan and in combination with the wider planning framework		
	Significant Positive Effect likely to occur	**Potentially Significant Adverse Effect, if unmitigated**	**Residual Adverse Effect**[28]
Air and climatic factors	• Contributions towards reductions in greenhouse gas and other emissions to air and associated achievement of legally binding targets (in combination with plans and programmes from all sectors, including energy, transport and land use planning) as a result of: facilitating a shift from car to more sustainable and non-motorised transport modes; and facilitating more consolidated urban areas and reductions in sprawl. • Contributions towards reductions in consumption from non-renewables and associated achievement of legally binding renewable energy targets, including sectoral targets for transport (in combination with plans and programmes from all sectors, including energy, transport and land use planning). • Contributions towards managing traffic flows (and associated management of adverse effects as a result of traffic on air quality and noise levels).	• Emissions to air and associated issues.	• An extent of travel related greenhouse gas and other emissions to air. This has been mitigated by provisions which have been integrated into the Plan, including those relating to sustainable mobility.
Population and human health	• Provides for the development of transport infrastructure and services in locations which will facilitate use by those living and working in urban/suburban areas. • Facilitates contribution towards the protection of human health as a result of contributing towards the protection of environmental vectors, especially air.	• Potential interactions if effects upon environmental vectors such as air are not mitigated	• An extent of travel related greenhouse gas and other emissions to air. This has been mitigated by provisions which have been integrated into the Plan, including those relating to sustainable mobility.

[28] Residual adverse environmental effects would be generally non-significant. Significant residual adverse effects would be in compliance with the relevant environmental protection legislation.

Environmental Component	Likely Environmental Effects, as a direct result of development and activities under the Plan and in combination with the wider planning framework		
	Significant Positive Effect likely to occur	**Potentially Significant Adverse Effect, if unmitigated**	**Residual Adverse Effect**[28]
Biodiversity and flora and fauna	• Facilitates lower overall effects on ecology (including designated sites, ecological connectivity, habitats) – due to increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites. • Contributions towards the protection of vegetation as a result of contributing towards the protection of environmental vectors, especially air. • Potential ecological enhancement interventions along transport corridors.	• Arising from both construction and operation of transport infrastructure and services and associated facilities/ infrastructure: loss of/damage to biodiversity in designated sites, ecological connectivity and non-designated habitats; and disturbance to biodiversity and flora and fauna. • Habitat loss, fragmentation and deterioration, including patch size and edge effects. • Disturbance (e.g. due to noise and lighting along transport corridors) and displacement of protected species and coastal squeeze. • Effects in riparian zones where new crossings of waters, if any, are progressed. • Potential effects on vegetation from transport emissions.	• Loss of an extent of non-protected habitats as a result of new or widened transport infrastructure that involves the replacement of semi-natural land covers with artificial surfaces • Losses or damage to ecology (these would be in compliance with relevant legislation)
Material Assets	• Contributions towards energy security (in combination with plans and programmes from all sectors, including energy, transport and land use planning) as a result of reducing traffic flows and associated energy use. • Contributions towards a mode shift away from the private car to public transport, walking and cycling and associated enhancement of the public realm. • Contributions towards the protection of built/amenity assets and infrastructure. • Contributions towards the reuse and regeneration of brownfield lands thereby contributing towards a higher efficiency of land utilisation, sustainable mobility and a reduction in the need to develop greenfield lands. By facilitating increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites there will be lower adverse effects upon ecology, landscape designations, architectural and archaeological heritage and soil. • Contributions towards appropriate waste management.	• Generation of construction waste. • Loss or damage to built/amenity assets and infrastructure including as a result of new or widened transport infrastructure.	• Residual wastes (these would be disposed of in line with higher level waste management policies) • Potential residual losses to built/amenity assets and infrastructure including as a result of new or widened transport infrastructure

Environmental Component	Likely Environmental Effects, as a direct result of development and activities under the Plan and in combination with the wider planning framework		
	Significant Positive Effect likely to occur	**Potentially Significant Adverse Effect, if unmitigated**	**Residual Adverse Effect**[28]
Water	• Contributions towards lower effects on ground and surface waters due to higher levels of development within established and serviced settlement centres that have installed/upgraded water services capable of delivering Water Framework Directive targets. • Contributions towards compliance with the Flood Risk Management Guidelines.	• Adverse impacts upon the status of water bodies and entries to the WFD Register of Protected Areas, arising from changes in quality, flow and/or morphology. • Increase in the risk of flooding.	• Flood related risks remain due to uncertainty with regard to extreme weather events
Landscape	• Contributions towards the protection of landscape designations as a result of facilitating compliance with relevant plans.	• Occurrence of adverse visual impacts and conflicts with the appropriate protection of statutory designations relating to the landscape.	• Residual visual effects (these would be in compliance with landscape designation provisions)
Cultural Heritage	• Contributions towards the protection of cultural heritage (archaeological and architectural) as a result of facilitating compliance with relevant legislation. • Contributions towards the enhancement of cultural heritage and its context in urban areas and their surrounds as a result of replacing motorised modes with more sustainable and non-motorised modes of transport such as walking, cycling and light rail/metro.	• Potential effects on protected and unknown archaeology and protected architecture arising from construction and operation activities, including as a result of increasing traffic flows.	• Potential alteration to the context and setting of designated cultural heritage however these will occur in compliance with legislation. Potential loss of unknown archaeology however this loss will be mitigated by measures integrated into the Plan
Soil	• Minimises land-take and loss of extent of soil resource – as a result of facilitating increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites. • Contributions towards the protection of the environment from contamination arising from brownfield development. • Contributions towards the protection of features or areas of geological / geomorphological interest.	• Adverse impacts on the hydrogeological and ecological function of the soil resource as a result of construction of transport and associated transport facilities/ infrastructure. • Adverse impacts on features or areas of geological / geomorphological interest as a result of construction of transport and associated transport facilities/ infrastructure. • Potential for increase in coastal erosion.	• Loss of an extent of soil function arising from the replacement of semi-natural land covers with artificial surfaces and from sea level rise/coastal erosion

Section 6 Mitigation and Monitoring Measures

6.1 Mitigation

Mitigation measures are measures envisaged to prevent, reduce and, as fully as possible, offset any significant adverse impacts on the environment of implementing the Integrated Implementation Plan. Various environmental sensitivities and issues have been communicated to the Authority through the SEA and Appropriate Assessment (AA) processes.

By integrating all SEA and AA recommendations into the Integrated Implementation Plan, the Authority has helped to ensure that:

- The potential significant adverse effects of implementing the Plan are avoided, reduced or offset; and
- The beneficial environmental effects of implementing the Plan are maximised.

Mitigation was achieved through the following:

- Early work undertaken by the Authority to ensure contribution towards environmental protection and sustainable development – including the adoption of the closely related Transport Strategy for the Greater Dublin Area 2016-2035 and the focusing of significant levels of investment in sustainable modes of transport to date, including the reopening of the Phoenix Park Tunnel and the delivery of Luas Cross City;
- The consideration of alternatives (see Section 4); and
- The integration of individual measures into the Plan (see Table 6.1).

6.2 Monitoring

The Environmental Report contains proposals for monitoring the potential significant effects of implementing the Guidelines, if unmitigated, which are adopted alongside the preparation of the Plan. Monitoring enables, at an early stage, the identification of unforeseen adverse effects and the undertaking of appropriate remedial action.

Monitoring is an ongoing process and the Monitoring Programme allows for flexibility and the further refinement of indicators and targets. The Monitoring Programme may also be updated to deal with specific environmental issues - including unforeseen effects - as they arise.

A stand-alone Monitoring Report on the significant environmental effects of implementing the Plan will be prepared in advance of the review of the Plan. This report will address the indicators set out on Table 6.2. The National Transport Authority is responsible for the ongoing review of indicators and targets, collating existing relevant monitored data, the preparation of monitoring evaluation report(s), the publication of these reports and, if necessary, the carrying out of corrective action, in combination with the relevant authorities.

The hierarchy of planning and environmental assessment - including associated environmental monitoring requirements - in which the Transport Plan is situated is noted. This includes the environmental monitoring requirements associated with other transport plans, with plans from other sectors (such as land use planning) and with lower tier other projects, including those related to transport.

Table 6.1 SEA/AA recommendations included within the Integrated Implementation Plan

Plan Chapter No.	Text inserted into the Plan arising from SEA/AA processes
Chapter 2 Background to the Implementation Plan, Sub-section 2.3 Spatial Planning	Any future Transportation Strategies for these Metropolitan Areas will be required to be subject to SEA and AA as appropriate.
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	**4.6.1 Regulatory Framework for Environmental Protection and Management** In implementing this Plan, the Authority will cumulatively contribute towards – in combination with other users and bodies – the achievement of the objectives of the regulatory framework for environmental protection and management, in compliance with EU Directives - including the Habitats Directive (92/43/EEC, as amended), the Birds Directive (2009/147/EC), the Environmental Impact Assessment Directive (2011/92/EU, as amended by 2014/52/EC) and the Strategic Environmental Assessment Directive (2001/42/EC) – and relevant transposing Regulations.
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	**4.6.2 Lower-level Decision Making** Lower levels of decision making and environmental assessment should consider the sensitivities identified in Section 4 of the SEA Environmental Report, including the following: • Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) and Candidate SACs and SPAs; • Features of the landscape that provide linkages/connectivity to designated sites (e.g. watercourses, areas of semi-natural habitat such as linear woodlands etc); • Salmonid waters; • Shellfish waters; • Freshwater pearl mussel catchments; • Natural Heritage Areas and proposed Natural Heritage Areas; • Areas likely to contain a habitat listed in Annex 1 of the Habitats Directive; • Un-designated sites of importance to wintering or breeding bird species of conservation concern; • Entries to the Record of Monuments and Places and Zones of Archaeological Potential; • Entries to the Record of Protected Structures; • Architectural Conservation Areas; and • Relevant landscape designations.
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	**4.6.3 Corridor and Route Selection Process for Relevant New Infrastructure** The following Corridor and Route Selection Process will be undertaken for relevant new infrastructure: Stage 1 – Route Corridor Identification, Evaluation and Selection • Environmental constraints (including those identified in Section 4 of the SEA Environmental Report) and opportunities (such as existing linear infrastructure) will assist in the identification of possible route corridor options; • Potentially feasible corridors within which infrastructure could be accommodated will be identified and these corridors assessed. The selection of the preferred route corridor will avoid constraints and meet opportunities to the optimum extent, as advised by the relevant specialists; and • In addition to the constraints identified above, site-specific field data may be required to identify the most appropriate corridors. Stage 2 – Route Identification, Evaluation and Selection • Potentially feasible routes within the preferred corridor will be identified and assessed. The selection of preferred routes will avoid constraints and meet opportunities to the optimum extent, as advised by the relevant specialists, taking into account project level information and potential mitigation measures that are readily achievable; • In addition to the constraints identified above, site specific field data may be required to identify the most appropriate routes; and • In addition to environmental considerations, the identification of route corridors and the refinement of route lines is likely to be informed by other considerations.
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	**4.6.4 Appropriate Assessment** All projects and plans arising from this Plan will be screened for the need to undertake Appropriate Assessment under Article 6 of the Habitats Directive. A plan or project will only be authorised after the competent authority has ascertained, based on scientific evidence, Screening for Appropriate Assessment, and subsequent Appropriate Assessment where necessary, that: 1. The plan or project will not give rise to significant adverse direct, indirect or secondary effects on the integrity of any European site (either individually or in combination with other plans or projects); or

Plan Chapter No.	Text inserted into the Plan arising from SEA/AA processes
	2. The plan or project will have significant adverse effects on the integrity of any European site (that does not host a priority natural habitat type/and or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or The plan or project will have a significant adverse effect on the integrity of any European site (that hosts a natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons for overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000.
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	**4.6.5 Protection of European Sites** No plans or projects giving rise to significant cumulative, direct, indirect or secondary impacts on European sites arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall be permitted on the basis of this Plan (either individually or in combination with other plans or projects[29]).
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	**4.6.6 Climate Change, Emissions and Energy** As identified in the SEA Environmental Report that accompanies this Plan, the Plan facilitates sustainable mobility and associated positive effects, including those relating to: • Reductions in/limits in increases of greenhouse gas emissions and associated achievement of legally binding greenhouse gas emissions targets; • Reductions in/limits in increases of all emissions to air and associated achievement of air quality objectives, thereby contributing towards improvement of air quality and protection of human health; • Reductions in/limits in increases of consumption of non-renewable energy sources and achievement of legally binding renewable energy targets; and • Energy security. In implementing the Plan, the Authority will support relevant provisions contained in the National Climate Change Adaptation Framework (2018), the National Mitigation Plan (2017) and the Department of Transport, Tourism and Sport's 2017 "Adaptation Planning – Developing Resilience to Climate Change in the Irish Transport Sector", the National Energy and Climate Plan, Climate Change Action Plans of local authorities and any Regional Decarbonisation Plan prepared on foot of commitments included in the RSESs. The implementation of the Plan will incorporate relevant targets and actions arising from the sectoral adaptation plan for transport that will be prepared to comply the requirements of the Climate Action and Low Carbon Development Act 2015. Cognisant of the imperative to reduce emissions, the Authority will seek to ensure primacy for transport options that provide for unit reductions in carbon emissions. This can most effectively be done by promoting public transport, walking and cycling, and by actively seeking to reduce car use in circumstances where alternative options are available. During the preparation and/or review of policies and plans relating to climate charge, carbon emissions and energy usage, the Authority will seek to integrate Plan objectives, as appropriate.
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	**4.6.7 Other SEA Recommendations** In implementing the Plan, the Authority will ensure that the mitigation measures included in Table 9.2 of the SEA Environmental Report are complied with.

[29] Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be:
a) no alternative solution available,
b) imperative reasons of overriding public interest for the plan/programme/strategy/project etc. to proceed; and
c) Adequate compensatory measures in place.

Table 6.2 Indicators for Monitoring

Environmental Component	Indicators
Air and Climatic Factors	AC1i: Compliance with Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive and associated legislation AC1ii: Greenhouse gas emissions from transport
	AC2: Percentage of population travelling to work, school or college by public transport or non-mechanical means
	AC3i: Energy use by the transport sector as a percentage of Total Final Energy Consumption AC3ii: Proportion of energy from renewable sources
Population and Human Health	PHH1: Extent of urban/suburban areas within the catchment of transport infrastructure and services
	PHH2: Occurrence (any) of a spatially concentrated deterioration in human health arising from environmental factors resulting from development provided for by the Plan, as identified by the Health Service Executive and Environmental Protection Agency
Biodiversity, Flora and Fauna	B1: Conservation status of habitats and species as assessed under Article 17 of the Habitats Directive
	B2: Percentage loss of functional connectivity without remediation resulting from development provided for by the Plan
	B3i: Number of significant impacts on relevant habitats, species, environmental features or other sustaining resources in designated sites including Wildlife Sites resulting from development provided for by the Plan B3ii: Number of significant impacts on the protection of listed species resulting from development provided for by the Plan
Material Assets	MA1: Protection of built/amenity assets and infrastructure
	MA2: Extent of brownfield land reused and regenerated which has been facilitated by the Plan
	MA3: Preparation and implementation of construction and environmental management plans
Water	W1i: Interactions with classification of Overall Status (comprised of ecological and chemical status) under the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No. 272 of 2009) resulting from development provided for by the Plan W1ii: Mandatory and Guide values as set by the EU Bathing Water Directive and transposing Bathing Water Quality Regulations (SI No. 79 of 2008)
	W2: Interactions with Groundwater Quality Standards and Threshold Values under Directive 2006/118/EC resulting from wind energy development (including associated development) permitted by planning authorities adhering to the Guidelines
	W3: Compliance of relevant lower tier assessments and decision making with the Flood Risk Management Guidelines
Landscape	L1: Number of unmitigated conflicts with the appropriate protection of statutory designations relating to the landscape, including those included in the land use plans of planning authorities, resulting from development provided for by the Plan
Cultural Heritage	CH1: Percentage of entries to the Record of Monuments and Places - including Zones of Archaeological Potential (and the context of the above within the surrounding landscape where relevant) - protected from significant adverse effects resulting from development provided for by the Plan
	CH2: Percentage of entries to the Record of Protected Structures and Architectural Conservation Areas and their context protected from significant adverse effects resulting from development provided for by the Plan
Soil	S1: Artificial surfaces land cover extent