SEA ENVIRONMENTAL REPORT

NON-TECHNICAL SUMMARY

FOR THE

KILDARE COUNTY DEVELOPMENT PLAN 2017-2023

for: **Kildare County Council**

Áras Chill Dara

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Section 1 Introduction and Terms of Reference

This is the Non-Technical Summary of the Environmental Report of Kildare County Development Plan 2017-2023. The purpose of the Environmental Report is to provide a clear understanding of the likely environmental consequences of decisions regarding the future accommodation of growth in County Kildare.

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 is being carried out in order to comply with the provisions of the SEA Regulations and in order to maintain high standards in environmental management and planning within County Kildare. The output of the process is an Environmental Report which should be read in conjunction with the County Development Plan.

How does it work?

All of the main environmental issues in County Kildare are assembled and presented to the team who prepared the Plan. This helps them to devise a Plan that protects whatever is sensitive in the environment. It also helps to identify wherever there are environmental problems in the area and ideally the Plan tries to improve these.

To decide how best to make a Plan that protects the environment as much as possible the planners examined alternative versions of the Plan. This helped to highlight the type of Plans that are least likely to harm the environment.

No significant difficulties have been encountered during the undertaking of the assessment to date.

What is included in the Environmental Report which accompanies the Draft Plan?

The Environmental Report contains the following information:

- A description of the environment and the key environmental issues;
- A description and assessment of alternatives for the Plan;
- An assessment of the Plan objectives; 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 avoid/reduce the environmental effects of implementing the Plan.

What happens at the end of the process?

On the making of the Plan, a document, referred to as the SEA Statement, is made public.

The SEA Statement includes information on how environmental considerations were integrated into the Plan and why the preferred alternative was chosen for the Plan in light of the other alternatives.

Section 2 The Plan

2.1 Introduction and Content of the Plan

The Kildare County Development Plan 2017-2023 (CDP) sets out the overall strategy for the proper planning and sustainable development of County Kildare for the plan period and beyond. The Kildare County Development Plan 2017-2023 has been prepared in accordance the Planning and Development Act 2000, as amended (the Act). The plan relates to the whole functional area of Kildare County Council.

The CDP consists of a written statement and maps that indicate the development objectives for County Kildare. The written statement is accompanied by a series of schedules and maps.

The Plan is set out in a written statement with accompanying maps in two volumes as follows:

- Volume One – Chapters 1 -17 and Appendices
- Volume Two – Land Use Plans

These two volumes are accompanied by SEA, AA and SFRA documents.

Chapter 1 sets out the introduction and strategic context for the plan.

Chapters 2 and 3 set out the core strategy and settlement strategy for County Kildare.

Chapters 4-14 set out detailed policies and objectives under a range of specific topic headings which the County Council seeks to achieve over the six-year life of the Plan e.g. housing, economic development, retail, infrastructure, rural development, social and community, heritage and landscape.

Chapters 15 and 16 outline urban and rural design guidance to promote quality developments.

Chapter 17 sets out development management standards to be applied to future development proposals in the county. The purpose of these standards and objectives is to guide and assist the formulation of development proposals and to regulate the impact of development on the environment.

Appendices which are part of Volume I include the Housing Strategy, Record of Monuments and Places, Record of Protected Structures and Scenic Routes.

Volume Two consists of the land use plans for the small towns, environs areas, villages and rural settlements in Kildare.

Separate Local Area Plans (LAPs) are in place, or will be in place, for the following towns: Sallins, Celbridge/ Castletown, Leixlip/Collinstown, Monasterevin, Kilcock, Kilcullen, Newbridge, Maynooth, Kildare and Clane. These LAPs are reviewed and made under Sections 18, 19 and 20 of the Planning and Development Act, and as such do not form part of the CDP. However, the CDP does provide the key parameters for these LAPs such the future population and housing targets and sets out the broad strategy for the future economic and social development of these towns.

Town Development Plans providing for the sustainable development of the towns of Naas and Athy are also in place and Local Area Plans will also be prepared for these settlements.

2.2 Strategic work done by the Council to ensure contribution towards environmental protection and sustainable development

Far in advance of both the submission of the Plan to the Elected Members for approval and the placing of the Plan (and associated SEA, AA and SFRA documents) on public display, Kildare County Council undertook various works in order to inform the preparation of the Plan.

The findings of this strategic work have been integrated into the Plan and will be implemented when it is adopted, contributing towards both environmental protection and management and sustainable development within the County.

Strategic work undertaken by the Council includes background work in relation to Plan Strategies and other provisions for a variety of sectors including: settlement; economic development, enterprise and tourism; movement and transportation; infrastructure; energy and communications; retail; rural development; social, community and cultural development; architectural and archaeological protection; natural heritage and green infrastructure; landscape, recreation and amenities; urban design; and rural design.

In addition, the undertaking of this SEA process as well as the preparation of an Appropriate Assessment and Strategic Flood Risk Assessment were part of this strategic work and contributed towards the integration of environmental considerations into individual Plan provisions as summarised in Section 5 of this report.

2.3 Relationship with other relevant Plans and Programmes

The CDP sits within a hierarchy of strategic action such as plans and programmes and is subject to a number of high level environmental protection policies and objectives with which it must comply. As required by the Act, the CDP is consistent, in so far as is practicable, with such national plans, policies and strategies as the Minister determines relate to proper planning and sustainable development. The CDP may, in turn, guide lower level strategic actions. Examples of relevant plans and programmes include the following:

The National Spatial Strategy 2002-2020
The National Spatial Strategy (NSS) 2002-2020 is a twenty-year National Plan that sets out a strategy for balanced Regional development across Ireland and it informs National decisions as to where development (and Government investment) should take place. The NSS, while acknowledging the Greater Dublin Area (GDA) as the driver of the National economy, seeks to promote a better balance of population, jobs and development elsewhere in the State. The NSS is now 15 years old and is currently under review. It is expected to be replaced by a new National Planning Framework document in 2017.

Regional Planning Guidelines
The Regional Planning Guidelines for the Greater Dublin Area provide a long-term strategic planning framework for the development of the Greater Dublin Area. The RPGs aim to give regional effect to the National Spatial Strategy and Guide the Development Plans and lower tier plans of planning authorities.

River Basin Management Plan and Programme of Measures
Local Authorities, including Kildare County Council, have prepared the South Eastern and the Eastern River Basin Management Plans, both of which are being implemented through, inter alia, the County Development Plan, in order to help protect and improve waters in the County and wider RBDs. The Management Plans provide specific policies for individual river basins in order to implement the requirements of the WFD.

Catchment Flood Risk Assessment and Management Studies
A Catchment Flood Risk Assessment and Management (CFRAM) Study is being undertaken for the Eastern and South Eastern River Basin Districts by the Office of Public Works. The CFRAM Study focusing on areas known to have experienced flooding in the past and areas that may be subject to flooding in the future either due to development pressures or climate change. In 2015, Flood Maps were published. The final output from the studies will be CFRAM Plans, to be finalised in 2017 . The Plans will define the current and future flood risk in the River Basin Districts and set out how this risk can be managed.

Smarter Travel 2009
"Smarter Travel, A Sustainable Transport Future, A New Transport Policy for Ireland 2009 - 2020" is the Government's action plan to free towns and cities from traffic congestion, substantially cut CO2 emissions, encourage car based commuters to leave their cars at home, and encourage a shift toward walking, cycling and greater public transport usage.

Eastern–Midlands Region Waste Management Plan
The Eastern–Midlands Region Waste Management Plan (WMP) 2015-2021 provides the framework for solid waste management in the region and sets out a range of policies and actions to meet specified mandatory and performance based targets. The WMP seeks to assist and support resource efficiency and waste prevention initiatives. A key WMP target is to achieve a 1% reduction per annum in the quantity of household waste generated per capita over the period of the WMP. In tandem, the WMP identifies measures to develop a circular economy whereby waste management initiatives are no longer confined to treating and disposing of waste, instead supporting initiatives that value waste as a resource or potential raw material.

Environmental Protection Objectives
The Plan is subject to a number of high level environmental protection policies and objectives with which it must comply, including those which have been identified as Strategic Environmental Objectives in Section 3.13. An example of an Environmental Protection Objective is 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.

Section 3 The Environmental Baseline

3.1 Introduction

Reflecting the specifications in the SEA Directive, the relevant aspects (those which have the greatest potential to be affected by implementation of the Plan) of the current state of the environment for the following environmental components is provided in this section:

- Air and Climatic Factors;
- Population and Human Health;
- Biodiversity, Flora and Fauna;
- Material Assets;
- Soil;
- Water;
- Cultural Heritage;
- Landscape; and
- The interrelationship between the above factors.

3.2 Likely Evolution of the Environment in the Absence of the Plan

In the absence of a new Plan it is uncertain how permission for new development would be applied for and considered.

The current County Plan has contributed towards environmental protection within County Kildare. If the previous Plan was to have expired and not be replaced by a new Plan, this would have resulted in a deterioration of the County's planning and environmental protection framework. Although higher level environmental protection objectives – such as those of various EU Directives and transposing Irish Regulations – would still apply, the deterioration of this framework would mean that new development would be less coordinated and controlled. Such development could result in an increase in the occurrence of adverse effects on all environmental components, especially those arising cumulatively. Cumulative effects occur as a result of the addition of many small impacts to create one larger, more significant, impact.

Such adverse effects could include:

- Arising from both construction and operation of development and associated infrastructure: loss of/damage to biodiversity in designated sites (including Natura 2000 Sites and Wildlife Sites) and Annexed habitats and species, listed specs, 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;
- Potential interactions if effects upon environmental vectors such as water and air are not mitigated;
- Damage to the hydrogeological and ecological function of the soil resource;
- Adverse impacts upon the status of water bodies, including bathing waters, arising from changes in quality, flow and/or morphology;
- Increase in the risk of flooding;
- Failure to provide adequate and appropriate waste water treatment (water services infrastructure and capacity is needed to ensure the mitigation of potential conflicts);
- Failure to comply with drinking water regulations and serve new development with adequate drinking water that is both wholesome and clean (water services infrastructure and capacity is needed to ensure the mitigation of potential conflicts);

- Increases in waste levels;
- Emissions to air including greenhouse gas emissions and other emissions;
- Potential effects on protected and unknown archaeology and protected architecture arising from construction and operation activities; and
- Occurrence of adverse visual impacts and conflicts with the appropriate protection of statutory designations relating to the landscape.

3.3 Biodiversity and Flora and Fauna

Kildare has a wide range of habitat types and landscapes which support a variety of species and ecosystems that contribute to the unique biodiversity of the County. These include grassland, woodland, stream and canal habitats, bogland and riparian habitats, and man-made habitats. County Kildare falls into the catchments of the Liffey, the Barrow and the Boyne, and these rivers and their associated tributaries and lakes, also support good areas of biodiversity.

Ecological Designations within the County include:

- Special Protection Areas[1];
- Special Areas of Conservation[2];
- Natural Heritage Areas and Proposed Natural Heritage Areas[3];
- Nature Reserves[4];
- Certain entries to the Water Framework Directive Register of Protected Areas [5];
- Wildfowl Sanctuaries [6]; and
- RAMSAR sites[7].

There are 7 Special Areas of Conservation (SACs) within the Plan area and one Special Protection Area (SPA) – see Figure 3.1.

Designated Salmonid waters in the County include the channels of the River Boyne. The Water Framework Directives 'Register of Protected Areas' for wildlife in County Kildare include the channels of the River Liffey and the River Barrow by virtue of their nutrient sensitivity.

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. Within and

[1] 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 - by the DECLG due to their conservation value for birds of importance in the European Union.

[2] Special Areas of Conservation (SACs) 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) - referred to as the Habitats Directive - by the DEHLG due to their conservation value for habitats and species of importance in the European Union.

[3] 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. Proposed NHAs 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.

[4] 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.

[5] 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.

[6] These 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.

[7] The Convention of Wetlands of International Importance, especially as Water Fowl Habitat, was established at Ramsar in 1971 and ratified by Ireland in 1984. The main aim of the Convention is to secure the designation by each contracting state of wetlands in its territory for inclusion in a list of wetlands of international importance for waterfowl. This entails the commitment of each contracting state to a policy of protection and management of the designated wetlands, and of formulating and implementing planning so as to promote the conservation of designated wetlands and, as far as possible, the wise use of wetlands in its territory. Ireland presently has 45 sites designated as Wetlands of International Importance, with surface areas of 66,994 hectares.

surrounding the County, the ecological networks are made up of components including undeveloped foothill/upland areas, rivers and lakes, woodlands, lands used for agriculture, parks, gardens and hedgerows within and surrounding the Plan area. These components provide habitats for flora and fauna and facilitate linkages to the surrounding countryside for flora and fauna.

There are 2 Natural Heritage Areas (NHAs), 21 proposed Natural Heritage Areas (pNHAs) and one Nature Reserve- Pollardstown Fen within the Plan area.

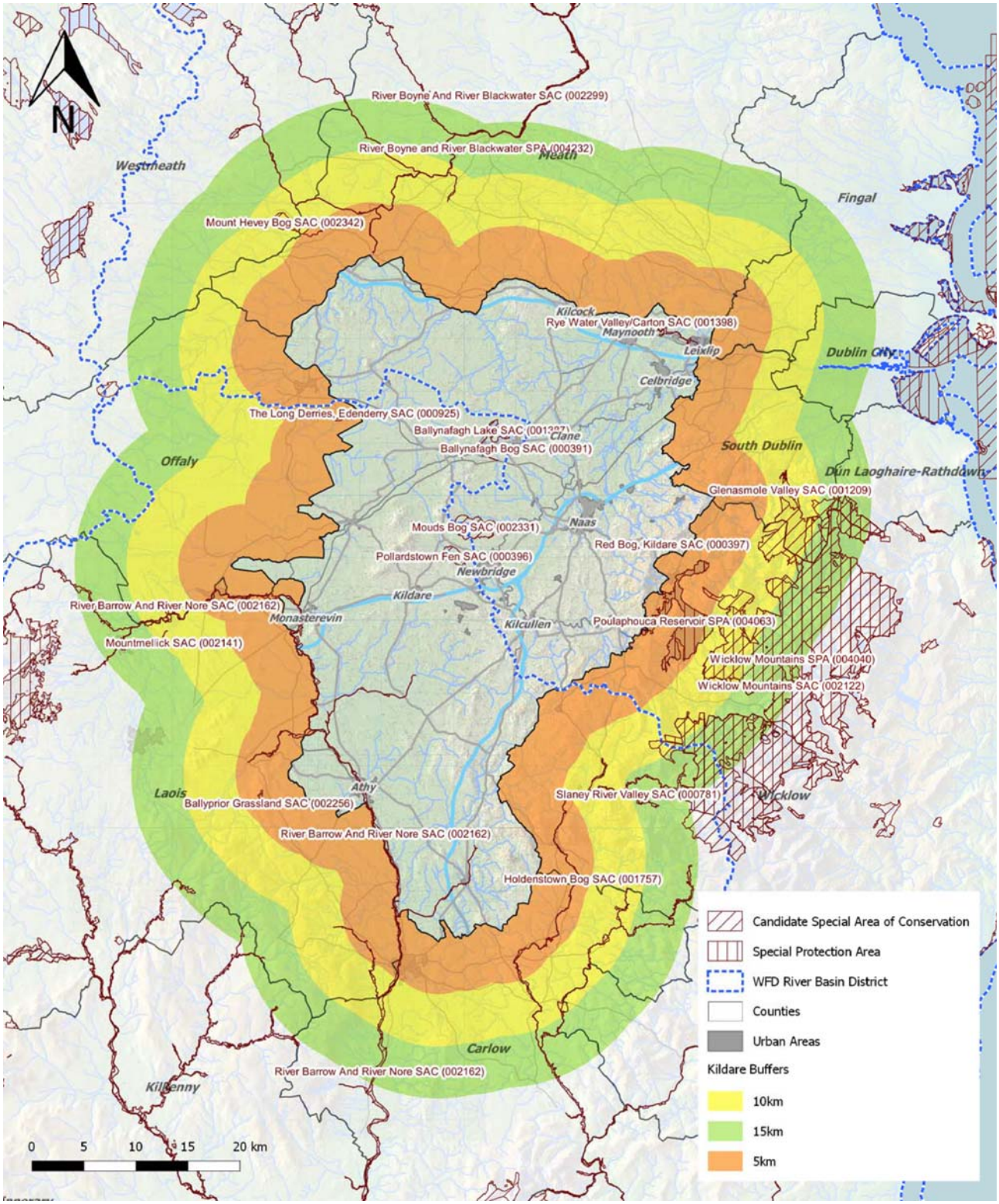

Figure 3.1 SPAs and SACs within the County
Source: NPWS (datasets downloaded April 2015)

3.4 Population and Human Health

Population

The population of County Kildare was 186,335 persons in 2006. This rose by 23,977 persons or c. 12.87% to 210,312 persons in 2011. The highest concentrations in population are along the north-east of the County and in settlements throughout the County.

For the review of the County Development Plan, the Planning Authority carried out an assessment which involved an evaluation of the dynamics and distribution of population and settlement within the county for the period 2006-2011. This assessment revealed:

- The period showed continued increase in population at an average rate of 4,795 persons per annum over the five years
- Population has more than doubled in the rural hinterlands of urban centres such as Athy, Naas, Newbridge, Clane and Kilcock and the village of Caragh. A considerable amount of this development pressure has arisen from the demand for high numbers of single rural dwellings and the demand for housing within rural settlements.
- The draw of Dublin as an employment hub, with approximately 50% of the workforce leaving the county for employment, is reflected in the county's settlement pattern. Higher population densities are located in the Metropolitan northeast and within and around the towns of Naas, Newbridge, Athy, Kildare, Monasterevin and Kilcullen.

Between 2009 and 2013 rural one-off dwellings accounted for 40% of all builds in Kildare. This high figure reflected the relatively low level of construction within the urban areas of Kildare due to the economic downturn and issues such as the Osberstown waste water treatment catchment.

An average of 264 rural dwellings were built per annum in Kildare between 2009-2015. This has consolidated a pattern of dispersed and in some situations resulted in dense rural development.

Human Health

The impact of implementing the Plan on human health is determined by the impacts which the Plan will have upon environmental vectors. Environmental vectors are 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 arising from incompatible adjacent land uses for example. These factors have been considered with regard to the description of: the baseline of each environmental component; and the identification and evaluation of the likely significant environmental effects of implementing the 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 land-use plan 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

The greatest health risk from radiation in Ireland is caused by radon. The presence of radon gas, a naturally occurring radioactive gas that originates from the decay of uranium in rocks and soils, occurs across the country. It accounts for more than half of the total radiation dose received by the Irish population. As a known carcinogen, in the same category as tobacco smoke and asbestos it is a cause of lung cancer. Exposure to radon for long periods or at high concentrations can lead to lung cancer.

Some areas within County Kildare, particularly to the south-east of the County are estimated as having 10%-20% of homes above the reference level for Radon (mapping available at http://www.epa.ie/radiation/radonmap).

There is historic and predictive evidence of flooding in various locations across the County (see information on Strategic Flood Risk Assessment at Section 3.6). All recommendations made by the SFRA in relation to flood risk management have been integrated into the Plan.

3.5 Soil

Soil Types
Soil types, as classified by Teagasc in co-operation with the Forest Service, EPA and GSI are mapped on Figure 3.2. The soils of the County support a variety of uses including agriculture. Subsoils in the Plan area are primarily made up of Limestone dominated till and Limestone sands and gravels. A strip of sandstone dominated till runs down the eastern County boundary. Large expanses of Cutaway Peat are evident in the north and west of the County. Alluvium, marl and lake sediments are dispersed throughout. These soils may indicate the current or historic flood plains of the County's various rivers and lakes.

County Geological Sites
In 2005 the Council in partnership with the Irish Geological Heritage Programme of the Geological Survey of Ireland assessed the geological heritage of Kildare and identified the most important sites which are worthy of protection as County Geological Sites. 21 County Geological Sites within County Kildare were identified by this survey.

Contaminated Soil
Given the urban nature of certain areas within the County and the range of land use activities which have taken place historically, soils may have been contaminated to some degree in the past in certain areas. Such contamination has the potential to affect water quality, biodiversity and flora and fauna and human health. Both the existing 2011-2017 Plan and the 2017-2023 Plan include provisions in relation to the protection of the environment.

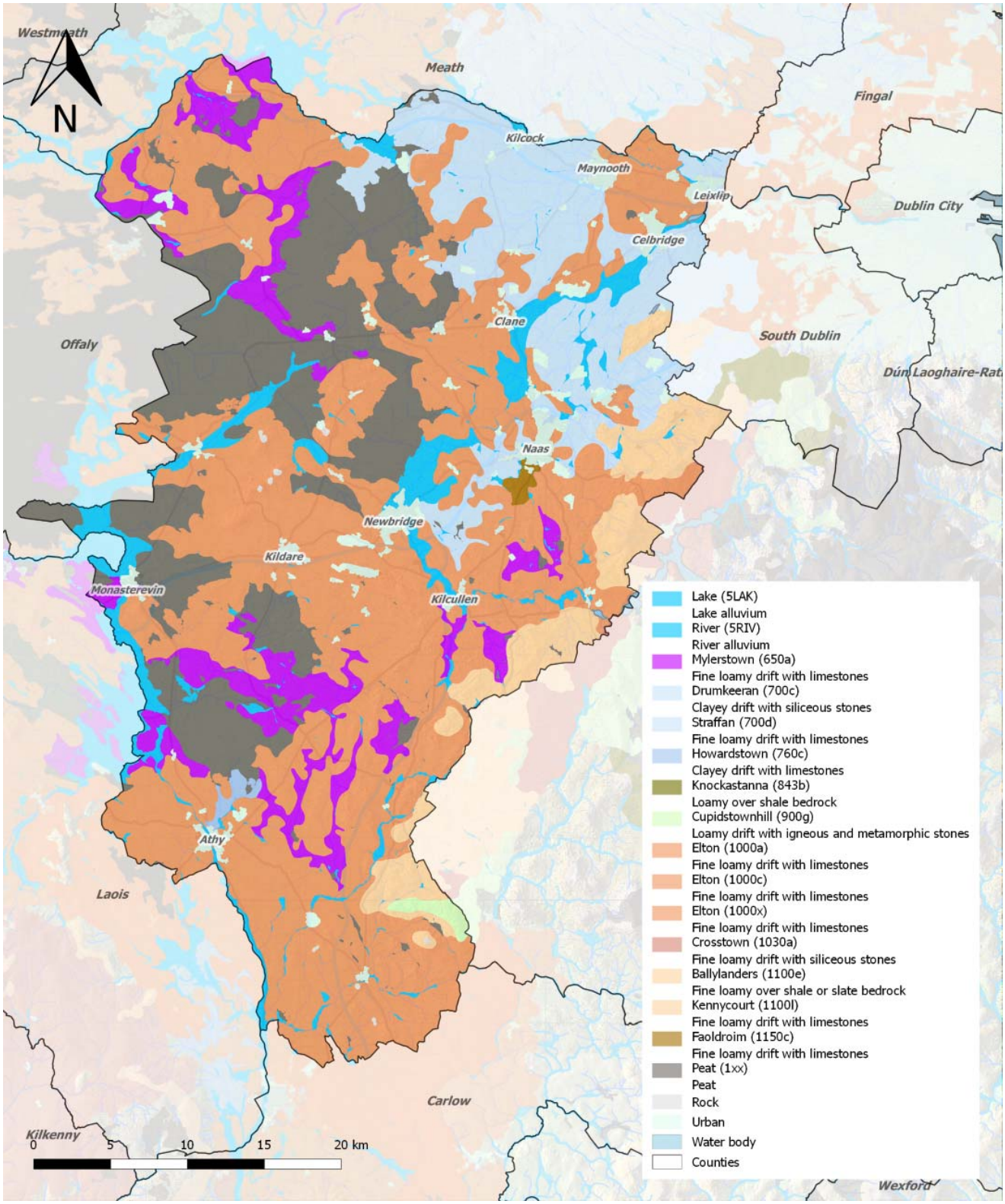

Figure 3.2 Soil Types

s in 2007 primarily due to the economic downturn, *Soils and Subsoils Class*

3.6 Water

Potential Pressures on Water Quality

Human activities, if not properly managed, can cause deterioration in water quality. Pressures exerted by human activities include the following: sewage and other effluents discharged to waters from point sources, e.g. pipes from treatment plants; discharges arising from diffuse or dispersed activities on land; abstractions from waters; and structural alterations to water bodies. 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". All public bodies are required to coordinate their policies and operations so as to maintain the good status of water bodies which are currently unpolluted and improve polluted water bodies to good status. Ireland has been divided into eight river basin districts or areas of land that are drained by a large river or number of rivers and the adjacent estuarine / coastal areas. Kildare falls within both the South-Eastern River Basin District and the Eastern River Basin District for which Management Plans and associated Programmes of Measures are being implemented.

WFD Surface Water Status

Figure 3.3 illustrates currently available data from the EPA on the status of waters within and surrounding the County. These status classifications are contributed towards by morphological pressures, such as those relating to culverts, river straightening or bed/bank reinforcement in reservoirs.

- The largest catchment in the County is the Barrow catchment which drains the south west of the County and includes the Barrow River and all of its tributaries. This catchment is generally a mixture *good* or *moderate* status.

- The north east of the County forms part of the Liffey catchment which includes the River Liffey and its tributaries. The waters in the Liffey catchment are generally classified as being of *poor* or *good* status. Poulaphuca Reservoir is located within the Liffey catchment and partially in County Kildare. This lake is the only lake in Kildare attributed with a status (it is identified as being of *moderate* status). Downstream of County Kildare, the Liffey catchment includes a various bathing waters at Dublin Bay.

- The north-eastern corner of the County forms part of the Boyne – waters here are generally classified as being of *poor or moderate* status.

WFD Groundwater Status

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 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. Groundwater is generally identified as being of *good* status however the Curragh Gravels West groundwater catchment is identified as being of *poor* status. (See Figure 3.4).

Flooding

Flooding is an environmental phenomenon which, as well have causing economic and social impacts, could in certain circumstances pose a risk to human health. In 2009 the Department of the Environment, Heritage and Local Government published *The Planning System and Flood Risk Management* Guidelines for Planning Authorities. These are aimed at ensuring a more consistent, rigorous and systematic approach which will fully incorporate flood risk assessment and management

into the planning system. Planning authorities are required to undertake flood risk identification, assessment and management processes as appropriate when preparing Development Plans and other plans and in the consideration of applications for planning permission. In compliance with the aforementioned Guidelines, a Strategic Flood Risk Assessment (SFRA) has been undertaken alongside the preparation of the new County Plan. There is historic and predictive evidence of flooding in various locations across the County. All recommendations made by the SFRA in relation to flooding risk management have been integrated into the Plan.

The SFRA was informed by modelled information on flood risk from the Office of Public Works which has been prepared as part of the Catchment Flood Risk Assessment and Management (CFRAM) Studies. County Kildare falls within two CFRAM Studies, the Eastern CFRAM and the South Eastern CFRAM. The two CFRAM Studies identified Areas for Further assessment (AFAs), which through the National CFRAM Programme will be assessed by a flood risk management plan. The designation of AFAs took into account flood risk and comprise the following settlements:

- Allenwood
- Athy
- Castledermot
- Celbridge
- Clane
- Hazelhatch
- Johnstownbridge
- Kilcock
- Leixlip
- Maynooth
- Monasterevin
- Naas
- Newbridge
- Rathangan
- Suncroft
- Turnings/Killeenmore

Existing Problems

Subject to exemptions provided for by Article 4 of the WFD[8], based on available data on the status of waters within the County, certain surface water bodies within the County will need improvement in order to comply with the objectives of the WFD:

- Certain water bodies within the County identified as being of *poor* or *moderate* status. These include water bodies within the following catchments: Liffey, Boyne and Barrow.

The Eastern and South-Eastern RBD Management Plans and associated Programmes of Measures include provisions to help ensure that these water bodies meet the objectives of the WFD. The Plan will contribute towards the achievement of the objectives of this Management Plan.

There is historic and predictive evidence of flooding in various locations across the County. All recommendations made by the SFRA in relation to flooding risk management have been integrated into the Plan.

[8] Article 4 of the WFD sets out various exemptions for deterioration in status caused as a result of certain physical modifications to water bodies. This is provided: all practicable mitigation measures are taken; there are reasons of overriding public interest or the benefits to human health, safety or sustainable development outweigh the benefits in achieving the WFD objective; there are no better alternatives; and the reasons for the physical modification are explained in the relevant river basin management plan.

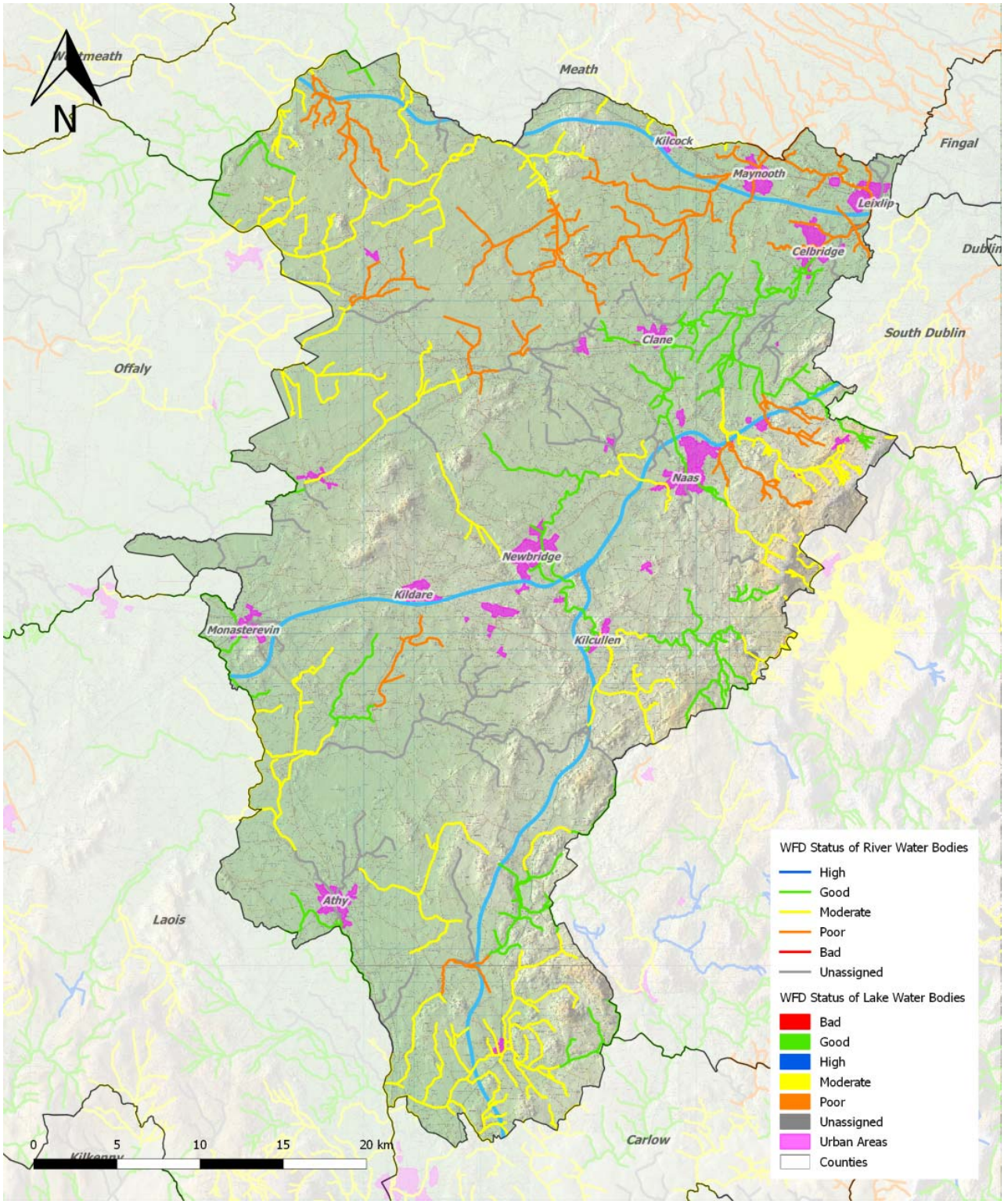

Figure 3.3 WFD Status of Rivers
Source: EPA (2011)

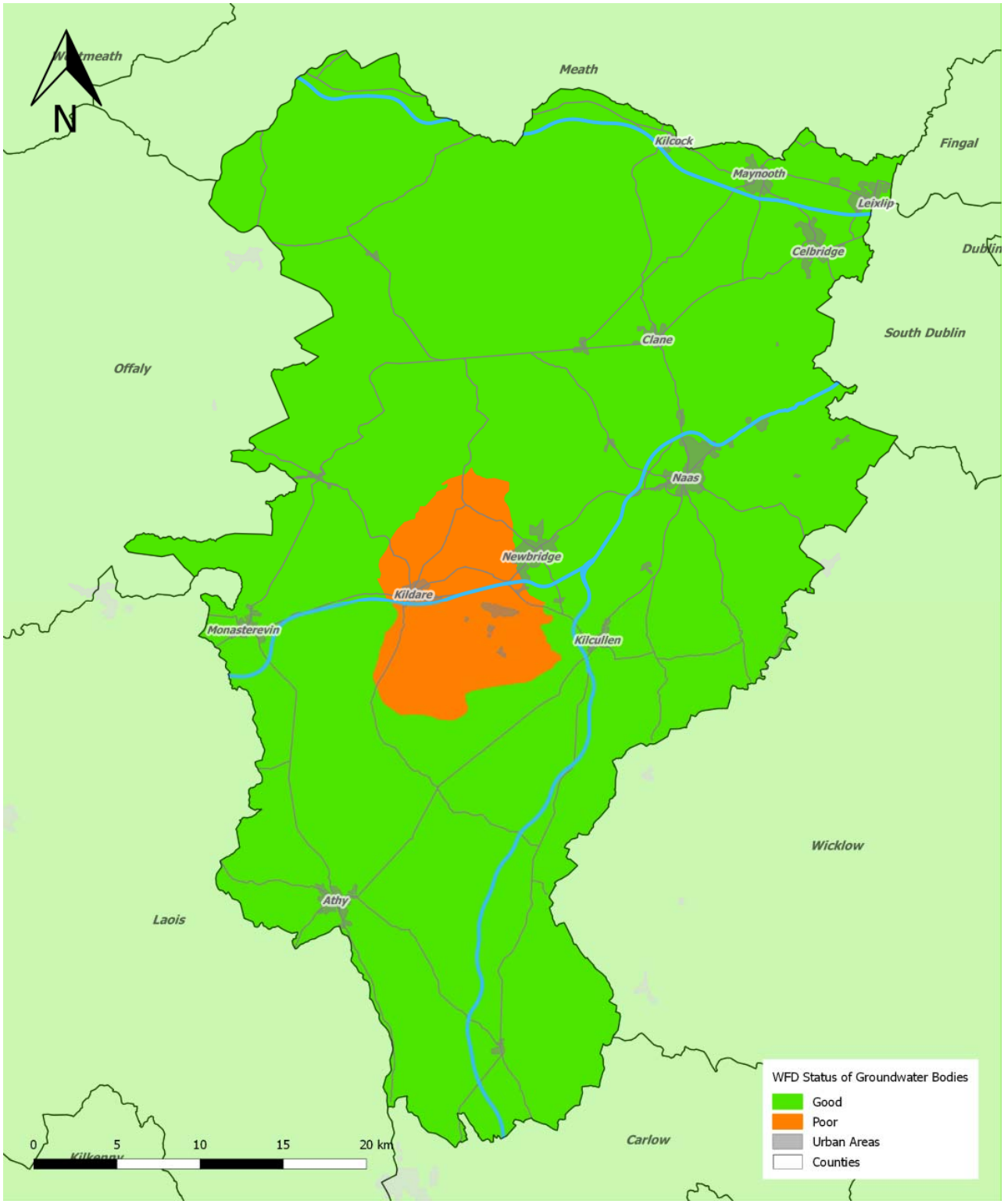

Figure 3.4 WFD Status of Groundwater
Source: EPA (2011)

3.7 Air and Climatic Factors

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 air quality standards directives, the EPA measures the levels of a number of atmospheric pollutants. The EPA's (2015) *Air Quality in Ireland 2014* identifies that, overall, air quality in Ireland compares favourably with other EU Member States and continues to be of good quality relative to other EU countries. The Plan facilitates improvements in sustainable mobility, thereby facilitating reductions in and limiting increases of emissions to air including noise. Such emissions would occur otherwise with higher levels of motorised transport and associated traffic.

Climatic Factors

The key issue involving the assessment of the effects of implementing the plan on climatic factors relates to greenhouse gas emissions arising from transport. Climatic factors also interact with flooding.

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

Ireland's emissions profile has changed considerably since 1990, with the contribution from transport more than doubling and the share from agriculture reducing since 1998. Travel is a source of:

1. Noise;
2. Air emissions; and
3. Energy use (39% of Total Final Energy Consumption in Ireland in 2012 was taken up by transport, the largest take up of any sector)[9].

Between 2008 and 2011, Ireland's greenhouse gas emissions decreased across all sectors due to the effects of the economic downturn with emissions falling by 15.2% between 2008 and 2011. However, 2012 saw emissions rise by 1.2% when compared with 2011. [10]

Between 1990 and 2013, the Transport sector shows the greatest overall increase at 115.5%. Emissions increased by 2.1% in 2013, the first increase in Transport emissions since 2007. However, Transport emissions have decreased by 23.1% below peak levels in 2007 primarily due to the economic downturn, improving vehicle standards due to the changes in vehicle registration tax and the increase use in biofuels. The increase up to 2007 can be attributed to general economic prosperity, increasing population with a high reliance on private car travel as well as rapidly increasing road freight transport.[11]

The EPA 2015 publication *Ireland's Greenhouse Gas Emission Projections 2014-2035*, identifies that:

- Under the 'worst case' scenario, Ireland is projected to cumulatively exceed its obligations by 4 Mtonnes of CO2eq over the period 2013-2020.
- Under the 'best case' scenario, Ireland is projected to cumulatively meet its compliance obligations over the 2013-2020 period and meet its 2020 target. This takes into account the

[9] Sustainable Energy Ireland (2014) *Energy in Ireland 1990 – 2012*
[10] EPA (2013) Ireland's Greenhouse Gas Emissions in 2012
[11] EPA (2014) Ireland's Provisional Greenhouse Gas Emissions in 2013

overachievement of the annual limits in the period 2013- 2017 which is banked and used in the years 2018-2020. The report identifies that achieving the outlook under the 'best case' scenario will require focus and effort which includes meeting renewable targets for transport and heat as well as energy efficiency targets.

- Transport emissions are projected to show strong growth over the period to 2020 with a 13%-19% increase on current levels depending on the level of policy implementation. Relative to 2005, transport emissions are projected to remain the same or, at best, decrease by 4% by 2020.

Maximising sustainable mobility will help Ireland meet its emission target for greenhouse gases under the 2020 EU Effort Sharing target which commits Ireland to reducing emissions from those sectors that are not covered by the Emissions Trading Scheme (e.g. transport, agriculture, residential) to 20% below 2005 levels.

Land-use planning contributes to what number and what extent of journeys occur. By addressing journey time through land use planning and providing more sustainable modes and levels of mobility (as is provided for by the Draft Plan), noise and other emissions to air and energy use can be minimised. Furthermore, by concentrating populations, greenfield development - and its associated impacts - can be minimised and the cost of service provision can be reduced.

Provisions in relation to climate change such as a commitment to prepare a Climate Change Adaptation Strategy have been integrated into the Plan.

Provisions in relation to green infrastructure have also been integrated into the Plan. Green Infrastructure has the potential to achieve objectives and synergies with regard to the following:

- Provision of open space amenities;
- Sustainable management of water;
- Protection and management of biodiversity;
- Protection of cultural heritage; and
- Protection of protected landscape sensitivities.

3.8 Material Assets

Introduction

The provision of an adequate supply of water and wastewater treatment facilities is critical to facilitate and sustain the growth of the County over the lifetime of the plan and beyond. As of January 2014, Kildare County Council no longer has any direct control in relation to the provision of such services. The delivery, integration and implementation of water and wastewater projects and infrastructural improvements are now the responsibility of the newly established State body 'Irish Water'.

Kildare County Council will work closely with Irish Water to ensure that the County Development Plan and - in particular the Core Strategy - continue to align with both the National Spatial Strategy and the Regional Planning Guidelines and that the provision of water/ wastewater services will not be a limiting factor in terms of targeted growth.

Waste Water

Irish Water provide public wastewater collection, treatment and disposal infrastructure. While significant resources have been invested in such facilities, there are still notable deficiencies throughout the County. These deficiencies undermine both the ability of the Council to support the increasing population and demand for development and the implementation of growth targets set by the Department of the Environment, Community and Local Government / Regional Planning Guidelines and also result in risk of pollution and environmental damage. Deficiencies in wastewater

services have also been identified as a barrier to the economic development of the County and addressing this issue is therefore critical to the success and well-being of the County.

Kildare is served by circa 37 wastewater treatment plants. The largest wastewater treatment plants are located at Osberstown and Leixlip. Wastewater collection and treatment capacity has struggled to keep pace with development in the county. Many networks and plants in the county are operating at capacity, with consequential negative impacts on receiving water quality.

Taking into account the population equivalent of the urban area catchments which they serve, there is currently a shortfall in design capacity at four of the public systems in the County: Derrinturn, Kilmeague, Leixlip and Oberstown.

Two of the public waste water systems, Ballymore Eustace and Kilmeague, are identified by the EPA as having failed to comply with quality standards in 2014.

Drinking Water

Irish Water being the Water Services body for the state and County Kildare, is responsible for providing and maintaining adequate public water supply infrastructure. Compliance with the drinking water requirements is determined by comparing the results of analyses submitted by water suppliers to the standard for 48 parameters specified in the European Communities (Drinking Water) Regulations (No. 2), 2007. To ensure that these standards are met, each water supply must be monitored on a regular basis.

The most recent drinking water report from the EPA 'Drinking Water Report 2013' (EPA, 2015) identifies that:

- There are 12 public water supplies in County Kildare serving a population of 185,658;
- Microbiological parameter compliance for the year was 100%;
- Chemical parameter compliance for the year was 99.9%;
- No boil notices were issued in 2014; and
- No water restrictions occurred.

The Remedial Action List identifies Interim Measures and an Action Programme for solving these issues. The most recent EPA Remedial Action List (Q4 of 2015) illustrates that all water supplies within the County were in compliance with the Drinking Water regulations for Q4 of 2015, and are not in need of improvement with respect to treatment and management issues.

Waste

The Eastern–Midlands Region Waste Management Plan (WMP) 2015-2021 provides the framework for solid waste management in the region and sets out a range of policies and actions to meet specified mandatory and performance based targets. The WMP seeks to assist and support resource efficiency and waste prevention initiatives. A key WMP target is to achieve a 1% reduction per annum in the quantity of household waste generated per capita over the period of the WMP. In tandem, the WMP identifies measures to develop a circular economy whereby waste management initiatives are no longer confined to treating and disposing of waste, instead supporting initiatives that value waste as a resource or potential raw material.

Existing Problems

There are a number of challenges with respect to water services which are outlined above. The provisions of the new Plan 2017-2023 will contribute towards protection of the environment with regard to impacts arising from material assets.

3.9 Cultural Heritage

Archaeological Heritage

Kildare has a significant archaeological heritage, which provides a valuable cultural, educational and tourism resource. A number of areas of archaeological potential and significance are present in Kildare, and Dún Ailinne has been proposed for the tentative list as a UNESCO World Heritage Site due to its international significance.

The Record of Monuments and Places (RMP) was established under Section 12 of the National Monuments (Amendment) Act 1994 and structures, features, objects or sites listed in this Record are known as Recorded Monuments. The term Monument refers to any artificial or partly artificial building or structure, that has been carved, sculptured or worked upon or which appears to have been purposely put or arranged in position. It also includes any, or part of any prehistoric or ancient tomb, grave or burial deposit, or ritual, industrial or habitation site. Monuments that predate 1700 AD are automatically accorded the title Historic Monument.

Figure 3.5 shows the spatial distribution of entries to the RMP in County Kildare. These monuments are found throughout the County with clusters found in towns and lower concentrations found in peatland areas.

Architectural Heritage

Kildare has a wealth of architectural heritage. Instances of built heritage in the County include the Grand Canal and the Royal Canal. Both Canals link the River Shannon with Dublin to the east.

Part IV of the Planning & Development Act requires every development plan to include a record of protected structures (RPS). A 'protected structure' is a structure or a specific feature of the structure as may be specified that a Planning Authority considers to be of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social or technical point of view.

Figure 3.5 also maps the location of entries to the Record of Protected Structures within County Kildare. Also, mapped on Figure 3.5 are entries to the National Inventory of Architectural Heritage (NIAH) (these provide the basis for the recommendations of the Minister for Arts, Heritage and the Gaeltacht for the inclusion of particular structures into the RPS). Concentrations of protected architectural structures are found within existing settlements.

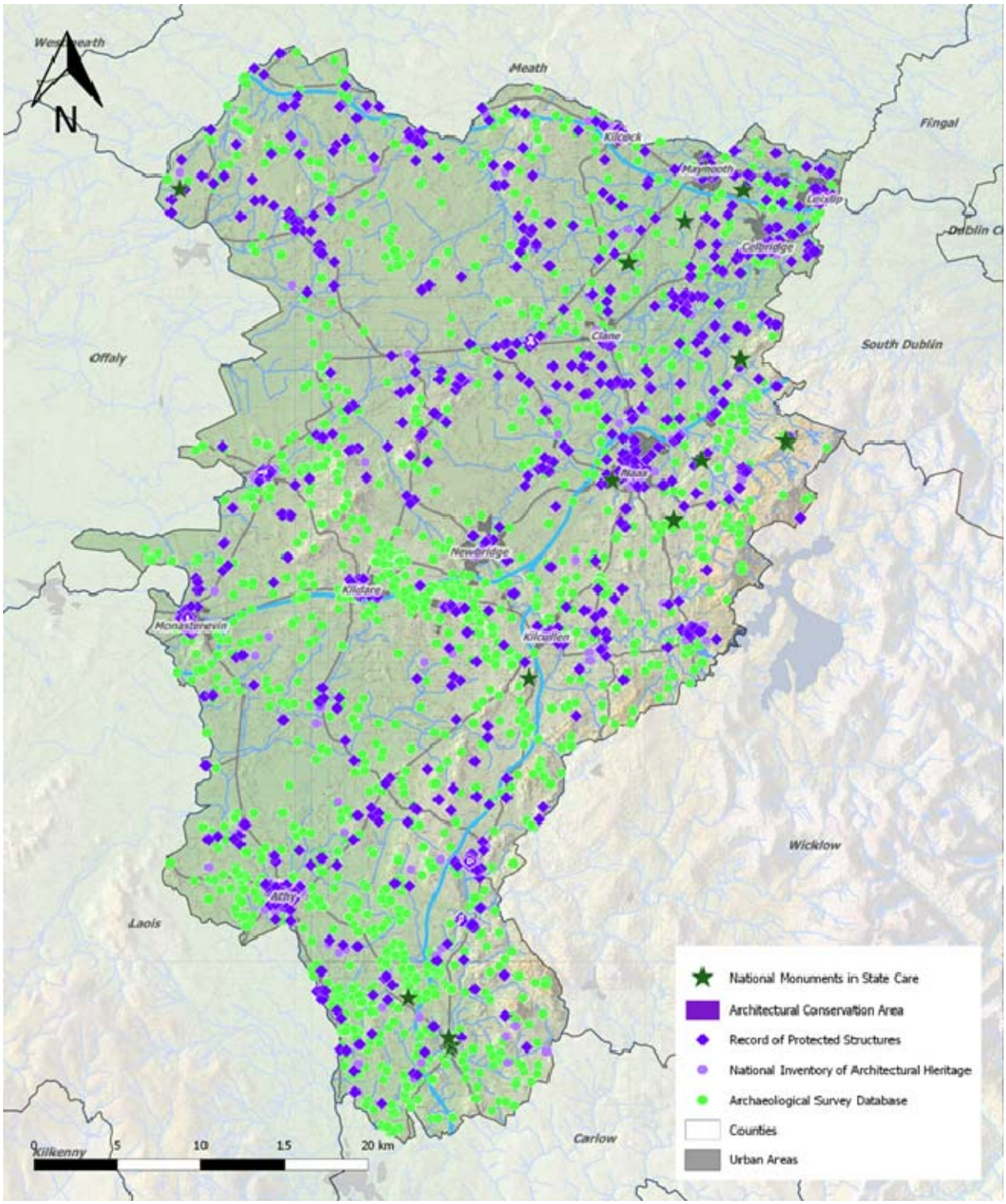

Figure 3.5 Archaeological Heritage - Record of Monuments and Places
Source: Kildare County Council (Unknown)

3.10 Landscape

The landscape assessment that has been undertaken as part of the Plan identifies 4 distinctive landscape categories each containing a number of landscape areas. The landscape categories are identified below and mapped on Figure 3.6. The individual landscape areas are described below under each of the landscape categories.

1. The Uplands

1(a) - Eastern Uplands – Oughterard

The Eastern Uplands are located in the northeast of the County and extend into the neighbouring County of Wicklow, as they are part of the Wicklow Mountain complex. The undulating hills situated within County Kildare lie to the east of the Liffey. The elevated nature of this area provides a defined skyline with scenic views over the central plains of Kildare and the neighbouring Wicklow Mountains which further define the skyline and the extent of visibility

1(b) - South-eastern Uplands – Corballis Hills– Red Hill, Dunmurry Hill, Allen Hill

The South-eastern Uplands coincide with Corballis and Hughstown Hills to the south-east of the County, east of Castledermot. This upland area also extends into the neighbouring Wicklow Mountains, as they are part of the same geomorphological complex. The relatively elevated nature of this area provides a locally defined skyline to the east with scenic views over the southern plains of Kildare as well as to the neighbouring Wicklow Mountains, which further define the skyline and the extent of visibility.

1(c) - Northern Hills – Newtown Hills

This character area is a small upland area on the central-northern part of the County boundary, which includes the hills to the north and south of Newtown (with 145m O.D. and 135m O.D. respectively) that locally define the skyline in this area. This unit lies immediately south of the Royal Canal. The relatively elevated nature of the local roads in this area, which run through both hilltops, provides scenic views over the northern and north-western plains of Kildare as well as to the Royal Canal corridor at certain vantage points and to the neighbouring County Meath undulating lowlands.

1(d) - Chair of Kildare

The Central Uplands or the Chair of Kildare as the area is locally known consists of a number of hills that interrupt the continuity of the Kildare plains. This landscape character unit is located immediately north of Kildare town. The elevated nature of this area provides highly scenic views over the central plains and boglands of Kildare.

2. Lowland Plains and Boglands

2(a) - Northern Lowlands– Naas and environs

This extensive lowland area to the north-east of the County is bisected by the River Liffey valley. The Royal Canal runs along its northern boundary and the Grand Canal corridor follows a northeast to southwest alignment. This area is characterised by generally flat terrain and open lands with regular (medium sized) field patterns. Hedgerows are generally well maintained and low, with scattered trees along the field boundaries that partially screen the lowest lying areas. Nevertheless, the generally low-lying vegetation of the area allows long-distance and extensive visibility. Distant views include the skylines of the Eastern Uplands, the Newtown Hills to the west, and the Chair of Kildare hilltops to the south-west.

2(b) - North-western Lowlands–Cadamstown and environs

This lowland landscape character unit is located on the northwestern boundary of the county. The area is characterised by generally flat topography and smooth terrain, gently undulating around Carbury, to a maximum elevation of 142m O.D. at Carbury Hill. The occurring open lands with medium to large field patterns are bordered by well-maintained and low hedgerows, which contain scattered trees along some sections of the field boundaries. Although hedgerows partially screen the adjacent lowest lying areas, the commonly flat terrain allows long-distance visibility. Distant views include the skylines of Newtown Hills to the east and Allen Hill to the south-east.

2(c) - Southern Lowlands

This landscape character unit comprises an extensive lowland area to the south-west of the County, the River Barrow and the Grand Canal running along its western quarter. This area is characterised by generally flat terrain and open lands with regularly shaped large field patterns. Hedgerows are well maintained and low, with scattered trees along the field boundaries that partially screen the lowest lying areas. Nevertheless, the generally flat topography and the low-lying vegetation allow long-distance and extensive visibility. Distant views include the skylines of the Eastern Kildare Uplands, the Newtown and Hughstown Hills and the Wicklow Mountains to the east, the Chair of Kildare hilltops to the north-east and the neighbouring hills of County Laois to the south-west

2(d) - Central Undulating Lowlands

This lowland landscape character unit is characterised by undulating topography and located in the centre of the County. The terrain gently rises to a maximum elevation of 147m O.D. at the east of the Curragh lands. The Curragh Racecourse and its natural grasslands represent a significant landscape feature in the area. The generally medium sized open lands are bordered by well-maintained hedgerows that contain scattered trees along some sections of the field boundaries. Although hedgerows are generally low, the undulating lands provide the potential to screen adjacent low-lying areas. The skyline to the east is defined by the Eastern Kildare Uplands and the Chair of Kildare defines the extent of visibility to the west.

2(e) - Western Boglands
This lowland landscape character unit, located to the western central part of the County, is characterised by flat topography and smooth terrain. The terrain has a high-water table and it is badly drained, providing generally unstable and unproductive land. This area of the county is highly distinctive due to the existing large areas of bogland vegetation. The commonly large sized open lands are often bordered by unmaintained hedgerows, which contain scattered trees, and have the potential to partially screen adjacent lands. Nevertheless, the generally low vegetation and the even ground provide extensive long-distance visibility. The skyline to the south of this unit is defined by the Chair of Kildare Hills and the Northern Uplands define the skyline to the northeast

3. Transition Lands

3(a) - Eastern Transition Lands
This transitional landscape character unit, located between the uplands and lowlands to the east of the County, is characterised by undulating topography. The River Liffey bisects the unit north and south. The lands are generally of medium size and regular pattern, with commonly well-maintained hedgerows. Gorse and natural vegetation occur at some areas of this unit. The terrain gently rises from the lowland areas to the hilltops of the Eastern Kildare Uplands. The land undulates through a series of hilltops, the main ones being: Old Kilcullen Hill, Bullhill, Mullacash Hill, Nine Tree Hill and Carrighill. The elevated vantage points along the local roads provide long-distance views of the Kildare lowlands. The skyline to the east of this unit is defined by the Eastern Uplands, distant views including the neighbouring Wicklow Mountains, define the extent of visibility. The hilltops of the Chair of Kildare Hills partially define the skyline to the west

4. River Valleys and Water Corridors

4(a) - River Liffey Valley
The Liffey Valley is located on the north-eastern quarter of the County, flowing in a north-east to south-east pattern and its waters winding along the central lowlands. Many towns have become well established along the riverbanks, such as Leixlip, Celbridge, Clane, Newbridge, Kilcullen and Ballymore Eustace, where the River Liffey flows into Poulaphouca Reservoir. This lowland unit, characterised mostly by smooth terrain and low vegetation, has extensive open mountain views (i.e. the Chair of Kildare to the west and the Eastern Uplands to the east; distant views including the neighbouring Wicklow Mountains).

4(b) - River Barrow Valley
The Barrow Valley is an extensive river valley flowing in a north south pattern along the western boundary of the County. The river valley is easily accessible by local roads and many towns have become well established along the riverbanks, such as Monasterevin and Athy. The river valley is characterised by its floodplain levels and gentle slopes of deciduous trees with a slow progression to pasture lands. Running along the Barrow Way, the riverbanks are predominately grassland, although sometimes there is a transition of natural vegetation. Medium to large tillage fields with hedgerow boundaries are also common to the river valley. The terrain is generally even with long distance views of mountains – the Chair of Kildare hills and the Eastern Uplands and the Wicklow Mountains being discernible to the east.

4 c) - Grand Canal Corridor
The Grand Canal is an extensive water corridor that flows in an east to south-west direction through the County. The canal corridor is divided at Sallins into the Naas and Corbally Branch and is further divided in three branches at Robertstown: the Milltown Feeder, the Barrow Line and the continuation of the Grand Canal into the neighbouring County Offaly.

The canal corridor is easily accessible by local roads and a number of towns have been established along the canal banks such as Allenwood, Robertstown and Rathangan. Smooth terrain and even topography characterise the canal corridor which generally progress into pasturelands and boglands, although natural vegetation occurs at some of the sections. The corridor and its adjacent lands have been landscaped and enhanced along the sections where the canal crosses urban areas.

Canal locks are distinctive features of this water corridor. Long-distance views of the canal corridors can be obtained from existing bridges and distant views of the County uplands (such as Red Hill and Allen Hill) can also be gained from certain vantage points.

4(d) - Royal Canal Corridor
The Royal Canal flows in an east to west direction along the northern boundary of the County. The canal corridor flows through Leixlip, Maynooth and Kilcock and continues into the neighbouring County Offaly. Local roads run parallel to the corridor along some sections. Smooth terrain and even topography characterise the canal corridor, which generally progresses into pasturelands, although natural vegetation occurs at some of the sections and tillage fields can also be found in adjacent lands. The lands along the corridor have been landscaped and enhanced where the canal crosses urban settlements. Canal locks are distinctive features of this water corridor. Long-distance views of the canal corridor and its surrounding environs can be obtained from local roads and existing bridges.

Based on the findings of the Landscape Character Assessment a landscape sensitivity rating was developed for each of the Landscape Character Areas. Landscape sensitivity is a measure of the ability of the landscape to accommodate change or intervention without suffering unacceptable effects to its character and values. It is determined using the following factors: slope, ridgeline, water bodies, land use and prior development. Each of the individual landscape areas in the County are described below in terms of their landscape sensitivity. Figure 3.7 shows the sensitivity rating and landscape sensitivity factors for each Landscape Character Area in the County.

Class 1: Low Sensitivity
Areas with the capacity to generally accommodate a wide range of uses without significant adverse effects on the appearance or character of the area. Landscape character areas:

- North-western Lowlands
- Northern Lowlands
- Central Undulating Lands
- Southern Lowlands

Class 2: Medium Sensitivity
Areas with the capacity to accommodate a range of uses without significant adverse effects on the appearance or character of the landscape having regards to localised sensitivity factors. Landscape character areas:

- Eastern Transition Lands
- South-eastern Uplands

Class 3: High Sensitivity
Areas with reduced capacity to accommodate uses without significant adverse effects on the appearance or character of the landscape having regard to prevalent sensitivity factors. Landscape character areas:

- Western Boglands
- Eastern Uplands

Class 4: Special
Areas with low capacity to accommodate uses without significant adverse effects on the appearance or character of the landscape having regard to special sensitivity factors. Landscape character areas:

- Chair of Kildare
- Northern Hills
- River Liffey
- River Barrow

Class 5: Unique
Areas with little or no capacity to accommodate uses without significant adverse effects on the appearance or character of the landscape having regard to unique and special sensitivity factors. Landscape character areas:

- The Curragh
- Pollardstown Fen

Views and Prospects

In addition to identifying landscape character areas, The Plan lists views and prospects that are considered to be of the highest amenity value in the County. The Plan lists views and prospects that are considered to be of the highest amenity value in Kildare. It includes views and prospects to and from:

- Water Corridors;
- Canals;
- County Waterways;
- Hills; and
- Scenic Routes.

Views and prospects listed by the Plan are shown on Figure 3.7.

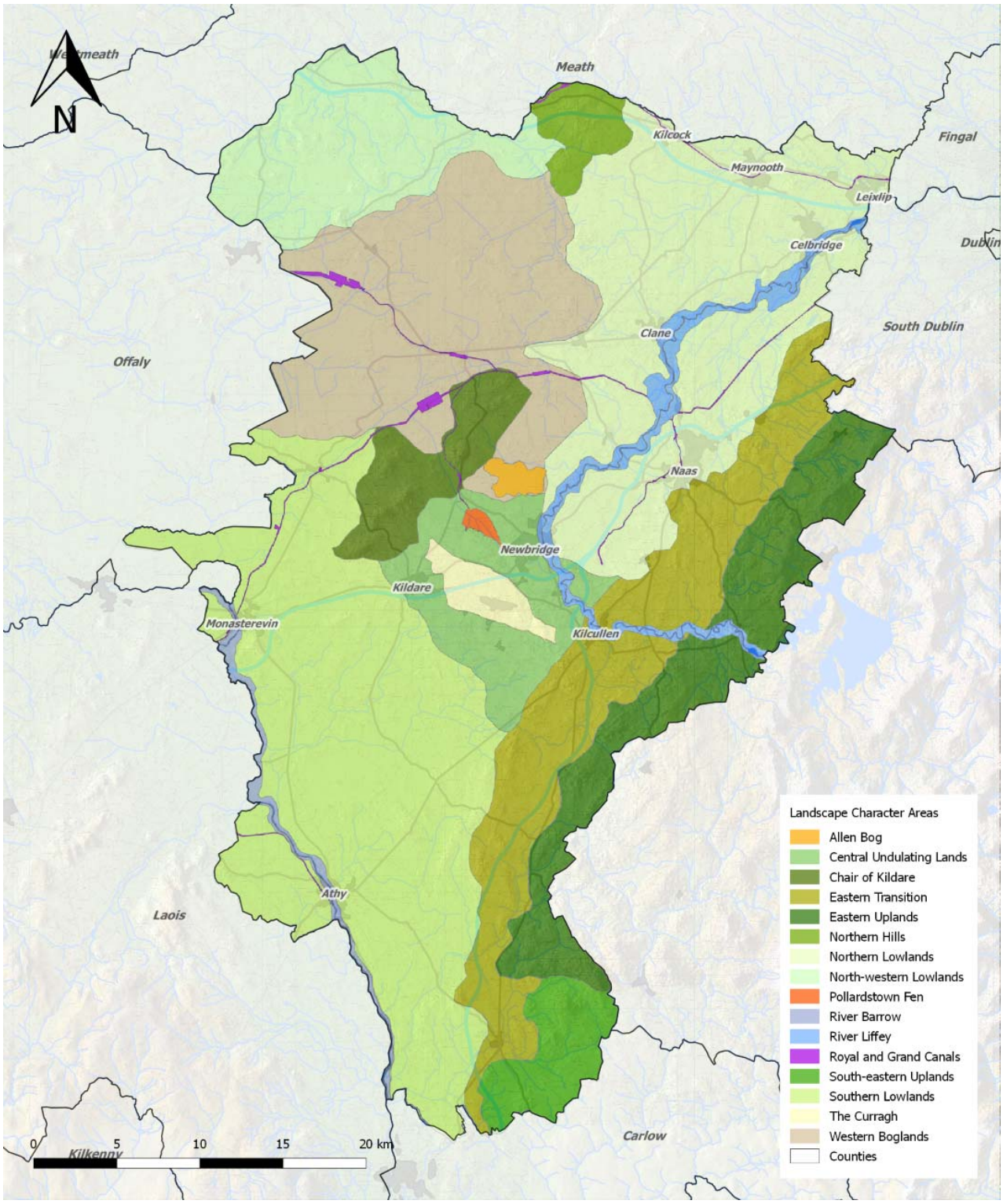

Figure 3.6 Landscape Category Map
Source: Kildare County Council (2015)

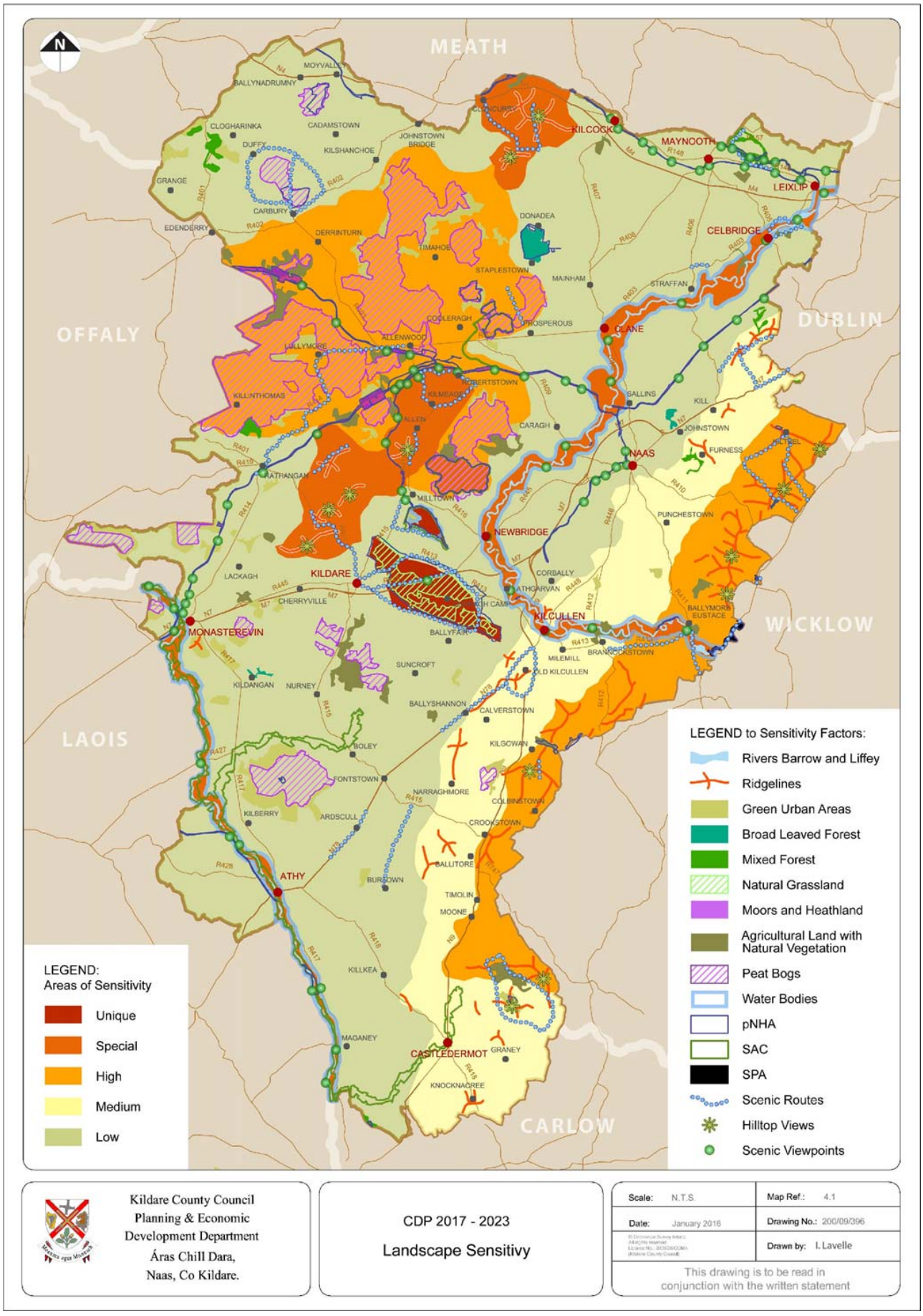

Figure 3.7 Sensitivity Ratings and Landscape Sensitivity Factors
Source: Kildare County Council (2016)

3.11 Overlay of Environmental Sensitivities

In order to identify where most sensitivities within Kildare occur, a number of the environmental sensitivities described above were weighted and mapped overlapping each other. Figure 3.8 provides an overlay of environmental sensitivities for the town.

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 complied with in order to ensure that the implementation of the Plan contributes towards environmental protection.

A weighting system applied through Geographical Information System (GIS) software was used in order to calculate the vulnerability of all areas in the county. Environmental considerations are given equal weight as follows, with a slight differentiation is made in certain layers:

- Ecological designations (candidate Special Areas of Conservation - 10 points - and proposed Natural Heritage Areas - 5 points);
- Cultural heritage (Entries to the Record of Protected Structures and entries to the Record Monuments and Places - 10 points);
- Landscape character areas of very high (10 points) and high value (5 points);
- Scenic routes and views (10 points);
- Sensitive landcover categories (Inland marshes and water bodies - 10 points);
- Surface and groundwater with bad and poor (10 points) and moderate, good and high (5 points) status;
- Aquifers which are highly (5 points) or extremely (10 points) vulnerable to pollution; and
- Indicative flood zones A (10 points) and B (5 points) from the Strategic Flood Risk Assessment.

The greatest extent of higher sensitivity categorisations occurs in the centre of the County, concentrated between the areas of Kildare Town, Kilcullen and Newbridge. This is due to a variety of overlapping and related factors including soil type (peat), groundwater status (bad), landscape value (exceptional), ecological designation (proposed Natural Heritage Area) and geological designation (County Geological Heritage Area).

Elevated levels of sensitivity are found in the foothills to the west of the Kildare/Wicklow county boundary.

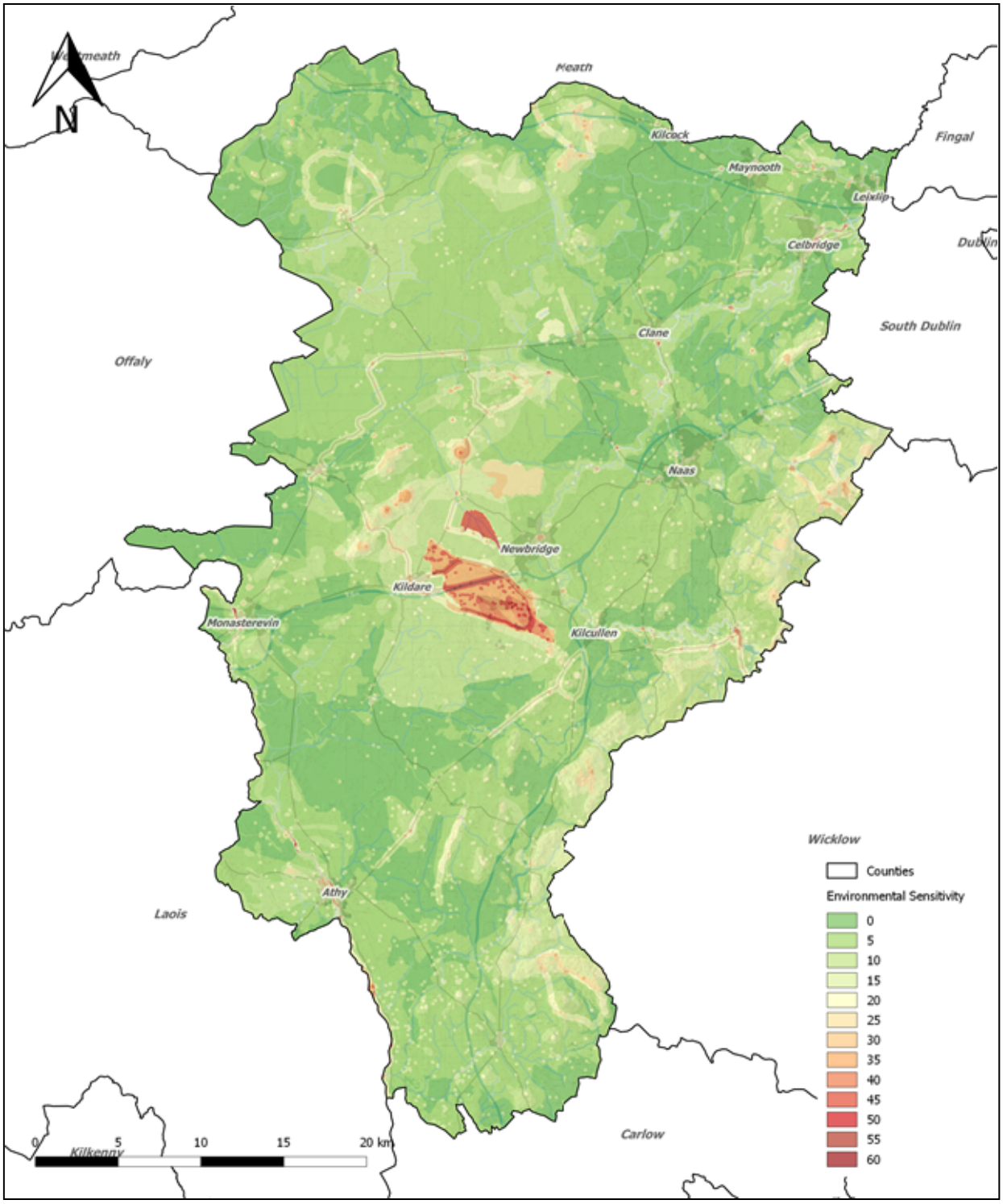

Figure 3.8 Overlay Mapping of Environmental Sensitivities
Source CAAS (2016)

3.12 Appropriate Assessment and Strategic Flood Risk Assessment

Appropriate Assessment (AA) Screening and a Strategic Flood Risk Assessment (SFRA) have both been undertaken alongside the Plan. The requirement for AA is provided under the EU Habitats Directive (Directive 1992/43/EEC). The requirement for SFRA is provided under 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (DECLG, 2009). The AA concluded that the Plan will not affect the integrity of the Natura 2000 network[12].

Various policies and objectives have been integrated into the Plan through the SEA, SFRA and AA processes. The preparation of the Plan, SEA, AA and SFRA has taken place concurrently and the findings of the AA and SFRA have informed both the Plan and the SEA. This has concluded the undertaking of Justification Tests by the Council, changing land use zoning and recommendations regarding the undertaking of site-specific SFRA at for development proposals at project level.

3.13 Strategic Environmental Objectives

Strategic Environmental Objectives (SEOs) are methodological measures against which the environmental effects of the Plan can be tested. If complied with in full, SEOs would result in an environmentally neutral impact from implementation of the Plan. The SEOs are set out under a range of topics and are used as standards against which the provisions of the Plan can be evaluated in order to help identify areas in which potential adverse impacts may occur. SEOs are distinct from the objectives of the Plan and are developed from international and national policies which generally govern environmental protection objectives. SEOs used in the assessment are as follows:

B1: *To ensure compliance with the Habitats and Birds Directives with regard to the protection of Natura 2000 Sites and Annexed habitats and species*[13]
B2: *To ensure 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 act 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*
B3: *To avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in designated sites including Wildlife Sites*[14] *and to ensure compliance with the Wildlife Acts 1976-2010 with regard to the protection of species listed within these Acts*
PHH1: *To protect populations and human health from exposure to incompatible landuses*
S1: *To avoid damage to the hydrogeological and ecological function of the soil resource*
W1: *To maintain and improve, where possible, the quality and status of surface waters*
W2: *To prevent pollution and contamination of ground water*
W3: *To comply as appropriate with the provisions of the Planning System and Flood Risk Management: Guidelines for Planning Authorities (DEHLG, 2009)*
M1: *To serve new development with adequate and appropriate waste water treatment*
M2: *To serve new development with adequate drinking water that is both wholesome and clean*
M3: *To reduce waste volumes, minimise waste to landfill and increase recycling and reuse*
C1: *To reduce travel related emissions to air and to encourage modal change from car to more sustainable forms of transport*
CH1: *To protect archaeological heritage including entries to the Record of Monuments and Places and/or their context*
CH2: *To protect architectural heritage including entries to the Record of Protected Structures and Architectural Conservation Areas and their context*
L1: *To minimise significant adverse visual impacts within and adjacent to the County*

[12] Except as provided for in Section 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.

[13] '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.

[14] The Planning and Development Act 2010 defines a 'wildlife site' as: (a) an area proposed as a natural heritage area and the subject of a notice made under section 16(1) of the Wildlife (Amendment) Act 2000, (b) an area designated as or proposed to be designated as a natural heritage area by a natural heritage area order made under section 18 of the Wildlife (Amendment) Act 2000, (c) a nature reserve established or proposed to be established under an establishment order made under section 15 (amended by section 26 of the Wildlife (Amendment) Act 2000) of the Wildlife Act 1976, (d) a nature reserve recognised or proposed to be recognised under a recognition order made under section 16 (amended by section 27 of the Wildlife (Amendment) Act 2000) of the Wildlife Act 1976, or (e) a refuge for fauna or flora designated or proposed to be designated under a designation order made under section 17 (amended by section 28 of the Wildlife (Amendment) Act 2000) of the Wildlife Act 1976.

Section 4 Effects of Alternative Scenarios and the Plan

4.1 Description of Alternative Scenarios

One of the critical roles of the SEA is to facilitate an evaluation of the likely environmental consequences of a range of alternative scenarios for accommodating future growth in County Kildare.

A wide range of Scenarios (1-4) were evaluated for the last (2011 to 2017) County Development Plan.

At that time, Scenario 4 'Centred Development Strategy' was chosen to be developed for the Development Plan by the Plan-making team and adopted by the Elected Members having regard to both:

1. The environmental effects which were identified by the Strategic Environmental Assessment; and
2. Planning - including social and economic – effects.

Scenario 4 envisaged a concentration of development, population and demands for infrastructural capacity into the north-eastern part of the County.

It also envisioned concentrations of growth in the central corridor where the majority of the rest of the population and development are likely to concentrate because this area is already well served by road, rail, power and gas corridors.

This strategy also envisaged sufficient levels of continued rural development to sustain the future viability of smaller more dispersed rural communities.

Since 2011, the continued low levels of economic growth have caused the trends to have conformed more closely with Scenario 3 and parts of Scenario 2.

These envisaged less balanced developments in the County with a concentration of development, population in areas with relatively high concentrations in installed infrastructure with spare capacity – existing and planned.

It also envisioned concentrations of growth in the central corridor where the majority of the rest of the population and development are likely to concentrate because this area is already well served by road, rail, power and gas corridors.

These scenarios envisaged weaker and less co-ordinated development in weaker areas – both in the south and outside of the environs of the Strategic Transportation Corridor.

Having regard to this review of outcomes it appears that the following range of Alternatives Scenarios fulfil the requirements of being realistic, capable of implementation, and representing a range of different approaches within statutory and operational requirements of the County Development Plan.

Note that the experience gained from examining the outcomes of actual development versus the scenarios that were examined for the previous (2011 – 2017) Kildare County Development Plan provides increased certainty and a lower range of differences for the scenarios that are examined in this assessment.

Pressure for development will return rapidly which will put pressure on plans and places where growth has been muted since 2006. As growth resumes differences between these scenarios – slight at first – will quickly diverge leading to markedly different environmental outcomes.

The scenarios suggest that the principal difference that are likely to arise will be in rural areas, small settlements and areas at a remove from the Strategic Transportation Corridors. In Scenario One and Scenario Two the plans for these areas will be less effective – leading to higher environmental pressures. Scenario Three, by contrast, envisages plan-led development that will significantly improve synergies causing increased, but balanced and more sustainable growth – throughout the County – with least impacts on the environment.

Scenario One 'Business as Usual' Trend Change

There will be very strong, but weakly co-ordinated growth within and adjacent to major settlements within the Strategic Transportation Corridor and the Metropolitan Areas of the North East. Elsewhere there will be markedly weaker growth due to the lack of integrated provision of services and accommodation. There will be strong and persistent patterns of social and economic imbalance between the north-east and southern parts of the county.

Scenario Two 'Mixed Planning' Uneven Outcomes

There will be very strong growth within the Strategic Transportation Corridor and the Metropolitan Areas of the North East. The need to co-ordinate key infrastructural resources – especially energy, water services and transportation – will enforce very strong planning and co-ordination in these areas. Elsewhere a variety of very local interests will militate against an orderly or sustainable provision of services which will produce uneven patters of settlement and enterprise.

Scenario Three 'Strong Planning' Balanced Outcomes

This Scenario envisages an effective County Development Plan ensuring that the Metropolitan areas of the North East will continue to grow strongly and quickly – but with increased connectivity into the strengthening urban centres of Kildare – rather than Dublin.

This Scenario also envisages that through the planning framework provided by the County Development Plan, the new Kildare Local Economic and Community Plan will make a difference in bringing higher levels of economic development and prosperity to more peripheral settlements and rural areas outside of the Strategic Transportation Corridors and in the south of the county.

4.2 Evaluation of Alternative Scenarios

The table overleaf summarises the evaluation of environmental effects of the alternative scenarios that is provided in the SEA Environmental Report.

The provisions of the alternatives are evaluated using compatibility criteria in order to determine how they would be likely to affect the status of the Strategic Environmental Objectives or SEOs (these are all detailed under Section 3.13). The SEOs and the alternatives are arrayed against each other to identify which interactions - if any - would cause effects on specific components of the environment. Where the appraisal identifies a conflict with the status of an SEO the relevant SEO code is entered into the conflict column - e.g. B1 which stands for the SEO likely to be affected - in this instance 'to ensure compliance with the Habitats Directive with regard to the protection of Natura 2000 Sites and Annexed habitats and species'.

The interactions identified are reflective of likely significant environmental effects[15]:

1. Interactions that would be likely to improve the status of a particular SEO would be likely to result in a significant positive effect on the environmental component to which the SEO relates. The extent of positive effects which would be likely to occur varies and there are three 'likely to improve columns'.
2. Interactions that would potentially conflict with the status of an SEO and would be likely to be mitigated are divided into three groups:
    - Interactions that would conflict the least with the status of SEOs – these would be likely to be mitigated to a greater degree and significant adverse effects would be less likely;
    - Interactions that would conflict more with status of SEOs - these would be likely to be mitigated to an intermediate degree and significant adverse effects would be more likely.
    - Interactions that would conflict the most with status of SEOs - these would be likely to be mitigated to a lesser degree and significant adverse effects would be more likely.

[15] These effects include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects.

Table 4.1 Summary Evaluation of Alternative Scenarios against SEOs

	Likely to **Improve** status of SEOs to a **greater** degree	Likely to **Improve** status of SEOs to an **intermediate** degree	Likely to **Improve** status of SEOs to a **lesser** degree	**Least Potential Conflict** with status of SEOs - likely to be mitigated to greater degree, significant adverse effects **less likely**	**More Potential Conflict** with status of SEOs - likely to be mitigated to an intermediate degree, significant adverse effects **more likely**	**Most Potential Conflict** with status of SEOs - likely to be mitigated to lesser degree, significant adverse effects **more likely**
Scenario 1:	This scenario will place most pressure on environmental resources throughout the County due to the dispersed and uncoordinated expenditure on important infrastructure – which will lessen its effectiveness. Further environmental pressure would result from the overwhelming of the provisions of Local Area Plans by excess (unplanned) and inappropriate development within the immediate environs of larger settlements. This will lead to increasing development taking place outside a strong and well-regulated planning framework. These factors would lead to mixed – occasionally poor – environmental outcomes in other areas – especially in more rural or underdeveloped settlements.					
			B1 B2 B3 PHH1 S1 W1 W2 W3 M1 M2 M3 C1 CH1 CH2 L1			**B1 B2 B3 PHH1 S1 W1 W2 W3 M1 M2 M3 C1 CH1 CH2 L1**
Scenario 2:	Along with Scenario 3, Scenario 2 results in least pressure on environmental resources in the north-east and within the immediate environs of larger settlements because development will take place within a strong and well-regulated planning framework. Environmental outcomes would be mixed in other areas – especially in more rural or underdeveloped settlements. In these areas development, would be less orderly and not accompanied by relevant services.					
		B1 B2 B3 PHH1 S1 W1 W2 W3 M1 M2 M3 C1 CH1 CH2 L1			**B1 B2 B3 PHH1 S1 W1 W2 W3 M1 M2 M3 C1 CH1 CH2 L1**	
Scenario 3:	Strategic, planned concentrations of development would occur within established settlements results in: higher levels of sustainable development and environmental protection and management; least pressure on natural resources or water-based infrastructure throughout the County; and lowest overall impacts on other environmental resources (ranging from air quality and landscape through to cultural heritage) because development will take place within a strong and well-regulated planning framework.					
	B1 B2 B3 PHH1 S1 W1 W2 W3 M1 M2 M3 C1 CH1 CH2 L1			**B1 B2 B3 PHH1 S1 W1 W2 W3 M1 M2 M3 C1 CH1 CH2 L1**		

4.3 Overall Findings

Alternative Scenario 3 contributes the greatest extent towards sustainable development and environmental protection and management is the preferred and selected alternative scenario which has been developed for the strategy for the Plan which focuses on building strong urban centres while protecting the rural hinterlands. The focus which is provided for by the various provisions evaluated in detail in the main SEA Environmental Report is on achieving:

- Critical mass in the Metropolitan urban areas (Maynooth, Leixlip, Celbridge, Kilcock) and in key towns and villages in the Hinterland (Naas, Newbridge, Athy, Kildare, Monasterevin and Kilcullen);
- Establishing a hierarchy of smaller rural settlements to develop rural centres capable of providing a range of services and employment to their local populations;
- Managing development in rural areas with a focus on agricultural diversification, appropriate rural enterprise, (e.g. renewable energy production) and the strengthening of existing towns and villages;
- Protecting the environment by implementing an environmental protection policy which recognises the various environmentally sensitive zones within the county but not to mutually exclude appropriate and otherwise acceptable uses and development.

Table 4.2 details the overall findings of the assessment with respect to this preferred and selected alternative scenario.

By complying with appropriate mitigation measures - including those which have been integrated into the Plan (which are summarised in Section 5 of this report) – potentially significant adverse environmental effects which could arise as a result of implementing the Plan would be likely to be avoided, reduced or offset.

Table 4.2 Overall Findings – Effects arising from the Preferred Alternative Scenario for the Plan

Environmental Component	Significant Positive Effect, likely to occur	Potential Effect, if unmitigated	Residual Adverse Effects
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. • Facilitates protection of ecology with respect to the provision of water services. • Facilitates contribution towards the protection of ecology as a result of contributing towards the protection of environmental vectors, including air and water.	• Arising from both construction and operation of development and associated infrastructure: loss of/damage to biodiversity in designated sites (including Natura 2000 Sites and Wildlife Sites) and Annexed habitats and species, listed species, 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.	• Loss of an extent of non-protected habitats and species arising from the replacement of semi-natural land covers with artificial surfaces. • Losses or damage to ecology (these would be in compliance with relevant legislation).
Population and Human Health	• Facilitates protection of human health with respect to the provision of water services and the provision of transport infrastructure integrated with land use planning – and associated interactions with sustainable mobility, emissions and energy usage. • Facilitates contribution towards the protection of human health as a result of contributing towards the protection of environmental vectors, including air and water.	• Potential interactions if effects upon environmental vectors such as water and air are not mitigated	• Potential interactions with residual effects on environmental vectors. This has been mitigated by provisions which have been integrated into the Plan, including those relating to sustainable mobility and infrastructural provision.

Environmental Component	Significant Positive Effect, likely to occur	Potential Effect, if unmitigated	Residual Adverse Effects
Soil	• Facilitates lower overall effects on soil – due to increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites. • Facilitates protection of soil with respect to the provision of water services.	• Damage to the hydrogeological and ecological function of the soil resource.	• Loss of an extent of soil function arising from the replacement of semi-natural land covers with artificial surfaces.
Water	• Facilitates 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.	• Adverse impacts upon the status of water bodies, including downstream bathing waters, arising from changes in quality, flow and/or morphology. • Increase in the risk of flooding.	• Increased loadings as a result of development to be in compliance with River Basin Management Plans. • Flood related risks remain due to uncertainty with regard to extreme weather events.
Material Assets	• Provides for planned infrastructure including water services infrastructure and transport infrastructure. • Make most use of existing water services and drainage infrastructure.	• Failure to provide adequate and appropriate waste water treatment (water services infrastructure and capacity is needed to ensure the mitigation of potential conflicts). • Failure to comply with drinking water regulations and serve new development with adequate drinking water that is both wholesome and clean (water services infrastructure and capacity is needed to ensure the mitigation of potential conflicts) • Increases in waste levels.	• Residual wastes to be disposed of in line with higher level waste management policies.
Air and Climatic Factors	• Facilitates contribution towards a shift from car to more sustainable and non-motorised transport modes. • Facilitates contribution towards reducing congestion and associated adverse effects on air quality. • Facilitates contribution towards reductions in travel related greenhouse gas and other emissions to air.	• Emissions to air including greenhouse gas emissions and other emissions.	• 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.
Cultural Heritage	• Contribution towards the protection of cultural heritage by facilitating compliance with protection legislation.	• Potential effects on protected and unknown archaeology and protected architecture arising from construction and operation activities.	• Potential alteration to the context and setting of architectural heritage however these will occur in compliance with legislation. • Potential alteration to the context and setting of archaeological heritage however this will occur in compliance with legislation. • Potential loss of unknown archaeology however this loss will be mitigated by measures integrated into the Draft Plan.
Landscape	• Contribution towards the protection of cultural heritage by facilitating compliance with objectives relating to landscape management and protection.	• Occurrence of adverse visual impacts and conflicts with the appropriate protection of statutory designations relating to the landscape.	• None. The Draft Plan contributes towards the protection of landscape designations. The County's landscapes will change overtime as a result of natural changes in vegetation cover combined with new developments.

Section 5 Mitigation and Monitoring Measures

5.1 Mitigation

5.1.1 Introduction

Mitigation measures are measures envisaged to prevent, reduce and, as fully as possible, offset any significant adverse impacts on the environment of implementing the Plan. Various environmental sensitivities and issues have been communicated to the Council through the SEA, Appropriate Assessment (AA) and Strategic Flood Risk Assessment (SFRA) processes. By integrating all related recommendations into the Plan, the Council have ensured that both the beneficial environmental effects of implementing the Plan have been and will be maximised and that potential adverse effects have been and will be avoided, reduced or offset.

Mitigation was achieved through the:

- Strategic work undertaken by the Council to ensure contribution towards environmental protection and sustainable development;
- Integration of individual SEA, AA and SFRA provisions into the text of the Plan; and
- Integration of environmental considerations into zoning provisions of the Plan.

5.1.2 Strategic work undertaken by the Council to ensure contribution towards environmental protection and sustainable development

Far in advance of both the submission of the Plan to the Elected Members for approval and the placing of the Plan (and associated SEA, AA and SFRA documents) on public display, Kildare County Council undertook various works in order to inform the preparation of the Plan.

The findings of this strategic work have been integrated into the Plan and will be implemented when it is adopted, contributing towards both environmental protection and management and sustainable development within the County.

Strategic work undertaken by the Council includes background work in relation to Plan Strategies and other provisions for a variety of sectors including: settlement; economic development, enterprise and tourism; movement and transportation; infrastructure; energy and communications; retail; rural development; social, community and cultural development; architectural and archaeological protection; natural heritage and green infrastructure; landscape, recreation and amenities; urban design; and rural design.

5.1.3 Integration of individual SEA, AA and SFRA provisions into the text of the Plan

Various provisions have been integrated into the text of the Plan through the Plan-preparation and SEA, SFRA and AA processes. Both the Planning and the assessment teams contributed towards the mitigation which was developed over multiple iterations and was informed by, inter alia, various communications through the SEA, AA and SFRA processes.

Table 5.1 links key mitigation measure(s) - which have been integrated into the Plan - to the likely significant effects of implementing the Plan, if unmitigated, as well as showing monitoring measures.

The measures generally benefit multiple environmental components i.e. a measure providing for the protection of biodiversity, flora and fauna could beneficially impact upon the minimisation of flood risk and the protection of human health, for example.

The reference codes are those which accompany the relevant measures in Section 8 of the main Environmental Report and in the Plan.

5.1.4 Integration of environmental considerations into Zoning of the Plan

Environmental considerations were integrated into the Plan's zoning through an interdisciplinary approach involving Planners and environmental specialists.

The detailed Plan preparation process undertaken by the Planning Department combined with specialist input from the AA process facilitated zoning that avoids impacts upon sensitive ecology and Natura 2000 sites.

The detailed Plan preparation process undertaken by the Planning Department combined with specialist input from the SFRA process facilitated zoning that avoids inappropriate development being permitted in areas of high flood risk.

The planning team also took into account other environmental considerations including sustainable mobility and sensitivities relating to cultural heritage, landscape and water, as well as taking into account overlay mapping of environmental sensitivities.

5.2 Monitoring

The SEA Directive requires that the significant environmental effects of the implementation of plans and programmes are monitored. The Environmental Report contains proposals for monitoring the Plan which are adopted alongside the Plan. Monitoring enables, at an early stage, the identification of unforeseen adverse effects and the undertaking of appropriate remedial action.

The Environmental Report identifies indicators - which allow quantitative measures of trends and progress in the environment over time. Measurements for indicators generally come from existing monitoring sources or from an internal monitoring of the environmental effects of grants of permission in the Council.

A stand-alone Monitoring Report on the significant environmental effects of implementing the Plan will be prepared before in advance of beginning the review of the Plan. This report will address the indicators that are set out on Table 5.1.

Table 5.1 SEA Summary Table: Likely Significant Effects (if unmitigated), Mitigation Measures and Indicators for Monitoring

Environmental Component	Potential Effect, if unmitigated	Mitigation Measures	Indicators for Monitoring
Biodiversity and Flora and Fauna	• Arising from both construction and operation of development and associated infrastructure: loss of/damage to biodiversity in designated sites (including Natura 2000 Sites and Wildlife Sites) and Annexed habitats and species, listed species, 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	• Chapter 13: Natural Heritage and Green Infrastructure Aim • Policies: NH 1 to NH 16, GI 1 to GI 30, WE 2, EI 16, WC 4, PF 2, WS 13 • Objectives: NHO1 to NHO 10, GIO 1 to GIO 5 • • See also various provisions under the environmental components of soil and water	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
Population and Human Health	• Potential interactions if effects upon environmental vectors such as water and air are not mitigated	• Environmental Services Aim • Policies: ECD 21, ECD 22, RS 3, RS 4, WM 2, WM 3, PC 1 to PC 10, WS 7 • Objectives: RSO 3 • See also various provisions under the environmental components of soil, water, air and material assets	PHH1: 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
Soil	• Damage to the hydrogeological and ecological function of the soil resource	• Policies: ECD 21, ECD 22, • See also various provisions under the environmental components of water and material assets	S1: Soil extent and hydraulic connectivity Selected Indicator(s)
Water	• Adverse impacts upon the status of water bodies, including downstream bathing waters, arising from changes in quality, flow and/or morphology • Increase in the risk of flooding	• Policies WS 9, WS 10, WS 11, WS12, WQ 1 to WQ 6, SW 1, SW 2, SW 3, SW 18 • (Flood) Policies SW 1 to SW 20 • (Flood) Objectives WDO 2, WDO 3, WDO 5 and WDO 7 • See also various provisions under the environmental components of soil and material assets	W1i: 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) 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: Groundwater Quality Standards and Threshold Values under Directive 2006/118/EC W3: Number of incompatible developments granted permission on lands which pose - or are likely to pose in the future - a significant flood risk

Environmental Component	Potential Effect, if unmitigated	Mitigation Measures	Indicators for Monitoring
Material Assets	• Failure to provide adequate and appropriate waste water treatment (water services infrastructure and capacity is needed to ensure the mitigation of potential conflicts) • Failure to comply with drinking water regulations and serve new development with adequate drinking water that is both wholesome and clean (water services infrastructure and capacity is needed to ensure the mitigation of potential conflicts) • Increases in waste levels	• Water Infrastructure and Flooding Strategy, Objectives • Policies WS 1 to WS13, WW 1 to WW 13, WM 1 to WM 18 • Objectives WDO 1, WDO 8	M1: Number of new developments granted permission which can be adequately and appropriately served with waste water treatment over the lifetime of the Plan M2: Number of non-compliances with the 48 parameters identified in the European Communities (Drinking Water) Regulations (No. 2) 2007 which present a potential danger to human health as a result of implementing the Plan M3i: Total collected and brought household waste M3ii: Packaging recovered (t) by self-complying packagers
Air and Climatic Factors	• Emissions to air including greenhouse gas emissions and other emissions	• Policies EB 1, RE 10, GI 23 • Objectives ERO 1 • Overall approach by the Plan and all provisions relating to development and sustainable mobility in the County	C1: Percentage of population travelling to work, school or college by public transport or non-mechanical means
Cultural Heritage	• Potential effects on protected and unknown archaeology and protected architecture arising from construction and operation activities	• Policies PS 1 to PS 21, CH1 to CH 9, VA 1 to VA8, ACA 1 to ACA 5, AH 1 to AH 11, AH 1 to AH 2, HF 1 • Objectives PSO 1 to PSO 8, ACO 1 to ACO 4, CHO 1 to CHO 2, VAO 1 to VAO 2, ACAO 1 to ACAO 3, AO 1 to AO 5, HFO 1 to HFO 2	CH1: Percentage of entries to the Record of Monuments and Places - including Areas of Archaeological Potential and Significance (and the context of the above within the surrounding landscape where relevant) - protected from significant adverse effects arising from new development granted permission under the Plan CH2: Percentage of entries to the Record of Protected Structures and Architectural Conservation Areas and their context protected from significant adverse effects arising from new development granted permission under the Plan
Landscape	• Occurrence of adverse visual impacts and conflicts with the appropriate protection of statutory designations relating to the landscape	• Policies LA 1 to LA 7, LU 1 to LU 5, TA 1 to TA 4, WC 1 to WC 8, CU 1 to CU 4, PF 1 to PF 3, LL 1 to LL 5, SR 1 to SR2, WV 1 to WV 3 • Objectives LO 1 to LO 11	L1: Number of complaints received from statutory consultees regarding avoidable adverse visual impacts on the landscape resulting from development which is granted permission under the Plan